

SQL*Plus

User's Guide and Reference

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SQL*Plus User's Guide and Reference, Release 8.1.7

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Primary Author: Simon Watt

Contributors: Alison Goggin, Alison Holloway, Christopher Jones, Anita Lam, Luan Nim

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SQL*Plus User's Guide and Reference, Release 8.1.7

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Preface

The *SQL*Plus* (pronounced "sequel plus") *User's Guide and Reference* introduces the SQL*Plus program and its uses. It also provides a detailed description of each SQL*Plus command.

Intended Audience

This Guide addresses business and technical professionals who have a basic understanding of the SQL database language. If you do not have any familiarity with this database tool, you should refer to the *Oracle8i SQL Reference*. If you plan to use the PL/SQL database language in conjunction with SQL*Plus, refer to the *PL/SQL User's Guide and Reference* for information on using PL/SQL.

Structure

This manual is divided into two parts containing a total of eight chapters, six appendices and a glossary of SQL*Plus related terms. Part 1, "Understanding SQL*Plus" contains the first six chapters and Part 2, "Reference" contains the remaining two chapters.

PART I, Understanding SQL*Plus

- Chapter 1** "Introduction" is an overview of SQL*Plus, with instructions on using this Guide, and information on what you need to run SQL*Plus.
- Chapter 2** "Learning SQL*Plus Basics" explains how to start SQL*Plus and enter and execute commands. You learn by following step-by-step examples using sample tables.
- Chapter 3** "Manipulating Commands" uses further examples to help you learn to edit commands, save them for later use, and write interactive commands.
- Chapter 4** "Formatting Query Results" uses examples to explain how you can format columns, clarify your reports with spacing and summary lines, define page dimensions and titles, store and print query results, and output query results to the web.
- Chapter 5** "Database Administration" is intended for use by DBAs. It covers basic database administration features in SQL*Plus.
- Chapter 6** "Accessing Databases" tells you how to connect to default and remote databases, and how to copy data between databases and between tables on the same database.

PART II, Reference

- Chapter 7** "Starting SQL*Plus and Getting Help" explains how to access SQL*Plus from the operating system prompt, and how to access online help.
- Chapter 8** "Command Reference" provides a summary of SQL*Plus commands and detailed descriptions of each SQL*Plus command in alphabetical order.
- Appendix A** "COPY Command Messages and Codes" lists copy command error messages, their causes, and appropriate actions for error recovery.
- Appendix B** "Release 8.1.7 Enhancements" describes enhancements to SQL*Plus in release 8.1.7.
- Appendix C** "SQL*Plus Limits" lists the maximum values for elements of SQL*Plus.
- Appendix D** "SQL Command List" lists the major SQL commands and clauses.
- Appendix E** "Security" explains how to restrict access to certain SQL*Plus and SQL commands.
- Appendix F** "Obsolete SQL*Plus Commands" provides information on Obsolete SQL*Plus commands.
- Glossary** "Glossary" defines technical terms associated with Oracle and SQL*Plus.

Related Documents

Related documentation includes the following publications:

- *SQL*Plus Accessibility Guide for Windows*
- *SQL*Plus Quick Reference*
- *PL/SQL User's Guide and Reference*
- *Oracle8i SQL Reference*
- *Oracle8i Concepts*
- *Oracle8i Administrator's Guide*
- *Oracle8i Backup and Recovery Guide*
- *Oracle8i Application Developer's Guide - Fundamentals*
- *Oracle8i Distributed Database Systems*
- *Oracle8i Replication*
- *Oracle8i Utilities*
- *Oracle8i Error Messages*
- *Oracle8i Migration*
- *Oracle8i Reference*
- *Oracle8i Designing and Tuning for Performance*
- *Oracle8i Parallel Server Concepts*
- *Net8 Administrator's Guide*
- *Oracle Call Interface Programmer's Guide*
- *Pro*COBOL Precompiler Programmer's Guide*
- *Pro*C/C++ Precompiler Programmer's Guide*
- Oracle installation and user's manual(s) provided for your operating system

Part I

Understanding SQL*Plus

This section provides an introduction to SQL*Plus. It provides an overview of how to run SQL*Plus and demonstrates this with various examples.

The following chapters are covered in this section:

- [Introduction](#)
- [Learning SQL*Plus Basics](#)
- [Manipulating Commands](#)
- [Formatting Query Results](#)
- [Database Administration](#)
- [Accessing SQL Databases](#)

Introduction

This chapter introduces you to SQL*Plus, covering the following topics:

- [Overview of SQL*Plus](#)
- [Using this Guide](#)
- [What You Need to Run SQL*Plus](#)

Overview of SQL*Plus

You can use the SQL*Plus program in conjunction with the SQL database language and its procedural language extension, PL/SQL. The SQL database language allows you to store and retrieve data in Oracle. PL/SQL allows you to link several SQL commands through procedural logic.

SQL*Plus enables you to execute SQL commands and PL/SQL blocks, and to perform many additional tasks as well. Through SQL*Plus, you can

- enter, edit, store, retrieve, and run SQL commands and PL/SQL blocks
- format, perform calculations on, store, print and create web output of query results
- list column definitions for any table
- access and copy data between SQL databases
- send messages to and accept responses from an end user
- perform database administration

Basic Concepts

The following definitions explain concepts central to SQL*Plus:

command	An instruction you give SQL*Plus or Oracle.
block	A group of SQL and PL/SQL commands related to one another through procedural logic.
table	The basic unit of storage in Oracle.
query	A SQL command (specifically, a SQL SELECT command) that retrieves information from one or more tables.
query results	The data retrieved by a query.
report	Query results formatted by you through SQL*Plus commands.

Who Can Use SQL*Plus

The SQL*Plus, SQL, and PL/SQL command languages are powerful enough to serve the needs of users with some database experience, yet straightforward enough for new users who are just learning to work with Oracle.

The design of the SQL*Plus command language makes it easy to use. For example, to give a column labelled ENAME in the database the clearer heading “Employee”, you might enter the following command:

```
COLUMN ENAME HEADING EMPLOYEE
```

Similarly, to list the column definitions for a table called EMP, you might enter this command:

```
DESCRIBE EMP
```

Using this Guide

This Guide gives you information about SQL*Plus that applies to all operating systems. Some aspects of SQL*Plus, however, differ on each operating system. Such operating system specific details are covered in the Oracle installation and user’s manual(s) provided for your system. Use these operating system specific manuals in conjunction with the *SQL*Plus User’s Guide and Reference*.

Throughout this Guide, examples showing how to enter commands use a common command syntax and a common set of sample tables. Both are described below. You will find the conventions for command syntax particularly useful when referring to commands in [Chapter 7](#) and [Chapter 8](#) of this Guide.

Conventions for Command Syntax

The following two tables describe the notation and conventions for command syntax used in this Guide.

Table 1–1 *Commands, Terms, and Clauses*

Feature	Example	Explanation
uppercase	BTITLE	Enter text exactly as spelled; it need not be in uppercase.
lowercase italics	<i>column</i>	A clause value; substitute an appropriate value.
words with specific meanings	c	A single character.
	char	A CHAR value—a literal in single quotes—or an expression with a CHAR value.
	d or e	A date or an expression with a DATE value.

Table 1–1 Commands, Terms, and Clauses

Feature	Example	Explanation
	<i>expr</i>	An unspecified expression.
	<i>m or n</i>	A number or an expression with a NUMBER value.
	<i>text</i>	A CHAR constant with or without single quotes.
	<i>variable</i>	A user variable (unless the text specifies another variable type).

Other words are explained where used if their meaning is not explained by context.

Table 1–2 Punctuation

Feature	Example	Explanation
vertical bar		Separates alternative syntax elements that may be optional or mandatory.
brackets	[ON OFF]	One or more optional items. If two items appear separated by , enter one of the items separated by . Do not enter the brackets or .
braces	{ON OFF}	A choice of mandatory items; enter one of the items separated by . Do not enter the braces or .
underlining	{ON <u>OFF</u> }	A default value; if you enter nothing, SQL*Plus uses the underlined value.
ellipsis	<i>n...</i>	Preceding item(s) may be repeated any number of times.

Enter other punctuation marks where shown in the command syntax.

Sample Tables

Many of the concepts and operations in this Guide are illustrated by a set of sample tables. These tables contain personnel records for a fictitious company. As you complete the exercises in this Guide, imagine that you are the personnel director for this company.

The exercises make use of the information in two sample tables:

EMP Contains information about the employees of the sample company.

DEPT Contains information about the departments in the company.

Note: Dates in the sample tables use four digit years. As the default date format in SQL*Plus is DD-MM-YY, dates displayed show only a two digit year. Use the SQL TO_CHAR function in your SELECT statements to control the way dates are displayed.

Figure 1-1 and Figure 1-2 show the information in these tables.

Figure 1-1 DEPT Table

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

Figure 1-2 EMP Table

EMPNO	ENAME	JOB	MGR	HIREDATE	SAL	COMM	DEPTNO
7369	SMITH	CLERK	7902	17-DEC-80	800		20
7499	ALLEN	SALESMAN	7698	20-FEB-81	1600	300	30
7521	WARD	SALESMAN	7698	22-FEB-81	1250	500	30
7566	JONES	MANAGER	7839	02-APR-81	2975		20
7654	MARTIN	SALESMAN	7698	28-SEP-81	1250	1400	30
7698	BLAKE	MANAGER	7839	01-MAY-81	2850		30
7782	CLARK	MANAGER	7839	09-JUN-81	2450		30
7788	SCOTT	ANALYST	7566	09-DEC-82	3000		20
7839	KING	PRESIDENT		17-NOV-81	5000		10
7844	TURNER	SALESMAN	7698	08-SEP-81	1500	0	30
7876	ADAMS	CLERK	7788	12-JAN-83	1100		20
7900	JAMES	CLERK	7698	03-DEC-81	950		30
7902	FORD	ANALYST	7566	03-DEC-81	3000		20
7934	MILLER	CLERK	7782	23-JAN-82	1300		10

What You Need to Run SQL*Plus

To run SQL*Plus, you need hardware, software, operating system specific information, a username and password, and access to one or more tables.

Hardware and Software

Oracle and SQL*Plus can run on many different kinds of computers. Your computer's operating system manages the computer's resources and mediates between the computer hardware and programs such as SQL*Plus. Different computers use different operating systems. For information about your computer's operating system, see the documentation provided with the computer.

Before you can begin using SQL*Plus, both Oracle and SQL*Plus must be installed on your computer. Note that in order to take full advantage of the enhancements in SQL*Plus Release 8.1.7, you must have Oracle8i Release 8.1.7. For a list of SQL*Plus Release 8.1.7 enhancements, see [Appendix B](#).

If you have multiple users on your computer, your organization should have a Database Administrator (called a DBA) who supervises the use of Oracle.

The DBA is responsible for installing Oracle and SQL*Plus on your system. If you are acting as DBA, see the instructions for installing Oracle and SQL*Plus in the Oracle installation and user's manual(s) provided for your operating system.

Information Specific to Your Operating System

A few aspects of Oracle and SQL*Plus differ from one type of host computer and operating system to another. These topics are discussed in the Oracle installation and user's manual(s), published in a separate version for each host computer and operating system that SQL*Plus supports.

Keep a copy of your Oracle installation and user's manual(s) available for reference as you work through this Guide. When necessary, this Guide will refer you to your installation and user's manual(s).

Username and Password

When you start SQL*Plus, you will need a *username* that identifies you as an authorized Oracle user and a *password* that proves you are the legitimate owner of your username. See the PASSWORD command in [Chapter 8](#) for details on how to change your password. The demonstration username, SCOTT, and password, TIGER, may be set up on your system during the installation procedure. In this

case, you can use the Oracle username SCOTT and password TIGER with the EMP and DEPT tables (Figure 1-1 and Figure 1-2).

Multi-User Systems

If several people share your computer's operating system, your DBA can set up your SQL*Plus username and password. You will also need a system username and password to gain admittance to the operating system. These may or may not be the same ones you use with SQL*Plus.

Single-User Systems

If only one person at a time uses your computer, you may be expected to perform the DBAs functions for yourself. In that case, you can use the Oracle username SCOTT and password TIGER with the appropriate DBA privileges. If you want to define your own username and password, see the *Oracle8i SQL Reference*.

Access to Sample Tables

Each table in the database is "owned" by a particular user. You may wish to have your own copies of the sample tables to use as you try the examples in this Guide. To get your own copies of the tables, see your DBA or run the Oracle-supplied command file named DEMOBLD (you run this file from your operating system, not from SQL*Plus).

When you have no more use for the sample tables, remove them by running another Oracle-supplied command file named DEMODROP. For instructions on how to run DEMOBLD and DEMODROP, see the Oracle installation and user's manual(s) provided for your operating system.

Learning SQL*Plus Basics

This chapter helps you learn the basics of using SQL*Plus, including the following topics:

- [Getting Started](#)
- [Entering and Executing Commands](#)
- [Getting Help](#)

Read this chapter while sitting at your computer and try out the examples shown. Before beginning, make sure you have access to the sample tables described in [Chapter 1](#).

Getting Started

To begin using SQL*Plus, you must first become familiar with the functions of several keys on your keyboard and understand how to start and leave SQL*Plus.

Using the Keyboard

Several keys on your keyboard have special meaning in SQL*Plus. [Table 2-1, "SQL*Plus Special Keys and their Functions"](#) lists these keys.

See your Oracle installation and user's manual(s) for your operating system to learn which physical key performs each function on the keyboard commonly used with your host computer.

Note: A SQL*Plus key may perform different functions when pressed in other products or the operating system.

Fill in each blank in [Table 2-1](#) with the name of the corresponding keyboard key. Then locate each key on your keyboard.

Table 2-1 *SQL*Plus Special Keys and their Functions*

SQL*Plus Key Name	Keyboard Key Name	Function
[Return]	_____	End of a line of input.
[Backspace]	_____	Move cursor left one character to correct an error.
[Pause]	_____	Suspend program operation and display of output.
[Resume]	_____	Resume program operation and output [Pause].
[Cancel]	_____	Halt program operation; return to the SQL*Plus command prompt.
[Interrupt]	_____	Exit SQL*Plus and return to the host operating system.

Starting SQL*Plus

Now that you have identified important keys on your keyboard, you are ready to start SQL*Plus.

Example 2–1 Starting SQL*Plus

This example shows you how to start SQL*Plus. Follow the steps shown.

1. Make sure that Oracle has been installed on your computer.
2. Turn on your computer (if it is off) and log on to the host operating system (if required). If you are already using your computer, you need not log off or reset it. Simply exit from the program you are using (if any).

You should see one or more characters at the left side of the screen. This is the operating system's command prompt, which signals that the operating system is ready to accept a command. In this Guide the operating system's prompt will be represented by a dollar sign (\$). Your computer's operating system prompt may be different.

3. Enter the command SQLPLUS and press [Return]. This is an operating system command that starts SQL*Plus.

```
$ SQLPLUS
```

Note: Some operating systems expect you to enter commands in lowercase letters. If your system expects lowercase, enter the SQLPLUS command in lowercase.

SQL*Plus displays its version number, the current date, and copyright information, and prompts you for your username (the text displayed on your system may differ slightly):

```
SQL*Plus: Release 8.1.7.0.0 - 0 - Production on Thu Aug 3 16:29:01 2000  
(c) Copyright 2000 Oracle Corporation. All rights reserved.  
Enter user-name:
```

4. Enter your username and press [Return]. SQL*Plus displays the prompt "Enter password:".
5. Enter your password and press [Return] again. For your protection, your password does not appear on the screen.

The process of entering your username and password is called *logging in*. SQL*Plus displays the version of Oracle to which you connected and the versions of available tools such as PL/SQL.

Next, SQL*Plus displays the SQL*Plus command prompt:

```
SQL>
```

The command prompt indicates that SQL*Plus is ready to accept your commands.

If SQL*Plus does not start, you should see a message to help you correct the problem.

Shortcuts to Starting SQL*Plus

When you start SQL*Plus, you can enter your username and password, separated by a slash (/), following the command SQLPLUS. For example, if your username is SCOTT and your password is TIGER, you can enter

```
$ SQLPLUS SCOTT/TIGER
```

and press [Return]. You can also arrange to log in to SQL*Plus automatically when you log on to your host operating system. See the Oracle installation and user's manual(s) provided for your operating system for details.

Leaving SQL*Plus

When you are done working with SQL*Plus and wish to return to the operating system, enter the EXIT command at the SQL*Plus command prompt.

Example 2-2 Exiting SQL*Plus

To leave SQL*Plus, enter the EXIT command at the SQL*Plus command prompt:

```
SQL> EXIT
```

SQL*Plus displays the version of Oracle from which you disconnected and the versions of tools available through SQL*Plus. After a moment you will see the operating system prompt.

Before continuing with this chapter, follow steps 3, 4, and 5 of [Example 2-1](#) to start SQL*Plus again. Alternatively, log in using the shortcut shown under "[Shortcuts to Starting SQL*Plus](#)" above.

Entering and Executing Commands

Entering Commands

Your computer's cursor, or pointer (typically an underline, a rectangular block, or a slash), appears after the command prompt. The cursor indicates the place where the next character you type will appear on your screen.

To tell SQL*Plus what to do, simply type the command you wish to use. Usually, you separate the words in a command from each other by a space or tab. You can use additional spaces or tabs between words, if you wish, to make your commands more readable.

Note: You will see examples of spacing and indentation throughout this Guide. When you enter the commands in the exercises, you do not have to space them as shown, but you may find them clearer to read if you do.

Case sensitivity is operating system specific. For the sake of clarity, all table names, column names, and commands in this Guide appear in capital letters.

You can enter three kinds of commands at the command prompt:

- SQL commands, for working with information in the database
- PL/SQL blocks, also for working with information in the database
- SQL*Plus commands, for formatting query results, setting options, and editing and storing SQL commands and PL/SQL blocks

The manner in which you continue a command on additional lines, end a command, or execute a command differs depending on the type of command you wish to enter and run. Examples of how to run and execute these types of commands are found on the following pages.

Getting Help

To get online help for SQL*Plus commands, type `HELP` at the command prompt followed by the name of the command. For example:

```
SQL>HELP ACCEPT
```

If you get a response indicating that help is not available, consult your database administrator. For more details about the help system, see the [HELP](#) command in the "Command Reference" in [Chapter 8](#).

Executing Commands

After you enter the command and direct SQL*Plus to execute it, SQL*Plus processes the command and re-displays the command prompt, indicating that you can enter another command.

Running SQL Commands

The SQL command language enables you to manipulate data in the database. See your *Oracle8i SQL Reference* for information on individual SQL commands.

Example 2-3 Entering a SQL Command

In this example, you will enter and execute a SQL command to display the employee number, name, job, and salary of each employee in the sample table EMP.

1. At the command prompt, enter the first line of the command:

```
SQL> SELECT EMPNO, ENAME, JOB, SAL
```

If you make a mistake, use [Backspace] to erase it and re-enter. When you are done, press [Return] to move to the next line.

2. SQL*Plus will display a "2", the prompt for the second line. Enter the second line of the command:

```
2 FROM EMP WHERE SAL < 1500;
```

The semicolon (;) means that this is the end of the command. Press [Return]. SQL*Plus processes the command and displays the results on the screen:

EMPNO	ENAME	JOB	SAL
-----	-----	-----	-----
7369	SMITH	CLERK	800
7521	WARD	SALESMAN	1250
7654	MARTIN	SALESMAN	1250
7876	ADAMS	CLERK	1100
7900	JAMES	CLERK	800
7934	MILLER	CLERK	1300

```
9 rows selected.
SQL>
```


After displaying the results and the number of rows retrieved, SQL*Plus displays the command prompt again. If you made a mistake and therefore did not get the results shown above, simply re-enter the command.

The headings may be repeated in your output, depending on the setting of a system variable called PAGESIZE. Whether you see the message concerning the number of records retrieved depends on the setting of a system variable called FEEDBACK. You will learn more about system variables later in this chapter in the section "[Variables that Affect Running Commands](#)". To save space, the number of records selected will not be shown in the rest of the examples in this Guide.

Understanding SQL Command Syntax

Just as spoken language has syntax rules that govern the way we assemble words into sentences, SQL*Plus has syntax rules that govern how you assemble words into commands. You must follow these rules if you want SQL*Plus to accept and execute your commands.

Dividing a SQL Command into Separate Lines You can divide your SQL command into separate lines at any points you wish, as long as individual words are not split between lines. Thus, you can enter the query you entered in Example 2-3 on one line:

```
SQL> SELECT EMPNO, ENAME, JOB, SAL FROM EMP WHERE SAL < 2500;
```

You can also enter the query on several lines:

```
SQL> SELECT
  2 EMPNO, ENAME, JOB, SAL
  3 FROM EMP
  4 WHERE SAL < 1500;
```

In this Guide, you will find most SQL commands divided into clauses, one clause on each line. In [Example 2-3](#), for instance, the SELECT and FROM clauses were placed on separate lines. Many people find this clearly visible structure helpful, but you may choose whatever line division makes commands most readable to you.

Ending a SQL Command You can end a SQL command in one of three ways:

- with a semicolon (;)
- with a slash (/) on a line by itself

- with a blank line

A semicolon (;) tells SQL*Plus that you want to run the command. Type the semicolon at the end of the last line of the command, as shown in [Example 2-3](#), and press [Return]. SQL*Plus will process the command and store it in the SQL buffer (see the section "[The SQL Buffer](#)" below for details). If you mistakenly press [Return] before typing the semicolon, SQL*Plus will prompt you with a line number for the next line of your command. Type the semicolon and press [Return] again to run the command.

Note: You cannot enter a comment on the same line after a semicolon. For more information about placing comments, see "[Placing Comments in Command Files](#)" in [Chapter 3](#).

A slash (/) on a line by itself also tells SQL*Plus that you wish to run the command. Press [Return] at the end of the last line of the command. SQL*Plus prompts you with another line number. Type a slash and press [Return] again. SQL*Plus will execute the command and store it in the buffer (see the section "[The SQL Buffer](#)" below for details).

A blank line in a SQL statement tells SQL*Plus that you have finished entering the command, but do not want to run it yet. Press [Return] at the end of the last line of the command. SQL*Plus prompts you with another line number.

Note: You can change the way blank lines appear and behave in SQL statements using the SET SQLBLANKLINES command. For more information about changing blank line behavior, see the [SET](#) command in [Chapter 8](#).

Press [Return] again; SQL*Plus now prompts you with the SQL*Plus command prompt. SQL*Plus does not execute the command, but stores it in the SQL buffer (see the section "[The SQL Buffer](#)" below for details). If you subsequently enter another SQL command, SQL*Plus overwrites the previous command in the buffer.

Creating Stored Procedures Stored procedures are PL/SQL functions, packages, or procedures. To create stored procedures, you use SQL CREATE commands. The following SQL CREATE commands are used to create stored procedures:

- CREATE FUNCTION
- CREATE LIBRARY

- CREATE PACKAGE
- CREATE PACKAGE BODY
- CREATE PROCEDURE
- CREATE TRIGGER
- CREATE TYPE

Entering any of these commands places you in PL/SQL mode, where you can enter your PL/SQL subprogram. For more information, see the section "[Running PL/SQL Blocks](#)" in this chapter). When you are done typing your PL/SQL subprogram, enter a period (.) on a line by itself to terminate PL/SQL mode. To run the SQL command and create the stored procedure, you must enter RUN or slash (/). A semicolon (;) will not execute these CREATE commands.

When you use CREATE to create a stored procedure, a message appears if there are compilation errors. To view these errors, you use SHOW ERRORS. For example:

```
SQL> SHOW ERRORS PROCEDURE ASSIGNVL
```

For more information about the [SHOW](#) command, see the "Command Reference" in [Chapter 8](#).

To execute a PL/SQL statement that references a stored procedure, you can use the EXECUTE command. EXECUTE runs the PL/SQL statement that you enter immediately after the command. For example:

```
SQL> EXECUTE :ID := EMP_MANAGEMENT.GET_ID('BLAKE')
```

For more information about the [EXECUTE](#) command, see the "Command Reference" in [Chapter 8](#).

The SQL Buffer

The area where SQL*Plus stores your most recently entered SQL command or PL/SQL block is called the *SQL buffer*. The command or block remains there until you enter another. Thus, if you want to edit or re-run the current SQL command or PL/SQL block, you may do so without re-entering it. For more information about editing or re-running a command or block stored in the buffer see the section "[Running Command Files](#)" in [Chapter 3](#).

SQL*Plus does not store the semicolon or the slash you type to execute a command in the SQL buffer.

Note: SQL*Plus commands are not stored in the SQL buffer.

Executing the Current SQL Command or PL/SQL Block from the Command Prompt

You can run (or re-run) the current SQL command or PL/SQL block by entering the RUN command or the slash (/) command at the command prompt. The RUN command lists the SQL command or PL/SQL block in the buffer before executing the command or block; the slash (/) command simply runs the SQL command or PL/SQL block.

Running PL/SQL Blocks

You can also use PL/SQL subprograms (called *blocks*) to manipulate data in the database. See your *PL/SQL User's Guide and Reference* for information on individual PL/SQL statements.

To enter a PL/SQL subprogram in SQL*Plus, you need to be in PL/SQL mode. You are placed in PL/SQL mode when

- You type DECLARE or BEGIN at the SQL*Plus command prompt. After you enter PL/SQL mode in this way, type the remainder of your PL/SQL subprogram.
- You type a SQL command (such as CREATE FUNCTION) that creates a stored procedure. After you enter PL/SQL mode in this way, type the stored procedure you want to create.

SQL*Plus treats PL/SQL subprograms in the same manner as SQL commands, except that a semicolon (;) or a blank line does not terminate and execute a block. Terminate PL/SQL subprograms by entering a period (.) by itself on a new line.

SQL*Plus stores the subprograms you enter at the SQL*Plus command prompt in the SQL buffer. Execute the current subprogram by issuing a RUN or slash (/) command. Likewise, to execute a SQL CREATE command that creates a stored procedure, you must also enter RUN or slash (/). A semicolon (;) will not execute these SQL commands as it does other SQL commands.

SQL*Plus sends the complete PL/SQL subprogram to Oracle for processing (as it does SQL commands).

You might enter and execute a PL/SQL subprogram as follows:

```
SQL> DECLARE
2     x  NUMBER := 100;
3 BEGIN
4     FOR i IN 1..10 LOOP
5         IF MOD (i, 2) = 0 THEN    --i is even
6             INSERT INTO temp VALUES (i, x, 'i is even');
7         ELSE
8             INSERT INTO temp VALUES (i, x, 'i is odd');
9         END IF;
10        x := x + 100;
11    END LOOP;
12 END;
13 .
SQL> /
```

When you run a subprogram, the SQL commands within the subprogram may behave somewhat differently than they would outside the subprogram. See your *PL/SQL User's Guide and Reference* for detailed information on the PL/SQL language.

Running SQL*Plus Commands

You can use SQL*Plus commands to manipulate SQL commands and PL/SQL blocks and to format and print query results. SQL*Plus treats SQL*Plus commands differently than SQL commands or PL/SQL blocks. For information on individual SQL*Plus commands, refer to the [Command Reference](#) in [Chapter 8](#).

To speed up command entry, you can abbreviate many SQL*Plus commands to one or a few letters. Abbreviations for some SQL*Plus commands are described along with the commands in [Chapter 3](#), [Chapter 4](#), and [Chapter 6](#). For abbreviations of all SQL*Plus commands, refer to the [Command Reference](#) in [Chapter 8](#).

Example 2-4 Entering a SQL*Plus Command

This example shows how you might enter a SQL*Plus command to change the format used to display the column SAL of the sample table EMP.

1. On the command line, enter this SQL*Plus command:

```
SQL> COLUMN SAL FORMAT $99,999 HEADING SALARY
```

If you make a mistake, use [Backspace] to erase it and re-enter. When you have entered the line, press [Return]. SQL*Plus notes the new format and displays the SQL*Plus command prompt again, ready for a new command.

2. Enter the RUN command to re-run the most recent query (from Example 2-3). SQL*Plus reprocesses the query and displays the results:

```
SQL> RUN
  1 SELECT EMPNO, ENAME, JOB, SAL
  2* FROM EMP WHERE SAL < 2400
EMPNO ENAME          JOB          SALARY
-----
7369 SMITH            CLERK          $800
7499 ALLEN            SALESMAN       $1,600
7521 WARD             SALESMAN       $1,250
7654 MARTIN          SALESMAN       $1,250
7844 TURNER          SALESMAN       $1,500
7876 ADAMS            CLERK          $1,100
7900 JAMES            CLERK          $800
7934 MILLER          CLERK          $1,300
```

The COLUMN command formatted the column SAL with a dollar sign (\$) and a comma (,) and gave it a new heading. The RUN command then re-ran the query of Example 2-3, which was stored in the buffer. SQL*Plus does not store SQL*Plus commands in the SQL buffer.

Understanding SQL*Plus Command Syntax

SQL*Plus commands have a different syntax from SQL commands or PL/SQL blocks.

Continuing a Long SQL*Plus Command on Additional Lines You can continue a long SQL*Plus command by typing a hyphen at the end of the line and pressing [Return]. If you wish, you can type a space before typing the hyphen. SQL*Plus displays a right angle-bracket (>) as a prompt for each additional line.

For example:

```
SQL> COLUMN SAL FORMAT $99,999 -
> HEADING SALARY
```

Since SQL*Plus identifies the hyphen as a continuation character, entering a hyphen within a SQL statement will be ignored by SQL*Plus. SQL*Plus will not identify the statement as a SQL statement until after the input processing has joined the lines together and removed the hyphen. For example, entering the following will return an error:

```
SQL> select 200 -
> 100 from dual;
```

```
select 200 100 from dual
      *
ERROR at line 1:
ORA-00923: FROM keyword not found where expected
```

To ensure that the statement is interpreted correctly, reposition the hyphen from the end of the first line to the beginning of the second line.

Ending a SQL*Plus Command You do not need to end a SQL*Plus command with a semicolon. When you finish entering the command, you can just press [Return]. If you wish, however, you can enter a semicolon at the end of a SQL*Plus command.

Variables that Affect Running Commands

The SQL*Plus command `SET` controls many variables—called *system variables*—the settings of which affect the way SQL*Plus runs your commands. System variables control a variety of conditions within SQL*Plus, including default column widths for your output, whether SQL*Plus displays the number of records selected by a command, and your page size. System variables are also called *SET command variables*.

The examples in this Guide are based on running SQL*Plus with the system variables at their default settings. Depending on the settings of your system variables, your output may appear slightly different than the output shown in the examples. (Your settings might differ from the default settings if you have a SQL*Plus LOGIN file on your computer.)

For more information on system variables and their default settings, see the `SET` command in [Chapter 8](#). For details on the SQL*Plus LOGIN file, refer to the section "[Setting Up Your SQL*Plus Environment](#)" under "[Saving Commands for Later Use](#)" in [Chapter 3](#) and to the `SQLPLUS` command in [Chapter 7](#).

To list the current setting of a SET command variable, enter `SHOW` followed by the variable name at the command prompt. See the `SHOW` command in [Chapter 8](#) for information on other items you can list with `SHOW`.

Saving Changes to the Database Automatically

Through the SQL DML commands `UPDATE`, `INSERT`, and `DELETE`—which can be used independently or within a PL/SQL block—specify changes you wish to make to the information stored in the database. These changes are not made permanent until you enter a SQL `COMMIT` command or a SQL DCL or DDL command (such as `CREATE TABLE`), or use the autocommit feature. The SQL*Plus autocommit

feature causes pending changes to be committed after a specified number of successful SQL DML transactions. (A SQL DML transaction is either an UPDATE, INSERT, or DELETE command, or a PL/SQL block.)

You control the autocommit feature with the SQL*Plus SET command's AUTOCOMMIT variable. It has these four forms:

SET AUTOCOMMIT ON	Turns autocommit on.
SET AUTOCOMMIT OFF	Turns autocommit off (the default).
SET AUTOCOMMIT <i>n</i>	Commits changes after <i>n</i> SQL DML commands.
SET AUTOCOMMIT IMMEDIATE	Turns autocommit on.

Example 2-5 Turning Autocommit On

To turn the autocommit feature on, enter

```
SQL> SET AUTOCOMMIT ON
```

Alternatively, you can enter the following to turn the autocommit feature on:

```
SQL> SET AUTOCOMMIT IMMEDIATE
```

Until you change the setting of AUTOCOMMIT, SQL*Plus automatically commits changes from each SQL DML command that specifies changes to the database. After each autocommit, SQL*Plus displays the following message:

```
commit complete
```

When the autocommit feature is turned on, you cannot roll back changes to the database.

To commit changes to the database after a number of SQL DML commands, for example, ten, enter

```
SQL> SET AUTOCOMMIT 10
```

SQL*Plus counts SQL DML commands as they are executed and commits the changes after the tenth SQL DML command.

Note: For this feature, a PL/SQL block is regarded as one transaction, regardless of the actual number of SQL commands contained within it.

To turn the autocommit feature off again, enter the following command:

```
SQL> SET AUTOCOMMIT OFF
```

To confirm that AUTOCOMMIT is now set to OFF, enter the following SHOW command:

```
SQL> SHOW AUTOCOMMIT  
autocommit OFF
```

For more information, see the AUTOCOMMIT variable of the [SET](#) command in [Chapter 8](#).

Stopping a Command while it is Running

Suppose you have displayed the first page of a 50 page report and decide you do not need to see the rest of it. Press [Cancel]. (Refer to [Table 2-1](#) at the beginning of this chapter to see how [Cancel] is labelled on your keyboard.) SQL*Plus stops the display and returns to the command prompt.

Note: Pressing [Cancel] will not stop the printing of a file that you have sent to a printer with the OUT clause of the SQL*Plus SPOOL command. (You will learn about printing query results in [Chapter 4](#).) You can stop the printing of a file through your operating system. For more information, see your operating system's installation and user(s) manual.

Collecting Timing Statistics on Commands You Run

Use the SQL*Plus command TIMING to collect and display data on the amount of computer resources used to run one or more commands or blocks. TIMING collects data for an elapsed period of time, saving the data on commands run during the period in a timer.

See [TIMING](#) in [Chapter 8](#) and the Oracle installation and user's manuals provided for your operating system for more information.

To delete all timers, enter CLEAR TIMING at the command prompt.

Running Host Operating System Commands

You can execute a host operating system command from the SQL*Plus command prompt. This is useful when you want to perform a task such as listing existing host operating system files.

To run a host operating system command, enter the SQL*Plus command `HOST` followed by the host operating system command. For example, this SQL*Plus command runs a host command, `DIRECTORY *.SQL`:

```
SQL> HOST DIRECTORY *.SQL
```

When the host command finishes running, the SQL*Plus command prompt appears again.

Note: Operating system commands entered from a SQL*Plus session using the `HOST` command do not effect the current SQL*Plus session.

You can suppress access to the `HOST` command. For more information about suppressing the `HOST` command see [Appendix E, "Security"](#).

Getting Help

While you use SQL*Plus, you may find that you need to list column definitions for a table, or start and stop the display that scrolls by. You may also need to interpret error messages you receive when you enter a command incorrectly or when there is a problem with Oracle or SQL*Plus. The following sections describe how to get help for those situations.

Listing a Table Definition

To see the definitions of each column in a given table, use the SQL*Plus `DESCRIBE` command.

Example 2–6 Using the DESCRIBE Command

To list the column definitions of the three columns in the sample table `DEPT`, enter

```
SQL> DESCRIBE DEPT
```

The following output results:

Name	Null?	Type
DEPTNO		NUMBER(2)
DNAME		VARCHAR2(14)
LOC		VARCHAR2(13)

Note: DESCRIBE accesses information in the Oracle data dictionary. You can also use SQL SELECT commands to access this and other information in the database. See your *Oracle8i SQL Reference* for details.

Listing PL/SQL Definitions

To see the definition of a function or procedure, use the SQL*Plus DESCRIBE command.

Example 2-7 Using the DESCRIBE Command

To list the definition of a function called AFUNC, enter

```
SQL> DESCRIBE afunc
```

The following output results:

```
FUNCTION afunc RETURNS NUMBER
Argument Name   Type      In/Out   Default?
-----
F1              CHAR     IN
F2              NUMBER   IN
```

Controlling the Display

Suppose that you wish to stop and examine the contents of the screen while displaying a long report or the definition of a table with many columns. Press [Pause]. (Refer to [Table 2-1](#) to see how [Pause] is labelled on your keyboard.) The display will pause while you examine it. To continue, press [Resume].

If you wish, you can use the PAUSE variable of the SQL*Plus SET command to have SQL*Plus pause after displaying each screen of a query or report. For more information, refer to the [SET](#) command in [Chapter 8](#).

Interpreting Error Messages

If SQL*Plus detects an error in a command, it will try to help you out by displaying an error message.

Example 2–8 Interpreting an Error Message

For example, if you misspell the name of a table while entering a command, an error message will tell you that the table or view does not exist:

```
SQL> DESCRIBE DPT
ERROR:
ORA-04043: object DPT does not exist
```

You will often be able to figure out how to correct the problem from the message alone. If you need further explanation, take one of the following steps to determine the cause of the problem and how to correct it:

- If the error is a numbered error for the SQL*Plus COPY command, look up the message in [Appendix A](#) of this Guide.
- If the error is a numbered error beginning with the letters "ORA", look up the message in the *Oracle8i Error Messages* manual or in the Oracle installation and user's manual(s) provided for your operating system to determine the cause of the problem and how to correct it.
- If the error is unnumbered, look up correct syntax for the command that generated the error in [Chapter 8](#) of this Guide for a SQL*Plus command, in the *Oracle8i SQL Reference* for a SQL command, or in the *PL/SQL User's Guide and Reference* for a PL/SQL block. Otherwise, contact your DBA.

Manipulating Commands

This chapter helps you learn to manipulate SQL*Plus commands, SQL commands, and PL/SQL blocks. It covers the following topics:

- [Editing Commands](#)
- [Saving Commands for Later Use](#)
- [Writing Interactive Commands](#)
- [Using Bind Variables](#)
- [Using REF_CURSOR Bind Variables](#)
- [Tracing Statements](#)

Read this chapter while sitting at your computer and try out the examples shown. Before beginning, make sure you have access to the sample tables described in [Chapter 1](#).

Editing Commands

Because SQL*Plus does not store SQL*Plus commands in the buffer, you edit a SQL*Plus command entered directly to the command prompt by using [Backspace] or by re-entering the command.

You can use a number of SQL*Plus commands to edit the SQL command or PL/SQL block currently stored in the buffer. Alternatively, you can use a host operating system editor to edit the buffer contents.

Table 3–1 lists the SQL*Plus commands that allow you to examine or change the command in the buffer without re-entering the command.

Table 3–1 SQL*Plus Editing Commands

Command	Abbreviation	Purpose
APPEND <i>text</i>	A <i>text</i>	adds <i>text</i> at the end of a line
CHANGE /old/new	C /old/new	changes <i>old</i> to <i>new</i> in a line
CHANGE /text	C /text	deletes <i>text</i> from a line
CLEAR BUFFER	CL BUFF	deletes all lines
DEL	(none)	deletes the current line
DEL <i>n</i>	(none)	deletes line <i>n</i>
DEL *	(none)	deletes the current line
DEL <i>n</i> *	(none)	deletes line <i>n</i> through the current line
DEL LAST	(none)	deletes the last line
DEL <i>m n</i>	(none)	deletes a range of lines (<i>m</i> to <i>n</i>)
DEL * <i>n</i>	(none)	deletes the current line through line <i>n</i>
INPUT	I	adds one or more lines
INPUT <i>text</i>	I <i>text</i>	adds a line consisting of <i>text</i>
LIST	L	lists all lines in the SQL buffer
LIST <i>n</i>	L <i>n</i> or <i>n</i>	lists line <i>n</i>
LIST *	L *	lists the current line

Table 3–1 SQL*Plus Editing Commands

Command	Abbreviation	Purpose
LIST <i>n</i> *	L <i>n</i> *	lists line <i>n</i> through the current line
LIST LAST	L LAST	lists the last line
LIST <i>m</i> <i>n</i>	L <i>m</i> <i>n</i>	lists a range of lines (<i>m</i> to <i>n</i>)
LIST * <i>n</i>	L * <i>n</i>	lists the current line through line <i>n</i>

You will find these commands useful if you mistype a command or wish to modify a command you have entered.

Listing the Buffer Contents

Any editing command other than LIST and DEL affects only a single line in the buffer. This line is called the *current line*. It is marked with an asterisk when you list the current command or block.

Example 3–1 Listing the Buffer Contents

Suppose you want to list the current command. Use the LIST command as shown below. (If you have EXITed SQL*Plus or entered another SQL command or PL/SQL block since following the steps in [Example 2–3](#), perform the steps in that example again before continuing.)

```
SQL> LIST
 1  SELECT EMPNO, ENAME, JOB, SAL
 2* FROM EMP WHERE SAL < 2500
```

Notice that the semicolon you entered at the end of the SELECT command is not listed. This semicolon is necessary to mark the end of the command when you enter it, but SQL*Plus does not store it in the SQL buffer. This makes editing more convenient, since it means you can append a new line to the end of the buffer without removing a semicolon.

Editing the Current Line

The SQL*Plus CHANGE command allows you to edit the current line. Various actions determine which line is the current line:

- LIST a given line to make it the current line.

- When you LIST or RUN the command in the buffer, the last line of the command becomes the current line. (Note, that using the slash (/) command to run the command in the buffer does not affect the current line.)
- If you get an error message, the line containing the error automatically becomes the current line.

Example 3-2 Making an Error in Command Entry

Suppose you try to select the DEPTNO column but mistakenly enter it as DPTNO. Enter the following command, purposely misspelling DEPTNO in the first line:

```
SQL> SELECT DPTNO, ENAME, SAL
      2 FROM EMP
      3 WHERE DEPTNO = 10;
```

You see this message on your screen:

```
SELECT DPTNO, ENAME, SAL
      *
ERROR at line 1:
ORA-00904: invalid column name
```

Examine the error message; it indicates an invalid column name in line 1 of the query. The asterisk shows the point of error—the mistyped column DPTNO.

Instead of re-entering the entire command, you can correct the mistake by editing the command in the buffer. The line containing the error is now the current line. Use the CHANGE command to correct the mistake. This command has three parts, separated by slashes or any other non-alphanumeric character:

- the word CHANGE or the letter C
- the sequence of characters you want to change
- the replacement sequence of characters

The CHANGE command finds the first occurrence in the current line of the character sequence to be changed and changes it to the new sequence. If you wish to re-enter an entire line, you do not need to use the CHANGE command: re-enter the line by typing the line number followed by a space and the new text and pressing [Return].

Example 3-3 Correcting the Error

To change DPTNO to DEPTNO, change the line with the CHANGE command:


```
SQL> CHANGE /DPTNO/DEPTNO
```

The corrected line appears on your screen:

```
1* SELECT DEPTNO, ENAME, SAL
```

Now that you have corrected the error, you can use the RUN command to run the command again:

```
SQL> RUN
```

SQL*Plus lists the command, and then runs it:

```
1 select deptno, ename, sal
2 from emp
3* where deptno = 10
```

DEPTNO	ENAME	SAL
10	CLARK	2450
10	KING	5000
10	MILLER	1300

Note that the column SAL retains the format you gave it in [Example 2-4](#). (If you have left SQL*Plus and started again since performing [Example 2-4](#) the column has reverted to its original format.)

For information about the significance of case in a CHANGE command and on using wildcard characters to specify blocks of text in a CHANGE command, refer to the [CHANGE](#) command in [Chapter 8](#).

Adding a New Line

To insert a new line after the current line, use the INPUT command.

To insert a line before line 1, enter a zero ("0") and follow the zero with text. SQL*Plus inserts the line at the beginning of the buffer and that line becomes line 1.

```
SQL> 0 SELECT EMPNO
```

Example 3-4 Adding a Line

Suppose you want to add a fourth line to the SQL command you modified in [Example 3-3](#). Since line 3 is already the current line, enter INPUT (which may be abbreviated to I) and press [Return]. SQL*Plus prompts you for the new line:

```
SQL> INPUT
4
```

Enter the new line. Then press [Return]. SQL*Plus prompts you again for a new line:

```
4 ORDER BY SAL
5
```

Press [Return] again to indicate that you will not enter any more lines, and then use RUN to verify and re-run the query.

SQL*Plus lists the modified command, and then runs it:

```
1 select deptno, ename, sal
2 from emp
3 where deptno = 10
4* order by sal
```

DEPTNO	ENAME	SAL
10	MILLER	1300
10	CLARK	2450
10	KING	5000

Appending Text to a Line

To add text to the end of a line in the buffer, use the APPEND command.

1. Use the LIST command (or just the line number) to list the line you want to change.
2. Enter APPEND followed by the text you want to add. If the text you want to add begins with a blank, separate the word APPEND from the first character of the text by two blanks: one to separate APPEND from the text, and one to go into the buffer with the text.

Example 3-5 Appending Text to a Line

To append a space and the clause DESC to line 4 of the current query, first list line 4:

```
SQL> LIST 4
4* ORDER BY SAL
```

Next, enter the following command (be sure to type two spaces between APPEND and DESC):

```
SQL> APPEND DESC
4* ORDER BY SAL DESC
```

Use RUN to verify and re-run the query.

SQL*Plus lists the modified command, and then runs it:

```
1 select deptno, ename, sal
2 from emp
3 where deptno = 10
4* order by sal desc
```

DEPTNO	ENAME	SAL
10	KING	5000
10	CLARK	2450
10	MILLER	1300

Deleting Lines

To delete lines in the buffer, use the DEL command.

1. Use the LIST command (or just the line numbers) to list the lines you want to delete.
2. Enter DEL with an optional clause.

Suppose you want to delete the current line to the last line inclusive. Use the DEL command as shown below.

```
SQL> DEL * LAST
```

DEL makes the following line of the buffer (if any) the current line.

For more information, see the [DEL](#) command in [Chapter 8](#).

Editing Commands with a System Editor

Your computer's host operating system may have one or more text editors that you can use to create and edit host system files. Text editors perform the same general functions as the SQL*Plus editing commands, but you may find them more familiar.

You can run your host operating system's default text editor without leaving SQL*Plus by entering the EDIT command:

```
SQL> EDIT
```

EDIT loads the contents of the buffer into your system's default text editor. You can then edit the text with the text editor's commands. When you tell the text editor to save edited text and then exit, the text is loaded back into the buffer.

To load the buffer contents into a text editor other than the default, use the SQL*Plus DEFINE command to define a variable, `_EDITOR`, to hold the name of the editor. For example, to define the editor to be used by EDIT as EDT, enter the following command:

```
SQL> DEFINE _EDITOR = EDT
```

You can also define the editor to be used by EDIT in your user or site profile. See "[Setting Up Your SQL*Plus Environment](#)" later in this chapter and the [DEFINE](#) and [EDIT](#) commands in [Chapter 8](#) for more information.

Saving Commands for Later Use

Through SQL*Plus, you can store one or more commands in a file called a *command file*. After you create a command file, you can retrieve, edit, and run it. Use command files to save commands for use over time, especially complex commands or PL/SQL blocks.

Storing Commands in Command Files

You can store one or more SQL commands, PL/SQL blocks, and SQL*Plus commands in command files. You create a command file within SQL*Plus in one of three ways:

- enter a command and save the contents of the buffer
- use INPUT to enter commands and then save the buffer contents
- use EDIT to create the file from scratch using a host system text editor

Because SQL*Plus commands are not stored in the buffer, you must use one of the latter two methods to save SQL*Plus commands.

Creating a Command File by Saving the Buffer Contents

To save the current SQL command or PL/SQL block for later use, enter the SAVE command. Follow the command with a file name:

```
SQL> SAVE file_name
```

SQL*Plus adds the extension `SQL` to the filename to identify it as a SQL query file. If you wish to save the command or block under a name with a different file extension, type a period at the end of the filename, followed by the extension you wish to use.

Note: `.sql` is the file extension used by default for files saved from SQL*Plus. You can use the SQL*Plus command, `SET SUFFIX extension`, to set the file extension you want to use.

Note that within SQL*Plus, you separate the extension from the filename with a period. Your operating system may use a different character or a space to separate the filename and the extension.

Example 3–6 Saving the Current Command

First, `LIST` the buffer contents to see your current command:

```
SQL> LIST
 1 SELECT DEPTNO, ENAME, SAL
 2 FROM EMP
 3 WHERE DEPTNO = 10
 4* ORDER BY SAL DESC
```

If the query shown is not in your buffer, re-enter the query now. Next, enter the `SAVE` command followed by the filename `DEPTINFO`:

```
SQL> SAVE DEPTINFO
Created file DEPTINFO
```

You can verify that the command file `DEPTINFO` exists by entering the SQL*Plus `HOST` command followed by your host operating system's file listing command:

```
SQL> HOST your_host's_file_listing_command
```

You can use the same method to save a PL/SQL block currently stored in the buffer.

Creating a Command File by Using `INPUT` and `SAVE`

If you use `INPUT` to enter your commands, you can enter SQL*Plus commands (as well as one or more SQL commands or PL/SQL blocks) into the buffer. You must enter the SQL*Plus commands first, and the SQL command(s) or PL/SQL block(s) last—just as you would if you were entering the commands directly to the command prompt.

You can also store a set of SQL*Plus commands you plan to use with many different queries by themselves in a command file.

Example 3-7 Saving Commands Using INPUT and SAVE

Suppose you have composed a query to display a list of salespeople and their commissions. You plan to run it once a month to keep track of how well each employee is doing. To compose and save the query using INPUT, you must first clear the buffer:

```
SQL> CLEAR BUFFER
```

Next, use INPUT to enter the command (be sure not to type a semicolon at the end of the command):

```
SQL> INPUT
 1 COLUMN ENAME HEADING SALESMAN
 2 COLUMN SAL HEADING SALARY FORMAT $99,999
 3 COLUMN COMM HEADING COMMISSION FORMAT $99,990
 4 SELECT EMPNO, ENAME, SAL, COMM
 5 FROM EMP
 6 WHERE JOB = 'SALESMAN'
 7
```

The zero at the end of the format model for the column COMM tells SQL*Plus to display a zero instead of a blank when the value of COMM is zero for a given row. Format models and the COLUMN command are described in more detail in [Chapter 4](#) and in the *Oracle 8i SQL Reference Manual*.

Now use the SAVE command to store your query in a file called SALES with the extension SQL:

```
SQL> SAVE SALES
Created file SALES
```

Note that you do not type a semicolon at the end of the query; if you did include a semicolon, SQL*Plus would attempt to run the buffer contents. The SQL*Plus commands in the buffer would produce an error because SQL*Plus expects to find only SQL commands in the buffer. You will learn how to run a command file later in this chapter.

To input more than one SQL command, leave out the semicolons on all the SQL commands. Then, use APPEND to add a semicolon to all but the last command. (SAVE appends a slash to the end of the file automatically; this slash tells SQL*Plus to run the last command when you run the command file.)

To input more than one PL/SQL block, enter the blocks one after another without including a period or a slash on a line between blocks. Then, for each block except the last, list the last line of the block to make it current and use INPUT in the following form to insert a slash on a line by itself:

```
INPUT /
```

Creating Command Files with a System Editor

You can also create a command file with a host operating system text editor by entering EDIT followed by the name of the file, for example:

```
SQL> EDIT SALES
```

Like the SAVE command, EDIT adds the filename extension SQL to the name unless you type a period and a different extension at the end of the filename. When you save the command file with the text editor, it is saved back into the same file.

You must include a semicolon at the end of each SQL command and a period on a line by itself after each PL/SQL block in the file. (You can include multiple SQL commands and PL/SQL blocks.)

When you create a command file using EDIT, you can also include SQL*Plus commands at the end of the file. You cannot do this when you create a command file using the SAVE command because SAVE appends a slash to the end of the file. This slash would cause SQL*Plus to run the command file twice, once upon reaching the semicolon at the end of the last SQL command (or the slash after the last PL/SQL block) and once upon reaching the slash at the end of the file.

Placing Comments in Command Files

You can enter comments in a command file in three ways:

- using the SQL*Plus REMARK command for single line comments.
- using the SQL comment delimiters /* ... */ for single or multi line comments.
- using ANSI/ISO (American National Standards Institute/International Standards Organization) comments -- for single line comments.

For further information about using comments in command files, see [Notes on Placing Comments](#) later in this chapter.

Using the REMARK Command

Use the REMARK command on a line by itself in the command file, followed by comments on the same line. To continue the comments on additional lines, enter additional REMARK commands. Do not place a REMARK command between different lines of a single SQL command.

```
REMARK Commissions report
REMARK to be run monthly.
COLUMN ENAME HEADING SALESMAN
COLUMN SAL HEADING SALARY FORMAT $99,999
COLUMN COMM HEADING COMMISSION FORMAT $99,990
REMARK Includes only salesmen.

SELECT EMPNO, ENAME, SAL, COMM
FROM EMP
WHERE JOB = 'SALESMAN'
```

Using /*...*/

Enter the SQL comment delimiters, /*...*/, on separate lines in your command file, on the same line as a SQL command, or on a line in a PL/SQL block.

The comments can span multiple lines, but cannot be nested within one another:

```
/* Commissions report
to be run monthly. */
COLUMN ENAME HEADING SALESMAN
COLUMN SAL HEADING SALARY FORMAT $99,999
COLUMN COMM HEADING COMMISSION FORMAT $99,990
SELECT EMPNO, ENAME, SAL, COMM
FROM EMP
WHERE JOB = 'SALESMAN' /* Includes only salesmen. */
```

If you enter a SQL comment directly at the command prompt, SQL*Plus does not store the comment in the buffer.

Using --

You can use ANSI/ISO "--" style comments within SQL statements, PL/SQL blocks, or SQL*Plus commands. Since there is no ending delimiter, the comment cannot span multiple lines. For PL/SQL and SQL, enter the comment after a command on a line, or on a line by itself:

```
-- Commissions report to be run monthly
DECLARE --block for reporting monthly sales
```


For SQL*Plus commands, you can only include "--" style comments if they are on a line by themselves. For example, these comments are legal:

```
--set maximum width for LONG to 777
SET LONG 777
-- set the heading for ENAME to be SALESMAN
COLUMN ENAME HEADING SALESMAN
```

These comments are illegal:

```
SET LONG 777 -- set maximum width for LONG to 777
SET -- set maximum width for LONG to 777 LONG 777
```

If you enter the following SQL*Plus command, SQL*Plus interprets it as a comment and does not execute the command:

```
-- SET LONG 777
```

Notes on Placing Comments

SQL*Plus generally does not parse or execute input it identifies as a comment.

SQL*Plus does not have a SQL or PL/SQL command parser. It scans the first few keywords of each new statement to determine the command type, SQL, PL/SQL or SQL*Plus. Comments in some locations can prevent SQL*Plus from correctly identifying the command type, giving unexpected results. The following usage notes may help you to use SQL*Plus comments more effectively:

1. Do not put comments within the first few keywords of a statement. For example:

```
SQL> create or replace
  2 /* hello */
  3 procedure hello
  4 as
  5 begin
  6 null;
Warning: Procedure created with compilation errors.
```

The location of the comment prevents SQL*Plus from recognizing the command as a PL/SQL command. SQL*Plus submits the block to the server when it sees the slash '/' at the beginning of the comment, which it interprets as the '/' statement terminator. You can avoid this error by moving the comment. For example:

```
SQL> create or replace procedure
  2 /* hello */
```

```
3 hello
4 as
...
```

2. Do not put comments after statement terminators (fullstop, semicolon or slash). For example,

```
SQL> SELECT 'Y' FROM DUAL; -- Testing
      2 ;
SELECT 'Y' FROM DUAL; -- Testing
                        *
ERROR at line 1:
ORA-00911: invalid character
```

SQL*Plus expects no text after statement terminators on the same line and is unable to recognize the comment.

3. Do not put statement termination characters on the same line after comments in a SQL statement or a PL/SQL block. For example:

```
SQL> select *
      2 -- comment;
-- comment
      *
ERROR at line 2:
ORA-00923: FROM keyword not found where expected
```

The semicolon is interpreted as a statement terminator and SQL*Plus submits the partially formed SQL command to the server for processing, resulting in an error.

4. Do not use ampersand characters '&' in comments in a SQL statement or PL/SQL block. For example:

```
SQL> select * from /* this & that */ dept;
Enter value for that:
old 1: select * from /* this & that */ dept
new 1: select * from /* this */ dept
  DEPTNO DNAME          LOC
-----
      10 ACCOUNTING    NEW YORK
      20 RESEARCH      DALLAS
      30 SALES          CHICAGO
      40 OPERATIONS    BOSTON
```

SQL*Plus interprets text after the ampersand character "&" as a substitution variable and prompts for the value of the variable. You can SET DEFINE OFF to prevent scanning for the substitution character.

For more information on substitution and termination characters, see DEFINE, SQLTERMINATOR and SQLBLANKLINES in the SET command in [Chapter 8](#).

Retrieving Command Files

If you want to place the contents of a command file in the buffer, you must retrieve the command from the file in which it is stored. You can retrieve a command file using the SQL*Plus command GET.

Just as you can save a query from the buffer to a file with the SAVE command, you can retrieve a query from a file to the buffer with the GET command:

```
SQL> GET file_name
```

When appropriate to the operating system, SQL*Plus adds a period and the extension SQL to the filename unless you type a period at the end of the filename followed by a different extension.

Example 3–8 Retrieving a Command File

Suppose you need to retrieve the SALES file in a later session. You can retrieve the file by entering the GET command. To retrieve the file SALES, enter

```
SQL> GET SALES
1  COLUMN ENAME HEADING SALESMAN
2  COLUMN SAL HEADING SALARY FORMAT $99,999
3  COLUMN COMM HEADING COMMISSION FORMAT $99,990
4  SELECT EMPNO, ENAME, SAL, COMM
5  FROM EMP
6* WHERE JOB = 'SALESMAN'
7
```

SQL*Plus retrieves the contents of the file SALES with the extension SQL into the SQL buffer and lists it on the screen. Then you can edit the command further. If the file did not contain SQL*Plus commands, you could also execute it with the RUN command.

Running Command Files

The `START` command retrieves a command file and runs the command(s) it contains. Use `START` to run a command file containing SQL commands, PL/SQL blocks, and/or SQL*Plus commands. Follow the `START` command with the name of the file:

```
START file_name
```

If the file has the extension `SQL`, you need not add the period and the extension `SQL` to the filename.

Example 3–9 Running a Command File

To retrieve and run the command stored in `SALES.SQL`, enter

```
SQL> START SALES
```

SQL*Plus runs the commands in the file `SALES` and displays the results of the commands on your screen, formatting the query results according to the SQL*Plus commands in the file:

EMPNO	SALESMAN	SALARY	COMMISSION
7499	ALLEN	\$1,600	\$300
7521	WARD	\$1,250	\$500
7654	MARTIN	\$1,250	\$1,400
7844	TURNER	\$1,500	\$0

To see the commands as SQL*Plus "enters" them, you can set the `ECHO` variable of the `SET` command to `ON`. The `ECHO` variable controls the listing of the commands in command files run with the `START`, `@` and `@@` commands. Setting the `ECHO` variable to `OFF` suppresses the listing.

You can also use the `@` ("at" sign) command to run a command file:

```
SQL> @SALES
```

The `@` command lists and runs the commands in the specified command file in the same manner as `START`. `SET ECHO` affects the `@` command as it affects the `START` command.

`START`, `@` and `@@` leave the last SQL command or PL/SQL block in the command file in the buffer.

Running a Command File as You Start SQL*Plus

To run a command file as you start SQL*Plus, use one of the following four options:

- Follow the SQLPLUS command with your username, a slash, your password, a space, @, and the name of the file:

```
SQLPLUS SCOTT/TIGER @SALES
```

SQL*Plus starts and runs the command file.

- Follow the SQLPLUS command and your username with a space, @, and the name of the file:

```
SQLPLUS SCOTT @SALES
```

SQL*Plus prompts you for your password, starts, and runs the command file.

- Include your username as the first line of the file. Follow the SQLPLUS command with @ and the filename. SQL*Plus prompts for your password, starts, and runs the file.
- Include your username, a slash (/), and your password as the first line of the file. Follow the SQLPLUS command with @ and the filename. SQL*Plus starts and runs the file.

Nesting Command Files

To run a series of command files in sequence, first create a command file containing several START commands, each followed by the name of a command file in the sequence. Then run the command file containing the START commands. For example, you could include the following START commands in a command file named SALESRPT:

```
START Q1SALES  
START Q2SALES  
START Q3SALES  
START Q4SALES  
START YRENDSLS
```

Note: The @@ command may be useful in this example. See the @@ (double "at" sign) command in [Chapter 8](#) for more information.

Modifying Command Files

You can modify an existing command file in two ways:

- using the EDIT command
- using GET, the SQL*Plus editing commands, and SAVE

To edit an existing command file with the EDIT command, follow the word EDIT with the name of the file. For example, to edit an existing file named PROFIT that has the extension SQL, enter the following command:

```
SQL> EDIT PROFIT
```

Remember that EDIT assumes the file extension SQL if you do not specify one.

To edit an existing file using GET, the SQL*Plus editing commands, and SAVE, first retrieve the file with GET, then edit the file with the SQL*Plus editing commands, and finally save the file with the SAVE command.

Note that if you want to replace the contents of an existing command file with the command or block in the buffer, you must use the SAVE command and follow the filename with the word REPLACE.

For example:

```
SQL> GET MYREPORT
1* SELECT * FROM EMP
SQL> C/*/ENAME, JOB
1* SELECT ENAME, JOB FROM EMP
SQL> SAVE MYREPORT REPLACE
Wrote file MYREPORT
```

If you want to append the contents of the buffer to the end of an existing command file, use the SAVE command and follow the filename with the word APPEND:

```
SQL> SAVE file_name APPEND
```

Exiting from a Command File with a Return Code

If your command file generates a SQL error while running from a batch file on the host operating system, you may want to abort the command file and exit with a return code. Use the SQL*Plus command WHENEVER SQLERROR to do this; see the [WHENEVER SQLERROR](#) command in [Chapter 8](#) for more information.

Similarly, the WHENEVER OSERROR command may be used to exit if an operating system error occurs. See the [WHENEVER OSERROR](#) command in [Chapter 8](#) for more information.

Setting Up Your SQL*Plus Environment

You may wish to set up your SQL*Plus environment in a particular way (such as showing the current time as part of the SQL*Plus command prompt) and then reuse those settings with each session. You can do this through a host operating system file called LOGIN with the file extension SQL (also called your *User Profile*). The exact name of this file is system dependent; see the Oracle installation and user's manual(s) provided for your operating system for the precise name.

You can add any SQL commands, PL/SQL blocks, or SQL*Plus commands to this file; when you start SQL*Plus, it automatically searches for your LOGIN file (first in your local directory and then on a system-dependent path) and runs the commands it finds there. (You may also have a Site Profile, for example, GLOGIN.SQL. See page 7-10 for more information on the relationship of Site and User Profiles.)

Modifying Your LOGIN File

You can modify your LOGIN file just as you would any other command file. You may wish to add some of the following commands to the LOGIN file:

SET COMPATIBILITY	Followed by V7 or V8, sets compatibility to the version of Oracle you specify. Setting COMPATIBILITY to V7 allows you to run command files created with Oracle7.
SET NUMFORMAT	Followed by a number format (such as \$99,999), sets the default format for displaying numbers in query results.
SET PAGESIZE	Followed by a number, sets the number of lines per page.
SET PAUSE	Followed by ON, causes SQL*Plus to pause at the beginning of each page of output (SQL*Plus continues scrolling after you enter [Return]). Followed by text, sets the text to be displayed each time SQL*Plus pauses (you must also set PAUSE to ON).
SET SHIFTTINOUT	Followed by VISIBLE, will display shift characters as a visible character. Setting SHIFTTINOUT to INVISIBLE, will not display any shift characters. Note, this command can only be used with shift sensitive character sets.
SET TIME	Followed by ON, displays the current time before each command prompt.

See the [SET](#) command in [Chapter 8](#) for more information on these and other SET command variables you may wish to set in your SQL*Plus LOGIN file.

Storing and Restoring SQL*Plus System Variables

You can store the current SQL*Plus system ("SET") variables in a host operating system file (a command file) with the `STORE` command. If you alter any variables, this command file can be run to restore the original values. This is useful if you run a report that alters system variables and you want to reset their values after the report has finished.

To store the current setting of all system variables, enter

```
SQL> STORE SET file_name
```

By default, SQL*Plus adds the extension "SQL" to the file name. If you want to use a different file extension, type a period at the end of the file name, followed by the extension. Alternatively, you can use the `SET SUFFIX` command to change the default file extension.

Restoring the System Variables

To restore the stored system variables, enter

```
SQL> START file_name
```

If the file has the default extension (as specified by the `SET SUFFIX` command), you do not need to add the period and extension to the file name.

You can also use the `@` ("at" sign) or the `@@` (double "at" sign) commands to run the command file.

Example 3–10 Storing and Restoring SQL*Plus System Variables

To store the current values of the SQL*Plus system variables in a new command file "plusenv.sql":

```
SQL> STORE SET plusenv  
Created file plusenv
```

Now the value of any system variable can be changed:

```
SQL> SHOW PAGESIZE  
pagesize 24  
SQL> SET PAGESIZE 60  
SQL> SHOW PAGESIZE  
pagesize 60
```


The original values of the system variables can then be restored from the command file:

```
SQL> START plusenv
SQL> SHOW PAGESIZE
pagesize 24
```

Writing Interactive Commands

The following features of SQL*Plus make it possible for you to set up command files that allow end-user input:

- defining user variables
- substituting values in commands
- using the START command to provide values
- prompting for values

Defining User Variables

You can define variables, called *user variables*, for repeated use in a single command file by using the SQL*Plus DEFINE command. Note that you can also define user variables to use in titles and to save you keystrokes (by defining a long string as the value for a variable with a short name).

Example 3–11 Defining a User Variable

To define a user variable EMPLOYEE and give it the value "SMITH", enter the following command:

```
SQL> DEFINE EMPLOYEE = SMITH
```

To confirm the definition of the variable, enter DEFINE followed by the variable name:

```
SQL> DEFINE EMPLOYEE
```

SQL*Plus lists the definition:

```
DEFINE EMPLOYEE          = "SMITH" (CHAR)
```

To list all user variable definitions, enter DEFINE by itself at the command prompt. Note that any user variable you define explicitly through DEFINE takes only CHAR values (that is, the value you assign to the variable is always treated as a CHAR

datatype). You can define a user variable of datatype NUMBER implicitly through the ACCEPT command. You will learn more about the ACCEPT command later in this chapter.

To delete a user variable, use the SQL*Plus command UNDEFINE followed by the variable name.

Using Substitution Variables

Suppose you want to write a query like the one in SALES (see [Example 3-7](#)) to list the employees with various jobs, not just those whose job is SALESMAN. You could do that by editing a different CHAR value into the WHERE clause each time you run the command, but there is an easier way.

By using a *substitution variable* in place of the value SALESMAN in the WHERE clause, you can get the same results you would get if you had written the values into the command itself.

A substitution variable is a user variable name preceded by one or two ampersands (&). When SQL*Plus encounters a substitution variable in a command, SQL*Plus executes the command as though it contained the value of the substitution variable, rather than the variable itself.

For example, if the variable SORTCOL has the value JOB and the variable MYTABLE has the value EMP, SQL*Plus executes the commands

```
SQL> BREAK ON &SORTCOL
SQL> SELECT &SORTCOL, SAL
  2 FROM &MYTABLE
  3 ORDER BY &SORTCOL;
```

as if they were

```
SQL> BREAK ON JOB
SQL> SELECT JOB, SAL
  2 FROM EMP
  3 ORDER BY JOB;
```

(Here the BREAK command suppresses duplicate values of the column named in SORTCOL. For more information about the BREAK command, see the section "[Clarifying Your Report with Spacing and Summary Lines](#)" in [Chapter 4](#).)

Where and How to Use Substitution Variables

You can use substitution variables anywhere in SQL and SQL*Plus commands, except as the first word entered at the command prompt. When SQL*Plus

encounters an undefined substitution variable in a command, SQL*Plus prompts you for the value.

You can enter any string at the prompt, even one containing blanks and punctuation. If the SQL command containing the reference should have quote marks around the variable and you do not include them there, the user must include the quotes when prompted.

SQL*Plus reads your response from the keyboard, even if you have redirected terminal input or output to a file. If a terminal is not available (if, for example, you run the command file in batch mode), SQL*Plus uses the redirected file.

After you enter a value at the prompt, SQL*Plus lists the line containing the substitution variable twice: once before substituting the value you enter and once after substitution. You can suppress this listing by setting the SET command variable VERIFY to OFF.

Example 3–12 Using Substitution Variables

Create a command file named STATS, to be used to calculate a subgroup statistic (the maximum value) on a numeric column:

```
SQL> CLEAR BUFFER
SQL> INPUT
  1 SELECT  &GROUP_COL,
  2          MAX(&NUMBER_COL) MAXIMUM
  3 FROM    &TABLE
  4 GROUP BY &GROUP_COL
  5
SQL> SAVE STATS
Created file STATS
```

Now run the command file STATS and respond to the prompts for values as shown:

```
SQL> @STATS
Enter value for group_col: JOB
old  1: SELECT  &GROUP_COL,
new  1: SELECT  JOB,
Enter value for number_col: SAL
old  2:          MAX(&NUMBER_COL) MAXIMUM
new  2:          MAX(SAL) MAXIMUM
Enter value for table: EMP
old  3: FROM    &TABLE
new  3: FROM    EMP
Enter value for group_col: JOB
old  4: GROUP BY &GROUP_COL
```

```
new 4: GROUP BY JOB
```

SQL*Plus displays the following output:

JOB	MAXIMUM
ANALYST	3000
CLERK	1300
MANAGER	2975
PRESIDENT	5000
SALESMAN	1600

If you wish to append characters immediately after a substitution variable, use a period to separate the variable from the character. For example:

```
SQL> SELECT * FROM EMP WHERE EMPNO='&X.01';
Enter value for X: 123
```

is interpreted as

```
SQL> SELECT * FROM EMP WHERE EMPNO='12301';
```

Avoiding Unnecessary Prompts for Values

Suppose you wanted to expand the file `STATS` to include the minimum, sum, and average of the "number" column. You may have noticed that SQL*Plus prompted you twice for the value of `GROUP_COL` and once for the value of `NUMBER_COL` in [Example 3-12](#), and that each `GROUP_COL` or `NUMBER_COL` had a single ampersand in front of it. If you were to add three more functions—using a single ampersand before each—to the command file, SQL*Plus would prompt you a total of four times for the value of the number column.

You can avoid being re-prompted for the group and number columns by adding a second ampersand in front of each `GROUP_COL` and `NUMBER_COL` in `STATS`. SQL*Plus automatically `DEFINEs` any substitution variable preceded by two ampersands, but does not `DEFINE` those preceded by only one ampersand. When you have `DEFINEd` a variable, SQL*Plus substitutes the value of *variable* for each substitution variable referencing *variable* (in the form `&variable` or `&&variable`). SQL*Plus will not prompt you for the value of *variable* in this session until you `UNDEFINE variable`.

Example 3-13 Using Double Ampersands

To expand the command file `STATS` using double ampersands and then run the file, first suppress the display of each line before and after substitution:

```
SQL> SET VERIFY OFF
```

Now retrieve and edit STATS by entering the following commands:

```
SQL> GET STATS
 1 SELECT &GROUP_COL,
 2         MAX(&NUMBER_COL) MAXIMUM
 3 FROM   &TABLE
 4 GROUP BY &GROUP_COL
SQL> 2
 2* MAX(&NUMBER_COL) MAXIMUM

SQL> APPEND ,
 2* MAX(&NUMBER_COL) MAXIMUM,
SQL> C /&/&&
 2* MAX(&&NUMBER_COL) MAXIMUM,
SQL> I
 3i MIN(&&NUMBER_COL) MINIMUM,
 4i SUM(&&NUMBER_COL) TOTAL,
 5i AVG(&&NUMBER_COL) AVERAGE
 6i
SQL> 1
 1* SELECT &GROUP_COL,
SQL> C /&/&&
 1* SELECT &&GROUP_COL,
SQL> 7
 7* GROUP BY &GROUP_COL
SQL> C /&/&&
 7* GROUP BY &&GROUP_COL
SQL> SAVE STATS2
created file STATS2
```

Finally, run the command file STATS2 and respond to the prompts for values as follows:

```
SQL> START STATS2
Enter value for group_col: JOB
Enter value for number_col: SAL
Enter value for table: EMP
```

SQL*Plus displays the following output:

JOB	MAXIMUM	MINIMUM	TOTAL	AVERAGE
ANALYST	3000	3000	6000	3000
CLERK	1300	800	4150	1037.5

MANAGER	2975	2450	8275	2758.33333
PRESIDENT	5000	5000	5000	5000
SALESMAN	1600	1250	5600	1400

Note that you were prompted for the values of `NUMBER_COL` and `GROUP_COL` only once. If you were to run `STATS2` again during the current session, you would be prompted for `TABLE` (because its name has a single ampersand and the variable is therefore not `DEFINED`) but not for `GROUP_COL` or `NUMBER_COL` (because their names have double ampersands and the variables are therefore `DEFINED`).

Before continuing, set the system variable `VERIFY` back to `ON`:

```
SQL> SET VERIFY ON
```

Restrictions

You cannot use substitution variables in the buffer editing commands, `APPEND`, `CHANGE`, `DEL`, and `INPUT`, nor in other commands where substitution would be meaningless, such as in `SQL*Plus` comments (`REMARK`, `/ * ... * /` or `--`). The buffer editing commands, `APPEND`, `CHANGE`, and `INPUT`, treat text beginning with `"&"` or `"&&"` literally, as any other text string.

System Variables

The following system variables, specified with the `SQL*Plus` `SET` command, affect substitution variables:

<code>SET DEFINE</code>	Defines the substitution character (by default the ampersand <code>"&"</code>) and turns substitution on and off.
<code>SET ESCAPE</code>	Defines an escape character you can use before the substitution character. The escape character instructs <code>SQL*Plus</code> to treat the substitution character as an ordinary character rather than as a request for variable substitution. The default escape character is a backslash (<code>\</code>).
<code>SET VERIFY ON</code>	Lists each line of the command file before and after substitution.
<code>SET CONCAT</code>	Defines the character that separates the name of a substitution variable or parameter from characters that immediately follow the variable or parameter—by default the period (<code>.</code>).

For more information about system variables, see the [SET](#) command in the "Command Reference" in [Chapter 8](#).

Passing Parameters through the START Command

You can bypass the prompts for values associated with substitution variables by passing values to parameters in a command file through the START command.

You do this by placing an ampersand (&) followed by a numeral in the command file in place of a substitution variable. Each time you run this command file, START replaces each &1 in the file with the first value (called an argument) after START *filename*, then replaces each &2 with the second value, and so forth.

For example, you could include the following commands in a command file called MYFILE:

```
SELECT * FROM EMP
WHERE JOB='&1'
AND SAL=&2
```

In the following START command, SQL*Plus would substitute CLERK for &1 and 7900 for &2 in the command file MYFILE:

```
SQL> START MYFILE CLERK 7900
```

When you use arguments with the START command, SQL*Plus DEFINES each parameter in the command file with the value of the appropriate argument.

Example 3-14 *Passing Parameters through START*

To create a new command file based on SALES that takes a parameter specifying the job to be displayed, enter

```
SQL> GET SALES
 1 COLUMN ENAME HEADING SALESMAN
 2 COLUMN SAL HEADING SALARY FORMAT $99,999
 3 COLUMN COMM HEADING COMMISSION FORMAT $99,990
 4 SELECT EMPNO, ENAME, SAL, COMM
 5 FROM EMP
 6* WHERE JOB = 'SALESMAN'
SQL> CHANGE /SALESMAN/&1
 6* WHERE JOB = '&1'
SQL> 1
 1* COLUMN ENAME HEADING SALESMAN
SQL> CHANGE /SALESMAN/&1
 1* COLUMN ENAME HEADING &1
SQL> SAVE ONEJOB
Created file ONEJOB
```

Now run the command with the parameter CLERK:

```
SQL> START ONEJOB CLERK
```

SQL*Plus lists the line of the SQL command that contains the parameter, before and after replacing the parameter with its value, and then displays the output:

```
old   3: WHERE JOB = '&1'
new   3: WHERE JOB = 'CLERK'
EMPNO CLERK          SALARY COMMISSION
-----
7369 SMITH            $800
7876 ADAMS            $1,100
7900 JAMES            $950
7934 MILLER           $1,300
```

You can use any number of parameters in a command file. Within a command file, you can refer to each parameter any number of times, and can include the parameters in any order.

Note: You cannot use parameters when you run a command with RUN or slash (/). You must store the command in a command file and run it with START or @.

Before continuing, return the column ENAME to its original heading by entering the following command:

```
SQL> COLUMN ENAME CLEAR
```

Communicating with the User

Three SQL*Plus commands—PROMPT, ACCEPT, and PAUSE—help you communicate with the end user. These commands enable you to send messages to the screen and receive input from the user, including a simple [Return]. You can also use PROMPT and ACCEPT to customize the prompts for values SQL*Plus automatically generates for substitution variables.

Prompting for and Accepting User Variable

Through PROMPT and ACCEPT, you can send messages to the end user and accept values as end-user input. PROMPT simply displays a message you specify on-screen; use it to give directions or information to the user. ACCEPT prompts the user for a value and stores it in the user variable you specify. Use PROMPT in

conjunction with ACCEPT when your prompt for the value spans more than one line.

Example 3–15 Prompting for and Accepting Input

To direct the user to supply a report title and to store the input in the variable MYTITLE for use in a subsequent query, first clear the buffer:

```
SQL> CLEAR BUFFER
```

Next, set up a command file as shown below:

```
SQL> INPUT
 1 PROMPT Enter a title up to 30 characters long.
 2 ACCEPT MYTITLE PROMPT 'Title: '
 3 TTITLE LEFT MYTITLE SKIP 2
 4 SELECT * FROM DEPT
 5
SQL> SAVE PROMPT1
Created file PROMPT1
```

The TTITLE command sets the top title for your report. For more information about the TTITLE command, see [Defining Page and Report Titles and Dimensions](#) in [Chapter 4](#).

Finally, run the command file, responding to the prompt for the title as shown:

```
SQL> START PROMPT1
Enter a title up to 30 characters long.
Title: Department Report as of 1/1/99
```

SQL*Plus displays the following output:

```
Department Report as of 1/1/99
  DEPTNO DNAME          LOC
-----
  10 ACCOUNTING        NEW YORK
  20 RESEARCH           DALLAS
  30 SALES              CHICAGO
  40 OPERATIONS         BOSTON
```

Before continuing, turn the TTITLE command you entered in the command file off as shown below:

```
SQL> TTITLE OFF
```

Customizing Prompts for Substitution Variable

If you want to customize the prompt for a substitution variable value, use `PROMPT` and `ACCEPT` in conjunction with the substitution variable, as shown in the following example.

Example 3–16 Using *PROMPT* and *ACCEPT* in Conjunction with Substitution Variables

As you have seen in [Example 3–15](#), SQL*Plus automatically generates a prompt for a value when you use a substitution variable. You can replace this prompt by including `PROMPT` and `ACCEPT` in the command file with the query that references the substitution variable. To create such a file, enter the commands shown:

```
SQL> CLEAR BUFFER
buffer cleared
SQL> INPUT
 1 PROMPT Enter a valid employee number
 2 PROMPT For example: 7369, 7499, 7521
 3 ACCEPT ENUMBER NUMBER PROMPT 'Emp. no.: '
 4 SELECT ENAME, MGR, JOB, SAL
 5 FROM EMP
 6 WHERE EMPNO = &ENUMBER
 7
SQL> SAVE PROMPT2
Created file PROMPT2
```

Next, run the command file. SQL*Plus prompts for the value of `ENUMBER` using the text you specified with `PROMPT` and `ACCEPT`:

```
SQL> START PROMPT2
Enter a valid employee number
For example: 7369, 7499, 7521
Emp. No.:
```

Try entering characters instead of numbers to the prompt for "Emp. No.":

```
Emp. No.: ONE
"ONE" is not a valid number
Emp. No.:
```

Since you specified `NUMBER` after the variable name in the `ACCEPT` command, SQL*Plus will not accept a non-numeric value. Now enter a number:

```
Emp. No.: 7521
```

```
old 3: WHERE EMPNO = &ENUMBER
new 3: WHERE EMPNO =          7521
```

SQL*Plus displays the following output:

ENAME	MGR	JOB	SALARY
-----	-----	-----	-----
WARD	7698	SALESMAN	\$1,250

Sending a Message and Accepting [Return] as Input

If you want to display a message on the user's screen and then have the user enter [Return] after reading the message, use the SQL*Plus command PAUSE. For example, you might include the following lines in a command file:

```
PROMPT Before continuing, make sure you have your account card.
PAUSE Press RETURN to continue.
```

Clearing the Screen

If you want to clear the screen before displaying a report (or at any other time), include the SQL*Plus CLEAR command with its SCREEN clause at the appropriate point in your command file, using the following format:

```
CLEAR SCREEN
```

Before continuing to the next section, reset all columns to their original formats and headings by entering the following command:

```
SQL> CLEAR COLUMNS
```

Using Bind Variables

Suppose that you want to be able to display the variables you use in your PL/SQL subprograms in SQL*Plus or use the same variables in multiple subprograms. If you declare a variable in a PL/SQL subprogram, you cannot display that variable in SQL*Plus. Use a bind variable in PL/SQL to access the variable from SQL*Plus.

Bind variables are variables you create in SQL*Plus and then reference in PL/SQL. If you create a bind variable in SQL*Plus, you can use the variable as you would a declared variable in your PL/SQL subprogram and then access the variable from SQL*Plus. You can use bind variables for such things as storing return codes or debugging your PL/SQL subprograms.

Because bind variables are recognized by SQL*Plus, you can display their values in SQL*Plus or reference them in other PL/SQL subprograms that you run in SQL*Plus.

Creating Bind Variables

You create bind variables in SQL*Plus with the VARIABLE command. For example

```
VARIABLE ret_val NUMBER
```

This command creates a bind variable named `ret_val` with a datatype of NUMBER. For more information, see the [VARIABLE](#) command in [Chapter 8](#). (To list all of the bind variables created in a session, type VARIABLE without any arguments.)

Referencing Bind Variables

You reference bind variables in PL/SQL by typing a colon (:) followed immediately by the name of the variable. For example

```
:ret_val := 1;
```

To change this bind variable in SQL*Plus, you must enter a PL/SQL block. For example

```
SQL> begin
  2  :ret_val:=4;
  3  end;
  4  /
```

PL/SQL procedure successfully completed.

This command assigns a value to the bind variable named `ret_val`.

Displaying Bind Variables

To display the value of a bind variable in SQL*Plus, you use the SQL*Plus PRINT command. For example

```
SQL> print ret_val
```

```
RET_VAL
-----
      4
```

This command displays a bind variable named `ret_val`. For more information about displaying bind variables, see the [PRINT](#) command in the "Command Reference" in [Chapter 8](#).

Example 3–17 Creating, Referencing, and Displaying Bind Variables

To declare a local bind variable named `id` with a datatype of `NUMBER`, enter

```
SQL> VARIABLE id NUMBER
```

Next, put a value of "1" into the bind variable you have just created:

```
SQL> BEGIN
  2  :id := 1;
  3  END;
  4  /
```

If you want to display a list of values for the bind variable named `id`, enter

```
SQL> print id
```

```

          ID
-----
         1
```

Using REFCURSOR Bind Variables

SQL*Plus REFCURSOR bind variables allow SQL*Plus to fetch and format the results of a `SELECT` statement contained in a PL/SQL block.

REFCURSOR bind variables can also be used to reference PL/SQL cursor variables in stored procedures. This allows you to store `SELECT` statements in the database and reference them from SQL*Plus.

A REFCURSOR bind variable can also be returned from a stored function.

Note: You must have Oracle7, Release 7.3 or above to assign the return value of a stored function to a REFCURSOR variable.

Example 3–18 Creating, Referencing, and Displaying REFCURSOR Bind Variables

To create, reference and display a REFCURSOR bind variable, first declare a local bind variable of the REFCURSOR datatype

```
SQL> VARIABLE dept_sel REFCURSOR
```

Next, enter a PL/SQL block that uses the bind variable in an OPEN ... FOR SELECT statement. This statement opens a cursor variable and executes a query. See the *PL/SQL User's Guide and Reference* for information on the OPEN command and cursor variables.

In this example we are binding the SQL*Plus *dept_sel* bind variable to the cursor variable.

```
SQL> BEGIN
  2   OPEN :dept_sel FOR SELECT * FROM DEPT;
  3   END;
  4   /
```

PL/SQL procedure successfully completed.

The results from the SELECT statement can now be displayed in SQL*Plus with the PRINT command.

```
SQL> PRINT dept_sel
DEPTNO DNAME          LOC
-----
10     ACCOUNTING     NEW YORK
20     RESEARCH        DALLAS
30     SALES           CHICAGO
40     OPERATIONS     BOSTON
```

The PRINT statement also closes the cursor. To reprint the results, the PL/SQL block must be executed again before using PRINT.

Example 3–19 Using REFCURSOR Variables in Stored Procedures

A REFCURSOR bind variable is passed as a parameter to a procedure. The parameter has a REF CURSOR type. First, define the type.

```
SQL> CREATE OR REPLACE PACKAGE cv_types AS
  2   TYPE DeptCurTyp is REF CURSOR RETURN dept%ROWTYPE;
  3   END cv_types;
  4   /
```

Package created.

Next, create the stored procedure containing an OPEN ... FOR SELECT statement.

```
SQL> CREATE OR REPLACE PROCEDURE dept_rpt
  2   (dept_cv IN OUT cv_types.DeptCurTyp) AS
  3   BEGIN
  4     OPEN dept_cv FOR SELECT * FROM DEPT;
```

```

5 END;
6 /

```

Procedure created.

Execute the procedure with a SQL*Plus bind variable as the parameter.

```

SQL> VARIABLE odcv REF_CURSOR
SQL> EXECUTE dept_rpt(:odcv)
PL/SQL procedure successfully completed.

```

Now print the bind variable.

```

SQL> PRINT odcv
DEPTNO DNAME          LOC
-----
10     ACCOUNTING     NEW YORK
20     RESEARCH        DALLAS
30     SALES           CHICAGO
40     OPERATIONS     BOSTON

```

The procedure can be executed multiple times using the same or a different REF_CURSOR bind variable.

```

SQL> VARIABLE pcv REF_CURSOR
SQL> EXECUTE dept_rpt(:pcv)
PL/SQL procedure successfully completed.
SQL> PRINT pcv
DEPTNO DNAME          LOC
-----
10     ACCOUNTING     NEW YORK
20     RESEARCH        DALLAS
30     SALES           CHICAGO
40     OPERATIONS     BOSTON

```

Example 3-20 Using REF_CURSOR Variables in Stored Functions

Create a stored function containing an OPEN ... FOR SELECT statement:

```

SQL> CREATE OR REPLACE FUNCTION dept_fn RETURN -
>   cv_types.DeptCurTyp IS
2   resultset cv_types.DeptCurTyp;
3 BEGIN
4   OPEN resultset FOR SELECT * FROM DEPT;
5   RETURN(resultset);
6 END;
7 /

```

Function created.

Execute the function.

```
SQL> VARIABLE rc REFCURSOR
SQL> EXECUTE :rc := dept_fn
PL/SQL procedure successfully completed.
```

Now print the bind variable.

```
SQL> PRINT rc
DEPTNO DNAME          LOC
-----
10     ACCOUNTING     NEW YORK
20     RESEARCH        DALLAS
30     SALES            CHICAGO
40     OPERATIONS      BOSTON
```

The function can be executed multiple times using the same or a different REFCURSOR bind variable.

```
SQL> EXECUTE :rc := dept_fn
PL/SQL procedure successfully completed.
SQL> PRINT rc
DEPTNO DNAME          LOC
-----
10     ACCOUNTING     NEW YORK
20     RESEARCH        DALLAS
30     SALES            CHICAGO
40     OPERATIONS      BOSTON
```

Tracing Statements

You can automatically get a report on the execution path used by the SQL optimizer and the statement execution statistics. The report is generated after successful SQL DML (that is, SELECT, DELETE, UPDATE and INSERT) statements. It is useful for monitoring and tuning the performance of these statements.

Controlling the Report

You can control the report by setting the AUTOTRACE system variable.

```
SET AUTOTRACE OFF
```

No AUTOTRACE report is generated. This is the default.

<code>SET AUTOTRACE ON EXPLAIN</code>	The AUTOTRACE report shows only the optimizer execution path.
<code>SET AUTOTRACE ON STATISTICS</code>	The AUTOTRACE report shows only the SQL statement execution statistics.
<code>SET AUTOTRACE ON</code>	The AUTOTRACE report includes both the optimizer execution path and the SQL statement execution statistics.
<code>SET AUTOTRACE TRACEONLY</code>	Like <code>SET AUTOTRACE ON</code> , but suppresses the printing of the user's query output, if any.

To use this feature, you must have the `PLUSTRACE` role granted to you and a `PLAN_TABLE` table created in your schema. For information on how to grant the `PLUSTRACE` role and how to create the `PLAN_TABLE` table, see the *Oracle8i SQL Reference* manual. For more information about the `PLUSTRACE` role and the `PLAN_TABLE`, see the *Oracle8i SQL Reference* manual and the `AUTOTRACE` variable of the `SET` command in [Chapter 8](#).

Execution Plan

The Execution Plan shows the SQL optimizer's query execution path. Both tables are accessed by a full table scan, sorted, and then merged.

Each line of the Execution Plan has a sequential line number. SQL*Plus also displays the line number of the parent operation.

The Execution Plan consists of four columns displayed in the following order:

Column Name	Description
<code>ID_PLUS_EXP</code>	Shows the line number of each execution step.
<code>PARENT_ID_PLUS_EXP</code>	Shows the relationship between each step and its parent. This column is useful for large reports.
<code>PLAN_PLUS_EXP</code>	Shows each step of the report.
<code>OBJECT_NODE_PLUS_EXP</code>	Shows the database links or parallel query servers used.

The format of the columns may be altered with the `COLUMN` command. For example, to stop the `PARENT_ID_PLUS_EXP` column being displayed, enter

```
SQL> COLUMN PARENT_ID_PLUS_EXP NOPRINT
```

The default formats can be found in the site profile (for example, `glogin.sql`).

The Execution Plan output is generated using the `EXPLAIN PLAN` command. For information about interpreting the output of `EXPLAIN PLAN`, see the *Oracle8i Designing and Tuning for Performance*.

Statistics

The statistics are recorded by the server when your statement executes and indicate the system resources required to execute your statement.

The *client* referred to in the statistics is SQL*Plus. *Net8* refers to the generic process communication between SQL*Plus and the server, regardless of whether Net8 is installed.

You cannot change the default format of the statistics report.

For more information about the statistics and how to interpret them, see the *Oracle8i Designing and Tuning for Performance*.

Example 3–21 Tracing Statements for Performance Statistics and Query Execution Path

If the SQL buffer contains the following statement:

```
SQL> SELECT D.DNAME, E.ENAME, E.SAL, E.JOB
       2 FROM EMP E, DEPT D
       3 WHERE E.DEPTNO = D.DEPTNO
```

The statement can be automatically traced when it is run:

```
SQL> SET AUTOTRACE ON
SQL> /
```

DNAME	ENAME	SAL	JOB
ACCOUNTING	CLARK	2450	MANAGER
ACCOUNTING	KING	5000	PRESIDENT
ACCOUNTING	MILLER	1300	CLERK
RESEARCH	SMITH	800	CLERK
RESEARCH	ADAMS	1100	CLERK
RESEARCH	FORD	3000	ANALYST
RESEARCH	SCOTT	3000	ANALYST
RESEARCH	JONES	2975	MANAGER
SALES	ALLEN	1600	SALESMAN

```

SALES          BLAKE          2850 MANAGER
SALES          MARTIN         1250 SALESMAN
SALES          JAMES          950  CLERK
SALES          TURNER        1500 SALESMAN
SALES          WARD           1250 SALESMAN

```

14 rows selected.

Execution Plan

```

-----
0      SELECT STATEMENT Optimizer=CHOOSE
1      0      MERGE JOIN
2      1      SORT (JOIN)
3      2      TABLE ACCESS (FULL) OF 'DEPT'
4      1      SORT (JOIN)
5      4      TABLE ACCESS (FULL) OF 'EMP'

```

Statistics

```

-----
148 recursive calls
4  db block gets
24 consistent gets
6  physical reads
43 redo size
591 bytes sent via Net8 to client
256 bytes received via Net8 from client
3  Net8 roundtrips to/from client
2  sort (memory)
0  sort (disk)
14 rows processed

```

Note: Your output may vary depending on the version of the server to which you are connected and the configuration of the server.

Example 3-22 *Tracing Statements Without Displaying Query Data*

To trace the same statement without displaying the query data:

```

SQL> SET AUTOTRACE TRACEONLY
SQL> /

```

Execution Plan

```
-----  
0      SELECT STATEMENT Optimizer=CHOOSE  
1    0      MERGE JOIN  
2    1        SORT (JOIN)  
3    2          TABLE ACCESS (FULL) OF 'DEPT'  
4    1          SORT (JOIN)  
5    4            TABLE ACCESS (FULL) OF 'EMP'
```

Statistics

```
-----  
0 recursive calls  
4 db block gets  
2 consistent gets  
0 physical reads  
0 redo size  
599 bytes sent via Net8 to client  
256 bytes received via Net8 from client  
3 Net8 roundtrips to/from client  
2 sort (memory)  
0 sort (disk)  
14 rows processed
```

This option is useful when you are tuning a large query, but do not want to see the query report.

Example 3–23 Tracing Statements Using a Database Link

To trace a statement using a database link:

```
SQL> SET AUTOTRACE TRACEONLY EXPLAIN  
SQL> SELECT * FROM EMP@MY_LINK;
```

Execution Plan

```
-----  
0      SELECT STATEMENT (REMOTE) Optimizer=CHOOSE  
1    0      TABLE ACCESS (FULL) OF 'EMP' MY_LINK.DB_DOMAIN
```

The Execution Plan shows the table being accessed on line 1 is via the database link MY_LINK.DB_DOMAIN.

Tracing Parallel and Distributed Queries

When you trace a statement in a parallel or distributed query, the Execution Plan shows the cost based optimizer estimates of the number of rows (the *cardinality*). In general, the cost, cardinality and bytes at each node represent cumulative results.

For example, the cost of a join node accounts for not only the cost of completing the join operations, but also the entire costs of accessing the relations in that join.

Lines marked with an asterisk (*) denote a parallel or remote operation. Each operation is explained in the second part of the report. See the *Oracle8i Designing and Tuning for Performance* for more information on parallel and distributed operations.

The second section of this report consists of three columns displayed in the following order

Column Name	Description
ID_PLUS_EXP	Shows the line number of each execution step.
OTHER_TAG_PLUS_EXP	Describes the function of the SQL statement in the OTHER_PLUS_EXP column.
OTHER_PLUS_EXP	Shows the text of the query for the parallel server or remote database.

The format of the columns may be altered with the COLUMN command. The default formats can be found in the site profile (for example, glogin.sql).

Note: You must have Oracle7, Release 7.3 or greater to view the second section of this report.

Example 3–24 Tracing Statements With Parallel Query Option

To trace a parallel query running the parallel query option:

```
SQL> CREATE TABLE D2_T1 (UNIQUE1 NUMBER) PARALLEL -
> (DEGREE 6);
```

Table created.

```
SQL> CREATE TABLE D2_T2 (UNIQUE1 NUMBER) PARALLEL -
> (degree 6);
```

Table created.

```
SQL> CREATE UNIQUE INDEX D2_I_UNIQUE1 ON D2_T1(UNIQUE1);
```

Index created.

```

SQL> SET LONG 500 LONGCHUNKSIZE 500
SQL> set autotrace on EXPLAIN
SQL> select /*+ index(b,d2_i_unique1) use_nl(b) ordered -
>    */ count (a.unique1)
    2 from d2_t2 a, d2_t1 b
    3 where a.unique1 = b.unique1;

```

SQL*Plus displays the following output:

Execution Plan

```

-----
0      SELECT STATEMENT Optimizer=CHOOSE (Cost=1
          Card=263 Bytes=5786)
1    0      SORT (AGGREGATE)
2    1      NESTED LOOPS* (Cost=1 Card=263 Bytes=5785)
          :Q8200
3    2      TABLE ACCESS* (FULL) OF 'D2_T2'
          :Q8200
4    2      INDEX* (UNIQUE SCAN) OF 'D2_I_UNIQUE1'
          (UNIQUE) :Q8200
2 PARALLEL_TO_SERIAL  SELECT /*+ ORDERED NO_EXPAND
          USE_NL(A2) INDEX(A2) PIV_SSF */
          COUNT(A1.C0) FROM (SELECT/*+
          ROWID(A3) */ A3."UNIQUE1" FROM
          "D2_T2" A3 WHERE ROWID BETWEEN :1
          AND :2) A1, "D2_T1" A2 WHERE
          A1.C0=A2."UNIQUE1"
3 PARALLEL_COMBINED_WITH_PARENT
4 PARALLEL_COMBINED_WITH_PARENT

```

Line 0 of the Execution Plan shows the cost based optimizer estimates the number of rows at 263, taking 5786 bytes. The total cost of the statement is 1.

Lines 2, 3 and 4 are marked with asterisks, denoting parallel operations. For example, the NESTED LOOPS step on line 2 is a PARALLEL_TO_SERIAL operation. PARALLEL_TO_SERIAL operations execute a SQL statement to produce output serially. Line 2 also shows that the parallel query server had the identifier Q8200.

Formatting Query Results

This chapter explains how to format your query results to produce a finished report. This chapter covers the following topics:

- [Formatting Columns](#)
- [Clarifying Your Report with Spacing and Summary Lines](#)
- [Defining Page and Report Titles and Dimensions](#)
- [Storing and Printing Query Results](#)
- [Creating Web Reports](#)

Read this chapter while sitting at your computer and try out the examples shown. Before beginning, make sure you have access to the sample tables described in [Chapter 1](#).

Formatting Columns

Through the SQL*Plus COLUMN command, you can change the column headings and reformat the column data in your query results.

Changing Column Headings

When displaying column headings, you can either use the default heading or you can change it using the COLUMN command. The sections below describe how the default headings are derived and how you can alter them with the COLUMN command.

Default Headings

SQL*Plus uses column or expression names as default column headings when displaying query results. Column names are often short and cryptic, however, and expressions can be hard to understand.

Changing Default Headings

You can define a more useful column heading with the HEADING clause of the COLUMN command, in the format shown below:

```
COLUMN column_name HEADING column_heading
```

See the [COLUMN](#) command in [Chapter 8](#) for more details.

Example 4–1 Changing a Column Heading

To produce a report from EMP with new headings specified for DEPTNO, ENAME, and SAL, enter the following commands:

```
SQL> COLUMN DEPTNO HEADING Department
SQL> COLUMN ENAME HEADING Employee
SQL> COLUMN SAL HEADING Salary
SQL> COLUMN COMM HEADING Commission
SQL> SELECT DEPTNO, ENAME, SAL, COMM
  2 FROM EMP
  3 WHERE JOB = 'SALESMAN';
```

SQL*Plus displays the following output:

Department	Employee	Salary	Commission
30	ALLEN	1600	300
30	WARD	1250	500


```

30 MARTIN          1250          1400
30 TURNER         1500              0
    
```

Note: The new headings will remain in effect until you enter different headings, reset each column's format, or exit from SQL*Plus.

To change a column heading to two or more words, enclose the new heading in single or double quotation marks when you enter the COLUMN command. To display a column heading on more than one line, use a vertical bar (|) where you want to begin a new line. (You can use a character other than a vertical bar by changing the setting of the HEADSEP variable of the SET command. See the [SET](#) command in [Chapter 8](#) for more information.)

Example 4-2 Splitting a Column Heading

To give the column ENAME the heading EMPLOYEE NAME and to split the new heading onto two lines, enter

```
SQL> COLUMN ENAME HEADING 'Employee|Name'
```

Now rerun the query with the slash (/) command:

```
SQL> /
```

SQL*Plus displays the following output:

```

                Employee
Department Name          Salary Commission
-----
30 ALLEN                 1600          300
30 WARD                  1250          500
30 MARTIN                1250          1400
30 TURNER               1500              0
    
```

To change the character used to underline each column heading, set the UNDERLINE variable of the SET command to the desired character.

Example 4-3 Setting the Underline Character

To change the character used to underline headings to an equal sign and rerun the query, enter the following commands:

```
SQL> SET UNDERLINE =
```

SQL> /

SQL*Plus displays the following results:

Department	Employee Name	Salary	Commission
30	ALLEN	1600	300
30	WARD	1250	500
30	MARTIN	1250	1400
30	TURNER	1500	0

Now change the underline character back to a dash:

SQL> SET UNDERLINE '-'

Note: You must enclose the dash in quotation marks; otherwise, SQL*Plus interprets the dash as a hyphen indicating that you wish to continue the command on another line.

Formatting NUMBER Columns

When displaying NUMBER columns, you can either accept the SQL*Plus default display width or you can change it using the COLUMN command. The sections below describe the default display and how you can alter the default with the COLUMN command.

Default Display

A NUMBER column's width equals the width of the heading or the width of the FORMAT plus one space for the sign, whichever is greater. If you do not explicitly use FORMAT, then the column's width will always be at least the value of SET NUMWIDTH.

SQL*Plus normally displays numbers with as many digits as are required for accuracy, up to a standard display width determined by the value of the NUMWIDTH variable of the SET command (normally 10). If a number is larger than the value of SET NUMWIDTH, SQL*Plus rounds the number up or down to the maximum number of characters allowed.

You can choose a different format for any NUMBER column by using a format model in a COLUMN command. A format model is a representation of the way you want the numbers in the column to appear, using 9's to represent digits.

Changing the Default Display

The COLUMN command identifies the column you want to format and the model you want to use, as shown below:

```
COLUMN column_name FORMAT model
```

Use format models to add commas, dollar signs, angle brackets (around negative values), and/or leading zeros to numbers in a given column. You can also round the values to a given number of decimal places, display minus signs to the right of negative values (instead of to the left), and display values in exponential notation.

To use more than one format model for a single column, combine the desired models in one COLUMN command (see [Example 4-4](#)). For a complete list of format models and further details, see the [COLUMN](#) command in [Chapter 8](#).

Example 4-4 Formatting a NUMBER Column

To display SAL with a dollar sign, a comma, and the numeral zero instead of a blank for any zero values, enter the following command:

```
SQL> COLUMN SAL FORMAT $99,990
```

Now rerun the current query:

```
SQL> /
```

SQL*Plus displays the following output:

Employee			
Department	Name	Salary	Commission
30	ALLEN	\$1,600	300
30	WARD	\$1,250	500
30	MARTIN	\$1,250	1400
30	TURNER	\$1,500	0

Use a zero in your format model, as shown above, when you use other formats such as a dollar sign and wish to display a zero in place of a blank for zero values.

Note: The format model will stay in effect until you enter a new one, reset the column's format with

```
COLUMN colname CLEAR
```

or exit from SQL*Plus.

Formatting Datatypes

When displaying datatypes, you can either accept the SQL*Plus default display width or you can change it using the COLUMN command. Datatypes, in this manual, include the following variables:

- CHAR
- NCHAR
- VARCHAR2 (VARCHAR)
- NVARCHAR2 (NCHAR VARYING)
- DATE
- LONG
- CLOB
- NCLOB

Note: The NCHAR, NVARCHAR2 (NCHAR VARYING), CLOB and NCLOB datatypes require Oracle8 or higher.

Default Display

The default width of datatype columns is the width of the column in the database.

The default width and format of unformatted DATE columns in SQL*Plus is derived from the NLS parameters in effect. Otherwise, the default format width is A9. For more information on formatting DATE columns, see the FORMAT clause of the COLUMN command in [Chapter 8](#).

Note: The default justification for datatypes is left justification.

Changing the Default Display

You can change the displayed width of a datatype or DATE, by using the COLUMN command with a format model consisting of the letter A (for alphanumeric) followed by a number representing the width of the column in characters.

Within the COLUMN command, identify the column you want to format and the model you want to use:

```
COLUMN column_name FORMAT model
```

If you specify a width shorter than the column heading, SQL*Plus truncates the heading. If you specify a width for a LONG, CLOB, or NCLOB column, SQL*Plus uses the LONGCHUNKSIZE or the specified width, whichever is smaller, as the column width. See the **COLUMN** command in [Chapter 8](#) for more details.

Example 4-5 Formatting a Character Column

To set the width of the column ENAME to four characters and rerun the current query, enter

```
SQL> COLUMN ENAME FORMAT A4
SQL> /
```

SQL*Plus displays the results:

Department	Empl Name	Salary	Commission
30	ALLE N	\$1,600	300
30	WARD	\$1,250	500
30	MART IN	\$1,250	1400
30	TURN ER	\$1,500	0

Note: The format model will stay in effect until you enter a new one, reset the column's format with

```
COLUMN colname CLEAR
```

or exit from SQL*Plus.

If the WRAP variable of the SET command is set to ON (its default value), the employee names wrap to the next line after the fourth character, as shown in [Example 4-5](#). If WRAP is set to OFF, the names are truncated (cut off) after the fourth character.

The system variable WRAP controls all columns; you can override the setting of WRAP for a given column through the WRAPPED, WORD_WRAPPED, and TRUNCATED clauses of the COLUMN command. See the **COLUMN** command in

Chapter 8 for more information on these clauses. You will use the `WORD_WRAPPED` clause of `COLUMN` later in this chapter.

Note: The column heading is truncated regardless of the setting of `WRAP` or any `COLUMN` command clauses.

Now return the column to its previous format:

```
SQL> COLUMN ENAME FORMAT A10
```

Copying Column Display Attributes

When you want to give more than one column the same display attributes, you can reduce the length of the commands you must enter by using the `LIKE` clause of the `COLUMN` command. The `LIKE` clause tells SQL*Plus to copy the display attributes of a previously defined column to the new column, except for changes made by other clauses in the same command.

Example 4-6 Copying a Column's Display Attributes

To give the column `COMM` the same display attributes you gave to `SAL`, but to specify a different heading, enter the following command:

```
SQL> COLUMN COMM LIKE SAL HEADING Bonus
```

Rerun the query:

```
SQL> /
```

SQL*Plus displays the following output:

	Employee		
Department	Name	Salary	Bonus
30	ALLEN	\$1,600	\$300
30	WARD	\$1,250	\$500
30	MARTIN	\$1,250	\$1,400
30	TURNER	\$1,500	\$0

Listing and Resetting Column Display Attributes

To list the current display attributes for a given column, use the `COLUMN` command followed by the column name only, as shown below:

```
COLUMN column_name
```

To list the current display attributes for all columns, enter the COLUMN command with no column names or clauses after it:

```
COLUMN
```

To reset the display attributes for a column to their default values, use the CLEAR clause of the COLUMN command as shown below:

```
COLUMN column_name CLEAR
```

To reset the attributes for all columns, use the COLUMNS clause of the CLEAR command.

Example 4-7 Resetting Column Display Attributes to their Defaults

To reset all columns' display attributes to their default values, enter the following command:

```
SQL> CLEAR COLUMNS  
columns cleared
```

Suppressing and Restoring Column Display Attributes

You can suppress and restore the display attributes you have given a specific column. To suppress a column's display attributes, enter a COLUMN command in the following form:

```
COLUMN column_name OFF
```

The OFF clause tells SQL*Plus to use the default display attributes for the column, but does not remove the attributes you have defined through the COLUMN command. To restore the attributes you defined through COLUMN, use the ON clause:

```
COLUMN column_name ON
```

Printing a Line of Characters after Wrapped Column Values

As you have seen, by default SQL*Plus wraps column values to additional lines when the value does not fit within the column width. If you want to insert a *record separator* (a line of characters or a blank line) after each wrapped line of output (or after every row), use the RECSEP and RECSEPCHAR variables of the SET command.

RECSEP determines when the line of characters is printed; you set RECSEP to EACH to print after every line, to WRAPPED to print after wrapped lines, and to OFF to suppress printing. The default setting of RECSEP is WRAPPED.

RECSEPCHAR sets the character printed in each line. You can set RECSEPCHAR to any character.

You may wish to wrap whole words to additional lines when a column value wraps to additional lines. To do so, use the WORD_WRAPPED clause of the COLUMN command as shown below:

```
COLUMN column_name WORD_WRAPPED
```

Example 4–8 Printing a Line of Characters after Wrapped Column Values

To print a line of dashes after each wrapped column value, enter the following commands:

```
SQL> SET RECSEP WRAPPED
SQL> SET RECSEPCHAR '-'
```

Now restrict the width of the column LOC and tell SQL*Plus to wrap whole words to additional lines when necessary:

```
SQL> COLUMN LOC FORMAT A7 WORD_WRAPPED
```

Finally, enter and run the following query:

```
SQL> SELECT * FROM DEPT;
```

SQL*Plus displays the results:

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

If you set RECSEP to EACH, SQL*Plus prints a line of characters after every row (after every department, for the above example).

Before continuing, set RECSEP to OFF to suppress the printing of record separators:

```
SQL> SET RECSEP OFF
```


Clarifying Your Report with Spacing and Summary Lines

When you use an `ORDER BY` clause in your `SQL SELECT` command, rows with the same value in the ordered column (or expression) are displayed together in your output. You can make this output more useful to the user by using the `SQL*Plus BREAK` and `COMPUTE` commands to create subsets of records and add space and/or summary lines after each subset.

`COMPUTE` command functions are always executed in the sequence `AVG`, `COUNT`, `MINIMUM`, `MAXIMUM`, `NUMBER`, `SUM`, `STD`, `VARIANCE`, regardless of their order in the `COMPUTE` command.

The column you specify in a `BREAK` command is called a *break column*. By including the break column in your `ORDER BY` clause, you create meaningful subsets of records in your output. You can then add formatting to the subsets within the same `BREAK` command, and add a summary line (containing totals, averages, and so on) by specifying the break column in a `COMPUTE` command.

For example, the following query, without `BREAK` or `COMPUTE` commands,

```
SQL> SELECT DEPTNO, ENAME, SAL
      2 FROM EMP
      3 WHERE SAL < 2500
      4 ORDER BY DEPTNO;
```

produces the following unformatted results:

DEPTNO	ENAME	SAL
10	CLARK	2450
10	MILLER	1300
20	SMITH	800
20	ADAMS	1100
30	ALLEN	1600
30	JAMES	950
30	TURNER	1500
30	WARD	1250
30	MARTIN	1250

9 rows selected.

To make this report more useful, you would use `BREAK` to establish `DEPTNO` as the break column. Through `BREAK` you could suppress duplicate values in `DEPTNO` and place blank lines or begin a new page between departments. You could use `BREAK` in conjunction with `COMPUTE` to calculate and print summary

lines containing the total (and/or average, maximum, minimum, standard deviation, variance, or count of rows of) salary for each department and for all departments.

Suppressing Duplicate Values in Break Columns

The BREAK command suppresses duplicate values by default in the column or expression you name. Thus, to suppress the duplicate values in a column specified in an ORDER BY clause, use the BREAK command in its simplest form:

```
BREAK ON break_column
```

Note: Whenever you specify a column or expression in a BREAK command, use an ORDER BY clause specifying the same column or expression. If you do not do this, breaks occur every time the column value changes.

Example 4–9 Suppressing Duplicate Values in a Break Column

To suppress the display of duplicate department numbers in the query results shown above, enter the following commands:

```
SQL> BREAK ON DEPTNO
SQL> SELECT DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE SAL < 2500
  4 ORDER BY DEPTNO;
```

SQL*Plus displays the following output:

DEPTNO	ENAME	SAL
10	CLARK	2450
	MILLER	1300
20	SMITH	800
	ADAMS	1100
30	ALLEN	1600
	JAMES	950
	TURNER	1500
	WARD	1250
	MARTIN	1250

9 rows selected.

Inserting Space when a Break Column's Value Changes

You can insert blank lines or begin a new page each time the value changes in the break column. To insert *n* blank lines, use the BREAK command in the following form:

```
BREAK ON break_column SKIP n
```

To skip a page, use the command in this form:

```
BREAK ON break_column SKIP PAGE
```

Example 4-10 *Inserting Space when a Break Column's Value Changes*

To place one blank line between departments, enter the following command:

```
SQL> BREAK ON DEPTNO SKIP 1
```

Now rerun the query:

```
SQL> /
```

SQL*Plus displays the results:

DEPTNO	ENAME	SAL
10	CLARK	2450
	MILLER	1300
20	SMITH	800
	ADAMS	1100
30	ALLEN	1600
	JAMES	950
	TURNER	1500
	WARD	1250
	MARTIN	1250

9 rows selected.

Inserting Space after Every Row

You may wish to insert blank lines or a blank page after every row. To skip *n* lines after every row, use BREAK in the following form:

```
BREAK ON ROW SKIP n
```

To skip a page after every row, use

```
BREAK ON ROW SKIP PAGE
```

Note: SKIP PAGE does not cause a physical page break unless you have also specified NEWPAGE 0.

Using Multiple Spacing Techniques

Suppose you have more than one column in your ORDER BY clause and wish to insert space when each column's value changes. Each BREAK command you enter replaces the previous one. Thus, if you want to use different spacing techniques in one report or insert space after the value changes in more than one ordered column, you must specify multiple columns and actions in a single BREAK command.

Example 4-11 Combining Spacing Techniques

First, add another column to the current query:

```
SQL> L
  1 SELECT DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE SAL < 2500
  4* ORDER BY DEPTNO
SQL> 1 SELECT DEPTNO, JOB, ENAME, SAL
SQL> 4 ORDER BY DEPTNO, JOB
```

Now, to skip a page when the value of DEPTNO changes and one line when the value of JOB changes, enter the following command:

```
SQL> BREAK ON DEPTNO SKIP PAGE ON JOB SKIP 1
```

To show that SKIP PAGE has taken effect, create a TTITLE with a page number, enter

```
SQL> TTITLE COL 35 FORMAT 9 'Page:' SQL.PNO
```

Run the new query to see the results:

```
SQL> /
```

DEPTNO	JOB	ENAME	Page: 1
-----	-----	-----	-----
10	CLERK	MILLER	300

	MANAGER	CLARK	2450
			Page: 2
DEPTNO	JOB	ENAME	SAL
-----	-----	-----	-----
20	CLERK	SMITH	800
		ADAMS	1100
			Page: 3
DEPTNO	JOB	ENAME	SAL
-----	-----	-----	-----
30	CLERK	JAMES	950
	SALESMAN	ALLEN	1600
		TURNER	1500
		WARD	1250
		MARTIN	1250

9 rows selected.

Listing and Removing Break Definitions

Before continuing, turn off the top title display without changing its definition, using:

```
SQL> TTITLE OFF
```

You can list your current break definition by entering the `BREAK` command with no clauses:

```
BREAK
```

You can remove the current break definition by entering the `CLEAR` command with the `BREAKS` clause:

```
CLEAR BREAKS
```

You may wish to place the command `CLEAR BREAKS` at the beginning of every command file to ensure that previously entered `BREAK` commands will not affect queries you run in a given file.

Computing Summary Lines when a Break Column's Value Changes

If you organize the rows of a report into subsets with the `BREAK` command, you can perform various computations on the rows in each subset. You do this with the

functions of the SQL*Plus COMPUTE command. Use the BREAK and COMPUTE commands together in the following forms:

```
BREAK ON break_column
COMPUTE function LABEL label_name OF column column column
... ON break_column
```

You can include multiple break columns and actions, such as skipping lines in the BREAK command, as long as the column you name after ON in the COMPUTE command also appears after ON in the BREAK command. To include multiple break columns and actions in BREAK when using it in conjunction with COMPUTE, use these commands in the following forms:

```
BREAK ON break_column_1 SKIP PAGE ON break_column_2 SKIP 1
COMPUTE function LABEL label_name OF column column column
... ON break_column_2
```

The COMPUTE command has no effect without a corresponding BREAK command.

You can COMPUTE on NUMBER columns and, in certain cases, on all types of columns. For more information about the COMPUTE command, see the "Command Reference" in [Chapter 8](#)

The following table lists compute functions and their effects

Table 4–1 Compute Functions

Function	Effect
SUM	Computes the sum of the values in the column.
MINIMUM	Computes the minimum value in the column.
MAXIMUM	Computes the maximum value in the column.
AVG	Computes the average of the values in the column.
STD	Computes the standard deviation of the values in the column.
VARIANCE	Computes the variance of the values in the column.
COUNT	Computes the number of non-null values in the column.
NUMBER	Computes the number of rows in the column.

The function you specify in the COMPUTE command applies to all columns you enter after OF and before ON. The computed values print on a separate line when the value of the ordered column changes.

Labels for ON REPORT and ON ROW computations appear in the first column; otherwise, they appear in the column specified in the ON clause.

You can change the compute label by using COMPUTE LABEL. If you do not define a label for the computed value, SQL*Plus prints the unabbreviated function keyword.

The compute label can be suppressed by using the NOPRINT option of the COLUMN command on the break column. See the [COMPUTE](#) command in [Chapter 8](#) for more details.

Example 4–12 Computing and Printing Subtotals

To compute the total of SAL by department, first list the current BREAK definition:

```
SQL> BREAK
break on DEPTNO skip 0 page nodup
      on JOB skip 1 nodup
```

Now enter the following COMPUTE command and run the current query:

```
SQL> COMPUTE SUM OF SAL ON DEPTNO
SQL> /
```

SQL*Plus displays the following output:

DEPTNO	JOB	ENAME	SAL
10	CLERK	MILLER	1300
	MANAGER	CLARK	2450
*****			-----
sum			3750
DEPTNO	JOB	ENAME	SAL
20	CLERK	SMITH	800
		ADAMS	1100
*****			-----
sum			1900
DEPTNO	JOB	ENAME	SAL
30	CLERK	JAMES	950
	SALESMAN	ALLEN	1600

```

                TURNER          1500
                WARD            1250
                MARTIN          1250
*****
sum                6550
9 rows selected.

```

To compute the sum of salaries for departments 10 and 20 without printing the compute label:

```

SQL> COLUMN DUMMY NOPRINT
SQL> COMPUTE SUM OF SAL ON DUMMY
SQL> BREAK ON DUMMY SKIP 1
SQL> SELECT DEPTNO DUMMY, DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE DEPTNO <= 20
  4 ORDER BY DEPTNO;

```

SQL*Plus displays the following output:

```

      DEPTNO ENAME          SAL
-----
      10 KING            5000
      10 CLARK           2450
      10 MILLER          1300
                               -----
                               8750

      20 JONES            2975
      20 FORD             3000
      20 SMITH             800
      20 SCOTT            3000
      20 ADAMS            1100
                               -----
                               10875

8 rows selected.

```

To compute the salaries at the end of the report:

```

SQL> COLUMN DUMMY NOPRINT
SQL> COMPUTE SUM OF SAL ON DUMMY
SQL> BREAK ON DUMMY
SQL> SELECT NULL DUMMY, DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE DEPTNO <= 20
  4 ORDER BY DEPTNO;

```


SQL*Plus displays the following output:

DEPTNO	ENAME	SAL
10	KING	5000
10	CLARK	2450
10	MILLER	1300
20	JONES	2975
20	FORD	3000
20	SMITH	800
20	SCOTT	3000
20	ADAMS	1100

		19625

8 rows selected.

Note: The format of the column SAL controls the appearance of the sum of SAL, as well as the individual values of SAL. When you establish the format of a NUMBER column, you must allow for the size of sums you will include in your report.

Computing Summary Lines at the End of the Report

You can calculate and print summary lines based on all values in a column by using BREAK and COMPUTE in the following forms:

```
BREAK ON REPORT
COMPUTE function LABEL label_name OF column column column
... ON REPORT
```

Example 4-13 Computing and Printing a Grand Total

To calculate and print the grand total of salaries for all salesmen and change the compute label, first enter the following BREAK and COMPUTE commands:

```
SQL> BREAK ON REPORT
SQL> COMPUTE SUM LABEL TOTAL OF SAL ON REPORT
```

Next, enter and run a new query:

```
SQL> SELECT ENAME, SAL
      2 FROM EMP
```

```
3 WHERE JOB = 'SALESMAN' ;
```

SQL*Plus displays the results:

```

ENAME          SAL
-----
ALLEN          1600
WARD           1250
MARTIN         1250
TURNER         1500
*****
TOTAL          5600
    
```

To print a grand total (or grand average, grand maximum, and so on) in addition to subtotals (or sub-averages, and so on), include a break column and an ON REPORT clause in your BREAK command. Then, enter one COMPUTE command for the break column and another to compute ON REPORT:

```

BREAK ON break_column ON REPORT
COMPUTE function LABEL label_name OF column ON break_column
COMPUTE function LABEL label_name OF column ON REPORT
    
```

Computing Multiple Summary Values and Lines

You can compute and print the same type of summary value on different columns. To do so, enter a separate COMPUTE command for each column.

Example 4–14 Computing the Same Type of Summary Value on Different Columns

To print the total of salaries and commissions for all salesmen, first enter the following COMPUTE command:

```
SQL> COMPUTE SUM OF SAL COMM ON REPORT
```

You do not have to enter a BREAK command; the BREAK you entered in [Example 4–13](#) is still in effect. Now, add COMM to the current query:

```
SQL> 1 SELECT ENAME, SAL, COMM
```

Finally, run the revised query to see the results:

```

SQL> /

ENAME          SAL          COMM
-----
ALLEN          1600          300
    
```

```

WARD          1250      500
MARTIN        1250      1400
TURNER        1500         0
***** -----
sum           5600      2200

```

You can also print multiple summary lines on the same break column. To do so, include the function for each summary line in the COMPUTE command as follows:

```

COMPUTE function LABEL label_name function
      LABEL label_name function LABEL label_name ...
      OF column ON break_column

```

If you include multiple columns after OFF and before ON, COMPUTE calculates and prints values for each column you specify.

Example 4–15 Computing Multiple Summary Lines on the Same Break Column

To compute the average and sum of salaries for the sales department, first enter the following BREAK and COMPUTE commands:

```

SQL> BREAK ON DEPTNO
SQL> COMPUTE AVG SUM OF SAL ON DEPTNO

```

Now, enter and run the following query:

```

SQL> SELECT DEPTNO, ENAME, SAL
      2 FROM EMP
      3 WHERE DEPTNO = 30
      4 ORDER BY DEPTNO, SAL;

```

SQL*Plus displays the results:

```

      DEPTNO ENAME          SAL
-----
      30 JAMES             950
          WARD             1250
          MARTIN           1250
          TURNER           1500
          ALLEN             1600
          BLAKE             2850
***** -----
avg                1566.6667
sum                9400

```

6 rows selected.

Listing and Removing COMPUTE Definitions

You can list your current COMPUTE definitions by entering the COMPUTE command with no clauses:

```
COMPUTE
```

Example 4–16 Removing COMPUTE Definitions

To remove all COMPUTE definitions and the accompanying BREAK definition, enter the following commands:

```
SQL> CLEAR BREAKS  
breaks cleared  
SQL> CLEAR COMPUTES  
computes cleared
```

You may wish to place the commands CLEAR BREAKS and CLEAR COMPUTES at the beginning of every command file to ensure that previously entered BREAK and COMPUTE commands will not affect queries you run in a given file.

Defining Page and Report Titles and Dimensions

The word *page* refers to a screenful of information on your display or a page of a spooled (printed) report. You can place top and bottom titles on each page, set the number of lines per page, and determine the width of each line.

The word *report* refers to the complete results of a query. You can also place headers and footers on each report and format them in the same way as top and bottom titles on pages.

Setting the Top and Bottom Titles and Headers and Footers

As you have already seen, you can set a title to display at the top of each page of a report. You can also set a title to display at the bottom of each page. The TTITLE command defines the top title; the BTITLE command defines the bottom title.

You can also set a header and footer for each report. The REPHEADER command defines the report header; the REPFOOTER command defines the report footer.

A TTITLE, BTITLE, REPHEADER or REPFOOTER command consists of the command name followed by one or more clauses specifying a position or format and a CHAR value you wish to place in that position or give that format. You can include multiple sets of clauses and CHAR values:

```
TTITLE position_clause(s) char_value position_clause(s) char_value ...
BTITLE position_clause(s) char_value position_clause(s) char_value ...
REPHEADER position_clause(s) char_value position_clause(s) char_value ...
REPFOOTER position_clause(s) char_value position_clause(s) char_value ...
```

For descriptions of all TTITLE, BTITLE, REPHEADER and REPFOOTER clauses, see the [TTITLE](#) and [REPHEADER](#) commands in [Chapter 8](#).

Example 4-17 Placing a Top and Bottom Title on a Page

To put titles at the top and bottom of each page of a report, enter

```
SQL> TTITLE CENTER -
> 'ACME WIDGET SALES DEPARTMENT PERSONNEL REPORT'
SQL> BTITLE CENTER 'COMPANY CONFIDENTIAL'
```

Now run the current query:

```
SQL> /
```

SQL*Plus displays the following output:

```

              ACME WIDGET SALES DEPARTMENT PERSONNEL REPORT
DEPTNO  ENAME              SAL
-----  -
      30  JAMES              950
      30  WARD              1250
      30  MARTIN            1250
      30  TURNER            1500
      30  ALLEN             1600
      30  BLAKE             2850
```

```

                                COMPANY CONFIDENTIAL
```

```
6 rows selected.
```

Example 4-18 Placing a Header on a Report

To put a report header on a separate page, and to center it, enter

```
SQL> REPHEADER PAGE CENTER 'ACME WIDGET'
```

Now run the current query:

```
SQL> /
```

SQL*Plus displays the following output on page one

```
ACME WIDGET SALES DEPARTMENT PERSONNEL REPORT
ACME WIDGET
```

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and the following output on page two

```
ACME WIDGET SALES DEPARTMENT PERSONNEL REPORT
DEPTNO ENAME SAL
-----
30 JAMES 950
30 WARD 1250
30 MARTIN 1250
30 TURNER 1500
30 ALLEN 1600
30 BLAKE 2850
```

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6 rows selected.

To suppress the report header without changing its definition, enter

```
SQL> REPHEADER OFF
```

Positioning Title Elements

The report in the preceding exercises might look more attractive if you give the company name more emphasis and place the type of report and the department name on either end of a separate line. It may also help to reduce the linesize and thus center the titles more closely around the data.

You can accomplish these changes by adding some clauses to the TTITLE command and by resetting the system variable LINESIZE, as the following example shows.

You can format report headers and footers in the same way as BTITLE and TTITLE using the REPHEADER and REPFOOTER commands.

Example 4–19 Positioning Title Elements

To redisplay the personnel report with a repositioned top title, enter the following commands:

```
SQL> TTITLE CENTER 'A C M E W I D G E T' SKIP 1 -
> CENTER ===== SKIP 1 LEFT 'PERSONNEL REPORT' -
> RIGHT 'SALES DEPARTMENT' SKIP 2
SQL> SET LINESIZE 60
SQL> /
```

SQL*Plus displays the results:

```

                A C M E W I D G E T
                =====
PERSONNEL REPORT                                SALES DEPARTMENT

  DEPTNO ENAME          SAL
-----
      30 JAMES          950
      30 WARD           1250
      30 MARTIN         1250
      30 TURNER         1500
      30 ALLEN          1600
      30 BLAKE          2850
                COMPANY CONFIDENTIAL
```

6 rows selected.

The LEFT, RIGHT, and CENTER clauses place the following values at the beginning, end, and center of the line. The SKIP clause tells SQL*Plus to move down one or more lines.

Note that there is no longer any space between the last row of the results and the bottom title. The last line of the bottom title prints on the last line of the page. The amount of space between the last row of the report and the bottom title depends on the overall page size, the number of lines occupied by the top title, and the number of rows in a given page. In the above example, the top title occupies three more lines than the top title in the previous example. You will learn to set the number of lines per page later in this chapter.

To always print *n* blank lines before the bottom title, use the SKIP *n* clause at the beginning of the BTITLE command. For example, to skip one line before the bottom title in the example above, you could enter the following command:

```
BTITLE SKIP 1 CENTER 'COMPANY CONFIDENTIAL'
```

Indenting a Title Element

You can use the COL clause in TTITLE or BTITLE to indent the title element a specific number of spaces. For example, COL 1 places the following values in the first character position, and so is equivalent to LEFT, or an indent of zero. COL 15 places the title element in the 15th character position, indenting it 14 spaces.

Example 4–20 Indenting a Title Element

To print the company name left-aligned with the report name indented five spaces on the next line, enter

```
SQL> TTITLE LEFT 'ACME WIDGET' SKIP 1 -
> COL 6 'SALES DEPARTMENT PERSONNEL REPORT' SKIP 2
```

Now rerun the current query to see the results:

```
SQL> /
ACME WIDGET
      SALES DEPARTMENT PERSONNEL REPORT

  DEPTNO  ENAME          SAL
-----
        30  JAMES          950
        30  WARD          1250
        30  MARTIN        1250
        30  TURNER        1500
        30  ALLEN         1600
        30  BLAKE         2850

                                COMPANY CONFIDENTIAL

6 rows selected.
```

Entering Long Titles

If you need to enter a title greater than 500 characters in length, you can use the SQL*Plus command DEFINE to place the text of each line of the title in a separate user variable:

```
SQL> DEFINE LINE1 = 'This is the first line...'
SQL> DEFINE LINE2 = 'This is the second line...'
SQL> DEFINE LINE3 = 'This is the third line...'
```

Then, reference the variables in your TTITLE or BTITLE command as follows:

```
SQL> TTITLE CENTER LINE1 SKIP 1 CENTER LINE2 SKIP 1 -
```



```
> CENTER LINE3
```

Displaying the Page Number and other System-Maintained Values in Titles

You can display the current page number and other system-maintained values in your title by entering a system value name as a title element, for example:

```
TTITLE LEFT system-maintained_value_name
```

There are five system-maintained values you can display in titles, the most commonly used of which is SQL.PNO (the current page number). For a list of system-maintained values you can display in titles, see the **TTITLE** command in the "Command Reference" in [Chapter 8](#).

Example 4–21 *Displaying the Current Page Number in a Title*

To display the current page number at the top of each page, along with the company name, enter the following command:

```
SQL> TTITLE LEFT 'ACME WIDGET' RIGHT 'PAGE:' SQL.PNO SKIP 2
```

Now rerun the current query:

```
SQL> /
```

SQL*Plus displays the following results:

```
ACME WIDGET                                PAGE:                1

  DEPTNO ENAME                SAL
-----
    30 JAMES                   950
    30 WARD                    1250
    30 MARTIN                  1250
    30 TURNER                  1500
    30 ALLEN                   1600
    30 BLAKE                   2850
```

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6 rows selected.

Note that SQL.PNO has a format ten spaces wide. You can change this format with the **FORMAT** clause of **TTITLE** (or **BTITLE**).

Example 4–22 Formatting a System-Maintained Value in a Title

To close up the space between the word PAGE: and the page number, reenter the TTITLE command as shown:

```
SQL> TTITLE LEFT 'ACME WIDGET' RIGHT 'PAGE:' FORMAT 999 -  
> SQL.PNO SKIP 2
```

Now rerun the query:

```
SQL> /
```

SQL*Plus displays the following results:

```
ACME WIDGET                                PAGE:  1  
  
      DEPTNO  ENAME                SAL  
-----  -  
          30  JAMES                 950  
          30  WARD                  1250  
          30  MARTIN                 1250  
          30  TURNER                 1500  
          30  ALLEN                  1600  
          30  BLAKE                  2850
```

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6 rows selected.

Listing, Suppressing, and Restoring Page Title Definitions

To list a page title definition, enter the appropriate title command with no clauses:

```
TTITLE  
BTITLE
```

To suppress a title definition, enter:

```
TTITLE OFF  
BTITLE OFF
```

These commands cause SQL*Plus to cease displaying titles on reports, but do not clear the current definitions of the titles. You may restore the current definitions by entering:

```
TTITLE ON
```

```
BTITLE ON
```

Displaying Column Values in Titles

You may wish to create a master/detail report that displays a changing master column value at the top of each page with the detail query results for that value below. You can reference a column value in a top title by storing the desired value in a variable and referencing the variable in a TTITLE command. Use the following form of the COLUMN command to define the variable:

```
COLUMN column_name NEW_VALUE variable_name
```

You must include the master column in an ORDER BY clause and in a BREAK command using the SKIP PAGE clause.

Example 4–23 *Creating a Master/Detail Report*

Suppose you want to create a report that displays two different managers' employee numbers, each at the top of a separate page, and the people reporting to the manager on the same page as the manager's employee number. First create a variable, MGRVAR, to hold the value of the current manager's employee number:

```
SQL> COLUMN MGR NEW_VALUE MGRVAR NOPRINT
```

Because you will display the managers' employee numbers in the title, you do not want them to print as part of the detail. The NOPRINT clause you entered above tells SQL*Plus not to print the column MGR.

Next, include a label and the value in your page title, enter the proper BREAK command, and suppress the bottom title from the last example:

```
SQL> TTITLE LEFT 'Manager: ' MGRVAR SKIP 2
SQL> BREAK ON MGR SKIP PAGE
SQL> BTITLE OFF
```

Finally, enter and run the following query:

```
SQL> SELECT MGR, ENAME, SAL, DEPTNO
2 FROM EMP
3 WHERE MGR IN (7698, 7839)
4 ORDER BY MGR;
```

SQL*Plus displays the following output:

```
Manager:          7698
```

```

ENAME          SAL          DEPTNO
-----
ALLEN          1600           30
WARD           1250           30
TURNER         1500           30
MARTIN         1250           30
JAMES          950            30

```

```

Manager:       7839

```

```

ENAME          SAL          DEPTNO
-----
JONES          2975           20
BLAKE          2850           30
CLARK          2450           10

```

8 rows selected.

If you want to print the value of a column at the bottom of the page, you can use the **COLUMN** command in the following form:

```
COLUMN column_name OLD_VALUE variable_name
```

SQL*Plus prints the bottom title as part of the process of breaking to a new page—after finding the new value for the master column. Therefore, if you simply referenced the **NEW_VALUE** of the master column, you would get the value for the next set of details. **OLD_VALUE** remembers the value of the master column that was in effect before the page break began.

Displaying the Current Date in Titles

You can, of course, date your reports by simply typing a value in the title. This is satisfactory for ad hoc reports, but if you want to run the same report repeatedly, you would probably prefer to have the date automatically appear when the report is run. You can do this by creating a variable to hold the current date.

To create the variable (in this example named **_DATE**), you can add the following commands to your SQL*Plus LOGIN file:

```

SET TERMOUT OFF
BREAK ON TODAY
COLUMN TODAY NEW_VALUE _DATE
SELECT TO_CHAR(SYSDATE, 'fmMonth DD, YYYY') TODAY
FROM DUAL;
CLEAR BREAKS

```

```
SET TERMOUT ON
```

When you start SQL*Plus, these commands place the value of SYSDATE (the current date) into a variable named `_DATE`. To display the current date, you can reference `_DATE` in a title as you would any other variable.

The date format model you include in the SELECT command in your LOGIN file determines the format in which SQL*Plus displays the date. See your *Oracle8i SQL Reference* for more information on date format models. For more information about the LOGIN file, see the section "Modifying Your LOGIN File" in Chapter 3.

You can also enter these commands interactively at the command prompt. For more information, see the `COLUMN` command in Chapter 8.

Setting Page Dimensions

Typically, a page of a report contains the number of blank line(s) set in the `NEWPAGE` variable of the SET command, a top title, column headings, your query results, and a bottom title. SQL*Plus displays a report that is too long to fit on one page on several consecutive pages, each with its own titles and column headings. The amount of data SQL*Plus displays on each page depends on the current page dimensions.

The default page dimensions used by SQL*Plus are shown below:

- number of lines before the top title: 1
- number of lines per page, from the top title to the bottom of the page: 24
- number of characters per line: 80

You can change these settings to match the size of your computer screen or, for printing, the size of a sheet of paper.

You can change the page length with the system variable `PAGESIZE`. For example, you may wish to do so when you print a report, since printed pages are customarily 66 lines long.

To set the number of lines between the beginning of each page and the top title, use the `NEWPAGE` variable of the SET command:

```
SET NEWPAGE number_of_lines
```

If you set `NEWPAGE` to zero, SQL*Plus skips zero lines and displays and prints a formfeed character to begin a new page. On most types of computer screens, the formfeed character clears the screen and moves the cursor to the beginning of the

first line. When you print a report, the formfeed character makes the printer move to the top of a new sheet of paper, even if the overall page length is less than that of the paper. If you set NEWPAGE to NONE, SQL*Plus does not print a blank line or formfeed between report pages.

To set the number of lines on a page, use the PAGESIZE variable of the SET command:

```
SET PAGESIZE number_of_lines
```

You may wish to reduce the linesize to center a title properly over your output, or you may want to increase linesize for printing on wide paper. You can change the line width using the LINESIZE variable of the SET command:

```
SET LINESIZE number_of_characters
```

Example 4-24 Setting Page Dimensions

To set the page size to 66 lines, clear the screen (or advance the printer to a new sheet of paper) at the start of each page, and set the linesize to 32, enter the following commands:

```
SQL> SET PAGESIZE 66
SQL> SET NEWPAGE 0
SQL> SET LINESIZE 32
```

Now enter and run the following commands to see the results:

```
SQL> TTITLE CENTER 'ACME WIDGET PERSONNEL REPORT' SKIP 1 -
> CENTER '10-JAN-99' SKIP 2
SQL> COLUMN DEPTNO HEADING DEPARTMENT
SQL> COLUMN ENAME HEADING EMPLOYEE
SQL> COLUMN SAL FORMAT $99,999 HEADING SALARY
SQL> SELECT DEPTNO, ENAME, SAL
  2 FROM EMP
  3 ORDER BY DEPTNO;
```

SQL*Plus displays a formfeed followed by the query results:

```
ACME WIDGET PERSONNEL REPORT
10-JAN-99

DEPARTMENT EMPLOYEE          SALARY
-----
10 CLARK          $2,450
10 KING           $5,000
10 MILLER         $1,300
```

20	SMITH	\$800
20	ADAMS	\$1,100
20	FORD	\$3,000
20	SCOTT	\$3,000
20	JONES	\$2,975
30	ALLEN	\$1,600
30	BLAKE	\$2,850
30	MARTIN	\$1,250
30	JAMES	\$950
30	TURNER	\$1,500
30	WARD	\$1,250

14 rows selected.

Now reset PAGESIZE, NEWPAGE, and LINESIZE to their default values:

```
SQL> SET PAGESIZE 24
SQL> SET NEWPAGE 1
SQL> SET LINESIZE 80
```

To list the current values of these variables, use the SHOW command:

```
SQL> SHOW PAGESIZE
pagesize 24
SQL> SHOW NEWPAGE
newpage 1
SQL> SHOW LINESIZE
linesize 80
```

Through the SQL*Plus command SPOOL, you can store your query results in a file or print them on your computer's default printer.

Storing and Printing Query Results

Send your query results to a file when you want to edit them with a word processor before printing or include them in a letter, memo, or other document.

To store the results of a query in a file—and still display them on the screen—enter the SPOOL command in the following form:

```
SPOOL file_name
```

If you do not follow the filename with a period and an extension, SPOOL adds a default file extension to the filename to identify it as an output file. The default varies with the host operating system; on most hosts it is LST or LIS. See the Oracle

installation and user's manual(s) provided for your operating system for more information.

SQL*Plus continues to spool information to the file until you turn spooling off, using the following form of SPOOL:

```
SPOOL OFF
```

Creating a Flat File

When moving data between different software products, it is sometimes necessary to use a "flat" file (an operating system file with no escape characters, headings, or extra characters embedded). For example, if you do not have Net8, you need to create a flat file for use with SQL*Loader when moving data from Oracle7 to Oracle8.

To create a flat file with SQL*Plus, you first must enter the following SET commands:

```
SET NEWPAGE 0
SET SPACE 0
SET LINESIZE 80
SET PAGESIZE 0
SET ECHO OFF
SET FEEDBACK OFF
SET HEADING OFF
SET MARKUP HTML OFF SPOOL OFF
```

After entering these commands, you use the SPOOL command as shown in the previous section to create the flat file.

The SET COLSEP command may be useful to delineate the columns. For more information, see the [SET](#) command in [Chapter 8](#).

Sending Results to a File

To store the results of a query in a file—and still display them on the screen—enter the SPOOL command in the following form:

```
SPOOL file_name
```

SQL*Plus stores all information displayed on the screen after you enter the SPOOL command in the file you specify.

Sending Results to a Printer

To print query results, spool them to a file as described in the previous section. Then, instead of using SPOOL OFF, enter the command in the following form:

```
SPOOL OUT
```

SQL*Plus stops spooling and copies the contents of the spooled file to your host computer's standard (default) printer. SPOOL OUT does not delete the spool file after printing.

Example 4–25 *Sending Query Results to a Printer*

To generate a final report and spool and print the results, create a command file named EMPRPT containing the following commands.

First, use EDIT to create the command file with your host operating system text editor. (Do not use INPUT and SAVE, or SQL*Plus will add a slash to the end of the file and will run the command file twice—once as a result of the semicolon and once due to the slash.)

```
SQL> EDIT EMPRPT
```

Next, enter the following commands into the file, using your text editor:

```
SPOOL TEMP
CLEAR COLUMNS
CLEAR BREAKS
CLEAR COMPUTES

COLUMN DEPTNO HEADING DEPARTMENT
COLUMN ENAME HEADING EMPLOYEE
COLUMN SAL HEADING SALARY FORMAT $99,999

BREAK ON DEPTNO SKIP 1 ON REPORT
COMPUTE SUM OF SAL ON DEPTNO
COMPUTE SUM OF SAL ON REPORT

SET PAGESIZE 21
SET NEWPAGE 0
SET LINESIZE 30

TTITLE CENTER 'A C M E W I D G E T' SKIP 2 -
LEFT 'EMPLOYEE REPORT' RIGHT 'PAGE:' -
FORMAT 999 SQL.PNO SKIP 2
```

```
BTITLE CENTER 'COMPANY CONFIDENTIAL'
```

```
SELECT DEPTNO, ENAME, SAL  
FROM EMP  
ORDER BY DEPTNO;
```

```
SPOOL OUT
```

If you do not want to see the output on your screen, you can also add SET TERMOUT OFF to the beginning of the file and SET TERMOUT ON to the end of the file. Save the file (you automatically return to SQL*Plus). Now, run the command file EMPRPT:

```
SQL> @EMPRPT
```

SQL*Plus displays the output on your screen (unless you set TERMOUT to OFF), spools it to the file TEMP, and sends the contents of TEMP to your default printer:

```
      A C M E W I D G E T  
  
EMPLOYEE REPORT      PAGE:    1  
  
DEPARTMENT EMPLOYEE      SALARY  
-----  
          10 CLARK          $2,450  
            KING          $5,000  
            MILLER         $1,300  
*****  
sum                $8,750  
  
          20 SMITH          $800  
            ADAMS         $1,100  
            FORD          $3,000  
            SCOTT         $3,000  
            JONES         $2,975  
  
*****  
sum                $10,875  
  
      COMPANY CONFIDENTIAL  
  
      A C M E W I D G E T  
  
EMPLOYEE REPORT      PAGE:    2
```

DEPARTMENT	EMPLOYEE	SALARY
-----	-----	-----
30	ALLEN	\$1,600
	BLAKE	\$2,850
	MARTIN	\$1,250
	JAMES	\$900
	TURNER	\$1,500
	WARD	\$1,250
*****		-----
sum		\$9,400
*****		-----
sum		\$29,025

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Creating Web Reports

SQL*Plus allows you to generate either a complete standalone web page, or HTML output which can be embedded in a web page. You can use `SQLPLUS -MARKUP HTML ON` or `SET MARKUP HTML ON SPOOL ON` to produce standalone web pages. SQL*Plus generates complete HTML pages automatically encapsulated with `<HTML>` and `<BODY>` tags.

The content is written to a HTML table by default, though you can optionally direct output to the HTML `<PRE>` tag so that it displays in a web browser exactly as it appears in SQL*Plus. See the `SQLPLUS -MARKUP` command in the ["Starting SQL*Plus Using the SQLPLUS Command"](#) section of [Chapter 7](#) and the `SET MARKUP` command in the ["SET"](#) section of [Chapter 8](#) for more information about these commands.

`SQLPLUS -MARKUP HTML ON` is useful when embedding SQL*Plus in program scripts. On starting, it outputs the HTML and BODY tags before executing any commands. All subsequent output is in HTML until SQL*Plus terminates. The `-SILENT` and `-RESTRICT` command line options may be effectively used in conjunction with `-MARKUP` to suppress the display of SQL*Plus prompt and banner information and to restrict the use of some commands.

`SET MARKUP HTML ON SPOOL ON` generates complete HTML pages for each subsequently spooled file. The HTML tags in a spool file are closed when `SPOOL OFF` is executed or SQL*Plus exits.

You can use `SET MARKUP HTML ON SPOOL OFF` to generate HTML output suitable for embedding in an existing web page. HTML output generated this way has no `<HTML>` or `<BODY>` tags.

Creating Web Reports Interactively

You use the `SET MARKUP` command interactively during a SQL*Plus session to write HTML to a spool file. The output can be viewed in a web browser.

`SET MARKUP` only specifies that SQL*Plus output will be HTML encoded, it does not create or begin writing to an output file. You must use `SET MARKUP HTML ON SPOOL ON` to enable the spooling of HTML output. You then use the SQL*Plus `SPOOL` command to create and name a spool file, and to begin writing HTML output to it.

When creating a HTML file, it is important and convenient to specify a `.html` file extension which is the standard file extension for HTML files. This allows you to easily identify the type of your output files, and also allows web browsers to

identify and correctly display your HTML files. If no extension is specified, the default SQL*Plus file extension, *.lst*, is used.

You use SPOOL OFF or EXIT to append final HTML tags to the spool file and then close it. If you enter another SPOOL *filename* command, the current spool file is closed as for SPOOL OFF or EXIT, and a new HTML spool file with the specified name is created.

You can use the SET MARKUP command to enable or disable HTML output as required.

Example 4–26 Creating a Standalone Web Report in an Interactive Session

You can create HTML output in an interactive SQL*Plus session using the SET MARKUP command. You can include an embedded style sheet, or any other valid text in the HTML <HEAD> tag. Open a SQL*Plus session and enter the following:

```
SET MARKUP HTML ON SPOOL ON PREAMBLE OFF ENMAP ON -
HEAD '<TITLE>Department Report</TITLE>' -
<STYLE type="text/css"> -
<!-- BODY {background: yellow} --> -
</STYLE>' -
BODY 'TEXT="#FF00FF" ' -
TABLE 'WIDTH="50%" BORDER="5" '
```

You use the COLUMN command to control column output. The following COLUMN commands create new heading names for the SQL query output. The first command also turns off entity mapping for the DNAME column to allow HTML hyperlinks to be correctly created in this column of the output data:

```
COLUMN DNAME HEADING "Department" ENMAP OFF
COLUMN LOC HEADING "Location"
```

SET MARKUP HTML ON SPOOL ON enables SQL*Plus to write HTML to a spool file. The following SPOOL command triggers the writing of the <HTML> and <BODY> tags to the named file:

```
SPOOL report.html
```

After the SPOOL command, anything entered or displayed on standard output is written to the spool file, *report.html*.

Enter a SQL query:

```
SELECT ' <A HREF="http://oracle.com/' || DNAME || '.html">' || DNAME || '</A>'
DNAME, LOC
```

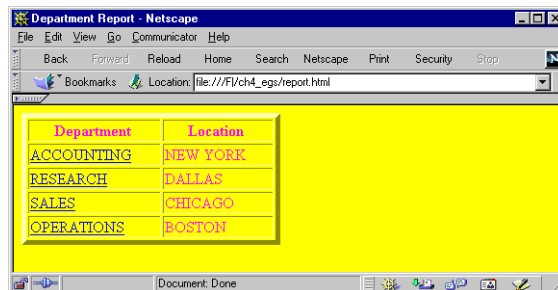
```
FROM DEPT
ORDER BY DEPTNO;
```

Enter the SPOOL OFF command:

```
SPOOL OFF
```

The `</BODY>` and `</HTML>` tags are appended to the spool file, *report.html*, before it is closed.

The output from *report.sql* is a file, *report.html*. This is a standalone web page that can be loaded into a web browser. Open *report.html* in your web browser. It should appear something like the following:



The SQL*Plus command in this example contains several items of usage worth noting:

- The hyphen used to continue lines in long SQL*Plus commands.
- The TABLE option to set table WIDTH and BORDER attributes.
- The COLUMN command to set ENTMAP OFF for the DNAME column to enable the correct formation of HTML hyperlinks. This makes sure that any HTML special characters such as quotes and angle brackets are not replaced by their equivalent entities, ", &, < and >.
- The use of quotes and concatenation characters in the SELECT statement to create hyperlinks by concatenating string and variable elements.

View the *report.html* source in your web browser, or in a text editor to see that the table cells for the Department column contain fully formed hyperlinks as shown:

```
<html><head>
<title>Department Report</title> <STYLE type="text/css"> <!-- BODY
{background: yellow} --> </STYLE>
<META Name="generator" content="SQL*Plus 8.1.7">
</head>
```

```

<body text="#ff00ff">
<p>
<table width="50%" border="5">
<tr><th>Department</th><th>Location</th></tr>
<tr><td><a href="http://oracle.com/ACCOUNTING.html">ACCOUNTING</a></td>
<td>NEW YORK</td></tr>
<tr><td><a href="http://oracle.com/RESEARCH.html">RESEARCH</a></td>
<td>DALLAS</td></tr>
<tr><td><a href="http://oracle.com/SALES.html">SALES</a></td>
<td>CHICAGO</td></tr>
<tr><td><a href="http://oracle.com/OPERATIONS.html">OPERATIONS</a></td>
<td>BOSTON</td></tr>
</table>
<p></body></html>

```

Example 4-27 Creating a Standalone Web Report using the SQLPLUS command

Enter the following command at the operating system prompt:

```
SQLPLUS -S -M "HTML ON TABLE 'BORDER=2'" scott/tiger @dept.sql > dept.html
```

where *dept.sql* contains:

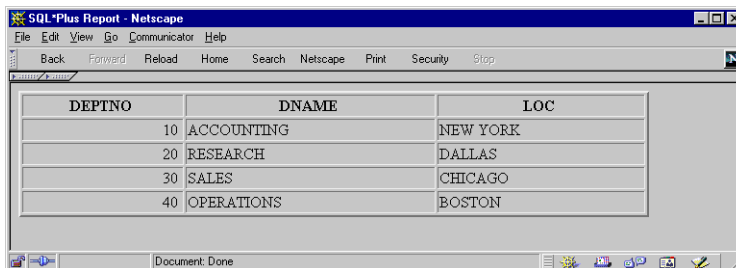
```

SELECT DEPTNO, DNAME, LOC
FROM DEPT
ORDER BY DEPTNO;
EXIT

```

This example starts SQL*Plus with user "scott", sets HTML ON, sets a BORDER attribute for TABLE, and runs the script *dept.sql*. The output from *dept.sql* is a complete web page which in this case has been redirected to the file *dept.html* using the > operating system command. It could be sent to a web browser if SQL*Plus was called in a web server CGI script. See [Creating a Standalone Web Report from a CGI Script](#) for information about calling SQL*Plus from a CGI script.

Start your web browser and enter the appropriate URL to open *dept.html*:



The SQLPLUS command in this example contains three layers of nested quotes. From the inside out, these are:

- "70%" is a quoted HTML attribute value for WIDTH.
- 'WIDTH="70%"' is the quoted text argument for the TABLE option.
- "HTML ON TABLE 'BORDER="2'" is the quoted argument for the -MARKUP option.

The nesting of quotes may be different in some operating systems or program scripting languages.

Creating Embedded Web Reports

The SQLPLUS -MARKUP command allows you to start a SQL*Plus session in Internet enabled mode, rather than using the SET MARKUP command interactively. This allows you to run a SQL*Plus session embedded inside a Common Gateway Interface (CGI) script or an operating system command file. A file created in this way can be displayed directly in a web browser. You can use any script language which is supported by your web server such as a shell script, a Windows command file (batch file), Java, JavaScript or a Perl file.

You can use this embedded approach to produce HTML web outputs that use existing SQL*Plus scripts unchanged. It provides an easy way to provide dynamically-created, web-based reports.

Example 4–28 Creating a Standalone Web Report from a CGI Script

You can use a CGI script to run SQL*Plus, and so produce a web report from a SQL script. There are three main elements required:

- A web page to call the CGI script.
- A CGI script to gather the input and run SQL*Plus.
- The SQL script to be run by the SQL*Plus session.

Web Page for CGI Example

In this example, the web page is a form which prompts for your username and password, a database connection string and the name of the SQL script to run.

Note: You need to carefully consider security on your server before embedding login information in a script file or using a CGI script to prompt for login information and pass it into the SQLPLUS command.

Consider setting initial conditions rather than assuming default values. For example, explicitly set ENTMAP ON even though its default is ON.

```
<html>
<head><title>SQL*Plus Report Demonstration</title></head>
<body bgcolor="#ffffff">

<h1>SQL*Plus Report Demonstration</h1>

<!-- Change the URL here.  On Windows NT you may need to use
http://whatever/cgi-bin/perl?plus.pl if your web server is not
configured to identify the script as a Perl program -->

<form method=post action="http://whatever/cgi-bin/plus.pl">
<table border=0 summary="">

<tr>
  <td>Username:</td>
  <td><input type="text" name="username" size="10" align="left"></td>
</tr>

<tr>
  <td>Password:</td>
  <td><input type="password" name="password" size="10" align="left"></td>
</tr>

<tr>
  <td>Connect string: </td>
  <td><input type="text" name="db" size="10" align="left"></td>
</tr>

<tr>
  <td>Report to run: </td>
  <td><input type="text" name="script" value="emp.sql" size=40></td>
</tr>

<tr>
  <td><input type="submit" value="Run it">&nbsp;<input type="reset"
value="Reset Form"></td>
  <td>&nbsp;</td>
```

```
</tr>
</table>
</form>
</body>
</html>
```

Perl Script for CGI Example

In this example, the CGI script is a Perl script, but it could be a shell script, a Java class or any other language supported by your web server. Create the following Perl CGI script and save it as *sqlscript.pl* in the *cgi-bin* directory of your web server:

```
# Set up the SQL*Plus environment
$ENV{'ORACLE_SID'} = "P817";           # Your SID goes here
$ENV{'ORACLE_HOME'} = "/oracle/817";  # Your Oracle Home directory goes here
$ENV{'TNS_ADMIN'} = "/var/opt/oracle";
$plusexe = "$ENV{'ORACLE_HOME'}/bin/sqlplus";

# Extract parameters and values from data entered through the web browser
$i=<>;
@in = split(/&|/, $i);

foreach $i (0 .. $#in)
{
    ($key, $val) = split(/=/, $in[$i], 2);

# Change encoding to machine character set
    $key =~ s/%([A-Fa-f0-9]{2})/pack("c", hex($1))/ge;
    $val =~ s/%([A-Fa-f0-9]{2})/pack("c", hex($1))/ge;

# Store the value
    $in{"$key"} = $val;
}

# Construct the connection string from values passed in
$connstr = $in{'username'}."/".$in{'password'};
$connstr = $connstr."@".$in{'db'} if ($in{'db'});

# Construct the SQL script to be run
$script = "@".$in{'script'};

# Force output to be flushed
$| = 1;

# Print mime type
print "Content-Type: text/html\n\n";
```

```

if ($debug)
{
    print "<html><body>\n";
    print "$plusexe:$connstr:$script:\n";
    print "</body></html>\n";
    exit;
}

# Call SQL*Plus with the parameters entered from the web browser
system ("$plusexe -r 3 -s -m \"html on\" $connstr $script");

exit;

```

SQL Script for CGI Example

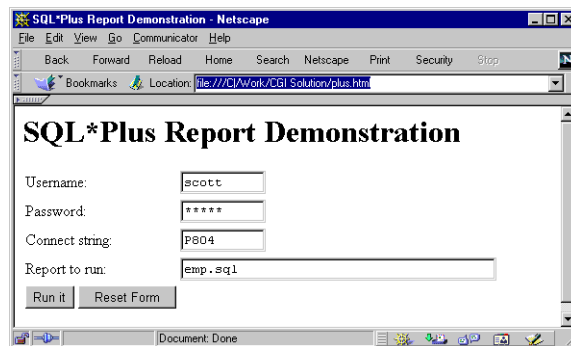
Create the following SQL*Plus script in a text editor and save it as *employee.sql* in the *cgi-bin* directory of your web server:

```

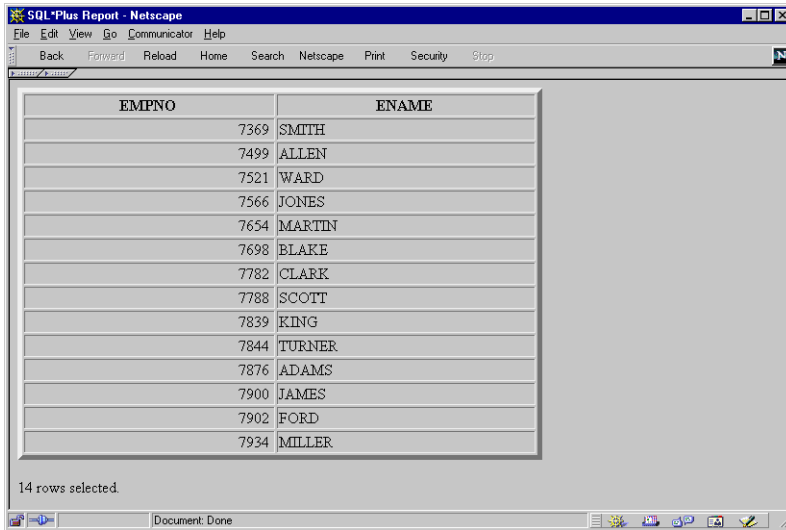
select empno, ename from emp;
exit;

```

Start your web browser and enter the appropriate URL to open *sqlplus.html*:



Click **Run It** to execute the shell script *sqlscript.pl*, which in turn starts SQL*Plus and runs the *employee.sql* script. The query results are displayed directly in your web browser:



Suppressing the Display of SQL*Plus Commands in Web Reports

It is recommended that you use SILENT mode to start your SQL*Plus session. This ensures that only the results of your SQL query appear in the web browser.

The SQLPLUS -SILENT option is particularly useful when used in combination with -MARKUP to generate embedded SQL*Plus reports using CGI scripts or operating system command files. It suppresses the display of SQL*Plus commands and the SQL*Plus banner. Your HTML output shows only the data resulting from your SQL query.

HTML Entities

Certain characters, <, >, " and & have predefined meaning in HTML. In the previous example, you may have noticed that the > character was replaced by > as soon as you entered the SET MARKUP HTML ON command. To enable these characters to be displayed in your web browser, HTML provides character entities to use instead.

Table 4–2 *Equivalent HTML Entities*

Character	HTML Entity	Meaning
<	<	Start HTML tag label
>	>	End HTML tag label
"	"	Double quote
&	&	Ampersand

The web browser displays the > character, but the actual text in the HTML encoded file is the HTML entity, >. The SET MARKUP option, ENTMAP, controls the substitution of HTML entities. ENTMAP is set ON by default. It ensures that the characters <, >, " and & are always replaced by the HTML entities representing these characters. This prevents web browsers from misinterpreting these characters when they occur in your SQL*Plus commands, or in data resulting from your query.

Database Administration

This chapter provides a brief overview of the database administration tools available in SQL*Plus, and discusses the following topics:

- [Overview](#)
- [Introduction to Database Startup and Shutdown](#)
- [Redo Log Files](#)
- [Database Recovery](#)

This chapter is intended for use by database administrators. In order to access the functionality of the commands mentioned in this chapter, database administrator privileges are necessary.

For more information on database administration, see the *Oracle8i Concepts* manual.

Overview

Special operations such as starting up or shutting down a database are performed by a database administrator (DBA). The DBA has certain privileges that are not assigned to normal users. The commands outlined in this chapter would normally be used by a DBA.

For more information about security and roles in SQL*Plus, see [Appendix E](#).

Introduction to Database Startup and Shutdown

An Oracle database may not always be available to all users. To open or close a database, or to start up or shut down an instance, you must have dba privileges or be connected as SYSOPER or SYSDBA. Other users cannot change the current status of an Oracle database.

You cannot use STARTUP or SHUTDOWN to start or stop Oracle instances on Oracle7 servers.

Database Startup

Starting a database involves three steps:

- 1. Starting an instance**

An instance controls the background processes and the allocation of memory area to access an Oracle database.

- 2. Mounting the database**

Mounting the database associates it with a previously started instance.

- 3. Opening the database**

Opening the database makes it available for normal database operations.

For more information about database startup, see the *Oracle8i Concepts* manual. For information about the **STARTUP** command, see the [Command Reference](#) in [Chapter 8](#).

Example 5–1 Starting an Instance

To start an Oracle instance, without mounting the database, enter

```
SQL> STARTUP NOMOUNT
```


Example 5–2 Mounting the Database

To start an instance, mount the database, but leave the database closed, enter

```
SQL> STARTUP MOUNT
```

Example 5–3 Opening the Database

To start an instance using the Oracle8i Server parameter file INITSALE.ORA, mount and open the database named SALES in exclusive mode, and restrict access to administrative personnel, enter

```
SQL> STARTUP OPEN sales PFILE=INITSALE.ORA EXCLUSIVE RESTRICT
```

where SALES is the database name specified in the DB_NAME parameter in the INITSALE.ORA parameter file.

Database Shutdown

Shutting down a database involves three steps:

1. Closing the database

When a database is closed, all database and recovery data in the SGA are written to the datafiles and redo log files, and closes all online datafiles.

2. Dismounting the database

Dismounting the database disassociates the database from an instance and closes the control files of the database.

3. Shutting down the instance

Shutting down an instance reclaims the SGA from memory and terminates the background Oracle processes that constitute an Oracle instance.

For more information about database shutdown, see the *Oracle8i Concepts* manual. For information about the **SHUTDOWN** command, see the [Command Reference](#) in [Chapter 8](#).

Example 5–4 Shutting Down the Database

To shut down the database normally after it has been opened and mounted, enter

```
SQL> SHUTDOWN
Database closed.
Database dismounted.
ORACLE instance shut down.
```

Redo Log Files

Every Oracle database has a set of two or more redo log files. The set of redo log files for a database is collectively referred to as the database's *redo log*.

The redo log is used to record changes made to data. If, for example, there is a database failure, the redo log is used to recover the database. To protect against a failure involving the redo log itself, Oracle allows a *mirrored redo log* so that two or more copies of the redo log can be maintained on different disks.

ARCHIVELOG Mode

Operating a database in ARCHIVELOG mode enables the archiving of the online redo log.

The ARCHIVE LOG command permits a complete recovery from disk failure as well as instance failure, because all changes made to the database are permanently saved in an archived redo log.

For more information about redo log files and database archiving modes, see the *Oracle8i Concepts* manual. For information about using the [ARCHIVE LOG](#) command, see the [Command Reference](#) in [Chapter 8](#).

To automatically begin archiving, enter

```
SQL> ARCHIVE LOG START
```

To list the details of the current log file being archived, enter

```
SQL> ARCHIVE LOG LIST
```

SQL*Plus displays results similar to the following:

Database log mode	Archive Mode
Automatic archival	Enabled
Archive destination	/vobs/oracle/dbs/arch
Oldest online log sequence	221
Next log sequence to archive	222
Current log sequence	222

Database Recovery

If a damaged database is in ARCHIVELOG mode, it is a candidate for either complete media recovery or incomplete media recovery operations. To begin media recovery operations use the RECOVER command. For more information about using the [RECOVER](#) command, see the [Command Reference](#) in [Chapter 8](#).

In order to begin recovery operations, you must have DBA privileges.

To recover the database up to a specified time using a control backup file, enter

```
SQL> RECOVER DATABASE UNTIL TIME '1998-11-23:12:47:30'-  
> USING BACKUP CONTROLFILE
```

To recover two offline tablespaces, enter

```
SQL> RECOVER TABLESPACE ts1, ts2
```

Make sure that the tablespaces you are interested in recovering have been taken offline, before proceeding with recovery for those tablespaces.

Accessing SQL Databases

This chapter explains how to access databases through SQL*Plus, and discusses the following topics:

- [Connecting to the Default Database](#)
- [Connecting to a Remote Database](#)
- [Copying Data from One Database to Another](#)
- [Copying Data between Tables on One Database](#)

Read this chapter while sitting at your computer and try out the example shown. Before beginning, make sure you have access to the sample tables described in [Chapter 1](#).

Connecting to the Default Database

In order to access data in a given database, you must first connect to the database. When you start SQL*Plus, you normally connect to your default Oracle database under the username and password you enter while starting. Once you have logged in, you can connect under a different username with the SQL*Plus CONNECT command. The username and password must be valid for the database.

For example, to connect the username TODD to the default database using the password FOX, you could enter

```
CONNECT TODD/FOX
```

If you omit the username and password, SQL*Plus prompts you for them. You also have the option of typing only the username following CONNECT and omitting the password (SQL*Plus then prompts for the password). Because CONNECT first disconnects you from your current database, you will be left unconnected to any database if you use an invalid username and password in your CONNECT command.

If you log on or connect as a user whose account has expired, SQL*Plus prompts you to change your password before you can connect.

If an account is locked, a message is displayed and connection as this user is not permitted until the account is unlocked by your DBA.

You can disconnect the username currently connected to Oracle without leaving SQL*Plus by entering the SQL*Plus command DISCONNECT at the SQL*Plus command prompt.

The default database is configured at an operating system level by setting operating system environment variables, symbols or, possibly, by editing an Oracle specific configuration file. Refer to your Oracle documentation for your operating system for more information.

Connecting to a Remote Database

Many large installations run Oracle on more than one computer. Such computers are often connected in a network, which permits programs on different computers to exchange data rapidly and efficiently. Networked computers can be physically near each other, or can be separated by large distances and connected by telecommunication links.

Databases on other computers or databases on your host computer other than your default database are called *remote databases*. You can access remote databases if the desired database has Net8 and both databases have compatible network drivers.

You can connect to a remote database in one of two ways:

- from within SQL*Plus, using the CONNECT command
- as you start SQL*Plus, using the SQLPLUS command

Connecting to a Remote Database from within SQL*Plus

To connect to a remote database using CONNECT, include a Net8 database specification in the CONNECT command in one of the following forms (the username and password you enter must be valid for the database to which you wish to connect):

- `CONNECT SCOTT@connect_identifier`
- `CONNECT SCOTT/TIGER@connect_identifier`

SQL*Plus prompts you for a password as needed, and connects you to the specified database.

Like any database connection, if you log on or connect as a user whose account has expired, SQL*Plus prompts you to change your password before you can connect. If an account is locked, a message is displayed and connection as this user is not permitted until the account is unlocked by your DBA.

When you connect to a remote database in this manner, you can use the complete range of SQL and SQL*Plus commands and PL/SQL blocks on the database.

The exact string you enter for the service name depends upon the Net8 protocol your computer uses. For more information, see [CONNECT](#) in [Chapter 8](#) and the Net8 manual appropriate for your protocol, or contact your DBA.

Connecting to a Remote Database as You Start SQL*Plus

To connect to a remote database when you start SQL*Plus, include the Net8 service name in your SQLPLUS command in one of the following forms:

- SQLPLUS SCOTT@*connect_identifier*
- SQLPLUS SCOTT/TIGER@*connect_identifier*

You must use a username and password valid for the remote database and substitute the appropriate service name for the remote database. SQL*Plus prompts you for username and password as needed, starts SQL*Plus, and connects you to the specified database. This is the database used until you CONNECT to another database, DISCONNECT, or leave SQL*Plus.

Like any database connection, if you log on or connect as a user whose account has expired, SQL*Plus prompts you to change your password before you can connect. If an account is locked, a message is displayed and connection as this user is not permitted until the account is unlocked by your DBA.

Once again, you can manipulate tables in the remote database directly after you connect in this manner.

Note: Do not confuse the @ symbol of the connect identifier with the @ command used to run a command file.

Copying Data from One Database to Another

Use the SQL*Plus COPY command to copy data between databases and between tables on the same database. With the COPY command, you can copy data between databases in the following ways:

- copy data from a remote database to your local database
- copy data from your local (default) database to a remote database (on most systems)
- copy data from one remote database to another remote database (on most systems)

Note: In general, the COPY command was designed to be used for copying data between Oracle and non-Oracle databases. You should use SQL commands (CREATE TABLE AS and INSERT) to copy data between Oracle databases.

Understanding COPY Command Syntax

You enter the COPY command in the following form:

```
SQL> COPY FROM database TO database action -  
> destination_table (column_name, column_name, -  
> column_name ...) USING query
```

Here is a sample COPY command:

```
SQL> COPY FROM SCOTT/TIGER@BOSTONDB -  
> TO TODD/FOX@CHICAGODB -  
> CREATE NEWDEPT (DNUMBER, DNAME, CITY) -  
> USING SELECT * FROM DEPT
```

To specify a database in the FROM or TO clause, you must have a valid username and password for the local and remote database(s) and know the appropriate Net8 service name(s). COPY obeys Oracle security, so the username you specify must have been granted access to tables for you to have access to tables. For information on what databases are available to you, contact your DBA.

When you copy to your local database from a remote database, you can omit the TO clause. When you copy to a remote database from your local database, you can omit the FROM clause. When you copy between remote databases, you must include both clauses. However, including both clauses benefits the readability of your scripts.

The COPY command behaves differently based on whether the destination table already exists and on the action clause you enter (CREATE in the example above). For more information, see the section "[Controlling Treatment of the Destination Table](#)" later in this chapter.

By default, the copied columns have the same names in the destination table that they have in the source table. If you want to give new names to the columns in the destination table, enter the new names in parentheses after the destination table name. If you enter any column names, you must enter a name for every column you are copying.

Note: To enable the copying of data between Oracle and non-Oracle databases, NUMBER columns are changed to DECIMAL columns in the destination table. Hence, if you are copying between Oracle databases, a NUMBER column with no precision will be changed to a DECIMAL(38) column. When copying between Oracle databases, you should use SQL commands (CREATE TABLE AS and INSERT) or you should ensure that your columns have a precision specified.

The USING clause specifies a query that names the source table and specifies the data that COPY copies to the destination table. You can use any form of the SQL SELECT command to select the data that the COPY command copies.

Here is an example of a COPY command that copies only two columns from the source table, and copies only those rows in which the value of DEPTNO is 30:

```
SQL> COPY FROM SCOTT/TIGER@BOSTONDB -  
> REPLACE EMPCOPY2 -  
> USING SELECT ENAME, SAL -  
> FROM EMPCOPY -  
> WHERE DEPTNO = 30
```

You may find it easier to enter and edit long COPY commands in command files rather than trying to enter them directly at the command prompt.

Controlling Treatment of the Destination Table

You control the treatment of the destination table by entering one of four control clauses—REPLACE, CREATE, INSERT, or APPEND.

The REPLACE clause names the table to be created in the destination database and specifies the following actions:

- If the destination table already exists, COPY drops the existing table and replaces it with a table containing the copied data.
- If the destination table does not already exist, COPY creates it using the copied data.

You can use the CREATE clause to avoid accidentally writing over an existing table. CREATE specifies the following actions:

- If the destination table already exists, COPY reports an error and stops.

- If the destination table does not already exist, COPY creates the table using the copied data.

Use INSERT to insert data into an existing table. INSERT specifies the following actions:

- If the destination table already exists, COPY inserts the copied data in the destination table.
- If the destination table does not already exist, COPY reports an error and stops.

Use APPEND when you want to insert data in an existing table, or create a new table if the destination table does not exist. APPEND specifies the following actions:

- If the destination table already exists, COPY inserts the copied data in the destination table.
- If the table does not already exist, COPY creates the table and then inserts the copied data in it.

Example 6-1 Copying from a Remote Database to Your Local Database Using CREATE

To copy EMP from a remote database into a table called EMPCOPY on your own database, enter the following command:

Note: See your DBA for an appropriate username, password, and service name for a remote computer that contains a copy of EMP.

```
SQL> COPY FROM SCOTT/TIGER@BOSTONDB -  
> CREATE EMPCOPY -  
> USING SELECT * FROM EMP
```

SQL*Plus displays the following messages:

```
Array fetch/bind size is 20. (arraysize is 20)  
Will commit when done. (copycommit is 0)  
Maximum long size is 80. (long is 80)
```

SQL*Plus then creates the table EMPCOPY, copies the rows, and displays the following additional messages:

```
Table EMPCOPY created.  
14 rows selected from SCOTT@BOSTONDB.  
14 rows inserted into EMPCOPY.
```

```
14 rows committed into EMPCOPY at DEFAULT HOST connection.
```

In this COPY command, the FROM clause directs COPY to connect you to the database with the specification D:BOSTON-MFG as SCOTT, with the password TIGER.

Notice that you do not need a semicolon at the end of the command; COPY is a SQL*Plus command, not a SQL command, even though it contains a query. Since most COPY commands are longer than one line, you must use a hyphen (-), optionally preceded by a space, at the end of each line except the last.

Interpreting the Messages that COPY Displays

The first three messages displayed by COPY show the values of SET command variables that affect the COPY operation. The most important one is LONG, which limits the length of a LONG column's value. (LONG is a datatype, similar to CHAR.) If the source table contains a LONG column, COPY truncates values in that column to the length specified by the system variable LONG.

The variable ARRAYSIZE limits the number of rows that SQL*Plus fetches from the database at one time. This number of rows makes up a *batch*. The variable COPYCOMMIT sets the number of batches after which COPY commits changes to the database. (If you set COPYCOMMIT to zero, COPY commits changes only after all batches are copied.) For more information on the variables of the SET command, including how to change their settings, see the [SET](#) command in [Chapter 8](#).

After listing the three system variables and their values, COPY tells you if a table was dropped, created, or updated during the copy. Then COPY lists the number of rows selected, inserted, and committed.

Specifying Another User's Table

You can refer to another user's table in a COPY command by qualifying the table name with the username, just as you would in your local database, or in a query with a database link.

For example, to make a local copy of a table named DEPT, owned by the username ADAMS on the database associated with the Net8 connect identifier BOSTONDB, you would enter

```
SQL> COPY FROM SCOTT/TIGER@BOSTONDB -  
> CREATE EMPCOPY2 -  
> USING SELECT * FROM ADAMS.DEPT
```

Of course, you could get the same result by instructing COPY to log in to the remote database as ADAMS. You cannot do that, however, unless you know the password associated with the username ADAMS.

Copying Data between Tables on One Database

You can copy data from one table to another in a single database (local or remote). To copy between tables in your local database, specify your own username and password and the service name for your local database in either a FROM or a TO clause (omit the other clause):

```
SQL> COPY FROM SCOTT/TIGER@MYDATABASE -  
> INSERT EMPCOPY2 -  
> USING SELECT * FROM EMP
```

To copy between tables on a remote database, include the same username, password, and service name in the FROM and TO clauses:

```
SQL> COPY FROM SCOTT/TIGER@BOSTONDB -  
> TO SCOTT/TIGER@BOSTONDB -  
> INSERT EMPCOPY2 -  
> USING SELECT * FROM EMP
```


Part II

Reference

This section provides an overview of how to start SQL*Plus. It also provides a Command Reference that contains a description of each SQL*Plus command.

The following chapters and appendices are covered in this section:

- [Starting SQL*Plus and Getting Help](#)
- [Command Reference](#)

Starting SQL*Plus and Getting Help

This chapter explains how to access SQL*Plus from the operating system prompt, and discusses the following topics:

- [Starting SQL*Plus Using the SQLPLUS Command](#)
- [Getting Help](#)

Starting SQL*Plus Using the SQLPLUS Command

You use the SQLPLUS command at the operating system prompt to start SQL*Plus:

```
SQLPLUS [ [Options] [Logon] [Start] ]
```

where:

Options has the following syntax:

```
- | -?  
| [ [-M[ARKUP]] markup_option] [-R[ESTRICT] {1|2|3}] [-S[ILENT]] ]
```

and *markup_option* has the following syntax:

```
HTML [ON|OFF] [HEAD text] [BODY text] [TABLE text]  
[ENIMAP {ON|OFF}] [SPOOL {ON|OFF}] [PRE[FORMAT] {ON|OFF}]
```

Logon has the following syntax:

```
{username[/password][@connect_identifier | / } [AS {SYSOPER|SYSDBA}]  
| /NOLOG
```

Start has the following syntax:

```
@file_name[.ext] [arg ...]
```

You have the option of entering *logon*. If you do not specify *logon* and do specify *start*, SQL*Plus assumes that the first line of the command file contains a valid logon. If neither *start* nor *logon* are specified, SQL*Plus prompts for logon information.

The following sections contain descriptions of SQLPLUS command terms:

Options

HELP Option

-

Displays the usage and syntax for the SQLPLUS command, and then returns control to the operating system.

VERSION Option

-?

Displays the current version and level number for SQL*Plus, and then returns control to the operating system.

MARKUP Options

-M[**MARKUP**]

You can use the MARKUP option to generate either a complete standalone web page from your query or script, or to generate HTML output which can be embedded in a web page. MARKUP currently supports HTML 3.2.

Use SQLPLUS -MARKUP HTML ON or SET MARKUP HTML ON SPOOL ON to produce standalone web pages. SQL*Plus will generate complete HTML pages automatically encapsulated with <HTML> and <BODY> tags. The HTML tags in a spool file are closed when SPOOL OFF is executed or SQL*Plus exits.

The -SILENT and -RESTRICT command line options may be useful when used in conjunction with -MARKUP.

You can use SET MARKUP HTML ON SPOOL OFF to generate HTML output suitable for embedding in an existing web page. Output generated this way has no <HTML> or <BODY> tags.

In this release, you can use MARKUP HTML ON to produce HTML output in either the <PRE> tag or in an HTML table. Output to a table uses standard HTML <TABLE>, <TR> and <TD> tags to automatically encode the rows and columns resulting from a query. Output to an HTML table is now the default behavior when the HTML option is set ON. You can generate output using HTML <PRE> tags by setting PRE-FORMAT ON. Use the SHOW MARKUP command to view the status of MARKUP options.

The SQLPLUS -MARKUP command has the same options and functionality as the SET MARKUP command. These options are described in this section. For information on the SET MARKUP command, see the [SET](#) command in [Chapter 8](#).

Note: Depending on your operating system, the complete `-MARKUP` clause for the `SQLPLUS` command may need to be contained in quotes.

HTML [`ON`|`OFF`]

HTML is a mandatory MARKUP argument which specifies that the type of output to be generated is HTML. The optional HTML arguments, ON and OFF, specify whether or not to generate HTML output. The default is OFF.

MARKUP HTML ON generates HTML output using the specified MARKUP options, or in the case of SET MARKUP, options set by previous SET MARKUP HTML commands in the current session.

You can turn HTML output ON and OFF as required during a session. The default is OFF.

You enable the writing of HTML output with the MARKUP option, SPOOL ON, and you subsequently initiate writing output to a spool file with the SQL*Plus command, SPOOL *filename*. See [SPOOL {ON|OFF}](#) below, and the [SPOOL](#) command in [Chapter 8](#) for more information.

Note: SQL*Plus 8.1.7 implements HTML tables as the default HTML output. More HTML tags may be implemented in future releases.

HEAD *text*

The HEAD *text* option allows you to specify content for the `<HEAD>` tag. By default, *text* is:

```
<TITLE>SQL*Plus Report</TITLE>
```

If text includes spaces, it must be enclosed in quotes. SQL*Plus does not test this free text entry for HTML validity. You must ensure that the text you enter is valid for the HTML `<HEAD>` tag. This gives you the flexibility to customize output for your browser or special needs.

BODY *text*

The BODY *text* option allows you to specify attributes for the `<BODY>` tag. By default, there are no attributes. If text includes spaces, it must be enclosed in quotes. SQL*Plus does not test this free text entry for HTML

validity. You must ensure that the text you enter is valid for the HTML <BODY> tag. This gives you the flexibility to customize output for your browser or special needs.

TABLE *text*

The **TABLE *text*** option allows you to enter attributes for the <TABLE> tag. You can use **TABLE *text*** to set HTML <TABLE> tag attributes such as **BORDER**, **CELLPADDING**, **CELLSPACING** and **WIDTH**. By default, the <TABLE> **WIDTH** attribute is set to 90% and the **BORDER** attribute is set to 1.

If *text* includes spaces, it must be enclosed in quotes. SQL*Plus does not test this free text entry for HTML validity. You must ensure that the text you enter is valid for the HTML <TABLE> tag. This gives you the flexibility to customize output for your browser or special needs.

ENTMAP {ON|OFF}

ENTMAP ON or **OFF** specifies whether or not SQL*Plus replaces special characters <, >, " and & with the HTML entities <, > " and & respectively. **ENTMAP** is set **ON** by default.

You can turn **ENTMAP ON** and **OFF** as required during a session. For example, with **ENTMAP OFF**, SQL*Plus screen output is:

```
SQL> SELECT ENAME, EMPNO
2 FROM EMP
3 WHERE SAL <= 2000;
```

With **ENTMAP ON**, SQL*Plus screen output is:

```
SQL&gt; SELECT ENAME, EMPNO
2 FROM EMP
3 WHERE SAL &lt;= 2000;
```

If entities are not mapped, web browsers may treat data as invalid HTML and all subsequent output may display incorrectly. **ENTMAP OFF** allows users to write their own HTML tags to customize output.

As entities in the <HEAD> and <BODY> tags are not mapped, you must ensure that valid entities are used in the **MARKUP HEAD** and **BODY** options.

Note: ENTMAP only has affect when either the HTML option is set ON, or the SPOOL option is set ON. For more information about using entities in your output, see the [COLUMN](#) command in [Chapter 8](#).

SPOOL {ON|OFF}

SPOOL ON or OFF specifies whether or not SQL*Plus writes the HTML opening tags, <HTML> and <BODY>, and the closing tags, </BODY> and </HTML>, to the start and end of each file created by the SQL*Plus SPOOL *filename* command. The default is OFF.

You can turn SPOOL ON and OFF as required during a session.

Note: It is important to distinguish between the SET MARKUP HTML SPOOL option, and the SQLPLUS SPOOL *filename* command.

The SET MARKUP HTML SPOOL ON option enables the writing of HTML tags to the spool file. The spool file is not created, and the tags enabled by the SET MARKUP HTML SPOOL ON option are not written to the spool file until you issue the SQLPLUS SPOOL *filename* command.

SQL*Plus writes several HTML tags to the spool file when you issue the SPOOL *filename* command. The tags written and their default content are:

```
<HTML>
<HEAD>
<TITLE>SQL*Plus Report</TITLE>
<META name="generator" content="SQL*Plus 8.1.7">
</HEAD>
<BODY>
```

When you issue any of the SQL*Plus commands: EXIT, SPOOL OFF or SPOOL *filename*, SQL*Plus appends the following end tags and closes the file:

```
</BODY></HTML>
```

You can specify <HEAD> tag contents and <BODY> attributes using the HEAD and BODY options

PRE[FORMAT] {ON|OFF}

PREFORMAT ON or OFF specifies whether or not SQL*Plus writes output to the <PRE> tag or to an HTML table. The default is OFF, so output is written to a HTML table by default. You can turn PREFORMAT ON and OFF as required during a session.

Notes: To produce report output using the HTML <PRE> tag, you must set PREFORMAT ON. For example:

```
SQLPLUS -M "HTML ON PREFORMAT ON"  
SET MARKUP HTML ON PREFORMAT ON
```

MARKUP Usage Notes

Existing scripts that do not explicitly set PREFORMAT ON will generate output in HTML tables. If you want output in HTML <PRE> tags, you must set PREFORMAT ON.

Some SQL*Plus commands have different behavior when output is directed to an HTML table. Commands originally intended to format paper reports may have different meaning for reports intended for web tables:

- PAGESIZE is the number of rows in an HTML table, not the number of lines. Each row may contain multiple lines. The TTITLE, BTITLE and column headings are repeated every PAGESIZE rows.
- LINESIZE may have an effect on data if wrapping is on, or for very long data. Depending on data size, they may be generated on separate lines, which a browser may interpret as a space character.
- TTITLE and BTITLE content is output to three line positions: left, center and right, and the maximum line width is preset to 90% of the browser window. These elements may not align with the main output as expected due to the way they are handled for web output. Entity mapping in TTITLE and BTITLE is the same as the general ENTMAP setting specified in the MARKUP command.
- If you use a title in your output, then SQL*Plus starts a new HTML table for output rows that appear after the title. Your browser may format column widths of each table differently, depending on the width of data in each column.
- SET COLSEP and RECSEP only produce output in HTML reports when PREFORMAT is ON.

RESTRICT Option

-R[ESTRICT] {1|2|3}

Allows you to disable certain commands that interact with the operating system. This is similar to disabling the same commands in the Product User Profile (PUP) table. However, commands disabled with the **-RESTRICT** option are disabled even if there is no connection to a server, and remain disabled until SQL*Plus terminates.

If no **-RESTRICT** option is active, than all commands can be used, unless disabled in the PUP table.

If **-RESTRICT 3** is used, then LOGIN.SQL is not read. GLOGIN.SQL is read but restricted commands used will fail.

Table 7-1 shows the commands disabled in each restriction level.

Table 7-1 Commands Disabled by Restriction Level

Command	Level 1	Level 2	Level 3
EDIT	disabled	disabled	disabled
GET			disabled
HOST, !	disabled	disabled	disabled
SAVE		disabled	disabled
SPOOL		disabled	disabled
START, @, @@			disabled
STORE		disabled	disabled

SILENT Option

-S[ILENT]

Suppresses all SQL*Plus information and prompt messages, including the command prompt, the echoing of commands, and the banner normally displayed when you start SQL*Plus. If you omit *username* or *password*, SQL*Plus prompts for them, but the prompts are not visible. Use **SILENT** to invoke SQL*Plus within another program so that the use of SQL*Plus is invisible to the user.

SILENT is a useful mode for creating reports for the web using the **SQLPLUS -MARKUP** command inside a CGI script or operating sys-

tem command file. The SQL*Plus banner and prompts are suppressed and do not appear in reports created using the SILENT option.

Logon

username[/password]

Represent the username and password with which you wish to start SQL*Plus and connect to Oracle. If you omit *username* and *password*, SQL*Plus prompts you for them.

If you omit only *password*, SQL*Plus prompts you for *password*. When prompting, SQL*Plus does not display *password* on your terminal screen. In silent mode, username and password prompts are not visible – your username will appear as you type it, but not your password.

@connect_identifier

Consists of a Net8 connect identifier. The exact syntax depends upon the Net8 communications protocol your Oracle installation uses. For more information, refer to the Net8 manual appropriate for your protocol or contact your DBA.

/

Represents a default logon using operating system authentication. You cannot enter a *database_specification* if you use a default logon. In a default logon, SQL*Plus typically attempts to log you in using the username *OPSSname*, where *name* is your operating system username. Note that the prefix "OPSS" can be set to any other string of text. For example, you may wish to change the settings in your INIT.ORA parameters file to *LOGONname* or *USERIDname*. See the *Oracle8i Administrator's Guide* for information about operating system authentication.

AS {SYSOPER|SYSDBA}

The AS clause allows privileged connections by users who have been granted SYSOPER or SYSDBA system privileges. You can also use either of these privileged connections with */* and */NOLOG*.

If you use this option, you need to quote the command arguments on many operating systems, for example:

```
SQLPLUS "/ AS SYSDBA"
```

```
SQLPLUS "SYSTEM/MANAGER AS SYSOPER"
```

/NOLOG

Establishes no initial connection to Oracle. Before issuing any SQL commands, you must issue a CONNECT command to establish a valid logon. Use /NOLOG when you want to have a SQL*Plus command file prompt for the username, password, or database specification. The first line of this command file is not assumed to contain a logon.

Start

@file_name[.ext] [arg ...]

Specifies the name of a command file and arguments to run. SQL*Plus passes the arguments to the command file as if executing the file using the SQL*Plus START command. If no file suffix (file extension) is specified, the suffix defined by the SET SUFFIX command is used. The default suffix is *.sql*.

See the [START](#) command in [Chapter 8](#) for more information.

Setting Up the Site Profile

SQL*Plus supports a Site Profile, a SQL*Plus command file created by the database administrator. This file is generally named GLOGIN with an extension of SQL. SQL*Plus executes this command file whenever any user starts SQL*Plus and SQL*Plus establishes the Oracle connection. The Site Profile allows the DBA to set up SQL*Plus environment defaults for all users at a particular site; users cannot directly access the Site Profile. The default name and location of the Site Profile depend on your system. Site Profiles are described in more detail in the Oracle installation and user's manual(s) provided for your operating system.

Setting Up the User Profile

SQL*Plus also supports a User Profile, executed after the Site Profile. SQL*Plus searches for a file named LOGIN with the extension SQL in your current directory. If SQL*Plus does not find the file there, SQL*Plus will search a system-dependent path to find the file. Some operating systems may not support this path search.

Receiving a Return Code

If you fail to log in successfully to SQL*Plus because your username or password is invalid or some other error, SQL*Plus will return an error status equivalent to an

EXIT FAILURE command. See the EXIT command in this chapter for further information.

Example 7-1 Starting SQL*Plus

To start SQL*Plus with *username* SCOTT and *password* TIGER, enter

```
SQL> SQLPLUS SCOTT/TIGER
```

To start SQL*Plus, as above, and to make POLICY the default database (where POLICY is a valid Net8 database connect identifier), enter

```
SQL> SQLPLUS SCOTT/TIGER@POLICY
```

To start SQL*Plus with *username* SCOTT and *password* TIGER and run a command file named STARTUP with the extension SQL, enter

```
SQL> SQLPLUS SCOTT/TIGER @STARTUP
```

Note the space between TIGER and @STARTUP.

To start SQL*Plus with HTML ON, so that output can be viewed on a web browser, enter

```
SQL> SQLPLUS -M "HTML ON" SCOTT/TIGER
```

To start SQL*Plus with no access to the EDIT and HOST commands during the session, enter

```
SQL> SQLPLUS -R 1 SCOTT/TIGER
```

Example 7-2 Displaying the SQLPLUS syntax

To display the syntax of the SQLPLUS command, enter

```
SQL> SQLPLUS -H
```

SQL*Plus displays the following

```
Usage: SQLPLUS [ [<option>] [<logon>] [<start>] ]
where <option> ::= - | -? | [ [-M <o>] [-R <n>] [-S] ]
      <logon>  ::= <username>[/<password>][@<connect_identifier>] | / |/NOLOG
      <start>  ::= @<filename>[.<ext>] [<parameter> ...]
              - displays the SQL*Plus version banner and usage syntax
              -? displays the SQL*Plus version banner
              -M <o> uses HTML markup options <o>
              -R <n> uses restricted mode <n>
              -S uses silent mode
```

Getting Help

To access online help for SQL*Plus commands, you can type `HELP` followed by the command name at the SQL command prompt. For example:

```
SQL> HELP ACCEPT
```

To display a list of SQL*Plus commands, type `HELP` followed by either `TOPICS` or `INDEX`. `HELP TOPICS` displays a single column list of SQL*Plus commands. `HELP INDEX` displays a four column list of SQL*Plus commands which usually fits in a single screen. For example:

```
SQL> HELP INDEX
```

If you get a response that help is unavailable, consult your database administrator. See the [HELP](#) command in [Chapter 8](#) for more information.

Command Reference

This chapter contains descriptions of SQL*Plus commands, listed alphabetically. Use this chapter for reference only. Each description contains the following parts:

Purpose	Discusses the basic use(s) of the command.
Syntax	Shows how to enter the command. Refer to Chapter 1 for an explanation of the syntax notation.
Terms and Clauses	Describes the function of each term or clause appearing in the syntax.
Usage Notes	Provides additional information on how the command works and on uses of the command.
Examples	Gives one or more examples of the command.

A summary table that lists and briefly describes SQL*Plus commands precedes the individual command descriptions.

You can continue a long SQL*Plus command by typing a hyphen at the end of the line and pressing [Return]. If you wish, you can type a space before typing the hyphen. SQL*Plus displays a right angle-bracket (>) as a prompt for each additional line.

You do not need to end a SQL*Plus command with a semicolon. When you finish entering the command, you can just press [Return]. If you wish, however, you can enter a semicolon at the end of a SQL*Plus command.

SQL*Plus Command Summary

Command	Page	Description
@	8-5	Runs the specified command file.
@@	8-7	Runs the specified command file which is expected to be in the same directory as the script that called it.
/	8-9	Executes the SQL command or PL/SQL block.
ACCEPT	8-10	Reads a line of input and stores it in a given user variable.
APPEND	8-12	Adds specified text to the end of the current line in the buffer.
ARCHIVE LOG	8-13	Starts or stops the automatic archiving of online redo log files, manually (explicitly) archives specified redo log files, or displays information about redo log files.
ATTRIBUTE	8-17	Specifies display characteristics for a given attribute of an Object Type column, and lists the current display characteristics for a single attribute or all attributes.
BREAK	8-19	Specifies where and how formatting will change in a report, or lists the current break definition.
BTITLE	8-24	Places and formats a specified title at the bottom of each report page, or lists the current BTITLE definition.
CHANGE	8-25	Changes text on the current line in the buffer.
CLEAR	8-28	Resets or erases the current clause or setting for the specified option, such as BREAKS or COLUMNS.
COLUMN	8-30	Specifies display characteristics for a given column, or lists the current display characteristics for a single column or for all columns.
COMPUTE	8-41	Calculates and prints summary lines, using various standard computations, on subsets of selected rows, or lists all COMPUTE definitions.
CONNECT	8-47	Connects a given user to Oracle.
COPY	8-49	Copies results from a query to a table in a local or remote database.
DEFINE	8-52	Specifies a user variable and assigns it a CHAR value, or lists the value and variable type of a single variable or all variables.
DEL	8-54	Deletes one or more lines of the buffer.

Command	Page	Description
DESCRIBE	8-56	Lists the column definitions for the specified table, view, or synonym or the specifications for the specified function or procedure.
DISCONNECT	8-63	Commits pending changes to the database and logs the current user off Oracle, but does not exit SQL*Plus.
EDIT	8-64	Invokes a host operating system text editor on the contents of the specified file or on the contents of the buffer.
EXECUTE	8-66	Executes a single PL/SQL statement.
EXIT	8-67	Terminates SQL*Plus and returns control to the operating system.
GET	8-69	Loads a host operating system file into the SQL buffer.
HELP	8-70	Accesses the SQL*Plus help system.
HOST	8-71	Executes a host operating system command without leaving SQL*Plus.
INPUT	8-73	Adds one or more new lines after the current line in the buffer.
LIST	8-75	Lists one or more lines of the SQL buffer.
PASSWORD	8-77	Allows a password to be changed without echoing the password on an input device.
PAUSE	8-78	Displays the specified text, then waits for the user to press [Return].
PRINT	8-79	Displays the current value of a bind variable.
PROMPT	8-80	Sends the specified message to the user's screen.
QUIT	8-67	Terminates SQL*Plus and returns control to the operating system. QUIT is identical to EXIT.
RECOVER	8-82	Performs media recovery on one or more tablespaces, one or more datafiles, or the entire database.
REMARK	8-88	Begins a comment in a command file.
REPFOOTER	8-89	Places and formats a specified report footer at the bottom of each report, or lists the current REPFOOTER definition.
REPHEADER	8-91	Places and formats a specified report header at the top of each report, or lists the current REPHEADER definition.
RUN	8-95	Lists and executes the SQL command or PL/SQL block currently stored in the SQL buffer.

Command	Page	Description
SAVE	8-96	Saves the contents of the SQL buffer in a host operating system file (a command file).
SET	8-98	Sets a system variable to alter the SQL*Plus environment for your current session.
SHOW	8-123	Shows the value of a SQL*Plus system variable or the current SQL*Plus environment.
SHUTDOWN	8-128	Shuts down a currently running Oracle instance.
SPOOL	8-130	Stores query results in an operating system file and, optionally, sends the file to a printer.
START	8-131	Executes the contents of the specified command file.
STARTUP	8-133	Starts an Oracle instance and optionally mounts and opens a database.
STORE	8-137	Saves attributes of the current SQL*Plus environment in a host operating system file (a command file).
TIMING	8-138	Records timing data for an elapsed period of time, lists the current timer's title and timing data, or lists the number of active timers.
TTITLE	8-140	Places and formats a specified title at the top of each report page, or lists the current TTITLE definition.
UNDEFINE	8-144	Deletes one or more user variables that you defined either explicitly (with the DEFINE command) or implicitly (with an argument to the START command).
VARIABLE	8-145	Declares a bind variable that can be referenced in PL/SQL.
WHENEVER OSEERROR	8-151	Exits SQL*Plus if an operating system command generates an error.
WHENEVER SQLEERROR	8-153	Exits SQL*Plus if a SQL command or PL/SQL block generates an error.

@ ("at" sign)

Purpose

Runs the specified command file.

Syntax

```
@ file_name[.ext] [arg...]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

file_name[.ext]

Represents the command file you wish to run. If you omit *ext*, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing the default extension, see the [SUFFIX](#) variable of the [SET](#) command in this chapter.

When you enter @ *file_name.ext*, SQL*Plus searches for a file with the filename and extension you specify in the current default directory. If SQL*Plus does not find such a file, SQL*Plus will search a system-dependent path to find the file. Some operating systems may not support the path search. See the Oracle installation and user's manual(s) provided for your operating system for specific information related to your operating system environment.

arg...

Represent data items you wish to pass to parameters in the command file. If you enter one or more arguments, SQL*Plus substitutes the values into the parameters (&1, &2, and so forth) in the command file. The first argument replaces each occurrence of &1, the second replaces each occurrence of &2, and so forth.

The @ command [DEFINES](#) the parameters with the values of the arguments; if you run the command file again in this session, you can enter new arguments or omit the arguments to use the current values.

For more information on using parameters, refer to the subsection "[Passing Parameters through the START Command](#)" under "[Writing Interactive Commands](#)" in [Chapter 3](#).

Usage Notes

You can include in a command file any command you would normally enter interactively (typically, SQL, SQL*Plus commands, or PL/SQL blocks).

An EXIT or QUIT command used in a command file terminates SQL*Plus.

The @ command functions similarly to START.

If the START command is disabled (see “Disabling SQL*Plus, SQL, and PL/SQL Commands” in [Appendix E](#)), this will also disable the @ command. See [START](#) in this chapter for information on the START command.

SQL*Plus removes the SQLTERMINATOR (a semicolon by default) before the @ command is issued. A workaround for this is to add another SQLTERMINATOR. See the SQLTERMINATOR variable of the SET command in this chapter for more information.

Examples

To run a command file named PRINTRPT with the extension SQL, enter

```
SQL> @PRINTRPT
```

To run a command file named WKRPT with the extension QRY, enter

```
SQL> @WKRPT.QRY
```

@@ (double "at" sign)

Purpose

Runs a command file. This command is identical to the @ ("at" sign) command except that it looks for the specified command file in the same path as the command file from which it was called.

Syntax

```
@@ file_name[.ext]
```

Terms and Clauses

Refer to the following for a description of the term or clause:

file_name[.ext]

Represents the nested command file you wish to run. If you omit *ext*, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing the default extension, see the [SUFFIX](#) variable of the [SET](#) command in this chapter.

When you enter `@@file_name.ext` from within a command file, SQL*Plus runs *file_name.ext* from the same directory as the command file. When you enter `@@file_name.ext` interactively, SQL*Plus runs *file_name.ext* from the current working directory. If SQL*Plus does not find such a file, SQL*Plus searches a system-dependent path to find the file. Some operating systems may not support the path search. See the Oracle installation and user's manual(s) provided for your operating system for specific information related to your operating system environment.

Usage Notes

You can include in a command file any command you would normally enter interactively (typically, SQL or SQL*Plus commands).

An EXIT or QUIT command used in a command file terminates SQL*Plus.

The @@ command functions similarly to START.

If the START command is disabled, this will also disable the @@ command. For more information, see the [START](#) command later in this chapter.

SQL*Plus removes the SQLTERMINATOR (a semicolon by default) before the @@ command is issued. A workaround for this is to add another SQLTERMINATOR.

See the [SQLTERMINATOR](#) variable of the [SET](#) command in this chapter for more information.

Example

Suppose that you have the following command file named PRINTRPT:

```
SELECT * FROM EMP
@EMPRPT
@@ WKRPT
```

When you START PRINTRPT and it reaches the @ command, it looks for the command file named EMPRPT in the current working directory and runs it. When PRINTRPT reaches the @@ command, it looks for the command file named WKRPT in the same path as PRINTRPT and runs it.

/ (slash)

Purpose

Executes the SQL command or PL/SQL block currently stored in the SQL buffer.

Syntax

```
/
```

Usage Notes

You can enter a slash (/) at the command prompt or at a line number prompt of a multi-line command.

The slash command functions similarly to RUN, but does not list the command in the buffer on your screen.

Executing a SQL command or PL/SQL block using the slash command will not cause the current line number in the SQL buffer to change unless the command in the buffer contains an error. In that case, SQL*Plus changes the current line number to the number of the line containing the error.

Example

To see the SQL command(s) you will execute, you can list the contents of the buffer:

```
SQL> LIST
  1* SELECT ENAME, JOB FROM EMP WHERE ENAME = 'JAMES'
```

Enter a slash (/) at the command prompt to execute the command in the buffer:

```
SQL> /
```

For the above query, SQL*Plus displays the following output:

```
ENAME      JOB
-----
JAMES      CLERK
```

ACCEPT

Purpose

Reads a line of input and stores it in a given user variable.

Syntax

```
ACC[EPT] variable [NUM[BER]|CHAR|DATE] [FOR[MAT] format]  
[DEF[AULT] default] [PROMPT text|NOPR[OMPT]] [HIDE]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

variable

Represents the name of the variable in which you wish to store a value. If *variable* does not exist, SQL*Plus creates it.

NUM[BER]

Makes the datatype of *variable* the datatype NUMBER. If the reply does not match the datatype, ACCEPT gives an error message and prompts again.

CHAR

Makes the datatype of *variable* the datatype CHAR. The maximum CHAR length limit is 240 bytes. If a multi-byte character set is used, one CHAR may be more than one byte in size.

DATE

Makes reply a valid DATE format. If the reply is not a valid DATE format, ACCEPT gives an error message and prompts again. The datatype is CHAR.

FOR[MAT]

Specifies the input format for the reply. If the reply does not match the specified format, ACCEPT gives an error message and prompts again for a reply. The format element must be a text constant such as A10 or 9.999. See the [COLUMN](#) command in this chapter for a complete list of format elements.

Oracle date formats such as "dd/mm/yy" are valid when the datatype is DATE. DATE without a specified format defaults to the Oracle NLS_DATE_FORMAT of the current session. See the *Oracle8i Administrator's*

Guide and the *Oracle8i SQL Reference* for information on Oracle date formats.

DEF[AULT]

Sets the default value if a reply is not given. The reply must be in the specified format if defined.

PROMPT *text*

Displays *text* on-screen before accepting the value of *variable* from the user.

NOPR[OMPT]

Skips a line and waits for input without displaying a prompt.

HIDE

Suppresses the display as you type the reply.

To display or reference variables, use the DEFINE command. See the [DEFINE](#) command in this chapter for more information.

Examples

To display the prompt "Password: ", place the reply in a CHAR variable named PSWD, and suppress the display, enter

```
SQL> ACCEPT pswd CHAR PROMPT 'Password: ' HIDE
```

To display the prompt "Enter weekly salary: " and place the reply in a NUMBER variable named SALARY with a default of 000.0, enter

```
SQL> ACCEPT salary NUMBER FORMAT '999.99' DEFAULT '000.0' -
> PROMPT 'Enter weekly salary: '
```

To display the prompt "Enter date hired: " and place the reply in a DATE variable named HIRED with the format "dd/mm/yy" and a default of "01/01/99", enter

```
SQL> ACCEPT hired DATE FORMAT 'dd/mm/yy' DEFAULT '01/01/99' -
> PROMPT 'Enter date hired: '
```

To display the prompt "Enter employee lastname: " and place the reply in a CHAR variable named LASTNAME, enter

```
SQL> ACCEPT lastname CHAR FORMAT 'A20' -
> PROMPT 'Enter employee lastname: '
```

APPEND

Purpose

Adds specified text to the end of the current line in the SQL buffer.

Syntax

A[PPEND] *text*

Terms and Clauses

Refer to the following for a description of the term or clause:

text

Represents the text you wish to append. If you wish to separate *text* from the preceding characters with a space, enter two spaces between APPEND and *text*.

To APPEND *text* that ends with a semicolon, end the command with two semicolons (SQL*Plus interprets a single semicolon as an optional command terminator).

Examples

To append a space and the column name DEPT to the second line of the buffer, make that line the current line by listing the line as follows:

```
SQL> 2
      2* FROM EMP,
```

Now enter APPEND:

```
SQL> APPEND DEPT
SQL> 2
      2* FROM EMP, DEPT
```

Notice the double space between APPEND and DEPT. The first space separates APPEND from the characters to be appended; the second space becomes the first appended character.

To append a semicolon to the line, enter

```
SQL> APPEND ;;
```

SQL*Plus appends the first semicolon to the line and interprets the second as the terminator for the APPEND command.

ARCHIVE LOG

Purpose

Starts or stops automatic archiving of online redo log files, manually (explicitly) archives specified redo log files, or displays information about redo log files.

Syntax

```
ARCHIVE LOG {LIST|STOP} [{START|NEXT|ALL|integer} [TO destination]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

LIST

Requests a display that shows the range of redo log files to be archived, the current log file group's sequence number, and the current archive destination (specified by either the optional command text or by the initialization parameter LOG_ARCHIVE_DEST).

If you are using both ARCHIVELOG mode and automatic archiving, the display might appear like:

```
SQL> ARCHIVE LOG LIST
```

Database log mode	Archive Mode
Automatic archival	Enabled
Archive destination	/vobs/oracle/dbs/arch
Oldest online log sequence	221
Next log sequence to archive	222
Current log sequence	222

Since the log sequence number of the current log group and the next log group to archive are the same, automatic archival has archived all log groups up to the current one.

If you are using ARCHIVELOG but have disabled automatic archiving, the last three lines might look like:

Oldest online log sequence	222
Next log sequence to archive	222
Current log sequence	225

If you are using NOARCHIVELOG mode, the "next log sequence to archive" line is suppressed.

The log sequence increments every time the Log Writer begins to write to another redo log file group; it does not indicate the number of logs being used. Every time an online redo log file group is reused, the contents are assigned a new log sequence number.

STOP

Disables automatic archival. If the instance is still in ARCHIVELOG mode and all redo log file groups fill, database operation is suspended until a redo log file is archived (for example, until you enter the command ARCHIVE LOG NEXT or ARCHIVE LOG ALL).

START

Enables automatic archiving. Starts the background process ARCH, which performs automatic archiving as required. If ARCH is started and a filename is supplied, the filename becomes the new default archive destination.

ARCH automatically starts on instance startup if the initialization parameter LOG_ARCHIVE_START is set to TRUE.

NEXT

Manually archives the next online redo log file group that has been filled, but not yet archived.

ALL

Manually archives all filled, but not yet archived, online redo log file groups.

integer

Causes archival of the online redo log file group with log sequence number *n*. You can specify any redo log file group that is still online. An error occurs if the log file cannot be found online or the sequence number is not valid. This option can be used to rearchive a log file group.

destination

Specifies the destination device or directory in an operating system. Specification of archive destination devices is installation-specific; see your platform-specific Oracle documentation for examples of specifying archive destinations. On many operating systems, multiple log files can be spooled to the same tape.

If not specified in the command line, the archive destination is derived from the initialization parameter LOG_ARCHIVE_DEST. The com-

mand `ARCHIVE LOG START destination` causes the specified device or directory to become the new default archive destination for all future automatic or manual archives. A destination specified with any other option is a temporary destination that is in effect only for the current (manual) archive. It does not change the default archive destination for subsequent automatic archives.

For information about specifying archive destinations, see your platform-specific Oracle documentation.

Usage Notes

You must be connected to an open Oracle database as SYSOPER, or SYSDBA. For information about connecting to the database, see the [CONNECT](#) command.

If an online redo log file group fills and none are available for reuse, database operation is suspended. The condition can be resolved by archiving a log file group.

For information about specifying archive destinations, see your platform-specific Oracle documentation.

Note: This command applies only to the current instance. To specify archiving for a different instance or for all instances in a Parallel Server, use the SQL command `ALTER SYSTEM`. For more information about using SQL commands, see the *Oracle8i SQL Reference*.

Examples

To start up the archive process and begin automatic archiving, using the archive destination specified in `LOG_ARCHIVE_DEST`, enter

```
SQL> ARCHIVELOG START
```

To stop automatic archiving, enter

```
SQL> ARCHIVELOG STOP
```

To archive the log file group with the sequence number 1001 to the destination specified, enter

```
SQL> ARCHIVELOG 1001 '/vobs/oracle/dbs/arch'
```

'arch' specifies the prefix of the filename on the destination device; the remainder of the filename is dependent on the initialization parameter LOG_ARCHIVE_FORMAT, which specifies the filename format for archived redo log files.

ATTRIBUTE

Purpose

Specifies display characteristics for a given attribute of an Object Type column, such as format for NUMBER data.

Also lists the current display characteristics for a single attribute or all attributes.

Syntax

```
ATTRIBUTE [type_name.attribute_name [option ...]]
```

where *option* represents one of the following clauses:

```
ALI[AS] alias  
CLE[AR]  
FOR[MAT] format  
LIKE {type_name.attribute_name|alias}  
ON|OFF
```

Terms and Clauses

Enter ATTRIBUTE followed by *type_name.attribute_name* and no other clauses to list the current display characteristics for only the specified attribute. Enter ATTRIBUTE with no clauses to list all current attribute display characteristics.

Refer to the following list for a description of each term or clause:

type_name.attribute_name

Identifies the data item (typically the name of an attribute) within the set of attributes for a given object of Object Type, *type_name*.

If you select objects of the same Object Type, an ATTRIBUTE command for that *type_name.attribute_name* will apply to all such objects you reference in that session.

ALI[AS] *alias*

Assigns a specified alias to a *type_name.attribute_name*, which can be used to refer to the *type_name.attribute_name* in other ATTRIBUTE commands.

CLEAR

Resets the display characteristics for the *attribute_name*. The format specification must be a text constant such as A10 or \$9,999—not a variable.

FOR[MAT] *format*

Specifies the display format of the column. The format specification must be a text constant such as A10 or \$9,999—not a variable.

LIKE {*type_name.attribute_name* | *alias*}

Copies the display characteristics of another attribute. LIKE copies only characteristics not defined by another clause in the current ATTRIBUTE command.

ON | OFF

Controls the status of display characteristics for a column. OFF disables the characteristics for an attribute without affecting the characteristics' definition. ON reinstates the characteristics.

Usage Notes

You can enter any number of ATTRIBUTE commands for one or more attributes. All attribute characteristics set for each attribute remain in effect for the remainder of the session, until you turn the attribute OFF, or until you use the CLEAR COLUMN command. Thus, the ATTRIBUTE commands you enter can control an attribute's display characteristics for multiple SQL SELECT commands.

When you enter multiple ATTRIBUTE commands for the same attribute, SQL*Plus applies their clauses collectively. If several ATTRIBUTE commands apply the same clause to the same attribute, the last one entered will control the output.

Examples

To make the ENAME attribute of the Object Type EMP_TYPE 20 characters wide, enter

```
SQL> ATTRIBUTE EMP_TYPE.ENAME FORMAT A20
```

To format the SAL attribute of the Object Type EMP_TYPE so that it shows millions of dollars, rounds to cents, uses commas to separate thousands, and displays \$0.00 when a value is zero, enter

```
SQL> ATTRIBUTE EMP_TYPE.SAL FORMAT $9,999,990.99
```

BREAK

Purpose

Specifies where and how formatting will change in a report, such as

- suppressing display of duplicate values for a given column
- skipping a line each time a given column value changes
- printing COMPUTED figures each time a given column value changes or at the end of the report (see also the [COMPUTE](#) command)

Also lists the current BREAK definition.

Syntax

```
BRE[AK] [ON report_element [action [action]]] ...
```

where:

report_element Requires the following syntax:

```
{column|expr|ROW|REPORT}
```

action Requires the following syntax:

```
[SKI[P] n|[SKI[P]] PAGE][NODUP[LICATES]|DUP[LICATES]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

ON *column* [*action* [*action*]]

When you include action(s), specifies action(s) for SQL*Plus to take whenever a break occurs in the specified column (called the *break column*). (*column* cannot have a table or view appended to it. To achieve this, you can alias the column in the SQL statement.) A break is one of three events, a change in the value of a column or expression, the output of a row, or the end of a report.

When you omit action(s), BREAK ON *column* suppresses printing of duplicate values in *column* and marks a place in the report where SQL*Plus will perform the computation you specify in a corresponding COMPUTE command.

You can specify ON *column* one or more times. If you specify multiple ON clauses, as in

```
SQL> BREAK ON DEPTNO SKIP PAGE ON JOB -  
> SKIP 1 ON SAL SKIP 1
```

the first ON clause represents the *outermost break* (in this case, ON DEPTNO) and the last ON clause represents the *innermost break* (in this case, ON SAL). SQL*Plus searches each row of output for the specified break(s), starting with the outermost break and proceeding—in the order you enter the clauses—to the innermost. In the example, SQL*Plus searches for a change in the value of DEPTNO, then JOB, then SAL.

Next, SQL*Plus executes actions beginning with the action specified for the innermost break and proceeding in reverse order toward the outermost break (in this case, from SKIP 1 for ON SAL toward SKIP PAGE for ON DEPTNO). SQL*Plus executes each action up to and including the action specified for the first occurring break encountered in the initial search.

If, for example, in a given row the value of JOB changes—but the values of DEPTNO and SAL remain the same—SQL*Plus skips *two* lines before printing the row (one as a result of SKIP 1 in the ON SAL clause and one as a result of SKIP 1 in the ON JOB clause).

Whenever you use ON *column*, you should also use an ORDER BY clause in the SQL SELECT command. Typically, the columns used in the BREAK command should appear in the same order in the ORDER BY clause (although all columns specified in the ORDER BY clause need not appear in the BREAK command). This prevents breaks from occurring at meaningless points in the report.

If the BREAK command specified earlier in this section is used, the following SELECT command produces meaningful results:

```
SQL> SELECT DEPTNO, JOB, SAL, ENAME  
2 FROM EMP  
3 ORDER BY DEPTNO, JOB, SAL, ENAME;
```

All rows with the same DEPTNO print together on one page, and within that page all rows with the same JOB print in groups. Within each group of jobs, those jobs with the same SAL print in groups. Breaks in ENAME cause no action because ENAME does not appear in the BREAK command.

ON *expr* [*action* [*action*]]

When you include action(s), specifies action(s) for SQL*Plus to take when the value of the expression changes.

When you omit action(s), BREAK ON *expr* suppresses printing of duplicate values of *expr* and marks a place in the report where SQL*Plus will perform the computation you specify in a corresponding COMPUTE command.

You can use an expression involving one or more table columns or an alias assigned to a report column in a SQL SELECT or SQL*Plus COLUMN command. If you use an expression in a BREAK command, you must enter *expr* exactly as it appears in the SELECT command. If the expression in the SELECT command is a+b, for example, you cannot use b+a or (a+b) in a BREAK command to refer to the expression in the SELECT command.

The information given above for ON *column* also applies to ON *expr*.

ON ROW [*action* [*action*]]

When you include action(s), specifies action(s) for SQL*Plus to take when a SQL SELECT command returns a row. The ROW break becomes the innermost break regardless of where you specify it in the BREAK command. You should always specify an action when you BREAK on a row.

ON REPORT [*action*]

Marks a place in the report where SQL*Plus will perform the computation you specify in a corresponding COMPUTE command. Use BREAK ON REPORT in conjunction with COMPUTE to print grand totals or other "grand" computed values.

The REPORT break becomes the outermost break regardless of where you specify it in the BREAK command.

Note that SQL*Plus will not skip a page at the end of a report, so you cannot use BREAK ON REPORT SKIP PAGE.

Refer to the following list for a description of each action:

SKI[P] *n*

Skips *n* lines before printing the row where the break occurred.

[SKI[P]] PAGE

Skips the number of lines that are defined to be a page before printing the row where the break occurred. The number of lines per page can be set via the PAGESIZE clause of the SET command. Note that PAGESIZE only changes the number of lines that SQL*Plus considers to be a page. Therefore, SKIP PAGE may not always cause a physical page break, unless you have also specified NEWPAGE 0. Note also that if there is a break after the last row of data to be printed in a report, SQL*Plus will not skip the page.

NODUP[LICATES]

Prints blanks rather than the value of a break column when the value is a duplicate of the column's value in the preceding row.

DUP[LICATES]

Prints the value of a break column in every selected row.

Enter BREAK with no clauses to list the current break definition.

Usage Notes

Each new BREAK command you enter replaces the preceding one.

To remove the BREAK command, use CLEAR BREAKS.

Example

To produce a report that prints duplicate job values, prints the average of SAL and inserts one blank line when the value of JOB changes, and *additionally* prints the sum of SAL and inserts another blank line when the value of DEPTNO changes, you could enter the following commands. (The example selects departments 10 and 30 and the jobs of clerk and salesman only.)

```
SQL> BREAK ON DEPTNO SKIP 1 ON JOB SKIP 1 DUPLICATES
SQL> COMPUTE SUM OF SAL ON DEPTNO
SQL> COMPUTE AVG OF SAL ON JOB
SQL> SELECT DEPTNO, JOB, ENAME, SAL FROM EMP
  2 WHERE JOB IN ('CLERK', 'SALESMAN')
  3 AND DEPTNO IN (10, 30)
  4 ORDER BY DEPTNO, JOB;
```

The following output results:

DEPTNO	JOB	ENAME	SAL
10	CLERK	MILLER	1300
*****			-----
	avg		1300
*****			-----
sum			1300
30	CLERK	JAMES	950
*****			-----
	avg		950
DEPTNO	JOB	ENAME	SAL

30	SALESMAN	ALLEN	1600
	SALESMAN	WARD	1250
	SALESMAN	MARTIN	1250
	SALESMAN	TURNER	1500
*****			-----
	avg		1400
*****			-----
sum			6550

6 rows selected.

BTITLE

Purpose

Places and formats a specified title at the bottom of each report page or lists the current BTITLE definition.

For a description of the old form of [BTITLE](#), see [Appendix F](#).

Syntax

```
BTI[TLE] [printspec [text|variable] ...] [ON|OFF]
```

Terms and Clauses

Refer to the [TTITLE](#) command for additional information on terms and clauses in the BTITLE command syntax.

Enter BTITLE with no clauses to list the current BTITLE definition.

Usage Notes

If you do not enter a *printspec* clause before the first occurrence of *text*, BTITLE left justifies the text. SQL*Plus interprets BTITLE in the new form if a valid *printspec* clause (LEFT, SKIP, COL, and so on) immediately follows the command name.

Examples

To set a bottom title with CORPORATE PLANNING DEPARTMENT on the left and a date on the right, enter

```
SQL> BTITLE LEFT 'CORPORATE PLANNING DEPARTMENT' -  
> RIGHT '23 Nov 1999'
```

To set a bottom title with CONFIDENTIAL in column 50, followed by six spaces and a date, enter

```
SQL> BTITLE COL 50 'CONFIDENTIAL' TAB 6 '23 Nov 1999'
```

CHANGE

Purpose

Changes the first occurrence of text on the current line in the buffer.

Syntax

```
C[CHANGE] sepchar old [sepchar [new [sepchar]]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

sepchar

Represents any non-alphanumeric character such as "/" or "!". Use a *sepchar* that does not appear in *old* or *new*. You can omit the space between CHANGE and the first *sepchar*.

old

Represents the text you wish to change. CHANGE ignores case in searching for *old*. For example,

```
CHANGE /aq/aw
```

will find the first occurrence of "aq", "AQ", "aQ", or "Aq" and change it to "aw". SQL*Plus inserts the *new* text exactly as you specify it.

If *old* is prefixed with "...", it matches everything up to and including the first occurrence of *old*. If it is suffixed with "...", it matches the first occurrence of *old* and everything that follows on that line. If it contains an embedded "...", it matches everything from the preceding part of *old* through the following part of *old*.

new

Represents the text with which you wish to replace *old*. If you omit *new* and, optionally, the second and third *sepchars*, CHANGE deletes *old* from the current line of the buffer.

Usage Notes

CHANGE changes the first occurrence of the existing specified text on the current line of the buffer to the new specified text. The current line is marked with an asterisk (*) in the LIST output.

You can also use **CHANGE** to modify a line in the buffer that has generated an Oracle error. **SQL*Plus** sets the buffer's current line to the line containing the error so that you can make modifications.

To reenter an entire line, you can type the line number followed by the new contents of the line. If you specify a line number larger than the number of lines in the buffer and follow the number with text, **SQL*Plus** adds the text in a new line at the end of the buffer. If you specify zero ("0") for the line number and follow the zero with text, **SQL*Plus** inserts the line at the beginning of the buffer (that line becomes line 1).

Examples

Assume the current line of the buffer contains the following text:

```
4* WHERE JOB IS IN ('CLERK', 'SECRETARY', 'RECEPTIONIST')
```

Enter the following command:

```
SQL> C /RECEPTIONIST/GUARD/
```

The text in the buffer changes as follows:

```
4* WHERE JOB IS IN ('CLERK', 'SECRETARY', 'GUARD')
```

Or enter the following command:

```
SQL> C /'CLERK',.../'CLERK')/
```

The original line changes to

```
4* WHERE JOB IS IN ('CLERK')
```

Or enter the following command:

```
SQL> C /(...)/('COOK', 'BUTLER')/
```

The original line changes to

```
4* WHERE JOB IS IN ('COOK', 'BUTLER')
```

You can replace the contents of an entire line using the line number. This entry

```
SQL> 2 FROM EMP e1
```

causes the second line of the buffer to be replaced with

```
FROM EMP e1
```

Note that entering a line number followed by a string will replace the line regardless of what text follows the line number. For example,

```
SQL> 2 c/old/new/
```

will change the second line of the buffer to be

```
2* c/old/new/
```

CLEAR

Purpose

Resets or erases the current value or setting for the specified option.

Syntax

CL[EAR] *option* ...

where *option* represents one of the following clauses:

BRE[AKS]
BUFF[ER]
COL[UMNS]
COMP[UTES]
SCR[EEN]
SQL
TIMI[NG]

Terms and Clauses

Refer to the following list for a description of each term or clause:

BRE[AKS]

Removes the break definition set by the BREAK command.

BUFF[ER]

Clears text from the buffer. CLEAR BUFFER has the same effect as CLEAR SQL, unless you are using multiple buffers (see the [SET BUFFER](#) command in [Appendix F](#)).

COL[UMNS]

Resets column display attributes set by the COLUMN command to default settings for all columns. To reset display attributes for a single column, use the CLEAR clause of the COLUMN command. CLEAR COLUMNS also clears the ATTRIBUTES for that column.

COMP[UTES]

Removes all COMPUTE definitions set by the COMPUTE command.

SCR[EEN]

Clears your screen.

SQL

Clears the text from SQL buffer. CLEAR SQL has the same effect as CLEAR BUFFER, unless you are using multiple buffers (see the [SET BUFFER](#) command in [Appendix F](#)).

TIMI[NG]

Deletes all timers created by the TIMING command.

Example

To clear breaks, enter

```
SQL> CLEAR BREAKS
```

To clear column definitions, enter

```
SQL> CLEAR COLUMNS
```

COLUMN

Purpose

Specifies display attributes for a given column, such as

- text for the column heading
- alignment of the column heading
- format for NUMBER data
- wrapping of column data

Also lists the current display attributes for a single column or all columns.

Syntax

```
COL[UMN] [{column|expr} [option ...]]
```

where *option* represents one of the following clauses:

```
ALI[AS] alias  
CLE[AR]  
ENIMAP {ON|OFF}  
FOLD_A[FTER]  
FOLD_B[EFORE]  
FOR[MAT] format  
HEA[DING] text  
JUS[TIFY] {L[EFT]|C[ENTER]|C[ENTRE]|R[IGHT]}  
LIKE {expr|alias}  
NEWL[INE]  
NEW_V[ALUE] variable  
NOPRI[NT]|PRI[NT]  
NUL[L] text  
OLD_V[ALUE] variable  
ON|OFF  
WRA[PPED]|WOR[D_WRAPPED]|TRU[NCATED]
```

Terms and Clauses

Enter COLUMN followed by *column* or *expr* and no other clauses to list the current display attributes for only the specified column or expression. Enter COLUMN with no clauses to list all current column display attributes.

Refer to the following list for a description of each term or clause:

{column | expr}

Identifies the data item (typically, the name of a column) in a SQL SELECT command to which the column command refers. If you use an expression in a COLUMN command, you must enter *expr* exactly as it appears in the SELECT command. If the expression in the SELECT command is a+b, for example, you cannot use b+a or (a+b) in a COLUMN command to refer to the expression in the SELECT command.

If you select columns with the same name from different tables, a COLUMN command for that column name will apply to both columns. That is, a COLUMN command for the column ENAME applies to all columns named ENAME that you reference in this session. COLUMN ignores table name prefixes in SELECT commands. Also, spaces are ignored unless the name is placed in double quotes.

To format the columns differently, assign a unique alias to each column within the SELECT command itself (do not use the ALIAS clause of the COLUMN command) and enter a COLUMN command for each column's alias.

ALI[AS] alias

Assigns a specified *alias* to a column, which can be used to refer to the column in BREAK, COMPUTE, and other COLUMN commands.

CLE[AR]

Resets the display attributes for the column to default values.

To reset the attributes for all columns, use the CLEAR COLUMNS command. CLEAR COLUMNS also clears the ATTRIBUTEs for that column.

ENTMAP {ON | OFF}

Allows entity mapping to be turned on or off for selected columns in HTML output. This feature allows you to include, for example, HTML hyperlinks in a column of data, while still mapping entities in other columns of the same report. By turning entity mapping off for a column containing HTML hyperlinks, the HTML anchor tag delimiters, <, >, " and &, are correctly interpreted in the report. Otherwise they would be replaced with their respective entities, <, >, " and &, preventing web browsers from correctly interpreting the HTML.

Entities in the column heading and any COMPUTE labels or output appearing in the column are mapped or not mapped according to the value of ENTMAP for the column.

The default setting for COLUMN ENTMAP is the current setting of the MARKUP HTML ENTMAP option. For more information about the MARKUP HTML ENTMAP option, see [MARKUP Options](#) in [Chapter 7](#) and [SET](#) later this Chapter.

FOLD_A[FTER]

Inserts a carriage return after the column heading and after each row in the column. SQL*Plus does not insert an extra carriage return after the last column in the SELECT list.

FOLD_B[EFOR]

Inserts a carriage return before the column heading and before each row of the column. SQL*Plus does not insert an extra carriage return before the first column in the SELECT list.

FOR[MAT] *format*

Specifies the display format of the column. The format specification must be a text constant such as A10 or \$9,999—not a variable.

Character Columns The default width of CHAR, NCHAR, VARCHAR2 (VARCHAR) and NVARCHAR2 (NCHAR VARYING) columns is the width of the column in the database. SQL*Plus formats these datatypes left-justified. If a value does not fit within the column width, SQL*Plus wraps or truncates the character string depending on the setting of SET WRAP.

A LONG, CLOB or NCLOB column's width defaults to the value of SET LONGCHUNKSIZE or SET LONG, whichever one is smaller.

To change the width of a datatype to *n*, use FORMAT *An*. (A stands for alphanumeric.) If you specify a width shorter than the column heading, SQL*Plus truncates the heading. If you specify a width for a LONG, CLOB, or NCLOB column, SQL*Plus uses the LONGCHUNKSIZE or the specified width, whichever is smaller, as the column width.

DATE Columns The default width and format of unformatted DATE columns in SQL*Plus is derived from the NLS parameters in effect. Otherwise, the default width is A9. In Oracle8i, the NLS parameters may be set in your database parameter file or may be environment variables or an equivalent platform-specific mechanism. They may also be specified

for each session with the ALTER SESSION command. (See the documentation for Oracle8i for a complete description of the NLS parameters).

You can change the format of any DATE column using the SQL function TO_CHAR in your SQL SELECT statement. You may also wish to use an explicit COLUMN FORMAT command to adjust the column width.

When you use SQL functions like TO_CHAR, Oracle automatically allows for a very wide column.

To change the width of a DATE column to *n*, use the COLUMN command with FORMAT An. If you specify a width shorter than the column heading, the heading is truncated.

NUMBER Columns To change a NUMBER column's width, use FORMAT followed by an element as specified in [Table 8-1](#).

Table 8-1 Number Formats

Element	Example(s)	Description
9	9999	Number of "9"s specifies number of significant digits returned. Blanks are displayed for leading zeroes. A zero (0) is displayed for a value of zero.
0	0999 9990	Displays a leading zero or a value of zero in this position as 0.
\$	\$9999	Prefixes value with dollar sign.
B	B9999	Displays a zero value as blank, regardless of "0"s in the format model.
MI	9999MI	Displays "-" after a negative value. For a positive value, a trailing space is displayed.
S	S9999	Returns "+" for positive values and "-" for negative values in this position.
PR	9999PR	Displays a negative value in <angle brackets>. For a positive value, a leading and trailing space is displayed.
D	99D99	Displays the decimal character in this position, separating the integral and fractional parts of a number.
G	9G999	Displays the group separator in this position.

Table 8–1 Number Formats

Element	Example(s)	Description
C	C999	Displays the ISO currency symbol in this position.
L	L999	Displays the local currency symbol in this position.
, (comma)	9,999	Displays a comma in this position.
. (period)	99.99	Displays a period (decimal point) in this position, separating the integral and fractional parts of a number.
V	999V99	Multiplies value by 10^n , where n is number of "9"s after "V".
EEEE	9.999EEEE	Displays value in scientific notation (format must contain exactly four "E"s).
RN or rn	RN	Displays upper- or lowercase Roman numerals. Value can be an integer between 1 and 3999.
DATE	DATE	Displays value as a date in MM/DD/YY format; used to format NUMBER columns that represent Julian dates.

The MI and PR format elements can only appear in the last position of a number format model. The S format element can only appear in the first or last position.

If a number format model does not contain the MI, S or PR format elements, negative return values automatically contain a leading negative sign and positive values automatically contain a leading space.

A number format model can contain only a single decimal character (D) or period (.), but it can contain multiple group separators (G) or commas (,). A group separator or comma cannot appear to the right of a decimal character or period in a number format model.

SQL*Plus formats NUMBER data right-justified. A NUMBER column's width equals the width of the heading or the width of the FORMAT plus one space for the sign, whichever is greater. If you do not explicitly use FORMAT, then the column's width will always be at least the value of SET NUMWIDTH.

SQL*Plus may round your NUMBER data to fit your format or field width.

If a value cannot fit within the column width, SQL*Plus indicates overflow by displaying a pound sign (#) in place of each digit the width allows.

If a positive value is extremely large and a numeric overflow occurs when rounding a number, then the infinity sign (~) replaces the value. Likewise, if a negative value is extremely small and a numeric overflow occurs when rounding a number, then the negative infinity sign replaces the value (-~).

HEA[DING] *text*

Defines a column heading. If you do not use a HEADING clause, the column's heading defaults to *column* or *expr*. If *text* contains blanks or punctuation characters, you must enclose it with single or double quotes. Each occurrence of the HEADSEP character (by default, "|") begins a new line.

For example,

```
COLUMN ENAME HEADING 'Employee |Name'
```

would produce a two-line column heading. See the [HEADSEP](#) variable of the [SET](#) command in this chapter for information on changing the HEADSEP character.

JUS[TIFY] {L[EFT] | C[ENTER] | C[ENTRE] | R[IGHT]}

Aligns the heading. If you do not use a JUSTIFY clause, headings for NUMBER columns default to RIGHT and headings for other column types default to LEFT.

LIKE {*expr* | *alias*}

Copies the display attributes of another column or expression (whose attributes you have already defined with another COLUMN command). LIKE copies only attributes not defined by another clause in the current COLUMN command.

NEWL[INE]

Starts a new line before displaying the column's value. NEWLINE has the same effect as FOLD_BEFORE.

NEW_V[ALUE] *variable*

Specifies a variable to hold a column value. You can reference the variable in TTITLE commands. Use NEW_VALUE to display column values or the date in the top title. You must include the column in a

BREAK command with the SKIP PAGE action. The variable name cannot contain a pound sign (#).

NEW_VALUE is useful for master/detail reports in which there is a new master record for each page. For master/detail reporting, you must also include the column in the ORDER BY clause. See the example at the end of this command description.

For information on displaying a column value in the bottom title, see [COLUMN OLD_VALUE](#). For more information on referencing variables in titles, see the [TTITLE](#) command later in this chapter. For information on formatting and valid format models, see the [FORMAT](#) command.

NOPRI[NT] | PRINT]

Controls the printing of the column (the column heading and all the selected values). NOPRINT turns off the screen output and printing of the column. PRINT turns the printing of the column on.

NUL[L] *text*

Controls the text SQL*Plus displays for null values in the given column. The default is a white space. SET NULL controls the text displayed for all null values for all columns, unless overridden for a specific column by the NULL clause of the COLUMN command. When a NULL value is SELECTed, a variable's type will always become CHAR so the SET NULL text can be stored in it.

OLD_V[ALUE] *variable*

Specifies a variable to hold a column value. You can reference the variable in BTITLE commands. Use OLD_VALUE to display column values in the bottom title. You must include the column in a BREAK command with the SKIP PAGE action.

OLD_VALUE is useful for master/detail reports in which there is a new master record for each page. For master/detail reporting, you must also include the column in the ORDER BY clause.

For information on displaying a column value in the top title, see [COLUMN NEW_VALUE](#). For more information on referencing variables in titles, see the [TTITLE](#) command later in this chapter.

ON | OFF

Controls the status of display attributes for a column. OFF disables the attributes for a column without affecting the attributes' definition. ON reinstates the attributes.

WRA[PPED] | WOR[D_WRAPPED] | TRU[NCATED]

Specifies how SQL*Plus will treat a datatype or DATE string that is too wide for a column. WRAPPED wraps the string within the column bounds, beginning new lines when required. When WORD_WRAP is enabled, SQL*Plus left justifies each new line, skipping all leading whitespace (for example, returns, newline characters, tabs and spaces), including embedded newline characters. Embedded whitespace not on a line boundary is not skipped. TRUNCATED truncates the string at the end of the first line of display.

Usage Notes

You can enter any number of COLUMN commands for one or more columns. All column attributes set for each column remain in effect for the remainder of the session, until you turn the column OFF, or until you use the CLEAR COLUMN command. Thus, the COLUMN commands you enter can control a column's display attributes for multiple SQL SELECT commands.

When you enter multiple COLUMN commands for the same column, SQL*Plus applies their clauses collectively. If several COLUMN commands apply the same clause to the same column, the last one entered will control the output.

Examples

To make the ENAME column 20 characters wide and display EMPLOYEE NAME on two lines as the column heading, enter

```
SQL> COLUMN ENAME FORMAT A20 HEADING 'EMPLOYEE |NAME'
```

To format the SAL column so that it shows millions of dollars, rounds to cents, uses commas to separate thousands, and displays \$0.00 when a value is zero, you would enter

```
SQL> COLUMN SAL FORMAT $9,999,990.99
```

To assign the alias NET to a column containing a long expression, to display the result in a dollar format, and to display <NULL> for null values, you might enter

```
SQL> COLUMN SAL+COMM+BONUS-EXPENSES-INS-TAX ALIAS NET
SQL> COLUMN NET FORMAT $9,999,999.99 NULL '<NULL>'
```

Note that the example divides this column specification into two commands. The first defines the alias NET, and the second uses NET to define the format.

Also note that in the first command you must enter the expression exactly as you entered it (or will enter it) in the SELECT command. Otherwise, SQL*Plus cannot match the COLUMN command to the appropriate column.

To wrap long values in a column named REMARKS, you can enter

```
SQL> COLUMN REMARKS FORMAT A20 WRAP
```

For example:

```
CUSTOMER  DATE          QUANTITY REMARKS
-----  -
123      25-AUG-86      144 This order must be s
        shipped by air freigh
        t to ORD
```

If you replace WRAP with WORD_WRAP, REMARKS looks like this:

```
CUSTOMER  DATE          QUANTITY REMARKS
-----  -
123      25-AUG-86      144 This order must be
        shipped by air freight
        to ORD
```

If you specify TRUNCATE, REMARKS looks like this:

```
CUSTOMER  DATE          QUANTITY REMARKS
-----  -
123      25-AUG-86      144 This order must be s
```

In order to print the current date and the name of each job in the top title, enter the following. (For details on creating a date variable, see ["Displaying the Current Date in Titles"](#) under ["Defining Page and Report Titles and Dimensions"](#) in Chapter 4.)

```
SQL> COLUMN JOB NOPRINT NEW_VALUE JOBVAR
SQL> COLUMN TODAY NOPRINT NEW_VALUE DATEVAR
SQL> BREAK ON JOB SKIP PAGE ON TODAY
SQL> TTITLE CENTER 'Job Report' RIGHT DATEVAR SKIP 2 -
> LEFT 'Job:      ' JOBVAR SKIP 2
SQL> SELECT TO_CHAR(SYSDATE, 'MM/DD/YY') TODAY,
2 ENAME, JOB, MGR, HIREDATE, SAL, DEPTNO
3 FROM EMP WHERE JOB IN ('CLERK', 'SALESMAN')
4 ORDER BY JOB, ENAME;
```

Your two page report would look similar to the following report, with "Job Report" centered within your current linesize:

```

                                Job Report                                10/25/99

Job:      CLERK

ENAME          MGR HIREDATE          SAL      DEPTNO
-----
ADAMS          7788 12-JAN-83          1100      20
JAMES          7698 03-DEC-81           950      30
MILLER         7782 23-JAN-82          1300      10
SMITH          7902 17-DEC-80           800      20
-----
                                1037.5

```

```

                                Job Report                                10/25/99

Job:      SALESMAN

ENAME          MGR HIREDATE          SAL      DEPTNO
-----
ALLEN          7698 20-FEB-81          1600      30
MARTIN         7698 28-SEP-81          1250      30
TURNER         7698 08-SEP-81          1500      30
WARD           7698 22-FEB-81          1250      30
-----
                                1400

```

8 rows selected.

To change the default format of DATE columns to 'YYYY-MM-DD', you can enter

```
SQL> ALTER SESSION SET NLS_DATE_FORMAT = 'YYYY-MM-DD';
```

The following output results:

Session altered.

To display the change, enter a SELECT statement, such as:

```
SQL> SELECT HIREDATE
2 FROM EMP
3 WHERE EMPNO = 7839;
```

The following output results:

Job Report 10/25/99

Job: SALESMAN

HIREDATE

1981-11-17

See the *Oracle8i SQL Reference* for information on the ALTER SESSION command.

Note that in a SELECT statement, some SQL calculations or functions, such as TO_CHAR, may cause a column to be very wide. In such cases, use the FORMAT option to alter the column width.

COMPUTE

Purpose

Calculates and prints summary lines, using various standard computations, on subsets of selected rows, or lists all COMPUTE definitions. (For details on how to create summaries, see ["Clarifying Your Report with Spacing and Summary Lines" in Chapter 4.](#))

Syntax

```
COMP[UTE] [function [LAB[EL] text] ...
  OF {expr|column|alias} ...
  ON {expr|column|alias|REPORT|ROW} ...]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

function ...

Represents one of the functions listed in [Table 8–2](#). If you specify more than one function, use spaces to separate the functions.

COMPUTE command functions are always executed in the sequence AVG, COUNT, MINIMUM, MAXIMUM, NUMBER, SUM, STD, VARIANCE, regardless of their order in the COMPUTE command.

Table 8–2 COMPUTE Functions

Function	Computes	Applies to Datatypes
AVG	Average of non-null values	NUMBER
COU[NT]	Count of non-null values	all types
MIN[IMUM]	Minimum value	NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)
MAX[IMUM]	Maximum value	NUMBER, CHAR, NCHAR, VARCHAR2 (VARCHAR), NVARCHAR2 (NCHAR VARYING)

Table 8–2 COMPUTE Functions

Function	Computes	Applies to Datatypes
NUM[BER]	Count of rows	all types
SUM	Sum of non-null values	NUMBER
STD	Standard deviation of non-null values	NUMBER
VAR[iance]	Variance of non-null values	NUMBER

LAB[EL] *text*

Defines the label to be printed for the computed value. If no LABEL clause is used, *text* defaults to the unabbreviated function keyword. If *text* contains spaces or punctuation, you must enclose it with single quotes. The label prints left justified and truncates to the column width or linesize, whichever is smaller. The maximum length of a label is 500 characters.

The label for the computed value appears in the break column specified. To suppress the label, use the NOPRINT option of the COLUMN command on the break column.

If you repeat a function in a COMPUTE command, SQL*Plus issues a warning and uses the first occurrence of the function.

With ON REPORT and ON ROW computations, the label appears in the first column listed in the SELECT statement. The label can be suppressed by using a NOPRINT column first in the SELECT statement. When you compute a function of the first column in the SELECT statement ON REPORT or ON ROW, then the computed value appears in the first column and the label is not displayed. To see the label, select a dummy column first in the SELECT list.

OF {*expr* | *column* | *alias*} ...

In the OF clause, you can refer to an expression or function reference in the SELECT statement by placing the expression or function reference in double quotes. Column names and aliases do not need quotes.

ON {*expr* | *column* | *alias* | REPORT | ROW} ...

Specifies the event SQL*Plus will use as a break. (*column* cannot have a table or view appended to it. To achieve this, you can alias the column in the SQL statement.) COMPUTE prints the computed value and

restarts the computation when the event occurs (that is, when the value of the expression changes, a new ROW is fetched, or the end of the report is reached).

If multiple COMPUTE commands reference the same column in the ON clause, only the last COMPUTE command applies.

To reference a SQL SELECT expression or function reference in an ON clause, place the expression or function reference in quotes. Column names and aliases do not need quotes.

Enter COMPUTE without clauses to list all COMPUTE definitions.

Usage Notes

In order for the computations to occur, the following conditions must all be true:

- One or more of the expressions, columns, or column aliases you reference in the OF clause must also be in the SELECT command.
- The expression, column, or column alias you reference in the ON clause must occur in the SELECT command and in the most recent BREAK command.
- If you reference either ROW or REPORT in the ON clause, also reference ROW or REPORT in the most recent BREAK command.

To remove all COMPUTE definitions, use the CLEAR COMPUTES command.

Examples

To subtotal the salary for the "clerk", "analyst", and "salesman" job classifications with a compute label of "TOTAL", enter

```
SQL> BREAK ON JOB SKIP 1
SQL> COMPUTE SUM LABEL 'TOTAL' OF SAL ON JOB
SQL> SELECT JOB, ENAME, SAL
  2 FROM EMP
  3 WHERE JOB IN ('CLERK', 'ANALYST', 'SALESMAN')
  4 ORDER BY JOB, SAL;
```

The following output results:

JOB	ENAME	SAL
ANALYST	SCOTT	3000
	FORD	3000
*****	-----	
TOTAL		6000

COMPUTE

CLERK	SMITH	800
	JAMES	950
	ADAMS	1100
	MILLER	1300
*****	-----	
TOTAL		4150
SALESMAN	WARD	1250
	MARTIN	1250
	TURNER	1500
	ALLEN	1600
*****	-----	
TOTAL		5600

To calculate the total of salaries less than 1,000 on a report, enter

```
SQL> COMPUTE SUM OF SAL ON REPORT
SQL> BREAK ON REPORT
SQL> COLUMN DUMMY HEADING ''
SQL> SELECT ' ' DUMMY, SAL, EMPNO
  2 FROM EMP
  3 WHERE SAL < 1000
  4 ORDER BY SAL;
```

The following output results:

	SAL	EMPNO
---	-----	-----
	800	7369
	950	7900

sum	1750	

To calculate the average and maximum salary for the accounting and sales departments, enter

```
SQL> BREAK ON DNAME SKIP 1
SQL> COMPUTE AVG LABEL 'Dept Average' -
>         MAX LABEL 'Dept Maximum' -
>         OF SAL ON DNAME
SQL> SELECT DNAME, ENAME, SAL
  2 FROM DEPT, EMP
  3 WHERE DEPT.DEPTNO = EMP.DEPTNO
  4 AND DNAME IN ('ACCOUNTING', 'SALES')
  5 ORDER BY DNAME;
```


The following output results:

DNAME	ENAME	SAL
ACCOUNTING	CLARK	2450
	KING	5000
	MILLER	1300

Dept Average		2916.66667
Dept Maximum		5000
SALES	ALLEN	1600
	BLAKE	2850
	MARTIN	1250
	JAMES	950
	TURNER	1500
	WARD	1250

Dept Average		1566.66667
Dept Maximum		2850

9 rows selected.

To calculate the sum of salaries for departments 10 and 20 without printing the compute label, enter

```
SQL> COLUMN DUMMY NOPRINT
SQL> COMPUTE SUM OF SAL ON DUMMY
SQL> BREAK ON DUMMY SKIP 1
SQL> SELECT DEPTNO DUMMY, DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE DEPTNO <= 20
  4 ORDER BY DEPTNO;
```

SQL*Plus displays the following output:

DEPTNO	ENAME	SAL
10	CLARK	2450
10	KING	5000
10	MILLER	1300
		8750
20	SMITH	800

COMPUTE

20	ADAMS	1100
20	FORD	3000
20	SCOTT	3000
20	JONES	2975

10875

8 rows selected.

To calculate the salary total at the end of the report without printing the compute label, enter

```
SQL> COLUMN DUMMY NOPRINT
SQL> COMPUTE SUM OF SAL ON DUMMY
SQL> BREAK ON DUMMY
SQL> SELECT NULL DUMMY, DEPTNO, ENAME, SAL
  2 FROM EMP
  3 WHERE DEPTNO <= 20
  4 ORDER BY DEPTNO;
```

SQL*Plus displays the following output:

DEPTNO	ENAME	SAL
10	CLARK	2450
10	KING	5000
10	MILLER	1300
20	SMITH	800
20	ADAMS	1100
20	FORD	3000
20	SCOTT	3000
20	JONES	2975

19625

8 rows selected.

CONNECT

Purpose

Connects a given username to Oracle.

Syntax

```
CONN[ECT] [[logon] [AS {SYSOPER|SYSDBA}]]
```

where *logon* requires the following syntax:

```
username[/password][@connect_identifier]/
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

***username*[/*password*]**

Represent the username and password with which you wish to connect to Oracle. If you omit *username* and *password*, SQL*Plus prompts you for them. If you enter a slash (/) or simply enter [Return] to the prompt for *username*, SQL*Plus logs you in using a default logon (see "/" below).

If you omit only *password*, SQL*Plus prompts you for *password*. When prompting, SQL*Plus does not display *password* on your terminal screen. See the [PASSWORD](#) command in this chapter for information about changing your password.

connect_identifier

Consists of a Net8 connect identifier. The exact syntax depends upon the Net8 communications protocol your Oracle installation uses. For more information, refer to the Net8 manual appropriate for your protocol or contact your DBA. SQL*Plus does not prompt for a service name, but uses your default database if you do not include a specification.

/

Represents a default logon using operating system authentication. You cannot enter a *connect_identifier* if you use a default logon. In a default logon, SQL*Plus typically attempts to log you in using the username OP\$*name*, where *name* is your operating system username. See the *Oracle8i Administrator's Guide* for information about operating system authentication.

AS {SYSOPER|SYSDBA}

The AS clause allows privileged connections by users who have been granted SYSOPER or SYSDBA system privileges. You can use either of these privileged connections with the default logon, /. For information about system privileges, see the *Oracle8i Administrator's Guide*.

Usage Notes

CONNECT commits the current transaction to the database, disconnects the current username from Oracle, and reconnects with the specified username.

If you log on or connect as a user whose account has expired, SQL*Plus prompts you to change your password before you can connect.

If an account is locked, a message is displayed and connection into that account (as that user) is not permitted until the account is unlocked by your DBA.

For more information about user account management, refer to the CREATE and ALTER USER commands, and the CREATE PROFILE command in the *Oracle8i SQL Reference*.

Examples

To connect across Net8 using username SCOTT and password TIGER to the database known by the Net8 alias as FLEETDB, enter

```
SQL> CONNECT SCOTT/TIGER@FLEETDB
```

To connect using username SCOTT, letting SQL*Plus prompt you for the password, enter

```
SQL> CONNECT SCOTT
```

For more information about setting up your password file, refer to the *Oracle8i Administrator's Guide*.

To use a password file to connect to an instance on the current node as a privileged user named SCOTT with the password TIGER, enter

```
SQL> CONNECT SCOTT/TIGER AS SYSDBA
```

To connect to an instance on the current node as a privileged default user, enter

```
SQL> CONNECT / AS SYSDBA
```

Note: In the last two examples, your default schema becomes SYS.

COPY

Purpose

Copies the data from a query to a table in a local or remote database. COPY supports the following datatypes:

CHAR
DATE
LONG
NUMBER
VARCHAR2

Syntax

```
COPY {FROM database | TO database | FROM database TO database}  
      {APPEND|CREATE|INSERT|REPLACE} destination_table  
      [(column, column, column, ...)] USING query
```

where *database* has the following syntax:

```
username[/password]@connect_identifier
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

FROM *database*

Specifies the database that contains the data to be copied. If you omit the FROM clause, the source defaults to the database to which SQL*Plus is connected (that is, the database that other commands address). You must include a FROM clause to specify a source database other than the default.

TO *database*

Specifies the database containing the destination table. If you omit the TO clause, the destination defaults to the database to which SQL*Plus is connected (that is, the database that other commands address). You must include a TO clause to specify a destination database other than the default.

database

Specifies *username*[/*password*] @*connect_identifier* of the Oracle source or destination database you wish to COPY FROM or COPY TO. If you do

not specify *password* in either the FROM clause or the TO clause, SQL*Plus will prompt you for it. SQL*Plus suppresses the display of your password response.

You must include the *connect_identifier* clause which consists of a Net8 connection string, to specify the source or destination database. The exact syntax depends upon the Net8 communications protocol your Oracle installation uses. For more information, refer to the Net8 manual appropriate for your protocol or contact your DBA.

APPEND

Inserts the rows from *query* into *destination_table* if the table exists. If *destination_table* does not exist, COPY creates it.

CREATE

Inserts the rows from *query* into *destination_table* after first creating the table. If *destination_table* already exists, COPY returns an error.

INSERT

Inserts the rows from *query* into *destination_table*. If *destination_table* does not exist, COPY returns an error. When using INSERT, the USING *query* must select one column for each column in the *destination_table*.

REPLACE

Replaces *destination_table* and its contents with the rows from *query*. If *destination_table* does not exist, COPY creates it. Otherwise, COPY drops the existing table and replaces it with a table containing the copied data.

destination_table

Represents the table you wish to create or to which you wish to add data.

(column, column, column, ...)

Specifies the names of the columns in *destination_table*. You must enclose a name in double quotes if it contains lowercase letters or blanks.

If you specify columns, the number of columns must equal the number of columns selected by the query. If you do not specify any columns, the copied columns will have the same names in the destination table as they had in the source if COPY creates *destination_table*.

USING *query*

Specifies a SQL query (SELECT command) determining which rows and columns COPY copies.

Usage Notes

To enable the copying of data between Oracle and non-Oracle databases, NUMBER columns are changed to DECIMAL columns in the destination table. Hence, if you are copying between Oracle databases, a NUMBER column with no precision will be changed to a DECIMAL(38) column. When copying between Oracle databases, you should use SQL commands (CREATE TABLE AS and INSERT) or you should ensure that your columns have a precision specified.

The SQL*Plus SET variable LONG limits the length of LONG columns that you copy. If any LONG columns contain data longer than the value of LONG, COPY truncates the data.

SQL*Plus performs a commit at the end of each successful COPY. If you set the SQL*Plus SET variable COPYCOMMIT to a positive value *n*, SQL*Plus performs a commit after copying every *n* batches of records. The SQL*Plus SET variable ARRAYSIZE determines the size of a batch.

Some operating environments require that service names be placed in double quotes.

Examples

The following command copies the entire EMP table to a table named WESTEMP. Note that the tables are located in two different databases. If WESTEMP already exists, SQL*Plus replaces the table and its contents. The columns in WESTEMP have the same names as the columns in the source table, EMP.

```
SQL> COPY FROM SCOTT/TIGER@HQ TO JOHN/CHROME@WEST -  
> REPLACE WESTEMP -  
> USING SELECT * FROM EMP
```

The following command copies selected records from EMP to the database to which SQL*Plus is connected. SQL*Plus creates SALESMEN through the copy. SQL*Plus copies only the columns EMPNO and ENAME, and at the destination names them EMPNO and SALESMAN.

```
SQL> COPY FROM SCOTT/TIGER@HQ -  
> CREATE SALESMEN (EMPNO,SALESMAN) -  
> USING SELECT EMPNO, ENAME FROM EMP -  
> WHERE JOB='SALESMAN'
```

DEFINE

Purpose

Specifies a user variable and assigns it a CHAR value, or lists the value and variable type of a single variable or all variables.

Syntax

```
DEF[INE] [variable][variable = text]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

variable

Represents the user variable whose value you wish to assign or list.

text

Represents the CHAR value you wish to assign to *variable*. Enclose *text* in single quotes if it contains punctuation or blanks.

variable = text

Defines (names) a user variable and assigns it a CHAR value.

Enter DEFINE followed by *variable* to list the value and type of *variable*. Enter DEFINE with no clauses to list the values and types of all user variables.

Usage Notes

DEFINED variables retain their values until one of the following events occurs:

- you enter a new DEFINE command referencing the variable
- you enter an UNDEFINE command referencing the variable
- you enter an ACCEPT command referencing the variable
- you reference the variable in the NEW_VALUE or OLD_VALUE clause of the COLUMN command and reference the column in a subsequent SQL SELECT command
- you EXIT SQL*Plus

Whenever you run a stored query or command file, SQL*Plus substitutes the value of *variable* for each substitution variable referencing *variable* (in the form &*variable* or

&&*variable*). SQL*Plus will not prompt you for the value of *variable* in this session until you UNDEFINE *variable*.

Note that you can use DEFINE to define the variable, `_EDITOR`, which establishes the host system editor invoked by the SQL*Plus EDIT command.

If you continue the value of a DEFINEd variable on multiple lines (using the SQL*Plus command continuation character), SQL*Plus replaces each continuation character and carriage return you enter with a space in the resulting variable. For example, SQL*Plus interprets

```
SQL> DEFINE TEXT = 'ONE-  
> TWO-  
> THREE'
```

as

```
SQL> DEFINE TEXT = 'ONE TWO THREE'
```

Examples

To assign the value `MANAGER` to the variable `POS`, type:

```
SQL> DEFINE POS = MANAGER
```

If you execute a command that contains a reference to `&POS`, SQL*Plus will substitute the value `MANAGER` for `&POS` and will not prompt you for a `POS` value.

To assign the `CHAR` value `20` to the variable `DEPTNO`, type:

```
SQL> DEFINE DEPTNO = 20
```

Even though you enter the number `20`, SQL*Plus assigns a `CHAR` value to `DEPTNO` consisting of two characters, `2` and `0`.

To list the definition of `DEPTNO`, enter

```
SQL> DEFINE DEPTNO  
DEFINE DEPTNO          = "20" (CHAR)
```

This result shows that the value of `DEPTNO` is `20`.

DEL

Purpose

Deletes one or more lines of the buffer.

Syntax

```
DEL [n|n m|n *|n LAST|*|* n|* LAST|LAST]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

n	Deletes line <i>n</i> .
n m	Deletes lines <i>n</i> through <i>m</i> .
n *	Deletes line <i>n</i> through the current line.
n LAST	Deletes line <i>n</i> through the last line.
*	Deletes the current line.
* n	Deletes the current line through line <i>n</i> .
* LAST	Deletes the current line through the last line.
LAST	Deletes the last line.

Enter DEL with no clauses to delete the current line of the buffer.

Usage Notes

DEL makes the following line of the buffer (if any) the current line. You can enter DEL several times to delete several consecutive lines.

Note: DEL is a SQL*Plus command and DELETE is a SQL command. For more information about the SQL DELETE command, see the *Oracle8i SQL Reference*.

Examples

Assume the SQL buffer contains the following query:

```
1  SELECT ENAME, DEPTNO
2  FROM EMP
3  WHERE JOB = 'SALESMAN'
```

```
4* ORDER BY DEPTNO
```

To make the line containing the WHERE clause the current line, you could enter

```
SQL> LIST 3
   3* WHERE JOB = 'SALESMAN'
```

followed by

```
SQL> DEL
```

The SQL buffer now contains the following lines:

```
1  SELECT ENAME, DEPTNO
2  FROM EMP
3* ORDER BY DEPTNO
```

To delete the second line of the buffer, enter

```
SQL> DEL 2
```

The SQL buffer now contains the following lines:

```
1  SELECT ENAME, DEPTNO
2* ORDER BY DEPTNO
```

DESCRIBE

Purpose

Lists the column definitions for the specified table, view, or synonym or the specifications for the specified function or procedure.

Syntax

```
DESC[RIBE] {[schema.]object[@connect_identifier]}
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

schema

Represents the schema where the *object* resides. If you omit *schema*, SQL*Plus assumes you own *object*.

object

Represents the table, view, type, procedure, function, package or synonym you wish to describe.

@connect_identifier

Consists of the database link name corresponding to the database where *object* exists. For more information on which privileges allow access to another table in a different schema, refer to the *Oracle8i SQL Reference*.

Usage Notes

The description for tables, views, types and synonyms contains the following information:

- each column's name
- whether or not null values are allowed (NULL or NOT NULL) for each column
- datatype of columns, for example, NUMBER, CHAR, VARCHAR2 (VARCHAR), LONG, DATE, RAW, LONGRAW, or ROWID
- precision of columns (and scale, if any, for a numeric column)

When you do a DESCRIBE, VARCHAR columns are returned with a type of VARCHAR2.

The DESCRIBE command allows you to describe objects recursively to the depth level set in the SET DESCRIBE command. You can also display the line number and indentation of the attribute or column name when an object contains multiple object types. For more information, see the SET command later in this chapter.

To control the width of the data displayed, use the SET LINESIZE command. For more information, see the SET command later in this chapter.

The description for functions and procedures contains the following information:

- the type of PL/SQL object (function or procedure)
- the name of the function or procedure
- the type of value returned (for functions)
- the argument names, types, whether input or output, and default values, if any

Examples

To describe the table EMP, enter

```
SQL> DESCRIBE EMP
```

SQL*Plus lists the following information:

Name	Null?	Type
EMPNO	NOT NULL	NUMBER(4)
ENAME		CHAR(10)
JOB		JOB(9)
MGR		NUMBER(4)
HIREDATE		DATE
SAL		NUMBER(7,2)
COMM		NUMBER(7,2)
DEPTNO		NUMBER(2)

To describe a procedure called CUSTOMER_LOOKUP, enter

```
SQL> DESCRIBE customer_lookup
```

SQL*Plus lists the following information:

```
PROCEDURE customer_lookup
Argument Name      Type      In/Out  Default?
-----
CUST_ID            NUMBER    IN
CUST_NAME          VARCHAR2  OUT
```

To create and describe the package **APACK** that contains the procedures **aproc** and **bproc**, enter

```
SQL> CREATE PACKAGE apack AS
  2  PROCEDURE aproc(P1 CHAR, P2 NUMBER);
  3  PROCEDURE bproc(P1 CHAR, P2 NUMBER);
  4  END apack;
  5  /
SQL> DESCRIBE apack
```

SQL*Plus lists the following information:

```
PROCEDURE aproc
Argument Name          Type          In/Out  Default?
-----
P1                     CHAR          IN
P2                     NUMBER        IN
PROCEDURE bproc
Argument Name          Type          In/Out  Default?
-----
P1                     CHAR          IN
P2                     NUMBER        IN
```

To create and describe the object type **ADDRESS** that contains the attributes **STREET** and **CITY**, enter

```
SQL> CREATE TYPE ADDRESS AS OBJECT
  2  ( STREET  VARCHAR2(20),
  3  CITY    VARCHAR2(20)
  4  );
  5  /
SQL> DESCRIBE address
```

SQL*Plus lists the following information:

```
Name                Null?    Type
-----
STREET              VARCHAR2(20)
CITY                VARCHAR2(20)
```

To create and describe the object type **EMPLOYEE** that contains the attributes **ENAME**, **EMPADDR**, **JOB** and **SAL**, enter

```
SQL> CREATE TYPE EMPLOYEE AS OBJECT
  2  ( ENAME  VARCHAR2(30),
  3  EMPADDR ADDRESS,
```

```

4   JOB      VARCHAR2(20),
5   SAL      NUMBER(7,2)
6 );
7 /

```

```
SQL> DESCRIBE employee
```

SQL*Plus lists the following information:

Name	Null?	Type
-----	-----	-----
ENAME		VARCHAR2(30)
EMPADDR		ADDRESS
JOB		VARCHAR2(20)
SAL		NUMBER(7,2)

To create and describe the object type `addr_type` as a table of the object type `ADDRESS`, enter

```

SQL> CREATE TYPE addr_type IS TABLE OF ADDRESS;
2 /
SQL> DESCRIBE addr_type

```

SQL*Plus lists the following information:

```
addr_type TABLE OF ADDRESS
```

Name	Null?	Type
-----	-----	-----
STREET		VARCHAR2(20)
CITY		VARCHAR2(20)

To create and describe the object type `addr_varray` as a varray of the object type `ADDRESS`, enter

```

SQL> CREATE TYPE addr_varray AS VARRAY(10) OF ADDRESS;
2 /
SQL> DESCRIBE addr_varray

```

SQL*Plus lists the following information:

```
addr_varray VARRAY(10) OF ADDRESS
```

Name	Null?	Type
-----	-----	-----
STREET		VARCHAR2(20)
CITY		VARCHAR2(20)

To create and describe the table dept_emp that contains the columns DEPTNO, PERSON and LOC, enter

```
SQL> CREATE TABLE dept_emp
  2 ( DEPTNO NUMBER,
  3   PERSON EMPLOYEE,
  4   LOC NUMBER
  5 );
  6 /
SQL> DESCRIBE dept_emp
```

SQL*Plus lists the following information:

Name	Null?	Type
DEPTNO		NUMBER
PERSON		EMPLOYEE
LOC		NUMBER

To create and describe the object type rational that contains the attributes NUMERATOR and DENOMINATOR, and the METHOD rational_order, enter

```
SQL> CREATE OR REPLACE TYPE rational AS OBJECT
  2 ( NUMERATOR NUMBER,
  3   DENOMINATOR NUMBER,
  4   MAP MEMBER FUNCTION rational_order -
>     RETURN DOUBLE PRECISION,
  5   PRAGMA RESTRICT_REFERENCES
  6   (rational_order, RNDS, WNDS, RNPS, WNPS) );
  7 /
SQL> CREATE OR REPLACE TYPE BODY rational AS OBJECT
  2 MAP MEMBER FUNCTION rational_order -
>   RETURN DOUBLE PRECISION IS
  3   BEGIN
  4     RETURN NUMERATOR/DENOMINATOR;
  5   END;
  6 END;
  7 /
SQL> DESCRIBE rational
```

SQL*Plus lists the following information:

Name	Null?	Type
NUMERATOR		NUMBER
DENOMINATOR		NUMBER


```
METHOD
-----
MAP MEMBER FUNCTION RATIONAL_ORDER RETURNS NUMBER
```

To describe the object `emp_object` and then format the output using the `SET DESCRIBE` command, first enter

```
SQL> DESCRIBE emp_object
```

`SQL*Plus` lists the following information:

Name	Null	Type
EMPLOYEE		RECUR_PERSON
DEPT		RECUR_DEPARTMENT
START_DATE		DATE
POSITION		VARCHAR2(1)
SAL		RECUR_SALARY

To format the `DESCRIBE` output use the `SET` command as follows:

```
SQL> SET LINESIZE 80
SQL> SET DESCRIBE DEPTH 2
SQL> SET DESCRIBE INDENT ON
SQL> SET DESCRIBE LINE OFF
```

To display the settings for the object, use the `SHOW` command as follows:

```
SQL> SHOW DESCRIBE
describe DEPTH 2 LINENUM OFF INDENT ON
SQL> DESCRIBE emp_object
```

`SQL*Plus` lists the following information:

Name	Null	Type
EMPLOYEE		RECUR_PERSON
NAME		VARCHAR2(20)
ADDR		RECUR_ADDRESS
ADDR1		RECUR_ADDRESS1
DOB		DATE
GENDER		VARCHAR2(10)
DEPT		RECUR_DEPARTMENT
DEPTNO		NUMBER
DEPT_NAME		VARCHAR2(20)
LOCATION		VARCHAR2(20)

DESCRIBE

START_DATE	DATE
POSITION	VARCHAR2(1)
SAL	RECUR_SALARY
ANNUAL_SAL	NUMBER(10,2)
EMP_TYPE	VARCHAR2(1)
COMM	NUMBER(10,2)
PENALTY_RATE	NUMBER(5,2)

For more information on using the CREATE TYPE command, see your *Oracle8i SQL Reference*.

For information about using the SET DESCRIBE and SHOW DESCRIBE commands, see the [SET](#) and [SHOW](#) commands later in this chapter.

DISCONNECT

Purpose

Commits pending changes to the database and logs the current username out of Oracle, but does not exit SQL*Plus.

Syntax

```
DISC[ONNECT]
```

Usage Notes

Use DISCONNECT within a command file to prevent user access to the database when you want to log the user out of Oracle but have the user remain in SQL*Plus. Use EXIT or QUIT to log out of Oracle and return control to your host computer's operating system.

Example

Your command file might begin with a CONNECT command and end with a DISCONNECT, as shown below.

```
SQL> GET MYFILE
  1  CONNECT ...
      .
      .
      .
      .
15* DISCONNECT
```

EDIT

Purpose

Invokes a host operating system text editor on the contents of the specified file or on the contents of the buffer.

Syntax

```
ED[IT] [file_name [.ext]]
```

Terms and Clauses

Refer to the following for a description of the term or clause:

file_name [.ext]

Represents the file you wish to edit (typically a command file).

Enter EDIT with no filename to edit the contents of the SQL buffer with the host operating system text editor.

Usage Notes

If you omit the file extension, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing the default extension, see the SUFFIX variable of the SET command in this chapter.

If you specify a filename, SQL*Plus searches for the file in the current working directory. If SQL*Plus cannot find the file in the current working directory, it creates a file with the specified name.

The user variable, `_EDITOR`, contains the name of the text editor invoked by EDIT. You can change the text editor by changing the value of `_EDITOR`. See [DEFINE](#) for information about changing the value of a user variable. If `_EDITOR` is undefined, EDIT attempts to invoke the default host operating system editor.

EDIT alone places the contents of the SQL buffer in a file by default named AFIEDT.BUF (in your current working directory) and invokes the text editor on the contents of the file. If the file AFIEDT.BUF already exists, it is overwritten with the contents of the buffer. You can change the default filename by using the SET EDITFILE command. For more information about setting a default filename for the EDIT command, see the EDITFILE variable of the SET command in this chapter.

Note: The default file, AFIEDT.BUF, may have a different name on some operating systems.

If you do not specify a filename and the buffer is empty, EDIT returns an error message.

To leave the editing session and return to SQL*Plus, terminate the editing session in the way customary for the text editor. When you leave the editor, SQL*Plus loads the contents of the file into the buffer.

Example

To edit the file REPORT with the extension SQL using your host operating system text editor, enter

```
SQL> EDIT REPORT
```

EXECUTE

Purpose

Executes a single PL/SQL statement. The EXECUTE command is often useful when you want to execute a PL/SQL statement that references a stored procedure. For more information on PL/SQL, see your *PL/SQL User's Guide and Reference*.

Syntax

```
EXEC[UTE] statement
```

Terms and Clauses

Refer to the following for a description of the term or clause:

statement

Represents a PL/SQL statement.

Usage Notes

If your EXECUTE command cannot fit on one line because of the PL/SQL statement, use the SQL*Plus continuation character (a hyphen) as shown in the example below.

The length of the command and the PL/SQL statement cannot exceed the length defined by SET LINESIZE.

Examples

The following EXECUTE command assigns a value to a bind variable:

```
SQL> EXECUTE :n := 1
```

The following EXECUTE command runs a PL/SQL statement that references a stored procedure:

```
SQL> EXECUTE -  
> :ID := EMP_MANAGEMENT.HIRE('BLAKE', 'MANAGER', 'KING', 2990, 'SALES')
```

Note that the value returned by the stored procedure is being placed in a bind variable, :ID. For information on how to create a bind variable, see the [VARIABLE](#) command in this chapter.

EXIT

Purpose

Terminates SQL*Plus and returns control to the operating system.

Syntax

```
{EXIT|QUIT} [SUCCESS|FAILURE|WARNING|n|variable|:BindVariable] [COMMIT|ROLLBACK]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

{EXIT|QUIT}

Can be used interchangeably (QUIT is a synonym for EXIT).

SUCCESS

Exits normally.

FAILURE

Exits with a return code indicating failure.

WARNING

Exits with a return code indicating warning.

COMMIT

Saves pending changes to the database before exiting.

n

Represents an integer you specify as the return code.

variable

Represents a user-defined or system variable (but not a bind variable), such as SQL.SQLCODE. EXIT *variable* exits with the value of *variable* as the return code.

:BindVariable

Represents a variable created in SQL*Plus with the VARIABLE command, and then referenced in PL/SQL, or other subprograms. *:BindVariable* exits the subprogram and returns you to SQL*Plus.

ROLLBACK

Executes a ROLLBACK statement and abandons pending changes to the database before exiting.

EXIT with no clauses commits and exits with a value of SUCCESS.

Usage Notes

EXIT allows you to specify an operating system return code. This allows you to run SQL*Plus command files in batch mode and to detect programmatically the occurrence of an unexpected event. The manner of detection is operating-system specific. See the Oracle installation and user's manual(s) provided for your operating system for details.

The key words SUCCESS, WARNING, and FAILURE represent operating-system dependent values. On some systems, WARNING and FAILURE may be indistinguishable.

Note: SUCCESS, FAILURE, and WARNING are not reserved words.

The range of operating system return codes is also restricted on some operating systems. This limits the portability of EXIT *n* and EXIT *variable* between platforms. For example, on UNIX there is only one byte of storage for return codes; therefore, the range for return codes is limited to zero to 255.

If you make a syntax error in the EXIT options or use a non-numeric variable, SQL*Plus performs an EXIT FAILURE COMMIT.

For information on exiting conditionally, see the [WHENEVER SQLERROR](#) and [WHENEVER OSERROR](#) commands later in this chapter.

Example

The following example commits all uncommitted transactions and returns the error code of the last executed SQL command or PL/SQL block:

```
SQL> EXIT SQL.SQLCODE
```

The location of the return code depends on your system. Consult your DBA for information concerning how your operating system retrieves data from a program. See the [TTITLE](#) command in this chapter for more information on SQL.SQLCODE.

GET

Purpose

Loads a host operating system file into the SQL buffer.

Syntax

```
GET file_name[.ext] [LIS[T]|NOL[IST]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

file_name[.ext]

Represents the file you wish to load (typically a command file).

LIS[T]

Lists the contents of the file.

NOL[IST]

Suppresses the listing.

Usage Notes

If you do not specify a file extension, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing the default extension, see the [SUFFIX](#) variable of the [SET](#) command in this chapter.

If the filename you specify contains the word *list* or the word *file*, the name must be in double quotes. SQL*Plus searches for the file in the current working directory.

The operating system file should contain a single SQL statement or PL/SQL block. The statement should not be terminated with a semicolon.

If a SQL*Plus command or more than one SQL statement or PL/SQL block is loaded into the SQL buffer from an operating system file, an error occurs when the RUN or slash (/) command is used to execute the buffer.

The GET command can be used to load files created with the SAVE command. See the [SAVE](#) command in this chapter for more information.

Example

To load a file called YEARENDRPT with the extension SQL into the buffer, enter

```
SQL> GET YEARENDRPT
```

HELP

Purpose

Accesses the SQL*Plus help system.

Syntax

```
HELP [topic]
```

Terms and Clauses

Refer to the following for a description of the term or clause:

topic

Represents a SQL*Plus help topic, for example, COLUMN.

Enter HELP without *topic* to get help on the help system.

Usage Notes

You can only enter one topic after HELP. You can abbreviate the topic (for example, COL for COLUMN). However, if you enter only an abbreviated topic and the abbreviation is ambiguous, SQL*Plus displays help for all topics that match the abbreviation. For example, if you enter

```
SQL> HELP EX
```

SQL*Plus displays the syntax for the EXECUTE command followed by the syntax for the EXIT command.

If you get a response indicating that help is not available, consult your database administrator.

Example

To see a list of SQL*Plus commands for which help is available, enter

```
SQL> HELP INDEX
```

Alternatively, to see a single column display of SQL*Plus commands for which help is available, enter

```
SQL> HELP TOPICS
```

HOST

Purpose

Executes a host operating system command without leaving SQL*Plus.

Syntax

HO[ST] [*command*]

Terms and Clauses

Refer to the following for a description of the term or clause:

command

Represents a host operating system command.

Enter HOST without *command* to display an operating system prompt. You can then enter multiple operating system commands. For information on returning to SQL*Plus, refer to the Oracle installation and user's manual(s) provided for your operating system.

Note: Operating system commands entered from a SQL*Plus session using the HOST command do not effect the current SQL*Plus session. For example, setting an operating system environment variable does not effect the current SQL*Plus session, it only effects SQL*Plus sessions started subsequently.

You can suppress access to the HOST command. For more information about suppressing the HOST command see [Appendix E, "Security"](#).

Usage Notes

With some operating systems, you can use a "\$" (VMS), "!" (UNIX), or another character instead of HOST. See the Oracle installation and user's manual(s) provided for your operating system for details.

You may not have access to the HOST command, depending on your operating system. See the Oracle installation and user's manual(s) provided for your operating system or ask your DBA for more information.

SQL*Plus removes the SQLTERMINATOR (a semicolon by default) before the HOST command is issued. A workaround for this is to add another

SQLTERMINATOR. See the [SQLTERMINATOR](#) variable of the [SET](#) command in this chapter for more information on the SQLTERMINATOR.

Example

To execute an operating system command, ls *.sql, enter

```
SQL> HOST ls *.sql
```

INPUT

Purpose

Adds one or more new lines of text after the current line in the buffer.

Syntax

```
I[INPUT] [text]
```

Terms and Clauses

Refer to the following for a description of the term or clause:

text

Represents the text you wish to add. To add a single line, enter the text of the line after the command INPUT, separating the text from the command with a space. To begin the line with one or more spaces, enter two or more spaces between INPUT and the first non-blank character of *text*.

To add several lines, enter INPUT with no *text*. INPUT prompts you for each line. To leave INPUT, enter a null (empty) line.

Usage Notes

If you enter a line number at the command prompt larger than the number of lines in the buffer, and follow the number with text, SQL*Plus adds the text in a new line at the end of the buffer. If you specify zero (0) for the line number and follow the zero with text, then SQL*Plus inserts the line at the beginning of the buffer (that line becomes line 1).

Examples

Assume the SQL buffer contains the following command:

```
1 SELECT ENAME, DEPTNO, SAL, COMM
2 FROM EMP
```

To add an ORDER BY clause to the query, enter

```
SQL> LIST 2
      2* FROM EMP
SQL> INPUT ORDER BY ENAME
```

LIST 2 ensures that line 2 is the current line. INPUT adds a new line containing the ORDER BY clause after the current line. The SQL buffer now contains the following lines:

```
1 SELECT ENAME, DEPTNO, SAL, COMM
2 FROM EMP
3* ORDER BY ENAME
```

To add a two-line WHERE clause, enter

```
SQL> LIST 2
  2* FROM EMP
SQL> INPUT
  3 WHERE JOB = 'SALESMAN'
  4 AND COMM 500
  5
```

INPUT prompts you for new lines until you enter an empty line. The SQL buffer now contains the following lines:

```
1 SELECT ENAME, DEPTNO, SAL, COMM
2 FROM EMP
3 WHERE JOB = 'SALESMAN'
4 AND COMM 500
5 ORDER BY ENAME
```

LIST

Purpose

Lists one or more lines of the SQL buffer.

Syntax

```
L[IST] [n|n m|n *|n LAST|*|* n|* LAST|LAST]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

n	Lists line <i>n</i> .
n m	Lists lines <i>n</i> through <i>m</i> .
n *	Lists line <i>n</i> through the current line.
n LAST	Lists line <i>n</i> through the last line.
*	Lists the current line.
* n	Lists the current line through line <i>n</i> .
* LAST	Lists the current line through the last line.
LAST	Lists the last line.

Enter LIST with no clauses to list all lines.

Usage Notes

The last line listed becomes the new current line (marked by an asterisk).

Example

To list the contents of the buffer, enter

```
SQL> LIST
```

You will see a listing of all lines in the buffer, similar to the following example:

```
1 SELECT ENAME, DEPTNO, JOB
2 FROM EMP
3 WHERE JOB = 'CLERK'
4* ORDER BY DEPTNO
```

The asterisk indicates that line 4 is the current line.

To list the second line only, enter

```
SQL> LIST 2
```

You will then see this:

```
2* FROM EMP
```

To list the current line (now line 2) to the last line, enter

```
SQL> LIST * LAST
```

You will then see this:

```
2 FROM EMP
3 WHERE JOB = 'CLERK'
4* ORDER BY DEPTNO
```


PASSWORD

Purpose

Allows you to change a password without echoing it on an input device.

Syntax

```
PASSW[ORD] [username]
```

Terms and Clauses

Refer to the following for a description of the clause or term:

username

Specifies the user. If you do not specify a username, *username* defaults to the current user.

Usage Notes

To change the password of another user, you must have been granted the appropriate privilege.

For more information about changing your password, see the [CONNECT](#) command in this chapter.

Example

Suppose you are logged on as scott/tiger, and want to change the password to tigertiger

```
SQL> passw
Changing password for scott
Old password: tiger
New password: tigertiger
Retype new password: tigertiger
Password changed
```

Suppose you are logged on as a DBA, and want to change the password for user usera (currently identified by passa) to passusera

```
SQL> passw usera
Changing password for usera
New password: passusera
Retype new password: passusera
Password changed
```

PAUSE

Purpose

Displays an empty line followed by a line containing text, then waits for the user to press [Return], or displays two empty lines and waits for the user's response.

Syntax

```
PAU[SE] [text]
```

Terms and Clauses

Refer to the following for a description of the clause or term:

text

Represents the text you wish to display.

Enter PAUSE followed by no text to display two empty lines.

Usage Notes

Because PAUSE always waits for the user's response, it is best to use a message that tells the user explicitly to press [Return].

PAUSE reads input from the terminal (if a terminal is available) even when you have designated the source of the command input as a file.

For information on pausing between pages of a report, see the [PAUSE](#) variable of the [SET](#) command later in this chapter.

Example

To print "Adjust paper and press RETURN to continue." and to have SQL*Plus wait for the user to press [Return], you might include the following PAUSE command in a command file:

```
SET PAUSE OFF  
PAUSE Adjust paper and press RETURN to continue.  
SELECT ...
```

PRINT

Purpose

Displays the current value of bind variables. For more information on bind variables, see your *PL/SQL User's Guide and Reference*.

Syntax

```
PRI[NT] [variable ...]
```

Terms and Clauses

Refer to the following for a description of the clause or term:

variable ...

Represents the names of the bind variables whose values you wish to display.

Enter PRINT with no variables to print all bind variables.

Usage Notes

Bind variables are created using the VARIABLE command. For more information and examples, see the [VARIABLE](#) command in this chapter.

You can control the formatting of the PRINT output just as you would query output. For more information, see the formatting techniques described in [Chapter 4](#).

To automatically display bind variables referenced in a successful PL/SQL block or used in an EXECUTE command, use the AUTOPRINT clause of the SET command. For more information, see the [SET](#) command in this chapter.

Example

The following example illustrates a PRINT command:

```
SQL> VARIABLE n NUMBER
SQL> BEGIN
  2   :n := 1;
  3   END;
SQL> PRINT n
      N
-----
      1
```

PROMPT

Purpose

Sends the specified message or a blank line to the user's screen.

Syntax

```
PRO[MPT] [text]
```

Terms and Clauses

Refer to the following for a description of the term or clause:

text

Represents the text of the message you wish to display. If you omit *text*, PROMPT displays a blank line on the user's screen.

Usage Notes

You can use this command in command files to give information to the user.

Example

The following example shows the use of PROMPT in conjunction with ACCEPT in a command file called ASKFORDEPT. ASKFORDEPT contains the following SQL*Plus and SQL commands:

```
PROMPT
PROMPT Please enter a valid department
PROMPT For example: 10, 20, 30, 40
ACCEPT NEWDEPT NUMBER PROMPT 'DEPT:> '
SELECT DNAME FROM DEPT
WHERE DEPTNO = &NEWDEPT
```

Assume you run the file using START or @:

```
SQL> @ASKFORDEPT
```

SQL*Plus displays the following prompts:

```
Please enter a valid department
For example: 10, 20, 30, 40
DEPT:>
```

You can enter a department number at the prompt DEPT:>. By default, SQL*Plus lists the line containing &NEWDEPT before and after substitution, and then displays the department name corresponding to the number entered at the DEPT:> prompt.

RECOVER

Purpose

Performs media recovery on one or more tablespaces, one or more datafiles, or the entire database. For more information on the RECOVER command, see the *Oracle8i Administrator's Guide*, the *Oracle8i SQL Reference*, and the *Oracle8i Backup and Recovery Guide*.

Syntax

```
RECOVER {general | managed} [parallel]
```

where the *general* clause has the following syntax:

```
[AUTOMATIC] [FROM location]
{[STANDBY] DATABASE [ [UNTIL {CANCEL | CHANGE integer | TIME date}
| USING BACKUP CONTROLFILE]...]}
| STANDBY {DATAFILE datafilename [, DATAFILE datafilename...]}
| TABLESPACE tablespace [, TABLESPACE tablespace ...]}
UNTIL [CONSISTENT] [WITH] CONTROLFILE
| TABLESPACE tablespace [, tablespace ...]
| DATAFILE datafilename [, datafilename ...]
| LOGFILE filename
| CONTINUE [DEFAULT]
| CANCEL}
```

and where the *managed* clause has the following syntax:

```
MANAGED STANDBY DATABASE {TIMEOUT integer | CANCEL [IMMEDIATE]}
```

and where the *parallel* clause has the following syntax:

```
PARALLEL [integer] | NOPARALLEL
```

Terms and Clauses

Refer to the following list for a description of each term and clause:

AUTOMATIC

Automatically generates the name of the next archived redo log file needed to continue the recovery operation. Oracle uses the LOG_ARCHIVE_DEST (or LOG_ARCHIVE_DEST_1) and LOG_ARCHIVE_FORMAT parameters (or their defaults) to generate the target redo log filename. If the file is found, the redo contained in that file is applied. If

the file is not found, SQL*Plus prompts you for a filename, displaying a generated filename as a suggestion.

If you specify neither AUTOMATIC nor LOGFILE, SQL*Plus prompts you for a filename, displaying the generated filename as a suggestion. You can then accept the generated filename or replace it with a fully qualified filename. If you know the archived filename differs from what Oracle would generate, you can save time by using the LOGFILE clause.

FROM *location*

Specifies the location from which the archived redo log file group is read. The value of *location* must be a fully specified file location following the conventions of your operating system. If you omit this parameter, SQL*Plus assumes the archived redo log file group is in the location specified by the initialization parameter LOG_ARCHIVE_DEST or LOG_ARCHIVE_DEST_1.

STANDBY

Recovers the standby database using the control file and archived redo log files copied from the primary database. The standby database must be mounted but not open.

DATABASE

Recovers the entire database.

UNTIL CANCEL

Specifies an incomplete, cancel-based recovery. Recovery proceeds by prompting you with the suggested filenames of archived redo log files, and recovery completes when you specify CANCEL instead of a filename.

UNTIL CHANGE *integer*

Specifies an incomplete, change-based recovery. *integer* is the number of the System Change Number (SCN) following the last change you wish to recover. For example, if you want to restore your database up to the transaction with an SCN of 9, you would specify UNTIL CHANGE 10.

UNTIL TIME *date*

Specifies an incomplete, time-based recovery. Use single quotes, and the following format:

'YYYY-MM-DD:HH24:MI:SS'

USING BACKUP CONTROLFILE

Specifies that a backup of the control file be used instead of the current control file.

STANDBY {[*DATAFILE datafilename* [, *DATAFILE datafilename ...*]}

Reconstructs a lost or damaged datafile in the standby database using archived redo log files copied from the primary database and a control file.

STANDBY {[*TABLESPACE tablespace* [, *TABLESPACE tablespace ...*]}

Reconstructs a lost or damaged tablespace in the standby database using archived redo log files copied from the primary database and a control file.

UNTIL [**CONSISTENT**] [**WITH**] **CONTROLFILE**

Specifies that the recovery of an old standby datafile or tablespace uses the current standby database control file.

TABLESPACE *tablespace*

Recovers a particular tablespace. *tablespace* is the name of a tablespace in the current database. You may recover up to 16 tablespaces in one statement.

DATAFILE *datafilename*

Recovers a particular datafile. You can specify any number of datafiles.

LOGFILE *filename*

Continues media recovery by applying the specified redo log file.

CONTINUE [**DEFAULT**]

Continues multi-instance recovery after it has been interrupted to disable a thread.

Continues recovery using the redo log file that Oracle would automatically generate if no other logfile were specified. This option is equivalent to specifying **AUTOMATIC**, except that Oracle does not prompt for a filename.

CANCEL

Terminates cancel-based recovery.

MANAGED STANDBY DATABASE

Specifies sustained standby recovery mode. This mode assumes that the standby database is an active component of an overall standby database architecture. A primary database actively archives its redo log files to the standby site. As these archived redo logs arrive at the standby site, they become available for use by a managed standby recovery operation. Sustained standby recovery is restricted to media recovery.

For more information on the parameters of this clause, see the *Oracle8i Backup and Recovery Guide*.

TIMEOUT *integer*

Specifies in minutes the wait period of the sustained recovery operation. The recovery process waits for integer minutes for a requested archived log redo to be available for writing to the standby database. If the redo log file does not become available within that time, the recovery process terminates with an error message. You can then issue the statement again to return to sustained standby recovery mode.

If you do not specify this clause, the database remains in sustained standby recovery mode until you reissue the statement with the RECOVER CANCEL clause or until instance shutdown or failure.

CANCEL [IMMEDIATE]

Terminates the sustained recovery operation after applying all the redo in the current archived redo file or after the next redo log file read, whichever comes first.

PARALLEL [*integer*]

Causes Oracle to select a degree of parallelism equal to the number of CPUs available on all participating instances times the value of the PARALLEL_THREADS_PER_CPU initialization parameter.

The PARALLEL keyword overrides the RECOVERY_PARALLELISM initialization parameter. For more information about the PARALLEL keyword see the *Oracle8i Parallel Server Concepts* manual.

Use *integer* to specify the degree of parallelism, which is the number of parallel threads used in the parallel operation. Each parallel thread may use one or two parallel execution processes. Normally Oracle calculates the optimum degree of parallelism, so it is not necessary for you to specify integer.

NOPARALLEL

Specifies serial execution. This is the default.

Usage Notes

You must be connected to Oracle as SYSOPER, or SYSDBA.

You cannot use the RECOVER command when connected via the multi-threaded server.

To perform media recovery on an entire database (all tablespaces), the database must be mounted EXCLUSIVE and closed.

To perform media recovery on a tablespace, the database must be mounted and open, and the tablespace must be offline.

To perform media recovery on a datafile, the database can remain open and mounted with the damaged datafiles offline (unless the file is part of the SYSTEM tablespace).

Before using the RECOVER command you must have restored copies of the damaged datafile(s) from a previous backup. Be sure you can access all archived and online redo log files dating back to when that backup was made.

When another log file is required during recovery, a prompt suggests the names of files that are needed. The name is derived from the values specified in the initialization parameters LOG_ARCHIVE_DEST and LOG_ARCHIVE_FORMAT. You should restore copies of the archived redo log files needed for recovery to the destination specified in LOG_ARCHIVE_DEST, if necessary. You can override the initialization parameters by setting the LOGSOURCE variable with the SET LOGSOURCE command.

During recovery you can accept the suggested log name by pressing return, cancel recovery by entering CANCEL instead of a log name, or enter AUTO at the prompt for automatic file selection without further prompting.

If you have enabled autorecovery (that is, SET AUTORECOVERY ON), recovery proceeds without prompting you with filenames. Status messages are displayed when each log file is applied.

When normal media recovery is done, a completion status is returned.

Examples

To recover the entire database, enter

```
SQL> RECOVER DATABASE
```

To recover the database until a specified time, enter

```
SQL> RECOVER DATABASE UNTIL TIME 23-NOV-99:04:32:00
```

To recover the two tablespaces `ts_one` and `ts_two` from the database, enter

```
SQL> RECOVER TABLESPACE ts_one, ts_two
```

To recover the datafile `data1.db` from the database, enter

```
SQL> RECOVER DATAFILE 'data1.db'
```

REMARK

Purpose

Begins a comment in a command file. SQL*Plus does not interpret the comment as a command.

Syntax

```
REM[ARK]
```

Usage Notes

The REMARK command must appear at the beginning of a line, and the comment ends at the end of the line. A line cannot contain both a comment and a command.

For details on entering comments in command files using the SQL comment delimiters, /* ... */ , or the ANSI/ISO comment delimiter, -- ..., refer to ["Placing Comments in Command Files"](#) in [Chapter 3](#).

Example

The following command file contains some typical comments:

```
REM COMPUTE uses BREAK ON REPORT to break on end of table
BREAK ON REPORT
COMPUTE SUM OF "DEPARTMENT 10" "DEPARTMENT 20" -
"DEPARTMENT 30" "TOTAL BY JOB" ON REPORT
REM Each column displays the sums of salaries by job for
REM one of the departments 10, 20, 30.
SELECT JOB,
       SUM( DECODE( DEPTNO, 10, SAL, 0)) "DEPARTMENT 10",
       SUM( DECODE( DEPTNO, 20, SAL, 0)) "DEPARTMENT 20",
       SUM( DECODE( DEPTNO, 30, SAL, 0)) "DEPARTMENT 30",
       SUM(SAL) "TOTAL BY JOB"
FROM EMP
GROUP BY JOB
```

REPFOOTER

Purpose

Places and formats a specified report footer at the bottom of each report, or lists the current REPFOOTER definition.

Syntax

```
REP[FOOTER] [PAGE] [printspec [text|variable] ...] [ON|OFF]
```

Terms and Clauses

Refer to the [REPHEADER](#) command for additional information on terms and clauses in the REPFOOTER command syntax.

Enter REPFOOTER with no clauses to list the current REPFOOTER definition.

Usage Notes

If you do not enter a *printspec* clause before the text or variables, REPFOOTER left justifies the text or variables.

You can use any number of constants and variables in a *printspec*. SQL*Plus displays the constants and variables in the order you specify them, positioning and formatting each constant or variable as specified by the *printspec* clauses that precede it.

Note: If SET EMBEDDED is ON, the report footer is suppressed.

Example

To define "END EMPLOYEE LISTING REPORT" as a report footer on a separate page and to center it, enter:

```
SQL> REPFOOTER PAGE CENTER 'END EMPLOYEE LISTING REPORT'
SQL> TTITLE RIGHT 'Page: ' FORMAT 999 SQL.PNO
SQL> SELECT ENAME, SAL
       2 FROM EMP
       3 WHERE SAL > 2000;
```

Page: 1

ENAME	SAL
-----	-----
JONES	2975
BLAKE	2850

CLARK	2450
SCOTT	3000
KING	5000
FORD	3000

Page: 2

END EMPLOYEE LISTING REPORT

6 rows selected.

To suppress the report footer without changing its definition, enter

SQL> REPFOOTER OFF

REPHEADER

Purpose

Places and formats a specified report header at the top of each report, or lists the current REPHEADER definition.

Syntax

```
REP[HEADER] [PAGE] [printspec [text|variable] ...] [ON|OFF]
```

where *printspec* represents one or more of the following clauses used to place and format the *text*:

```
COL n  
S[KIP] [n]  
TAB n  
LE[FT]  
CE[NTER]  
R[IGHT]  
BOLD  
FORMAT text
```

Terms and Clauses

Refer to the following list for a description of each term or clause. These terms and clauses also apply to the REPFOOTER command.

PAGE

Begins a new page after printing the specified report header or before printing the specified report footer.

text

Represents the report header or footer text. Enter *text* in single quotes if you want to place more than one word on a single line. The default is NULL.

variable

Represents a user variable or any of the following system-maintained values. SQL.LNO is the current line number. SQL.PNO is the current page number. SQL.RELEASE is the current Oracle release number. SQL.CODE is the current error code, and SQL.USER is the current user-name.

To print one of these values, reference the appropriate variable in the report header or footer. You can format *variable* with the `FORMAT` clause.

OFF

Turns the report header or footer off (suppresses its display) without affecting its definition.

COL *n*

Indents to column *n* of the current line (backward if column *n* has been passed). "Column" in this context means print position, not table column.

S[KIP] [*n*]

Skips to the start of a new line *n* times; if you omit *n*, one time; if you enter zero for *n*, backward to the start of the current line.

TAB *n*

Skips forward *n* columns (backward if you enter a negative value for *n*). "Column" in this context means print position, not table column.

LE[FT] CE[NTER] R[IGHT]

Left-align, center, and right-align data on the current line respectively. SQL*Plus aligns following data items as a group, up to the end of the *printspec* or the next `LEFT`, `CENTER`, `RIGHT`, or `COL` command. `CENTER` and `RIGHT` use the `SET LINESIZE` value to calculate the position of the data item that follows.

BOLD

Prints data in bold print. SQL*Plus represents bold print on your terminal by repeating the data on three consecutive lines. On some operating systems, SQL*Plus may instruct your printer to print bolded text on three consecutive lines, instead of bold.

FORMAT *text*

Specifies a format model that determines the format of following data items, up to the next `FORMAT` clause or the end of the command. The format model must be a *text* constant such as `A10` or `$999`. See `COLUMN FORMAT` for more information on formatting and valid format models.

If the datatype of the format model does not match the datatype of a given data item, the `FORMAT` clause has no effect on that item.

If no appropriate **FORMAT** model precedes a given data item, SQL*Plus prints **NUMBER** values according to the format specified by **SET NUMFORMAT** or, if you have not used **SET NUMFORMAT**, the default format. SQL*Plus prints **DATE** values according to the default format.

Refer to the **FORMAT** clause of the **COLUMN** command in this chapter for more information on default formats.

Enter **REPHEADER** with no clauses to list the current **REPHEADER** definition.

Usage Notes

If you do not enter a *printspec* clause before the text or variables, **REPHEADER** left justifies the text or variables.

You can use any number of constants and variables in a *printspec*. SQL*Plus displays the constants and variables in the order you specify them, positioning and formatting each constant or variable as specified by the *printspec* clauses that precede it.

Example

To define "EMPLOYEE LISTING REPORT" as a report header on a separate page, and to center it, enter:

```
SQL> REPHEADER PAGE CENTER 'EMPLOYEE LISTING REPORT'
SQL> TTITLE RIGHT 'Page: ' FORMAT 999 SQL.PNO
SQL> SELECT ENAME, SAL
       2 FROM EMP
       3 WHERE SAL > 2000;
```

Page: 1

EMPLOYEE LISTING REPORT

Page: 2

ENAME	SAL
-----	-----
JONES	2975
BLAKE	2850
CLARK	2450
SCOTT	3000
KING	5000
FORD	3000

6 rows selected.

To suppress the report header without changing its definition, enter:

```
SQL> REPHEADER OFF
```

RUN

Purpose

Lists and executes the SQL command or PL/SQL block currently stored in the SQL buffer.

Syntax

```
R[UN]
```

Usage Notes

RUN causes the last line of the SQL buffer to become the current line.

The slash command (/) functions similarly to RUN, but does not list the command in the SQL buffer on your screen.

Example

Assume the SQL buffer contains the following query:

```
SELECT DEPTNO FROM DEPT
```

To RUN the query, enter

```
SQL> RUN
```

The following output results:

```
1* SELECT DEPTNO FROM DEPT
```

```
      DEPTNO  
-----  
         10  
         20  
         30  
         40
```

SAVE

Purpose

Saves the contents of the SQL buffer in a host operating system file (a command file).

Syntax

```
SAV[E] file_name[.ext] [CRE[ATE]|REP[LACE]|APP[END]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

file_name[.ext]

Specifies the command file in which you wish to save the buffer's contents.

CREATE

Creates a new file with the name specified. This is the default behavior.

REP[LACE]

Replaces the contents of an existing file. If the file does not exist, REPLACE creates the file.

APP[END]

Adds the contents of the buffer to the end of the file you specify.

Usage Notes

If you do not specify an extension, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing this default extension, see the [SUFFIX](#) variable of the [SET](#) command in this chapter.

If you wish to SAVE a file under a name identical to a SAVE command clause (CREATE, REPLACE, or APPEND), you must specify a file extension.

When you SAVE the contents of the SQL buffer, SAVE adds a line containing a slash (/) to the end of the file.

If the filename you specify is the word *file*, you need to put the name in single quotes.

Examples

To save the contents of the buffer in a file named DEPTSALRPT with the extension SQL, enter

```
SQL> SAVE DEPTSALRPT
```

To save the contents of the buffer in a file named DEPTSALRPT with the extension OLD, enter

```
SQL> SAVE DEPTSALRPT.OLD
```

SET

Purpose

Sets a system variable to alter the SQL*Plus environment for your current session, such as

- the display width for NUMBER data
- the display width for LONG data
- enabling or disabling the printing of column headings
- the number of lines per page

Syntax

SET system_variable value

where *system_variable* and *value* represent one of the following clauses.

```

APPI[NFO] {ON|OFF|text}
ARRAY[SIZE] {15|n}
AUTO[COMMIT] {ON|OFF|IMM[EDIATE]|n}
AUTOP[RINT] {ON|OFF}
AUTORECOVERY [ON|OFF]
AUTOT[RACE] {ON|OFF|TRACE[ONLY]} [EXP[LAIN]] [STAT[ISTICS]]
BLO[CKTERMINATOR] {.|c}
CMDS[EP] {;|c|ON|OFF}
COLSEP {_|text}
COM[PATIBILITY] {v7|v8|NATIVE}
CON[CAT] {.|c|ON|OFF}
COPYC[OMMIT] {0|n}
COPYTYPECHECK {ON|OFF}
DEF[INE] {&|c|ON|OFF}
DESCRIBE [DEPTH {1|n|ALL}][LINENUM {ON|OFF}][INDENT {ON|OFF}]
ECHO {ON|OFF}
EDITF[ILE] file_name[.ext]
EMB[EDDED] {ON|OFF}
ESC[APE] {\|c|ON|OFF}
FEED[BACK] {6|n|ON|OFF}
FLAGGER {OFF|ENTRY|INTERMED[IATE]|FULL}
FLU[SH] {ON|OFF}
HEA[DING] {ON|OFF}
HEADS[EP] {||c|ON|OFF}
INSTANCE [instance_path|LOCAL]
LIN[ESIZE] {80|n}

```

```

LOBOF[FSET] {n|1}
LOGSOURCE [pathname]
LONG {80|n}
LONGC[HUNKSIZE] {80|n}
MARK[UP] H1ML [ON|OFF] [HEAD text] [BODY text] [TABLE text] [EN1MAP {ON|OFF}]
[SPOOL {ON|OFF}] [PRE[FORMAT] {ON|OFF}]
NEWP[AGE] {1|n|NONE}
NULL text
NUMF[ORMAT] format
NUM[WIDTH] {10|n}
PAGES[1ZE] {24|n}
PAU[SE] {ON|OFF|text}
RECSEP {WR[APPED]|EA[CH]|OFF}
RECSEPCHAR {_|c}
SERVEROUT[PUT] {ON|OFF} [SIZE n] [FOR[FORMAT] {WRA[PPED]|WOR[D_
WRAPPED]|TRU[NCATED]}]
SHIFT[INOUT] {VIS[1BLE]|INV[1SIBLE]}
SHOW[MODE] {ON|OFF}
SQLBL[ANKLINES] {ON|OFF}
SQLC[ASE] {MIX[ED]|LO[WER]|UP[PER]}
SQLCO[NTINUE] {> |text}
SQLN[UMBER] {ON|OFF}
SQLPRE[FIX] {#|c}
SQLP[ROMPT] {SQL>|text}
SQLT[ERMINATOR] {;|c|ON|OFF}
SUF[FIX] {SQL|text}
TAB {ON|OFF}
TERM[OUT] {ON|OFF}
TI[ME] {ON|OFF}
TIMI[NG] {ON|OFF}
TRIM[OUT] {ON|OFF}
TRIMS[POOL] {ON|OFF}
UND[ERLINE] {-|c|ON|OFF}
VER[IFY] {ON|OFF}
WRA[P] {ON|OFF}

```

Terms and Clauses

Refer to the following list for a description of each term, clause, or system variable:

APPI[NFO] {ON|OFF|text}

Sets automatic registering of command files through the DBMS_APPLICATION_INFO package. This enables the performance and resource usage of each command file to be monitored by your DBA. The registered name appears in the MODULE column of the V\$SES-

SION and VSQLAREA virtual tables. You can also read the registered name using the DBMS_APPLICATION_INFO.READ_MODULE procedure.

ON registers command files invoked by the @, @@ or START commands. OFF disables registering of command files. Instead, the current value of *text* is registered. *Text* specifies the text to register when no command file is being run or when APPINFO is OFF. The default for *text* is "SQL*Plus". If you enter multiple words for *text*, you must enclose them in quotes. The maximum length for *text* is limited by the DBMS_APPLICATION_INFO package.

The registered name has the format *nn@xfilename* where: *nn* is the depth level of command file; *x* is '*<*' when the command file name is truncated, otherwise, it is blank; and *filename* is the command file name, possibly truncated to the length allowed by the DBMS_APPLICATION_INFO package interface.

Note: To use this feature, you must have access to the DBMS_APPLICATION_INFO package. Run DBMSUTIL.SQL (this name may vary depending on your operating system) as SYS to create the DBMS_APPLICATION_INFO package. DBMSUTIL.SQL is part of the Oracle8i database server product.

For more information on the DBMS_APPLICATION_INFO package, see the *Oracle8i Designing and Tuning for Performance* manual.

ARRAY[SIZE] { 15 | *n* }

Sets the number of rows—called a *batch*—that SQL*Plus will fetch from the database at one time. Valid values are 1 to 5000. A large value increases the efficiency of queries and subqueries that fetch many rows, but requires more memory. Values over approximately 100 provide little added performance. ARRAYSIZE has no effect on the results of SQL*Plus operations other than increasing efficiency.

AUTO[COMMIT] { ON | OFF | IMM[EDIATE] | *n* }

Controls when Oracle commits pending changes to the database. ON commits pending changes to the database after Oracle executes each successful INSERT, UPDATE, or DELETE command or PL/SQL block. OFF suppresses automatic committing so that you must commit changes manually (for example, with the SQL command COMMIT).

IMMEDIATE functions in the same manner as the ON option. *n* commits pending changes to the database after Oracle executes *n* successful SQL INSERT, UPDATE, or DELETE commands or PL/SQL blocks. *n* cannot be less than zero or greater than 2,000,000,000. The statement counter is reset to zero after successful completion of *n* INSERT, UPDATE or DELETE commands or PL/SQL blocks, after a commit, after a rollback, and after a SET AUTOCOMMIT command.

Note: For this feature, a PL/SQL block is considered one transaction, regardless of the actual number of SQL commands contained within it.

AUTOP[RINT] {ON|**OFF**}

Sets the automatic PRINTing of bind variables. ON or OFF controls whether SQL*Plus automatically displays bind variables (referenced in a successful PL/SQL block or used in an EXECUTE command). For more information about displaying bind variables, see the [PRINT](#) command in this chapter.

AUTORECOVERY [ON|**OFF**]

ON sets the RECOVER command to automatically apply the default filenames of archived redo log files needed during recovery. No interaction is needed when AUTORECOVERY is set to ON, provided the necessary files are in the expected locations with the expected names. The filenames used when AUTORECOVERY is ON are derived from the values of the initialization parameters LOG_ARCHIVE_DEST and LOG_ARCHIVE_FORMAT.

OFF, the default option, requires that you enter the filenames manually or accept the suggested default filename given.

AUTOT[RACE] {ON|**OFF**|TRACE[ONLY]} [EXPLAIN] [STATISTICS]

Displays a report on the execution of successful SQL DML statements (SELECT, INSERT, UPDATE or DELETE). The report can include execution statistics and the query execution path.

OFF does not display a trace report. ON displays a trace report. TRACEONLY displays a trace report, but does not print query data, if any. EXPLAIN shows the query execution path by performing an EXPLAIN PLAN. STATISTICS displays SQL statement statistics. Information

about EXPLAIN PLAN is documented in the *Oracle8i SQL Reference* manual.

Using ON or TRACEONLY with no explicit options defaults to EXPLAIN STATISTICS.

The TRACEONLY option may be useful to suppress the query data of large queries. If STATISTICS is specified, SQL*Plus still fetches the query data from the server, however, the data is not displayed.

The AUTOTRACE report is printed after the statement has successfully completed.

Information about Execution Plans and the statistics is documented in the *Oracle8i Tuning* manual.

When SQL*Plus produces a STATISTICS report, a second connection to the database is automatically created. This connection is closed when the STATISTICS option is set to OFF, or you log out of SQL*Plus.

The formatting of your AUTOTRACE report may vary depending on the version of the server to which you are connected and the configuration of the server.

AUTOTRACE is not available when FIPS flagging is enabled.

See "[Tracing Statements](#)" in [Chapter 3](#) for more information on AUTOTRACE.

BLO[CKTERMINATOR] { *c* | *c* }

Sets the non-alphanumeric character used to end PL/SQL blocks to *c*. It cannot be an alphanumeric character or a whitespace. To execute the block, you must issue a RUN or / (slash) command.

CMDS[EP] { ; | *c* | ON | OFF }

Sets the non-alphanumeric character used to separate multiple SQL*Plus commands entered on one line to *c*. ON or OFF controls whether you can enter multiple commands on a line; ON automatically sets the command separator character to a semicolon (;).

COLSEP { *_* | *text* }

Sets the text to be printed between SELECTed columns. If the COLSEP variable contains blanks or punctuation characters, you must enclose it with single quotes. The default value for *text* is a single space.

In multi-line rows, the column separator does not print between columns that begin on different lines. The column separator does not appear on blank lines produced by `BREAK ... SKIP n` and does not overwrite the record separator. See [SET RECSEP](#) in this chapter for more information.

COMPATIBILITY { *v7* | *v8* | **NATIVE** }

Specifies the version of Oracle to which you are currently connected. Set `COMPATIBILITY` to `V7` for Oracle7, or `V8` for Oracle8 and Oracle8i. Set `COMPATIBILITY` to `NATIVE` if you wish the database to determine the setting (for example, if connected to Oracle8 or Oracle8i, compatibility would default to `V8`). `COMPATIBILITY` must be correctly set for the version of Oracle to which you are connected; otherwise, you will be unable to run any SQL commands.

Note: You can set `COMPATIBILITY` to `V7` when connected to Oracle8i. This enables you to run Oracle7 SQL against Oracle8i.

CONCAT { *.* | *c* | **ON** | **OFF** }

Sets the character you can use to terminate a substitution variable reference if you wish to immediately follow the variable with a character that SQL*Plus would otherwise interpret as a part of the substitution variable name. SQL*Plus resets the value of `CONCAT` to a period when you switch `CONCAT` on.

COPYCOMMIT { *0* | *n* }

Controls the number of batches after which the `COPY` command commits changes to the database. `COPY` commits rows to the destination database each time it copies *n* row batches. Valid values are zero to 5000. You can set the size of a batch with the `ARRAYSIZE` variable. If you set `COPYCOMMIT` to zero, `COPY` performs a commit only at the end of a copy operation.

COPYTYPECHECK { **ON** | **OFF** }

Sets the suppression of the comparison of datatypes while inserting or appending to tables with the `COPY` command. This is to facilitate copying to DB2, which requires that a `CHAR` be copied to a DB2 `DATE`.

DEFINE { *.* | *c* | **ON** | **OFF** }

Sets the character used to prefix substitution variables to *c*. `ON` or `OFF` controls whether SQL*Plus will scan commands for substitution vari-

ables and replace them with their values. ON changes the value of *c* back to the default '&', not the most recently used character. The setting of DEFINE to OFF overrides the setting of the SCAN variable. For more information on the SCAN variable, see the [SET SCAN](#) command in [Appendix F](#).

DESCRIBE [DEPTH {1|*n*|ALL}][LINENUM {ON|OFF}][INDENT {ON|OFF}]
Sets the depth of the level to which you can recursively describe an object. The valid range of the DEPTH clause is from 1 to 50. If you SET DESCRIBE DEPTH ALL, then the depth will be set to 50, which is the maximum level allowed. You can also display the line number and indentation of the attribute or column name when an object contains multiple object types. Use the SET LINESIZE command to control the width of the data displayed.

For more information about describing objects, see [DESCRIBE](#) earlier in this chapter.

ECHO {ON|OFF}
Controls whether the START command lists each command in a command file as the command is executed. ON lists the commands; OFF suppresses the listing.

EDITF[ILE] *file_name* [.ext]
Sets the default filename for the EDIT command. For more information about the EDIT command, see [EDIT](#) in this chapter.

You can include a path and/or file extension. For information on changing the default extension, see the [SUFFIX](#) variable of this command. The default filename and maximum filename length are operating system specific.

EMB[EDDED] {ON|OFF}
Controls where on a page each report begins. OFF forces each report to start at the top of a new page. ON allows a report to begin anywhere on a page. Set EMBEDDED to ON when you want a report to begin printing immediately following the end of the previously run report.

ESC[APE] {\|*c*|ON|OFF}
Defines the character you enter as the escape character. OFF undefines the escape character. ON enables the escape character. ON changes the value of *c* back to the default "\".

You can use the escape character before the substitution character (set through SET DEFINE) to indicate that SQL*Plus should treat the substitution character as an ordinary character rather than as a request for variable substitution.

FEED[BACK] { 0 | *n* | **ON** | **OFF** }

Displays the number of records returned by a query when a query selects at least *n* records. ON or OFF turns this display on or off. Turning feedback ON sets *n* to 1. Setting feedback to zero is equivalent to turning it OFF.

FLAGGER { **OFF** | **ENTRY** | **INTERMED**[**IATE**] | **FULL** }

Checks to make sure that SQL statements conform to the ANSI/ISO SQL92 standard. If any non-standard constructs are found, the Oracle Server flags them as errors and displays the violating syntax. This is the equivalent of the SQL language ALTER SESSION SET FLAGGER command.

You may execute SET FLAGGER even if you are not connected to a database. FIPS flagging will remain in effect across SQL*Plus sessions until a SET FLAGGER OFF (or ALTER SESSION SET FLAGGER = OFF) command is successful or you exit SQL*Plus.

When FIPS flagging is enabled, SQL*Plus displays a warning for the CONNECT, DISCONNECT, and ALTER SESSION SET FLAGGER commands, even if they are successful.

FLU[SH] { **ON** | **OFF** }

Controls when output is sent to the user's display device. OFF allows the host operating system to buffer output. ON disables buffering.

Use OFF only when you run a command file non-interactively (that is, when you do not need to see output and/or prompts until the command file finishes running). The use of FLUSH OFF may improve performance by reducing the amount of program I/O.

HEA[DING] { **ON** | **OFF** }

Controls printing of column headings in reports. ON prints column headings in reports; OFF suppresses column headings.

The SET HEADING OFF command will not affect the column width displayed, and only suppresses the printing of the column header itself.

HEADS[EP] { | | *c* | **ON** | **OFF** }

Defines the character you enter as the heading separator character. The heading separator character cannot be alphanumeric or white space. You can use the heading separator character in the COLUMN command and in the old forms of BTITLE and TTITLE to divide a column heading or title onto more than one line. ON or OFF turns heading separation on or off. When heading separation is OFF, SQL*Plus prints a heading separator character like any other character. ON changes the value of *c* back to the default "|".

INSTANCE [*instance_path* | **LOCAL**]

Changes the default instance for your session to the specified instance path. Using the SET INSTANCE command does not connect to a database. The default instance is used for commands when no instance is specified.

Any commands preceding the first use of SET INSTANCE communicate with the default instance.

To reset the instance to the default value for your operating system, you can either enter SET INSTANCE with no *instance_path* or SET INSTANCE LOCAL. See your operating system-specific Oracle documentation for a description of how to set the initial default instance.

Note, you can only change the instance when you are not currently connected to any instance. That is, you must first make sure that you have disconnected from the current instance, then set or change the instance, and reconnect to an instance in order for the new setting to be enabled.

This command may only be issued when Net8 is running. You can use any valid Net8 connect identifier as the specified instance path. See your operating system-specific Oracle documentation for a complete description of how your operating system specifies Net8 connect identifiers. The maximum length of the instance path is 64 characters.

LIN[ESIZE] { **80** | *n* }

Sets the total number of characters that SQL*Plus displays on one line before beginning a new line. It also controls the position of centered and right-aligned text in TTITLE, BTITLE, REPHEADER and REPFOOTER. You can define LINESIZE as a value from 1 to a maximum that is system dependent. Refer to the Oracle installation and user's manual(s) provided for your operating system.

LOBOF[FSET] {*n*|1}

Sets the starting position from which CLOB and NCLOB data is retrieved and displayed.

LOGSOURCE [*pathname*]

Specifies the location from which archive logs are retrieved during recovery. The default value is set by the LOG_ARCHIVE_DEST initialization parameter in the Oracle initialization file, *init.ora*. Using the SET LOGSOURCE command without a pathname restores the default location.

LONG {80|*n*}

Sets maximum width (in bytes) for displaying LONG, CLOB and NCLOB values; and for copying LONG values. The maximum value of *n* is 2 gigabytes.

LONGC[HUNKSIZE] {80|*n*}

Sets the size (in bytes) of the increments in which SQL*Plus retrieves a LONG, CLOB or NCLOB value.

**MARK[UP] HTML [ON|OFF] [HEAD *text*] [BODY *text*] [TABLE *text*]
[ENTMAP {ON|OFF}] [SPOOL {ON|OFF}] [PRE[FORMAT] {ON|OFF}]**

Outputs HTML 3.2 marked up text. SET MARKUP has the same options and behavior as SQLPLUS -MARKUP. For detailed information see [MARKUP Options](#) in [Chapter 7](#). For examples of usage, see [MARKUP](#) on page 8-117, and [Creating Web Reports](#) in [Chapter 4](#).

NEWP[AGE] {1|*n*|NONE}

Sets the number of blank lines to be printed from the top of each page to the top title. A value of zero places a formfeed at the beginning of each page (including the first page) and clears the screen on most terminals. If you set NEWPAGE to NONE, SQL*Plus does not print a blank line or formfeed between the report pages.

NULL *text*

Sets the text that represents a null value in the result of a SQL SELECT command. Use the NULL clause of the COLUMN command to override the setting of the NULL variable for a given column.

NUMF[ORMAT] *format*

Sets the default format for displaying numbers. Enter a number format for *format*. For number format descriptions, see the **FORMAT** clause of the **COLUMN** command in this chapter.

NUM[WIDTH] {10 | *n*}

Sets the default width for displaying numbers. For number format descriptions, see the **FORMAT** clause of the **COLUMN** command in this chapter.

PAGES[IZE] {24 | *n*}

Sets the number of lines in each page. You can set PAGESIZE to zero to suppress all headings, page breaks, titles, the initial blank line, and other formatting information.

PAU[SE] {ON | OFF | *text*}

Allows you to control scrolling of your terminal when running reports. ON causes SQL*Plus to pause at the beginning of each page of report output. You must press [Return] after each pause. The *text* you enter specifies the text to be displayed each time SQL*Plus pauses. If you enter multiple words, you must enclose *text* in single quotes.

You can embed terminal-dependent escape sequences in the PAUSE command. These sequences allow you to create inverse video messages or other effects on terminals that support such characteristics.

RECSEP {WRAPPED | EA[CH] | OFF}

RECSEPCHAR {_ | *c*}

Display or print record separators. A record separator consists of a single line of the RECSEPCHAR (record separating character) repeated LINESIZE times.

RECSEPCHAR defines the record separating character. A single space is the default.

RECSEP tells SQL*Plus where to make the record separation. For example, if you set RECSEP to WRAPPED, SQL*Plus prints a record separator only after wrapped lines. If you set RECSEP to EACH, SQL*Plus prints a record separator following every row. If you set RECSEP to OFF, SQL*Plus does not print a record separator.

SERVEROUT[PUT] {ON | OFF} [SIZE *n*] [FOR[MAT]]

{WRA[PPED] | WORD_WRAPPED | TRU[NCATED] }

Controls whether to display the output (that is, DBMS_OUTPUT.PUT_LINE) of stored procedures or PL/SQL blocks in SQL*Plus. OFF suppresses the output of DBMS_OUTPUT.PUT_LINE; ON displays the output.

SIZE sets the number of bytes of the output that can be buffered within the Oracle8i database server. The default for *n* is 2000. *n* cannot be less than 2000 or greater than 1,000,000.

When WRAPPED is enabled SQL*Plus wraps the server output within the line size specified by SET LINESIZE, beginning new lines when required.

When WORD_WRAPPED is enabled, each line of server output is wrapped within the line size specified by SET LINESIZE. Lines are broken on word boundaries. SQL*Plus left justifies each line, skipping all leading whitespace.

When TRUNCATED is enabled, each line of server output is truncated to the line size specified by SET LINESIZE.

For each FORMAT, every server output line begins on a new output line.

For more information on DBMS_OUTPUT.PUT_LINE, see your *Oracle8i Application Developer's Guide - Fundamentals*.

SHIFT[INOUT] {VIS[IBLE] | INVISIBLE }

Allows correct alignment for terminals that display shift characters. The SET SHIFTOINOUT command is useful for terminals which display shift characters together with data (for example, IBM 3270 terminals). You can only use this command with shift sensitive character sets (for example, JA16DBCS).

Use VISIBLE for terminals that display shift characters as a visible character (for example, a space or a colon). INVISIBLE is the opposite and does not display any shift characters.

SHOW[MODE] {ON | OFF }

Controls whether SQL*Plus lists the *old* and *new* settings of a SQL*Plus system variable when you change the setting with SET. ON lists the settings; OFF suppresses the listing. SHOWMODE ON has the same behavior as the obsolete SHOWMODE BOTH.

SQLBL[ANKLINES] {ON|**OFF**}

Controls whether SQL*Plus allows blank lines within a SQL command. ON interprets blank lines and new lines as part of a SQL command. OFF, the default value, does not allow blank lines or new lines in a SQL command.

Enter the BLOCKTERMINATOR to stop SQL command entry without running the SQL command. Enter the SQLTERMINATOR character to stop SQL command entry and run the SQL statement.

SQLC[ASE] {**MIX[ED]**|LO[WER]|UP[PER]}

Converts the case of SQL commands and PL/SQL blocks just prior to execution. SQL*Plus converts all text within the command, including quoted literals and identifiers. If SQLCASE equals UPPER, all text is converted to uppercase. If SQLCASE equals LOWER all text is converted to lowercase, and if SQLCASE equals MIXED, all text is unchanged. SQLCASE does not change the SQL buffer itself.

SQLCO[NTINUE] {≥ |*text*}

Sets the character sequence SQL*Plus displays as a prompt after you continue a SQL*Plus command on an additional line using a hyphen (-).

SQLN[UMBER] {**ON**|**OFF**}

Sets the prompt for the second and subsequent lines of a SQL command or PL/SQL block. ON sets the prompt to be the line number. OFF sets the prompt to the value of SQLPROMPT.

SQLPRE[FIX] {**#**|*c*}

Sets the SQL*Plus prefix character. While you are entering a SQL command or PL/SQL block, you can enter a SQL*Plus command on a separate line, prefixed by the SQL*Plus prefix character. SQL*Plus will execute the command immediately without affecting the SQL command or PL/SQL block that you are entering. The prefix character must be a non-alphanumeric character.

SQLP[ROMPT] {**SQL>**|*text*}

Sets the SQL*Plus command prompt.

SQLT[ERMINATOR] {**_**|*c*|**ON**|**OFF**}

Sets the character used to end and execute SQL commands to *c*. It cannot be an alphanumeric character or a whitespace. OFF means that SQL*Plus recognizes no command terminator; you terminate a SQL

command by entering an empty line. If SQLBLANKLINES is set ON, you must use the BLOCKTERMINATOR to terminate a SQL command. ON resets the terminator to the default semicolon (;).

SUF[FIX] {SQL | *text*}

Sets the default file extension that SQL*Plus uses in commands that refer to command files. SUFFIX does not control extensions for spool files.

TAB {ON | OFF}

Determines how SQL*Plus formats white space in terminal output. OFF uses spaces to format white space in the output. ON uses the TAB character. TAB settings are every eight characters. The default value for TAB is system dependent.

TERM[OUT] {ON | OFF}

Controls the display of output generated by commands executed from a command file. OFF suppresses the display so that you can spool output from a command file without seeing the output on the screen. ON displays the output. TERMOUT OFF does not affect output from commands you enter interactively.

TI[ME] {ON | OFF}

Controls the display of the current time. ON displays the current time before each command prompt. OFF suppresses the time display.

TIMI[NG] {ON | OFF}

Controls the display of timing statistics. ON displays timing statistics on each SQL command or PL/SQL block run. OFF suppresses timing of each command. For information about the data SET TIMING ON displays, see the Oracle installation and user's manual(s) provided for your operating system. Refer to the [TIMING](#) command for information on timing multiple commands.

TRIM[OUT] {ON | OFF}

Determines whether SQL*Plus allows trailing blanks at the end of each displayed line. ON removes blanks at the end of each line, improving performance especially when you access SQL*Plus from a slow communications device. OFF allows SQL*Plus to display trailing blanks. TRIMOUT ON does not affect spooled output.

TRIMS[POOL] {ON|OFF}

Determines whether SQL*Plus allows trailing blanks at the end of each spooled line. ON removes blanks at the end of each line. OFF allows SQL*Plus to include trailing blanks. TRIMSPOOL ON does not affect terminal output.

UND[ERLINE] {_|c|ON|OFF}

Sets the character used to underline column headings in SQL*Plus reports to *c*. Note, *c* cannot be an alphanumeric character or a white space. ON or OFF turns underlining on or off. ON changes the value of *c* back to the default "-".

VER[IFY] {ON|OFF}

Controls whether SQL*Plus lists the text of a SQL statement or PL/SQL command before and after SQL*Plus replaces substitution variables with values. ON lists the text; OFF suppresses the listing.

WRAP[P] {ON|OFF}

Controls whether SQL*Plus truncates the display of a SELECTed row if it is too long for the current line width. OFF truncates the SELECTed row; ON allows the SELECTed row to wrap to the next line.

Use the WRAPPED and TRUNCATED clauses of the COLUMN command to override the setting of WRAP for specific columns.

Usage Notes

SQL*Plus maintains system variables (also called SET command variables) to allow you to establish a particular environment for a SQL*Plus session. You can change these system variables with the SET command and list them with the SHOW command.

SET ROLE and SET TRANSACTION are SQL commands (see the *Oracle8i SQL Reference* for more information). When not followed by the keywords TRANSACTION or ROLE, SET is assumed to be a SQL*Plus command.

Examples

The following examples show sample uses of selected SET command variables.

APPINFO

To display the setting of APPINFO, enter

```
SQL> SHOW APPINFO
```

```
SQL> appinfo is ON and set to "SQL*Plus"
```

To change the default text, enter

```
SQL> SET APPI 'This is SQL*Plus'
SQL> SHOW APPINFO
SQL> appinfo is ON and set to "This is SQL*Plus"
```

To make sure that registration has taken place, enter

```
SQL> VARIABLE MOD VARCHAR2(50)
SQL> VARIABLE ACT VARCHAR2(40)
SQL> EXECUTE DBMS_APPLICATION_INFO.READ_MODULE(:MOD, :ACT);
SQL> PRINT MOD
MOD
```

```
-----
This is SQL*Plus
```

AUTORECOVERY

To set the recovery mode to AUTOMATIC, enter

```
SQL> SET AUTORECOVERY ON
SQL> RECOVER DATABASE
```

CMDSEP

To specify a TTITLE and format a column on the same line, enter

```
SQL> SET CMDSEP +
SQL> TTITLE LEFT 'SALARIES' + COLUMN SAL FORMAT $9,999
SQL> SELECT ENAME, SAL FROM EMP
 2 WHERE JOB = 'CLERK';
```

The following output results:

```
SALARIES
ENAME          SAL
-----
SMITH          $800
ADAMS          $1,100
JAMES          $950
MILLER         $1,300
```

COLSEP

To set the column separator to "|" enter

```
SQL> SET COLSEP '|'
SQL> SELECT ENAME, JOB, DEPTNO
   2 FROM EMP
   3 WHERE DEPTNO = 20;
```

The following output results:

```
ENAME          |JOB          | DEPTNO
-----
SMITH          |CLERK        |      20
JONES          |MANAGER      |      20
SCOTT          |ANALYST      |      20
ADAMS          |CLERK        |      20
FORD           |ANALYST      |      20
```

COMPATIBILITY

To run a command file, SALARY.SQL, created with Oracle7, enter

```
SQL> SET COMPATIBILITY V7
SQL> START SALARY
```

After running the file, reset compatibility to V8 to run command files created with Oracle8i:

```
SQL> SET COMPATIBILITY V8
```

Alternatively, you can add the command SET COMPATIBILITY V7 to the beginning of the command file, and reset COMPATIBILITY to V8 at the end of the file.

DESCRIBE

To describe the object emp_object to a depth of two levels, and indent the output while also displaying line numbers, first describe the object as follows:

```
SQL> DESCRIBE emp_object
```

The following output results:

Name	Null	Type
EMPLOYEE		RECUR_PERSON
NAME		VARCHAR2(20)
ADDR		RECUR_ADDRESS
ADDR1		RECUR_ADDRESS1
DOB		DATE
GENDER		VARCHAR2(10)
DEPT		RECUR_DEPARTMENT
DEPTNO		NUMBER
DEPT_NAME		VARCHAR2(20)
LOCATION		VARCHAR2(20)
START_DATE		DATE
POSITION		VARCHAR2(1)
SAL		RECUR_SALARY
ANNUAL_SAL		NUMBER(10,2)
EMP_TYPE		VARCHAR2(1)
COMM		NUMBER(10,2)
PENALTY_RATE		NUMBER(5,2)

To format emp_object so that the output displays with indentation and line numbers, use the SET DESCRIBE command as follows:

```
SQL> SET DESCRIBE DEPTH 2 LINENUM ON INDENT ON
```

To display the above settings, enter

```
SQL> DESCRIBE emp_object
```

The following output results:

	Name	Null	Type
1	EMPLOYEE		RECUR_PERSON
2	1 NAME		VARCHAR2(20)
3	1 ADDR		RECUR_ADDRESS
4	1 ADDR1		RECUR_ADDRESS1
5	1 DOB		DATE
6	1 GENDER		VARCHAR2(10)
7	DEPT		RECUR_DEPARTMENT
8	7 DEPTNO		NUMBER
9	7 DEPT_NAME		VARCHAR2(20)

10	7	LOCATION	VARCHAR2(20)
11		START_DATE	DATE
12		POSITION	VARCHAR2(1)
13		SAL	RECUR_SALARY
14	13	ANNUAL_SAL	NUMBER(10,2)
15	13	EMP_TYPE	VARCHAR2(1)
16	13	COMM	NUMBER(10,2)
17	13	PENALTY_RATE	NUMBER(5,2)

ESCAPE

If you define the escape character as an exclamation point (!), then

```
SQL> SET ESCAPE !
SQL> ACCEPT v1 PROMPT 'Enter !&1:'
```

displays this prompt:

```
Enter &1:
```

HEADING

To suppress the display of column headings in a report, enter

```
SQL> SET HEADING OFF
```

If you then run a SQL SELECT command,

```
SQL> SELECT ENAME, SAL FROM EMP
  2 WHERE JOB = 'CLERK';
```

the following output results:

```
ADAMS          1100
JAMES          950
MILLER         1300
```

INSTANCE

To set the default instance to "PROD1" enter

```
SQL> SET INSTANCE PROD1
```

To set the instance back to the default or local, enter

```
SQL> SET INSTANCE local
```

You must disconnect from any connected instances to change the instance.

LOBOFFSET

To set the starting position from which a CLOB column's data is retrieved to the 22nd position, enter

```
SQL> SET LOBOFFSET 22
```

The CLOB data will wrap on your screen; SQL*Plus will not truncate until the 23rd character.

LOGSOURCE

To set the default location of log files for recovery to the directory "/usr/oracle81/dbs/arch" enter

```
SQL> SET LOGSOURCE "/usr/oracle81/dbs/arch"  
SQL> RECOVER DATABASE
```

LONG

To set the maximum number of characters to fetch for displaying and copying LONG values to 500, enter

```
SQL> SET LONG 500
```

The LONG data will wrap on your screen; SQL*Plus will not truncate until the 501st character.

LONGCHUNKSIZE

To set the size of the increments in which SQL*Plus retrieves LONG values to 100 characters, enter

```
SQL> SET LONGCHUNKSIZE 100
```

The LONG data will be retrieved in increments of 100 characters until the entire value is retrieved or the value of SET LONG is reached, whichever is the smaller.

MARKUP

The following is a log of an interactive session to output HTML marked up text to a spool file:

Note: The SET MARKUP example command is laid out for readability using line continuation characters "-" and spacing. Command options are concatenated in normal entry.

```
SQL> SET MARKUP HTML ON SPOOL ON HEAD '<TITLE>Employee List</title> -
      <STYLE TYPE="TEXT/CSS"><!--BODY {background: yellow} --></STYLE>'
SQL&gt; SET ECHO OFF
<BR>
SQL&gt; SPOOL EMPLOYEE.HTML
<BR>
<HTML>
<HEAD>
<TITLE>EMPLOYEE LIST</TITLE><STYLE TYPE="TEXT/CSS"><!--BODY {background: yellow}
--></STYLE>
<META NAME="GENERATOR" CONTENT="SQL*Plus 8.1.7">
</HEAD>
<BODY>
SQL&GT; SELECT DEPTNO, DNAME FROM DEPT;
<BR>
<P>
<TABLE BORDER="1" WIDTH="90%">
<TR>
<TH>
DEPTNO
</TH>
<TH>
DNAME
</TH>
</TR>
<TR>
<TD ALIGN="RIGHT">
      10
</TD>
<TD>
ACCOUNTING
</TD>
</TR>
<TR>
<TD ALIGN="RIGHT">
      20
</TD>
<TD>
RESEARCH
</TD>
</TR>
<TR>
<TD ALIGN="RIGHT">
      30
</TD>
```

```

</TD>
SALES
</TD>
</TR>
<TR>
<TD ALIGN="RIGHT">
    40
</TD>
<TD>
OPERATIONS
</TD>
</TR>
</TABLE>
<P>

SQL&GT; EXIT
<BR>
</BODY>
</HTML>

```

Disconnected from Oracle8i Enterprise Edition Release 8.1.7.0.0 - Production
 With the Partitioning option
 JServer Release 8.1.7.0.0 - Production

The previous SQL*Plus session spools the HTML output to the spool file *employee.html*. This file is a standalone web page as follows:

SQL> SELECT empno, ename from emp;

EMPNO	ENAME
7369	SMITH
7499	ALLEN
7521	WARD
7566	JONES
7654	MARTIN
7698	BLAKE
7782	CLARK
7788	SCOTT
7839	KING
7844	TURNER
7876	ADAMS
7900	JAMES
7902	FORD
7934	MILLER

14 rows selected.
 SQL> exit

SERVEROUTPUT

To enable the display of text within a PL/SQL block using DBMS_OUTPUT.PUT_LINE, enter

```
SQL> SET SERVEROUTPUT ON
```

The following example shows what happens when you execute an anonymous procedure with SET SERVEROUTPUT ON:

```
SQL> BEGIN
  2  DBMS_OUTPUT.PUT_LINE('Task is complete');
  3  END;
  4  /
Task is complete.
```

PL/SQL procedure successfully completed.

The following example shows what happens when you create a trigger with SET SERVEROUTPUT ON:

```
SQL> CREATE TRIGGER SERVER_TRIG BEFORE INSERT OR UPDATE -
>   OR DELETE
  2  ON SERVER_TAB
  3  BEGIN
  4  DBMS_OUTPUT.PUT_LINE('Task is complete. ');
  5  END;
  6  /
Trigger created.
SQL> INSERT INTO SERVER_TAB VALUES ('TEXT');
Task is complete.
1 row created.
```

To set the output to WORD_WRAPPED, enter

```
SQL> SET SERVEROUTPUT ON FORMAT WORD_WRAPPED
SQL> SET LINESIZE 20
SQL> BEGIN
  2  DBMS_OUTPUT.PUT_LINE('If there is nothing left to do');
  3  DBMS_OUTPUT.PUT_LINE('shall we continue with plan B?');
  4  end;
  5  /
If there is nothing
left to do
shall we continue
with plan B?
```

To set the output to TRUNCATED, enter

```
SQL> SET SERVEROUTPUT ON FORMAT TRUNCATED
SQL> SET LINESIZE 20
SQL> BEGIN
  2 DEMS_OUTPUT.PUT_LINE('If there is nothing left to do');
  3 DEMS_OUTPUT.PUT_LINE('shall we continue with plan B?');
  4 END;
  5 /
If there is nothing
shall we continue wi
```

SHIFTINOUT

To enable the display of shift characters, enter

```
SQL> SET SHIFTINOUT VISIBLE
SQL> SELECT ENAME, JOB FROM EMP;
```

The following output results:

```
ENAME      JOB
-----
:JJOO:     :AABBCC:
:AA:abc    :DDEE:e
```

where ":" = shift character

uppercase = multibyte character

lowercase = singlebyte character

Note: This example illustrates that the columns are aligned correctly. The data used in this example is an illustration only and does not represent real data.

SQLBLANKLINES

To preserve blank lines in a SQL statement, enter

```
SQL> SET SQLBLANKLINES ON
SQL> REM Using the SQLTERMINATOR (default is ";")
SQL> REM Could have used the BLOCKTERMINATOR (default is ".")
SQL> SELECT *
  2
  3 FROM
```

```
4
5 DUAL
6
7 ;
```

The following output results:

```
D
-
X
```

SQLCONTINUE

To set the SQL*Plus command continuation prompt to an exclamation point followed by a space, enter

```
SQL> SET SQLCONTINUE '! '
```

SQL*Plus will prompt for continuation as follows:

```
SQL> TTITLE 'YEARLY INCOME' -
! RIGHT SQL.PNO SKIP 2 -
! CENTER 'PC DIVISION'
SQL>
```

SUFFIX

To change the default command-file extension from the default, *.SQL* to *.UFI*, enter

```
SQL> SET SUFFIX UFI
```

If you then enter

```
SQL> GET EXAMPLE
```

SQL*Plus will look for a file named `EXAMPLE` with an extension of `UFI` instead of `EXAMPLE` with an extension of `SQL`.

SHOW

Purpose

Shows the value of a SQL*Plus system variable or the current SQL*Plus environment.

Syntax

SHO[W] *option*

where *option* represents one of the following terms or clauses:

system_variable

ALL

BTI [TLE]

ERR[ORS] [{FUNCTION|PROCEDURE|PACKAGE|PACKAGE BODY|
TRIGGER|VIEW|TYPE|TYPE BODY} [*schema.*]*name*]

LNO

PARAMETERS [*parameter_name*]

PNO

REL[EASE]

REPF[OOTER]

REPH[EADER]

SGA

SPOOL[L]

SQLCODE

TTI [TLE]

USER

Terms and Clauses

Refer to the following list for a description of each term or clause:

system_variable

Represents any system variable set by the SET command.

ALL

Lists the settings of all SHOW options, except ERRORS, in alphabetical order.

BTI [TLE]

Shows the current BTITLE definition.

```
ERR[ORS] [ {FUNCTION|PROCEDURE|PACKAGE|PACKAGE BODY
|TRIGGER|VIEW|TYPE|TYPE BODY} [ schema. ]name ]
```

Shows the compilation errors of a stored procedure (includes stored functions, procedures, and packages). After you use the CREATE command to create a stored procedure, a message is displayed if the stored procedure has any compilation errors. To see the errors, you use SHOW ERRORS.

When you specify SHOW ERRORS with no arguments, SQL*Plus shows compilation errors for the most recently created or altered stored procedure. When you specify the type (function, procedure, package, package body, trigger, view, type, or type body) and the name of the PL/SQL stored procedure, SQL*Plus shows errors for that stored procedure. For more information on compilation errors, see your *PL/SQL User's Guide and Reference*.

schema contains the named object. If you omit *schema*, SHOW ERRORS assumes the object is located in your current schema.

SHOW ERRORS output displays the line and column number of the error (LINE/COL) as well as the error itself (ERROR). LINE/COL and ERROR have default widths of 8 and 65, respectively. You can alter these widths using the COLUMN command.

LNO

Shows the current line number (the position in the current page of the display and/or spooled output).

PARAMETERS [*parameter_name*]

Displays the current values for one or more initialization parameters. You can use a string after the command to see a subset of parameters whose names include that string. For example, if you enter:

```
SQL> SHOW PARAMETERS COUNT
```

you would see:

NAME	TYPE	VALUE
-----	-----	-----
db_file_multiblock_read_count	integer	12
spin_count	integer	0

The SHOW PARAMETERS command, without any string following the command, displays all initialization parameters.

Note, your output may vary depending on the version and configuration of the Oracle database server to which you are connected. You need `SELECT ON V_$PARAMETER` object privileges to use the `PARAMETERS` clause, otherwise you will receive a message

ORA-00942: table or view does not exist

PNO

Shows the current page number.

REL[EASE]

Shows the release number of Oracle that SQL*Plus is accessing.

REPF[OOTER]

Shows the current REPFOOTER definition.

REPH[EADER]

Shows the current REPHEADER definition.

SPOO[L]

Shows whether output is being spooled.

SGA

Displays information about the current instance's System Global Area. Note, you need `SELECT ON V_$SGA` object privileges to use the `SGA` clause, otherwise you will receive a message

ORA-00942: table or view does not exist

SQLCODE

Shows the value of `SQL.SQLCODE` (the SQL return code of the most recent operation).

TTI[TLE]

Shows the current TTITLE definition.

USER

Shows the username you are currently using to access SQL*Plus. If you connect as `"/ AS SYSDBA"`, then the `SQL> SHOW USER` command displays `SQL> USER is "SYS"`.

Examples

To list the current LINESIZE, enter

```
SQL> SHOW LINESIZE
```

If the current linesize is 80 characters, SQL*Plus will give the following response:

```
linesize 80
```

The following example illustrates how to create a stored procedure and then show its compilation errors:

```
SQL> connect system/manager
SQL> create procedure scott.procl as
SQL> begin
SQL>   :pl := 1;
SQL> end;
SQL> /
Warning: Procedure created with compilation errors.
SQL> show errors
Errors for PROCEDURE SCOTT.PROC1:
LINE/COL ERROR
-----
3/3      PLS-00049: bad bind variable 'P1'
SQL> show errors procedure procl
No errors.
SQL> show errors procedure scott.procl
Errors for PROCEDURE SCOTT.PROC1:
LINE/COL ERROR
-----
3/3      PLS-00049: bad bind variable 'P1'
```

To show whether AUTORECOVERY is enabled, enter

```
SQL> SHOW AUTORECOVERY
autorecovery ON
```

To display the connect identifier for the default instance, enter

```
SQL> SHOW INSTANCE
instance "local"
```

To display the location for archive logs, enter

```
SQL> SHOW LOGSOURCE
logsource "/usr/oracle81/dbs/arch"
```

To display information about the SGA, enter

```
SQL> SHOW SGA
Total System Global Area      7629732 bytes
Fixed Size                    60324 bytes
Variable Size                 6627328 bytes
Database Buffers              409600 bytes
Redo Buffers                   532480 bytes
```

SHUTDOWN

Purpose

Shuts down a currently running Oracle instance, optionally closing and dismounting a database. You cannot use SHUTDOWN to stop Oracle instances on Oracle7 servers.

Syntax

SHUTDOWN [ABORT|IMMEDIATE|NORMAL]

Terms and Clauses

Refer to the following list for a description of each term or clause:

ABORT

Proceeds with the fastest possible shutdown of the database without waiting for calls to complete or users to disconnect.

Uncommitted transactions are not rolled back. Client SQL statements currently being processed are terminated. All users currently connected to the database are implicitly disconnected and the next database startup will require instance recovery.

You must use this option if a background process terminates abnormally.

IMMEDIATE

Does not wait for current calls to complete or users to disconnect from the database.

Further connects are prohibited. The database is closed and dismounted. The instance is shutdown and no instance recovery is required on the next database startup.

NORMAL

NORMAL is the default option which waits for users to disconnect from the database.

Further connects are prohibited. The database is closed and dismounted. The instance is shutdown and no instance recovery is required on the next database startup.

Usage Notes

SHUTDOWN with no arguments is equivalent to SHUTDOWN NORMAL.

You must be connected to a database as SYSOPER, or SYSDBA. You cannot connect via a multi-threaded server. For more information about connecting to a database, see the [CONNECT](#) command earlier in this chapter.

Example

To shutdown the database in normal mode, enter

```
SQL> SHUTDOWN
Database closed.
Database dismounted.
Oracle instance shut down.
```

SPOOL

Purpose

Stores query results in an operating system file and, optionally, sends the file to a printer.

Syntax

```
SPO[OL] [file_name[.ext]|OFF|OUT]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

file_name[.ext]

Represents the name of the file to which you wish to spool. SPOOL followed by *file_name* begins spooling displayed output to the named file. If you do not specify an extension, SPOOL uses a default extension (LST or LIS on most systems).

OFF

Stops spooling.

OUT

Stops spooling and sends the file to your host computer's standard (default) printer.

Enter SPOOL with no clauses to list the current spooling status.

Usage Notes

To spool output generated by commands in a command file without displaying the output on the screen, use SET TERMOUT OFF. SET TERMOUT OFF does not affect output from commands run interactively.

Examples

To record your displayed output in a file named DIARY using the default file extension, enter

```
SQL> SPOOL DIARY
```

To stop spooling and print the file on your default printer, enter

```
SQL> SPOOL OUT
```

START

Purpose

Executes the contents of the specified command file.

Syntax

```
STA[RT] file_name[.ext] [arg ...]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

file_name[.ext]

Represents the command file you wish to execute. The file can contain any command that you can run interactively.

If you do not specify an extension, SQL*Plus assumes the default command-file extension (normally SQL). For information on changing this default extension, see the [SUFFIX](#) variable of the [SET](#) command in this chapter.

When you enter `START file_name.ext`, SQL*Plus searches for a file with the filename and extension you specify in the current default directory. If SQL*Plus does not find such a file, SQL*Plus will search a system-dependent path to find the file. Some operating systems may not support the path search. Consult the Oracle installation and user's manual(s) provided for your operating system for specific information related to your operating system environment.

arg ...

Represent data items you wish to pass to parameters in the command file. If you enter one or more arguments, SQL*Plus substitutes the values into the parameters (&1, &2, and so forth) in the command file. The first argument replaces each occurrence of &1, the second replaces each occurrence of &2, and so forth.

The START command DEFINES the parameters with the values of the arguments; if you START the command file again in this session, you can enter new arguments or omit the arguments to use the old values.

For more information on using parameters, refer to the subsection ["Passing Parameters through the START Command"](#) under ["Writing Interactive Commands"](#) in [Chapter 3](#).

Usage Notes

The @ ("at" sign) and @@ (double "at" sign) commands function similarly to START. Disabling the START command in the Product User Profile also disables the @ and @@ commands. See the @ ("at" sign) and @@ (double "at" sign) commands in this chapter for further information on these commands.

The EXIT or QUIT commands in a command file terminate SQL*Plus.

Example

A file named PROMOTE with the extension SQL, used to promote employees, might contain the following command:

```
SELECT * FROM EMP
WHERE MGR=&1 AND JOB='&2' AND SAL>&3;
```

To run this command file, enter

```
SQL> START PROMOTE 7280 CLERK 950
```

SQL*Plus then executes the following command:

```
SELECT * FROM EMP
WHERE MGR=7280 AND JOB='CLERK' AND SAL>950;
```


STARTUP

Purpose

Starts an Oracle instance with several options, including mounting and opening a database. You cannot use STARTUP to start Oracle instances on Oracle7 servers.

Syntax

```
STARTUP [FORCE] [RESTRICT] [PFILE=filename] [EXCLUSIVE] [PARALLEL [RETRY]]  
[SHARED [RETRY]] [MOUNT [dbname] | OPEN [open_options] [dbname] | NOMOUNT]
```

where *open_options* has the following syntax:

```
READ {ONLY | WRITE [RECOVER]} | RECOVER
```

Terms and Clauses

Refer to the following list for a description of each term and clause:

FORCE

Shuts down the current Oracle instance (if it is running) with SHUTDOWN mode ABORT, before restarting it. If the current instance is running and FORCE is not specified, an error results. FORCE is useful while debugging and under abnormal circumstances. It should not normally be used.

RESTRICT

Only allows Oracle users with the RESTRICTED SESSION system privilege to connect to the database. Later, you can use the ALTER SYSTEM command to disable the restricted session feature.

PFILE=*filename*

Causes the specified parameter file to be used while starting up the instance. If PFILE is not specified, then the default STARTUP parameter file is used. The default file used is platform specific. For example, the default file is \$ORACLE_HOME/dbs/init\$ORACLE_SID.ora on UNIX, and %ORACLE_HOME%\database\initORCL.ora on Windows.

EXCLUSIVE

Signifies that the database can only be mounted and opened by the current instance (it cannot be opened simultaneously by multiple instances). Cannot be used with SHARED, PARALLEL, or NOMOUNT. If no mounting option is specified, EXCLUSIVE is assigned by default.

PARALLEL

Must be specified if the database is to be mounted by multiple instances concurrently. Cannot be used with **EXCLUSIVE** or **NOMOUNT**. Invalid if the initialization parameter **SINGLE_PROCESS** is set to **TRUE**.

SHARED

Synonym for **PARALLEL**.

RETRY

Specifies that opening the database should be attempted every five seconds if the instance is busy being recovered by another instance. When an instance is being recovered by another instance, the down instance cannot open the database until recovery is complete. If the database cannot be opened for any other reason, **RETRY** does not attempt to open the database again. This option is only available for instances operating in **PARALLEL** mode.

MOUNT *dbname*

Mounts a database but does not open it.

dbname is the name of the database to mount or open. If no database name is specified, the database name is taken from the initialization parameter **DB_NAME**.

OPEN

Mounts and opens the specified database.

NOMOUNT

Causes the database not to be mounted upon instance startup.

Cannot be used with **SHARED**, **EXCLUSIVE**, **PARALLEL**, **MOUNT**, or **OPEN**.

RECOVER

Specifies that media recovery should be performed, if necessary, before starting the instance. **STARTUP RECOVER** has the same effect as issuing the **RECOVER DATABASE** command and starting an instance. Only complete recovery is possible with the **RECOVER** option.

Recovery proceeds, if necessary, as if **AUTORECOVERY** is set to **ON**, regardless of whether or not **AUTORECOVERY** is enabled. If a redo log file is not found in the expected location, recovery continues as if **AUTORECOVERY** is disabled, by prompting you with the suggested location and name of the subsequent log files that need to be applied.

Usage Notes

You must be connected to a database as SYSOPER, or SYSDBA. You cannot be connected via a multi-threaded server.

STARTUP with no arguments is equivalent to STARTUP OPEN.

STARTUP OPEN RECOVER mounts and opens the database even when recovery fails.

Examples

To start an instance using the standard parameter file, mount the default database in exclusive mode, and open the database, enter

```
SQL> STARTUP
```

or enter

```
SQL> STARTUP EXCLUSIVE OPEN database
```

To start an instance using the standard parameter file, mount the default database in parallel mode, and open the database, enter

```
SQL> STARTUP PARALLEL
```

```
SQL> STARTUP PARALLEL OPEN database
```

To restart an instance that went down in parallel mode and may not yet have been recovered by other instances, use the RETRY option:

```
SQL> STARTUP PARALLEL RETRY
```

To shutdown the current instance, immediately restart it without mounting or opening, and allow only database administrators to connect, enter

```
SQL> STARTUP FORCE RESTRICT NOMOUNT
```

To start an instance using the parameter file TESTPARM without mounting the database, enter

```
SQL> STARTUP PFILE=testparm NOMOUNT
```

To shutdown a particular database, immediately restart and open it in parallel mode, allow access only to database administrators, and use the parameter file MYINIT.ORA. enter

```
SQL> STARTUP FORCE RESTRICT PFILE=myinit.ora SHARED OPEN database
```

To startup an instance and mount but not open a database, enter

```
SQL> CONNECT / as SYSDBA
Connected to an idle instance.
SQL> STARTUP MOUNT
ORACLE instance started.
```

Total System Global Area	7629732 bytes
Fixed Size	60324 bytes
Variable Size	6627328 bytes
Database Buffers	409600 bytes
Redo Buffers	532480 bytes

STORE

Purpose

Saves attributes of the current SQL*Plus environment in a host operating system file (a command file).

Syntax

```
STORE SET file_name[.ext] [CRE[ATE] | REP[LACE] | APP[END]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

SET

Saves the values of the system variables.

Refer to the [SAVE](#) command for information on the other terms and clauses in the STORE command syntax.

Usage Notes

This command creates a command file which can be executed with the [START](#), [@](#) or [@@](#) commands.

If you want to store a file under a name identical to a STORE command clause (that is, CREATE, REPLACE or APPEND), you must put the name in single quotes or specify a file extension.

Example

To store the current SQL*Plus system variables in a file named DEFAULTENV with the default command-file extension, enter

```
SQL> STORE SET DEFAULTENV
```

To append the current SQL*Plus system variables to an existing file called DEFAULTENV with the extension OLD, enter

```
SQL> STORE SET DEFAULTENV.OLD APPEND
```

TIMING

Purpose

Records timing data for an elapsed period of time, lists the current timer's name and timing data, or lists the number of active timers.

Syntax

```
TIMI[NG] [START text | SHOW | STOP]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

START *text*

Sets up a timer and makes *text* the name of the timer. You can have more than one active timer by STARTing additional timers before STOPping the first; SQL*Plus nests each new timer within the preceding one. The timer most recently STARTed becomes the current timer.

SHOW

Lists the current timer's name and timing data.

STOP

Lists the current timer's name and timing data, then deletes the timer. If any other timers are active, the next most recently STARTed timer becomes the current timer.

Enter TIMING with no clauses to list the number of active timers.

Usage Notes

You can use this data to do a performance analysis on any commands or blocks run during the period.

For information about the data TIMING displays, see the Oracle installation and user's manual(s) provided for your operating system. Refer to [SET TIMING ON](#) for information on automatically displaying timing data after each SQL command or PL/SQL block you run.

To delete all timers, use the CLEAR TIMING command.

Examples

To create a timer named SQL_TIMER, enter

```
SQL> TIMING START SQL_TIMER
```

To list the current timer's title and accumulated time, enter

```
SQL> TIMING SHOW
```

To list the current timer's title and accumulated time and to remove the timer, enter

```
SQL> TIMING STOP
```

TTITLE

Purpose

Places and formats a specified title at the top of each report page or lists the current TTITLE definition. The old form of TTITLE is used if only a single word or string in quotes follows the TTITLE command.

For a description of the old form of TTITLE, see [TTITLE](#) in [Appendix F](#).

Syntax

```
TTI[TLE] [printspec [text|variable] ...] [ON|OFF]
```

where *printspec* represents one or more of the following clauses used to place and format the *text*:

```
COL n  
S[KIP] [n]  
TAB n  
LE[FT]  
CE[NTER]  
R[IGHT]  
BOLD  
FORMAT text
```

Terms and Clauses

Refer to the following list for a description of each term or clause. These terms and clauses also apply to the BTITLE command.

text

Represents the title text. Enter *text* in single quotes if you want to place more than one word on a single line.

variable

Represents a user variable or any of the following system-maintained values:

- SQL.LNO (current line number)
- SQL.PNO (current page number)
- SQL.RELEASE (current Oracle release number)

- SQL.SQLCODE (current error code)
- SQL.USER (current username)

To print one of these values, reference the appropriate variable in the title. You can format *variable* with the FORMAT clause.

OFF

Turns the title off (suppresses its display) without affecting its definition.

ON

Turns the title on (restores its display). When you define a top title, SQL*Plus automatically sets TTITLE to ON.

COL *n*

Indents to column *n* of the current line (backward if column *n* has been passed). "Column" in this context means print position, not table column.

S[KIP] [*n*]

Skips to the start of a new line *n* times; if you omit *n*, one time; if you enter zero for *n*, backward to the start of the current line.

TAB *n*

Skips forward *n* columns (backward if you enter a negative value for *n*). "Column" in this context means print position, not table column.

LE[FT] | CE[NTER] | R[IGHT]

Left-align, center, and right-align data on the current line respectively. SQL*Plus aligns following data items as a group, up to the end of the *printspec* or the next LEFT, CENTER, RIGHT, or COL command. CENTER and RIGHT use the SET LINESIZE value to calculate the position of the data item that follows.

BOLD

Prints data in bold print. SQL*Plus represents bold print on your terminal by repeating the data on three consecutive lines. On some operating systems, SQL*Plus may instruct your printer to print bolded text on three consecutive lines, instead of bold.

FORMAT *text*

Specifies a format model that determines the format of following data items, up to the next **FORMAT** clause or the end of the command. The format model must be a *text* constant such as A10 or \$999. See the **COLUMN** **FORMAT** command for more information on formatting and valid format models.

If the datatype of the format model does not match the datatype of a given data item, the **FORMAT** clause has no effect on that item.

If no appropriate **FORMAT** model precedes a given data item, SQL*Plus prints **NUMBER** values according to the format specified by **SET NUMFORMAT** or, if you have not used **SET NUMFORMAT**, the default format. SQL*Plus prints **DATE** values according to the default format.

Refer to the **FORMAT** clause of the **COLUMN** command in this chapter for more information on default formats.

Enter **TTITLE** with no clauses to list the current **TTITLE** definition.

Usage Notes

If you do not enter a *printspec* clause before the first occurrence of *text*, **TTITLE** left justifies the text. SQL*Plus interprets **TTITLE** in the new form if a valid *printspec* clause (**LEFT**, **SKIP**, **COL**, and so on) immediately follows the command name.

See **COLUMN NEW_VALUE** for information on printing column and **DATE** values in the top title.

You can use any number of constants and variables in a *printspec*. SQL*Plus displays the constants and variables in the order you specify them, positioning and formatting each constant or variable as specified by the *printspec* clauses that precede it.

The length of the title you specify with **TTITLE** cannot exceed 2400 characters.

The continuation character (a hyphen) will not be recognized inside a single-quoted title text string. To be recognized, the continuation character must appear outside the quotes, as follows:

```
SQL> TTITLE CENTER 'Summary Report for' -  
> 'the Month of May'
```

Examples

To define "Monthly Analysis" as the top title and to left-align it, to center the date, to right-align the page number with a three-digit format, and to display "Data in Thousands" in the center of the next line, enter

```
SQL> TTITLE LEFT 'Monthly Analysis' CENTER '23 Nov 99' -  
> RIGHT 'Page:' FORMAT 999 SQL.PNO SKIP CENTER -  
> 'Data in Thousands'
```

The following title results:

```
Monthly Analysis                23 Nov 99                Page:   1  
                                Data in Thousands
```

To suppress the top title display without changing its definition, enter

```
SQL> TTITLE OFF
```

UNDEFINE

Purpose

Deletes one or more user variables that you defined either explicitly (with the DEFINE command) or implicitly (with an argument to the START command).

Syntax

```
UNDEF[INE] variable ...
```

Terms and Clauses

Refer to the following for a description of the term or clause:

variable

Represents the name of the user variable you wish to delete. One or more user variables may be deleted in the same command.

Examples

To undefine a user variable named POS, enter

```
SQL> UNDEFINE POS
```

To undefine two user variables named MYVAR1 and MYVAR2, enter

```
SQL> UNDEFINE MYVAR1 MYVAR2
```

VARIABLE

Purpose

Declares a bind variable that can then be referenced in PL/SQL. For more information on bind variables, see ["Using Bind Variables"](#) in [Chapter 3](#). For more information about PL/SQL, see your *PL/SQL User's Guide and Reference*.

VARIABLE without arguments displays a list of all the variables declared in the session. VARIABLE followed only by a variable name lists that variable.

Syntax

```
VAR[IABLE] [variable [NUMBER|CHAR|CHAR (n)|NCHAR|NCHAR (n)  
|VARCHAR2 (n)|NVARCHAR2 (n)|CLOB|NCLOB|REFCURSOR]]
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

variable

Represents the name of the bind variable you wish to create.

NUMBER

Creates a variable of type NUMBER with a fixed length.

CHAR

Creates a variable of type CHAR (character) with a length of one.

CHAR (*n*)

Creates a variable of type CHAR with a maximum length of *n*, up to 2000.

NCHAR

Creates a variable of type NCHAR (national character) with a length of one.

NCHAR (*n*)

Creates a variable of type NCHAR with a maximum length of *n*, up to 2000.

VARCHAR2 (*n*)

Creates a variable of type VARCHAR2 with a maximum length of *n*, up to 4000.

NVARCHAR2 (n)

Creates a variable of type NVARCHAR2 (NCHAR VARYING) with a maximum length of *n*, up to 4000.

CLOB

Creates a variable of type CLOB.

NCLOB

Creates a variable of type NCLOB.

REFCURSOR

Creates a variable of type REF CURSOR.

Usage Notes

Bind variables may be used as parameters to stored procedures, or may be directly referenced in anonymous PL/SQL blocks.

To display the value of a bind variable created with VARIABLE, use the PRINT command. For more information, see the [PRINT](#) command in this chapter.

To automatically display the value of a bind variable created with VARIABLE, use the SET AUTOPRINT command. For more information, see the [SET AUTOPRINT](#) command in this chapter.

Bind variables cannot be used in the COPY command or SQL statements, except in PL/SQL blocks. Instead, use substitution variables.

When you execute a VARIABLE ... CLOB or NCLOB command, SQL*Plus associates a LOB locator with the bind variable. The LOB locator is automatically populated when you execute a SELECT clob_column INTO :cv statement in a PL/SQL block. SQL*Plus closes the LOB locator after completing a PRINT statement for that bind variable, or when you exit SQL*Plus.

SQL*Plus SET commands such as SET LONG and SET LONGCHUNKSIZE and SET LOBOFFSET may be used to control the size of the buffer while PRINTing CLOB or NCLOB bind variables.

SQL*Plus REFCURSOR bind variables may be used to reference PL/SQL 2.3 or higher Cursor Variables, allowing PL/SQL output to be formatted by SQL*Plus. For more information on PL/SQL Cursor Variables, see your *PL/SQL User's Guide and Reference*.

When you execute a VARIABLE ... REFCURSOR command, SQL*Plus creates a cursor bind variable. The cursor is automatically opened by an OPEN ... FOR SELECT statement referencing the bind variable in a PL/SQL block. SQL*Plus

closes the cursor after completing a PRINT statement for that bind variable, or on exit.

SQL*Plus formatting commands such as BREAK, COLUMN, COMPUTE and SET may be used to format the output from PRINTing a REFCURSOR.

A REFCURSOR bind variable may not be PRINTed more than once without re-executing the PL/SQL OPEN...FOR statement.

Examples

The following example illustrates creating a bind variable and then setting it to the value returned by a function:

```
SQL> VARIABLE id NUMBER
SQL> BEGIN
  2   :id := emp_management.hire
  3     ('BLAKE', 'MANAGER', 'KING', 2990, 'SALES');
  4 END;
```

The bind variable named id can be displayed with the PRINT command or used in subsequent PL/SQL subprograms.

The following example illustrates automatically displaying a bind variable:

```
SQL> SET AUTOPRINT ON
SQL> VARIABLE a REFCURSOR
SQL> BEGIN
  2 OPEN :a FOR SELECT * FROM DEPT ORDER BY DEPTNO;
  3 END;
  4 /
```

PL/SQL procedure successfully completed.

DEPTNO	DNAME	LOC
10	ACCOUNTING	NEW YORK
20	RESEARCH	DALLAS
30	SALES	CHICAGO
40	OPERATIONS	BOSTON

In the above example, there is no need to issue a PRINT command to display the variable.

The following example creates some variables and then lists them:

```
SQL> VARIABLE id NUMBER
SQL> VARIABLE txt CHAR (20)
SQL> VARIABLE myvar REFCURSOR
SQL> VARIABLE
variable id
datatype NUMBER

variable txt
datatype CHAR(20)

variable myvar
datatype REFCURSOR
```

The following example lists a single variable:

```
SQL> VARIABLE txt
variable txt
datatype CHAR(20)
```

The following example illustrates producing a report listing individual salaries and computing the departmental and total salary cost:

```
SQL> VARIABLE RC REFCURSOR
 2 BEGIN
 3   OPEN :RC FOR SELECT DNAME, ENAME, SAL
 4     FROM EMP, DEPT
 5     WHERE EMP.DEPTNO = DEPT.DEPTNO
 6     ORDER BY EMP.DEPTNO, ENAME;
 7 END;
 8 /
```

PL/SQL procedure successfully completed.

```
SQL> SET PAGESIZE 100 FEEDBACK OFF
SQL> TTITLE LEFT '*** Departmental Salary Bill ***' SKIP 2
SQL> COLUMN SAL FORMAT $999,990.99 HEADING 'Salary'
SQL> COLUMN DNAME HEADING 'Department'
SQL> COLUMN ENAME HEADING 'Employee'
SQL> COMPUTE SUM LABEL 'Subtotal:' OF SAL ON DNAME
SQL> COMPUTE SUM LABEL 'Total:' OF SAL ON REPORT
SQL> BREAK ON DNAME SKIP 1 ON REPORT SKIP 1
SQL> PRINT RC
```



```

*** Departmental Salary Bill ***

Department      Employee      Salary
-----
ACCOUNTING      CLARK         $2,450.00
                 KING          $5,000.00
                 MILLER        $1,300.00
*****
Subtotal:                $8,750.00

RESEARCH        ADAMS         $1,100.00
                 FORD          $3,000.00
                 JONES         $2,975.00
                 SCOTT         $3,000.00
                 SMITH         $800.00
*****
Subtotal:                $10,875.00

SALES           ALLEN         $1,600.00
                 BLAKE         $2,850.00
                 JAMES         $950.00
                 MARTIN        $1,250.00
                 TURNER        $1,500.00
                 WARD          $1,250.00
*****
Subtotal:                $9,400.00

Total:                $29,025.00

```

The following example illustrates producing a report containing a CLOB column, and then displaying it with the SET LOBOFFSET command.

Assume you have already created a table named `clob_tab` which contains a column named `clob_col` of type CLOB. The `clob_col` contains the following data:

Remember to run the Departmental Salary Bill report each month. This report contains confidential information.

To produce a report listing the data in the `col_clob` column, enter

```

SQL> variable t clob
SQL> begin
  2   select clob_col into t: from clob_tab;
  3   end;
  4   /

```

PL/SQL procedure successfully completed

To print 200 characters from the column `clob_col`, enter

```
SQL> set LONG 200
```

```
SQL> print t
```

The following output results:

```
T
```

```
-----  
Remember to run the Departmental Salary Bill report each month. This report  
contains confidential information.
```

To set the printing position to the 21st character, enter

```
SQL> set LOBOFFSET 21
```

```
SQL> print t
```

the following output results:

```
T
```

```
-----  
Departmental Salary Bill report each month. This report contains confidential  
information.
```

For more information on creating CLOB columns, see your *Oracle8i SQL Reference*.

WHENEVER OSERROR

Purpose

Exits SQL*Plus if an operating system error occurs (such as a file I/O error).

Syntax

```
WHENEVER OSERROR  
  {EXIT [SUCCESS|FAILURE|n|variable]:BindVariable}[COMMIT|ROLLBACK]  
  |CONTINUE [COMMIT|ROLLBACK|NONE]}
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

EXIT [SUCCESS|FAILURE|*n*|*variable*]:*BindVariable*]

Directs SQL*Plus to exit as soon as an operating system error is detected. You can also specify that SQL*Plus return a success or failure code, the operating system failure code, or a number or variable of your choice. See [EXIT](#) in this chapter for details.

CONTINUE

Turns off the EXIT option.

COMMIT

Directs SQL*Plus to execute a COMMIT before exiting or continuing and save pending changes to the database.

ROLLBACK

Directs SQL*Plus to execute a ROLLBACK before exiting or continuing and abandon pending changes to the database.

NONE

Directs SQL*Plus to take no action before continuing.

Usage Notes

If you do not enter the WHENEVER OSERROR command, the default behavior of SQL*Plus is to continue and take no action when an operating system error occurs.

If you do not enter the WHENEVER SQLERROR command, the default behavior of SQL*Plus is to continue and take no action when a SQL error occurs.

Examples

The commands in the following command file cause SQL*Plus to exit and COMMIT any pending changes if a failure occurs when writing to the output file:

```
SQL> WHENEVER OSERROR EXIT
SQL> START no_such_file
OS Message: No such file or directory
Disconnected from Oracle8.....
```

WHENEVER SQLERROR

Purpose

Exits SQL*Plus if a SQL command or PL/SQL block generates an error.

Syntax

```
WHENEVER SQLERROR  
  {EXIT [SUCCESS|FAILURE|WARNING|n|variable|:BindVariable]  
  [COMMIT|ROLLBACK]|CONTINUE [COMMIT|ROLLBACK|NONE]}
```

Terms and Clauses

Refer to the following list for a description of each term or clause:

EXIT [SUCCESS|FAILURE|WARNING|n|variable|:BindVariable]
Directs SQL*Plus to exit as soon as it detects a SQL command or PL/SQL block error (but after printing the error message). SQL*Plus will not exit on a SQL*Plus error. The EXIT clause of WHENEVER SQLERROR follows the same syntax as the EXIT command. See [EXIT](#) in this chapter for details.

CONTINUE
Turns off the EXIT option.

COMMIT
Directs SQL*Plus to execute a COMMIT before exiting or continuing and save pending changes to the database.

ROLLBACK
Directs SQL*Plus to execute a ROLLBACK before exiting or continuing and abandon pending changes to the database.

NONE
Directs SQL*Plus to take no action before continuing.

Usage Notes

The WHENEVER SQLERROR command is triggered by SQL command or PL/SQL block errors, and not by SQL*Plus command errors.

Examples

The commands in the following command file cause SQL*Plus to exit and return the SQL error code if the SQL UPDATE command fails:

```
SQL> WHENEVER SQLERROR EXIT SQL.SQLCODE
SQL> UPDATE EMP SET SAL = SAL*1.1
```

The following SQL command error causes SQL*Plus to exit and return the SQL error code:

```
SQL> WHENEVER SQLERROR EXIT SQL.SQLCODE
SQL> SELECT COLUMN_DOES_NOT_EXIST FROM DUAL;
select column_does_not_exist from dual
      *
```

```
ERROR at line 1:
ORA-00904: invalid column name
```

```
Disconnected from Oracle.....
```

The following SQL command error causes SQL*Plus to exit and return the value of the variable MY_ERROR_VAR:

```
SQL> DEFINE MY_ERROR_VAR = 99
SQL> WHENEVER SQLERROR EXIT my_error_var
SQL> UPDATE non_existed_table set coll = coll + 1;
```

```
UPDATE NON_EXISTED_TABLE set coll = coll + 1
      *
```

```
ERROR at line 1:
ORA-00942: table or view does not exist
```

```
Disconnected from Oracle.....
```

The following examples show that the WHENEVER SQLERROR command does not have any effect on SQL*Plus commands, but does on SQL commands and PL/SQL blocks:

```
SQL> WHENEVER SQLERROR EXIT SQL.SQLCODE
SQL> COLUMN ENAME HEADING "EMPLOYEE NAME"
```

```
Unknown COLUMN option "HEADING"
```

```
SQL> show non_existed_option
```

```
Unknown SHOW option "NON_EXISTED_OPTION"
```

```
SQL> get non_existed_file.sql
```

Unable to open "NON_EXISTED_FILE.SQL"

The following PL/SQL block error causes SQL*Plus to exit and return the SQL error code:

```
SQL> WHENEVER SQLERROR EXIT SQL.SQLCODE
SQL> BEGIN
  2   select column_does_not_exist from dual;
  3   end;
  4   /

select column_does_not_exist from dual;
      *
ERROR at line 2:
ORA-06550: line 2, column 10:
PLS-00201: identifier 'COLUMN_DOES_NOT_EXIST' must be declared
ORA-06550: line 2, column 3:
PL/SQL: SQL Statement ignored

Disconnected from Oracle.....
```


A

COPY Command Messages and Codes

This appendix lists error messages generated by the COPY command. For error messages generated by Oracle, refer to the *Oracle8i Error Messages* manual.

CPY0002

Illegal or missing APPEND, CREATE, INSERT, or REPLACE option

Cause: An internal COPY function has invoked COPY with a create option (flag) value that is out of range.

Action: Please contact your Oracle Worldwide Customer Support Services representative.

CPY0003

Internal Error: logical host number out of range

Cause: An internal COPY function has been invoked with a logical host number value that is out of range.

Action: Please contact your Oracle Worldwide Customer Support Services representative.

CPY0004

Source and destination table and column names don't match

Cause: On an APPEND operation or an INSERT (when the table exists), at least one column name in the destination table does not match the corresponding column name in the optional column name list or in the SELECT command.

Action: Re-specify the COPY command, making sure that the column names and their respective order in the destination table match the column names and column order in the optional column list or in the SELECT command

CPY0005

Source and destination column attributes don't match

Cause: On an APPEND operation or an INSERT (when the table exists), at least one column in the destination table does not have the same datatype as the corresponding column in the SELECT command.

Action: Re-specify the COPY command, making sure that the datatypes for items being selected agree with the destination. You can use TO_DATE, TO_CHAR, and TO_NUMBER to make conversions.

CPY0006

Select list has more columns than destination table

Cause: On an APPEND operation or an INSERT (when the table exists), the number of columns in the SELECT command is greater than the number of columns in the destination table.

Action: Re-specify the COPY command, making sure that the number of columns being selected agrees with the number in the destination table.

CPY0007

Select list has fewer columns than destination table

Cause: On an APPEND operation or INSERT (when the table exists), the number of columns in the SELECT command is less than the number of columns in the destination table.

Action: Re-specify the COPY command, making sure that the number of columns being selected agrees with the number in the destination table.

CPY0008

More column list name than columns in the destination table

Cause: On an APPEND operation or an INSERT (when the table exists), the number of columns in the column name list is greater than the number of columns in the destination table.

Action: Re-specify the COPY command, making sure that the number of columns in the column list agrees with the number in the destination table.

CPY0009

Fewer column list name than columns in the destination table

Cause: On an APPEND operation or an INSERT (when the table exists), the number of columns in the column name list is less than the number of columns in the destination table.

Action: Re-specify the COPY command, making sure that the number of columns in the column list agrees with the number in the destination table.

Release 8.1.7 Enhancements

SQL*Plus Release 8.1.7 provides a number of enhancements over previous releases of SQL*Plus. This appendix describes the enhancements for SQL*Plus Release 8.1.7 and earlier releases.

SQL*Plus Release 8.1.7 Enhancements

SQL*Plus Release 8.1.7 gives you the following additional capabilities:

SQLPLUS -MARKUP and SET MARKUP Changes

In this release, you can use MARKUP HTML ON to produce HTML output in either the <PRE> tag or in an HTML table. Output to a table uses standard HTML <TABLE>, <TR> and <TD> tags to automatically encode the rows and columns resulting from a query. Output to an HTML table is now the default behavior when the HTML option is set ON. You can generate output using HTML <PRE> tags by setting PREFORMAT ON. For more information about the SQLPLUS and SET commands, see [Starting SQL*Plus Using the SQLPLUS Command](#) in [Chapter 7](#) and the [SET](#) command in [Chapter 8](#).

TABLE text

TABLE text is a new MARKUP option which allows you to enter attributes for the HTML <TABLE> tag. You can use this option to set <TABLE> tag attributes such as BORDER, CELLPADDING, CELLSPACING and WIDTH. For more information about this option, see [TABLE text](#) in [Chapter 7](#).

The new MARKUP syntax for SQLPLUS -MARKUP and SET MARKUP is:

```
HTML [ON|OFF] [HEAD text] [BODY text] [TABLE text]
      [ENTMAP {ON|OFF}] [SPOOL {ON|OFF}] [PRE[FORMAT] {ON|OFF}]
```

For more information about this option, see [MARKUP Options](#) in [Chapter 7](#).

COLUMN ENTMAP {ON|OFF}

A new option, ENTMAP {ON|OFF}, has been added to the COLUMN command to add flexibility for mapping entities. The default for COLUMN ENTMAP is the current value of the MARKUP HTML ENTMAP option.

ENTMAP {ON|OFF} in the COLUMN command allows you to explicitly turn entity mapping on or off for selected columns in HTML output. For more information about this option, see the [COLUMN](#) command in [Chapter 8](#).

SQL*Plus Release 8.1.6 Enhancements

- SQL*Loader is no longer used to install the SQL*Plus command line help system. The help system is now installed by running SQL*Plus scripts. See the Installation Guide for your operating system for instructions on how to install the help system.

A SQL*Plus script is also provided to enable the removal of the help system.
- The SQLPLUS command now has a -RESTRICT option. -RESTRICT allows certain commands that interact with the operating system to be disabled. Compared to disabling the same commands with the Product User Profile (PUP) table, commands disabled with -RESTRICT can be disabled when there is no connection to a server, and remain disabled until SQL*Plus terminates.
- The SQLPLUS command now has a -MARKUP option. -MARKUP allows the use of server-side CGI scripts to create HTML reports for access on the web. You can use the SQLPLUS -MARKUP command to create web reports from existing SQL scripts. SQLPLUS -MARKUP options have the same effect as the new SET MARKUP command options.
- The SET command now has a MARKUP clause. During a SQL*Plus session, SET MARKUP allows the interactive creation of HTML reports for access on the web.
- SHOW MARKUP displays the status of MARKUP options.

SQL*Plus Release 8.1.5 Enhancements

- There is a new command named **STARTUP**. The **STARTUP** command starts an Oracle instance, with the options to mount and open a database.
- There is a new command named **SHUTDOWN**. The **SHUTDOWN** command shuts down an Oracle instance that is currently running. It also optionally closes and dismounts a database.
- There is a new command named **RECOVER**. The **RECOVER** command performs media recovery on tablespaces, datafiles or the entire database.
- There is a new command named **ARCHIVE LOG**. The **ARCHIVE LOG** command allows redo log files to be archived. It also displays information about redo log files.
- The **CONNECT** command now has an **AS** clause. The **AS** clause, allows privileged connections by users who have been granted **SYSOPER** or **SYSDBA** system privileges.
- The **SET** command now has an **AUTORECOVERY** clause. The **AUTORECOVERY** clause specifies whether default archived redo log files are to be used during recovery.
- The **SET** command now has a **DESCRIBE** clause. The **DESCRIBE** clause specifies the depth or level to which objects can be described.
- The **SET** command now has an **INSTANCE** clause. The **INSTANCE** clause changes the default instance for your session to the specified instance.
- The **SET** command now has a **LOGSOURCE** clause. The **LOGSOURCE** clause specifies the location from which archive logs are retrieved during recovery.
- The **SET** command now has a **SQLBLANKLINES** clause. The **SQLBLANKLINES** clause allows and preserves blank lines within any SQL command.
- The **SHOW** command now has a **PARAMETERS** clause. The **PARAMETERS** clause displays the current values for one or more initialization parameters.
- The **SHOW** command now has an **SGA** clause. The **SGA** clause displays information about the current instance's System Global Area.

C

SQL*Plus Limits

Table C-1, on the following page, lists the limit, or maximum value, of each of the SQL*Plus elements shown. The limits shown are valid for most operating systems.

Table C-1 SQL*Plus Limits

Item	Limit
filename length	system dependent
username length	30 bytes
user variable name length	30 bytes
user variable value length	240 characters
command-line length	2500 characters
length of a LONG value entered through SQL*Plus	LINESIZE value
LINESIZE	system dependent
LONGCHUNKSIZE value	system dependent
output line size	system dependent
line size after variable substitution	3,000 characters (internal only)
number of characters in a COMPUTE command label	500 characters
number of lines per SQL command	500 (assuming 80 characters per line)
maximum PAGESIZE	50,000 lines
total row width	60,000 characters for VMS; otherwise, 32,767 characters
maximum ARRAYSIZE	5000 rows
maximum number of nested command files	20 for VMS, CMS, Unix; otherwise, 5
maximum page number	99,999
maximum PL/SQL error message size	2K
maximum ACCEPT character string length	240 Bytes
maximum number of DEFINE variables	2048

D

SQL Command List

Table D-1, on the following page, lists major SQL commands. Refer to the *Oracle8i SQL Reference* for full documentation of these commands.

Table D-1 SQL Command List

Major SQL Commands and Clauses

ALTER	LOCK TABLE
ANALYZE	NOAUDIT
AUDIT	RENAME
COMMENT	REVOKE
CREATE	SAVEPOINT
DROP	SET ROLE
EXPLAIN	SET TRANSACTION
GRANT	TRUNCATE
INSERT	UPDATE

This appendix describes the available methods for controlling access to database tables and SQL*Plus commands. The available methods for security fall into three broad categories:

- [PRODUCT_USER_PROFILE Table](#)
- [Roles](#)
- [SQLPLUS -RESTRICT](#)

PRODUCT_USER_PROFILE Table

Various Oracle products use `PRODUCT_USER_PROFILE`, a table in the `SYSTEM` account, to provide product-level security that supplements the user-level security provided by the `SQL GRANT` and `REVOKE` commands and user roles.

Overview

DBAs can use `PRODUCT_USER_PROFILE` to disable certain `SQL` and `SQL*Plus` commands in the `SQL*Plus` environment on a per-user basis. `SQL*Plus`—not Oracle—enforces this security. DBAs can even restrict access to the `GRANT`, `REVOKE`, and `SET ROLE` commands to control users' ability to change their database privileges.

`SQL*Plus` reads restrictions from `PRODUCT_USER_PROFILE` when a user logs in to `SQL*Plus` and maintains those restrictions for the duration of the session. Changes to `PRODUCT_USER_PROFILE` will only take effect the next time the affected users log in to `SQL*Plus`.

The `PRODUCT_USER_PROFILE` table applies only to the local database. If accessing objects on a remote database via a database link, the `PRODUCT_USER_PROFILE` for the remote database does not apply. The remote database cannot extract the username and password from the database link in order to determine that user's profile and privileges.

Creating the Table

You can create `PRODUCT_USER_PROFILE` by running the command file named `PUPBLD` with the extension `SQL` as `SYSTEM`. The exact format of the file extension and the location of the file are system dependent. See the Oracle installation and user's manual(s) provided for your operating system or your DBA for more information.

Note: If the table is created incorrectly, all users other than `SYSTEM` will see a warning when connecting to Oracle that the `PRODUCT_USER_PROFILE` information is not loaded.

Table Structure

The PRODUCT_USER_PROFILE table consists of the following columns:

PRODUCT	NOT NULL CHAR (30)
USERID	CHAR(30)
ATTRIBUTE	CHAR(240)
SCOPE	CHAR(240)
NUMERIC_VALUE	NUMBER(15,2)
CHAR_VALUE	CHAR(240)
DATE_VALUE	DATE
LONG_VALUE	LONG

Description and Use of Columns

Refer to the following list for the descriptions and use of each column in the PRODUCT_USER_PROFILE table:

Product	Must contain the product name (in this case "SQL*Plus"). You cannot enter wildcards or NULL in this column. Also notice that the product name SQL*Plus must be specified in mixed case, as shown, in order to be recognized.
userid	Must contain the username (in uppercase) of the user for whom you wish to disable the command. To disable the command for more than one user, use SQL wild cards (%) or make multiple entries. Thus, all of the following entries are valid: <ul style="list-style-type: none"> ■ SCOTT ■ CLASS1 ■ CLASS% (all users whose names start with CLASS) ■ % (all users)
Attribute	Must contain the name (in uppercase) of the SQL, SQL*Plus, or PL/SQL command you wish to disable (for example, GET). If you are disabling a role, it must contain the character string "ROLES". You cannot enter a wildcard. See the section "Administration" later in this chapter for a list of SQL and SQL*Plus commands you can disable. See the section "Roles" in this chapter for information on how to disable a role.

Scope	SQL*Plus ignores this column. It is recommended that you enter NULL in this column. Other products may store specific file restrictions or other data in this column.
Numeric_Value	SQL*Plus ignores this column. It is recommended that you enter NULL in this column. Other products may store numeric values in this column.
Char_Value	Must contain the character string "DISABLED" to disable a SQL, SQL*Plus, or PL/SQL command. If you are disabling a role, it must contain the name of the role you wish to disable. You cannot use a wildcard. See "Roles" below for information on how to disable a role.
Date_Value	SQL*Plus ignores this column. It is recommended that you enter NULL in this column. Other products may store DATE values in this column.
Long_Value	SQL*Plus ignores this column. It is recommended that you enter NULL in this column. Other products may store LONG values in this column.

Administration

The DBA username SYSTEM owns and has all privileges on PRODUCT_USER_PROFILE. (When SYSTEM logs in, SQL*Plus does not read PRODUCT_USER_PROFILE. Therefore, no restrictions apply to user SYSTEM.) Other Oracle usernames should have only SELECT access to this table, which allows a view of restrictions of that username and those restrictions assigned to PUBLIC. The command file PUPBLD, when run, grants SELECT access on PRODUCT_USER_PROFILE to PUBLIC.

Disabling SQL*Plus, SQL, and PL/SQL Commands

To disable a SQL or SQL*Plus command for a given user, insert a row containing the user's username in the Userid column, the command name in the Attribute column, and DISABLED in the Char_Value column.

The Scope, Numeric_Value, and Date_Value columns should contain NULL. For example:

PRODUCT	USERID	ATTRIBUTE	SCOPE	NUMERIC VALUE	CHAR VALUE	DATE VALUE
-----	-----	-----	-----	-----	-----	-----
SQL*Plus	SCOTT	HOST			DISABLED	

SQL*Plus	%	INSERT	DISABLED
SQL*Plus	%	UPDATE	DISABLED
SQL*Plus	%	DELETE	DISABLED

To re enable commands, delete the row containing the restriction.

You can disable the following SQL*Plus commands:

- COPY
- EDIT
- EXECUTE
- EXIT
- GET
- HOST (or your operating system's alias for HOST, such as \$ on VMS, and ! on UNIX)
- QUIT
- PASSWORD
- RUN
- SAVE
- SET (see note below)
- SPOOL
- START

Note: Disabling the SQL*Plus SET command will also disable the SQL SET ROLE and SET TRANSACTION commands. Disabling the SQL*Plus START command will also disable the SQL*Plus @ and @@ commands.

You can also disable the following SQL commands:

- ALTER
- ANALYZE
- AUDIT
- CONNECT

- CREATE
- DELETE
- DROP
- GRANT
- INSERT
- LOCK
- NOAUDIT
- RENAME
- REVOKE
- SELECT
- SET ROLE
- SET TRANSACTION
- TRUNCATE
- UPDATE

You can also disable the following PL/SQL commands:

- BEGIN
- DECLARE

Note: Disabling BEGIN and DECLARE does not prevent the use of the SQL*Plus EXECUTE command. EXECUTE must be disabled separately.

Disabling SET ROLE

From SQL*Plus, users can submit any SQL command. In certain situations, this can cause security problems. Unless you take proper precautions, a user could use SET ROLE to access privileges obtained via an application role. With these privileges, they might issue SQL statements from SQL*Plus that could wrongly change database tables.

To prevent application users from accessing application roles in SQL*Plus, you can use PRODUCT_USER_PROFILE to disable the SET ROLE command. This allows a SQL*Plus user only those privileges associated with the roles enabled when they

started SQL*Plus. For more information about the creation and usage of user roles, see your *Oracle8i SQL Reference* and *Oracle8i Administrator's Guide*.

Disabling Roles

To disable a role for a given user, insert a row in PRODUCT_USER_PROFILE containing the user's username in the Userid column, "ROLES" in the Attribute column, and the role name in the Char_Value column.

Note: When you enter "PUBLIC" or "%" for the Userid column, you disable the role for all users. You should only use "%" or "PUBLIC" for roles which are granted to "PUBLIC". If you try to disable a role that has not been granted to a user, none of the roles for that user are disabled.

The Scope, Numeric_Value, and Date_Value columns should contain NULL. For example:

PRODUCT	USERID	ATTRIBUTE	SCOPE	NUMERIC VALUE	CHAR VALUE	DATE VALUE
-----	-----	-----	-----	-----	-----	-----
SQL*Plus	SCOTT	ROLES			ROLE1	
SQL*Plus	PUBLIC	ROLES			ROLE2	

During login, these table rows are translated into the command

```
SET ROLE ALL EXCEPT ROLE1, ROLE2
```

To ensure that the user does not use the SET ROLE command to change their roles after login, you can disable the SET ROLE command. See ["Disabling SET ROLE"](#) earlier in this appendix.

To re enable roles, delete the row containing the restriction.

Roles

To provide for the security of your database tables in Oracle8i using SQL commands, you can create and control access to roles.

By creating a role and then controlling who has access to it, you can ensure that only certain users have access to particular database privileges.

Overview

Roles are created and used with the SQL CREATE, GRANT, and SET commands:

- To create a role, you use the CREATE command. You can create roles with or without passwords.
- To grant access to roles, you use the GRANT command. In this way, you can control who has access to the privileges associated with the role.
- To access roles, you use the SET ROLE command. If you created the role with a password, the user must know the password in order to access the role.

For more information about roles, see your *Oracle8i SQL Reference*, your *Oracle8i Administrator's Guide*, and your *Oracle8i Concepts* manual.

SQLPLUS -RESTRICT

Like the Product User Profile table, the RESTRICT option allows you to disable certain commands that interact with the operating system. However, commands disabled with the -RESTRICT option are disabled even when no connection to a server exists, and remain disabled until SQL*Plus terminates.

The following table shows which commands are disabled in each restriction level.

Command	Level 1	Level 2	Level 3
EDIT	disabled	disabled	disabled
GET			disabled
HOST, !	disabled	disabled	disabled
SAVE		disabled	disabled
SPOOL		disabled	disabled
START, @, @@			disabled
STORE		disabled	disabled

For more information about the RESTRICT option, see the SQLPLUS `-R[ESTRICT]` {[1](#) | [2](#) | [3](#)} command on page 7-8

Obsolete SQL*Plus Commands

This appendix covers earlier versions of some SQL*Plus commands. While these older commands still function within SQL*Plus, they are no longer supported. It is recommended that you use the alternative SQL*Plus commands listed in the following table.

SQL*Plus Obsolete Command Alternatives

Obsolete Command	Alternative Command	Description of Alternative Command
BTITLE (old form)	BTITLE on page 8-24	Places and formats a title at the bottom of each report page or lists the current BTITLE definition.
COLUMN DEFAULT	COLUMN CLEAR on page 8-31	Resets column display attributes to default values.
DOCUMENT	REMARK on page 8-88	Places a comment which SQL*Plus does not interpret as a command.
NEWPAGE	SET NEWPAGE on page 8-107	Sets the number of blank lines to be printed from the top of each page to the top title.
SET BUFFER	EDIT on page 8-64	Enables the editing of the SQL*Plus command buffer, or the contents of a saved file. Use the SQL*Plus SAVE, GET, @ and START commands to create and use external files.
SET CLOSECURSOR	none	Obsolete
SET DOCUMENT	none	Obsolete
SET MAXDATA	none	Obsolete
SET SCAN	SET DEFINE on page 8-103	Sets the character used to prefix substitution variables.
SET SPACE	SET COLSEP on page 8-102	Sets the text to be printed between SELECTed columns.
SET TRUNCATE	SET WRAP on page 8-112	Controls whether SQL*Plus truncates a SELECTed row if it is too long for the current line width.
SHOW LABEL	none	Obsolete
TTITLE (old form)	TTITLE on page 8-140	Places and formats a title at the top of each report page or lists the current TTITLE definition.

BTITLE (old form)

Purpose

Displays a title at the bottom of each report page.

Syntax

```
BTI[TITLE] text
```

Usage Notes

The old form of BTITLE offers formatting features more limited than those of the new form, but provides compatibility with UFI (a predecessor of SQL*Plus). The old form defines the bottom title as an empty line followed by a line with centered text. Refer to [TTITLE \(old form\)](#) in this appendix for more details.

COLUMN DEFAULT

Purpose

Resets the display attributes for a given column to default values.

Syntax

```
COL[UMN] {column|expr} DEF[AULT]
```

Usage Notes

Has the same effect as COLUMN CLEAR.

DOCUMENT

Purpose

Begins a block of documentation in a command file.

Syntax

```
DOC[UMENT]
```

Usage Notes

For information on the current method of inserting comments in a command file, refer to the section "[Placing Comments in Command Files](#)" under "[Saving Commands for Later Use](#)" in [Chapter 3](#) and to the [REMARK](#) command in the "Command Reference" in [Chapter 8](#).

After you type DOCUMENT and enter [Return], SQL*Plus displays the prompt DOC> in place of SQL> until you end the documentation. The "pound" character (#) on a line by itself ends the documentation.

If you have set DOCUMENT to OFF, SQL*Plus suppresses the display of the block of documentation created by the DOCUMENT command. (See "[SET DOCUMENT](#)" later in this appendix.)

NEWPAGE

Purpose

Advances spooled output *n* lines beyond the beginning of the next page.

Syntax

```
NEWPAGE [1 | n]
```

Usage Notes

Refer to the [NEWPAGE](#) variable of the [SET](#) command in [Chapter 8](#) for information on the current method for advancing spooled output.

SET BUFFER

Purpose

Makes the specified buffer the current buffer.

Syntax

```
SET BUF[FER] {buffer | SQL}
```

Usage Notes

Initially, the SQL buffer is the current buffer. SQL*Plus does not require the use of multiple buffers; the SQL buffer alone should meet your needs.

If the buffer name you enter does not already exist, SET BUFFER defines (creates and names) the buffer. SQL*Plus deletes the buffer and its contents when you exit SQL*Plus.

Running a query automatically makes the SQL buffer the current buffer. To copy text from one buffer to another, use the GET and SAVE commands. To clear text from the current buffer, use CLEAR BUFFER. To clear text from the SQL buffer while using a different buffer, use CLEAR SQL.

SET CLOSECURSOR

Purpose

Sets the cursor usage behavior.

Syntax

```
SET CLOSECUR[SOR] {ON|OFF}
```

Usage Notes

ON or OFF sets whether or not the cursor will close and reopen after each SQL statement. This feature may be useful in some circumstances to release resources in the database server.

SET DOCUMENT

Purpose

Displays or suppresses blocks of documentation created by the DOCUMENT command.

Syntax

```
SET DOC[UMENT] {ON|OFF}
```

Usage Notes

SET DOCUMENT ON causes blocks of documentation to be echoed to the screen. Set DOCUMENT OFF suppresses the display of blocks of documentation.

See [DOCUMENT](#) in this appendix for information on the DOCUMENT command.

SET MAXDATA

Purpose

Sets the maximum total row width that SQL*Plus can process.

Syntax

```
SET MAXD[ATA] n
```

Usage Notes

In SQL*Plus, the maximum row width is unlimited. Any values you set using SET MAXDATA are ignored by SQL*Plus.

SET SCAN

Purpose

Controls scanning for the presence of substitution variables and parameters. OFF suppresses processing of substitution variables and parameters; ON allows normal processing.

Syntax

```
SET SCAN {ON|OFF}
```

Usage Notes

ON functions in the same manner as SET DEFINE ON.

SET SPACE

Purpose

Sets the number of spaces between columns in output. The maximum value of *n* is 10.

Syntax

```
SET SPACE {1|n}
```

Usage Notes

The SET SPACE 0 and SET COLSEP " commands have the same effect. This command is obsoleted by SET COLSEP, but you can still use it for backward compatibility. You may prefer to use COLSEP because the SHOW command recognizes COLSEP and does not recognize SPACE.

SET TRUNCATE

Purpose

Controls whether SQL*Plus truncates or wraps a data item that is too long for the current line width.

Syntax

```
SET TRU[NCATE] {ON|OFF}
```

Usage Notes

ON functions in the same manner as SET WRAP OFF, and vice versa. You may prefer to use WRAP because the SHOW command recognizes WRAP and does not recognize TRUNCATE.

SHOW LABEL

Purpose

Shows the security level for the current session.

Syntax

```
SHO[W] LABEL
```

TTITLE (old form)

Purpose

Displays a title at the top of each report page.

Syntax

```
TTI[TLE] text
```

Usage Notes

The old form of TTITLE offers formatting features more limited than those of the new form, but provides compatibility with UFI (a predecessor of SQL*Plus). The old form defines the top title as a line with the date left-aligned and the page number right-aligned, followed by a line with centered text and then a blank line.

The *text* you enter defines the title TTITLE will display.

SQL*Plus centers text based on the size of a line as determined by SET LINESIZE. A separator character (|) begins a new line; two line separator characters in a row (| |) insert a blank line. You can change the line separator character with SET HEADSEP.

You can control the formatting of page numbers in the old forms of TTITLE and BTITLE by defining a variable named "_page". The default value of _page is the formatting string "page &P4". To alter the format, you can DEFINE _page with a new formatting string as follows:

```
SQL> SET ESCAPE / SQL> DEFINE _page = 'Page /&P2'
```

This formatting string will print the word "page" with an initial capital letter and format the page number to a width of two. You can substitute any text for "page" and any number for the width. You must set escape so that SQL*Plus does not interpret the ampersand (&) as a substitution variable. See the [ESCAPE](#) variable of the SET command in [Chapter 8](#) for more information on setting the escape character.

SQL*Plus interprets TTITLE in the old form if a valid new-form clause does not immediately follow the command name.

If you want to use CENTER with TTITLE and put more than one word on a line, you should use the new form of TTITLE. For more information see the [TTITLE](#) command in [Chapter 8](#).

Example

To use the old form of TTITLE to set a top title with a left-aligned date and right-aligned page number on one line followed by SALES DEPARTMENT on the next line and PERSONNEL REPORT on a third line, enter

```
SQL> TTITLE 'SALES DEPARTMENT|PERSONNEL REPORT'
```

Glossary

account

An authorized user of an operating system or a product (such as Oracle database server or Oracle Forms). Depending on the operating system, may be referred to as ID, User ID, login, and so on. Accounts are often created and controlled by a system administrator.

alias

In SQL, a temporary name assigned to a table, view, column, or value within a SQL statement, used to refer to that item later in the same statement or in associated SQL*Plus commands.

alignment

The way in which data is positioned in a field. It may be positioned to the left, right, center, flush/left, flush/right, or flush/center of the defined width of a field.

anonymous block

A PL/SQL program unit that has no name and does not require the explicit presence of the BEGIN and END keywords to enclose the executable statements.

archived redo log

Recovery structure where online redo log files are archived before being reused.

ARCHIVELOG

Redo log mode where the filled online redo log files are archived before they are reused in the cycle. In ARCHIVELOG mode, the database can be completely recovered from both instance and disk failure. The database can also be backed up while it is open and available for use. However, additional administrative

operations are required to maintain the archived redo log. See also [archived redo log](#).

argument

A data item following the command file name in a START command. The argument supplies a value for a parameter in the command file.

array processing

Processing performed on multiple rows of data rather than one row at a time. In some Oracle utilities such as SQL*Plus, Export/Import, and the precompilers, users can set the size of the array; increasing the array size often improves performance.

ASCII

A convention for using digital data to represent printable characters. ASCII is an acronym for American Standard Code for Information Interchange.

autocommit

A feature unique to SQL*Plus that enables SQL*Plus to automatically commit changes to the database after every successful execution of a SQL command or PL/SQL block. Setting the AUTOCOMMIT variable of the SET command to ON enables this feature. Setting the AUTOCOMMIT variable to *n* enables this feature after every *n* successful INSERT, UPDATE or DELETE commands or PL/SQL blocks.

background process

A non-interactive process that runs in an operating system environment and performs some service or action. Certain Oracle database server products use background processes for different tasks, such as performing and coordinating tasks on behalf of concurrent users of the database, processing and delivering electronic messages, and managing printing services.

bind reference

A reference to a parameter used to replace a single literal value (for example, a character string, number, or date) appearing anywhere in a PL/SQL construct or a SQL SELECT statement. For a bind reference, you must precede the parameter name with a colon (:).

bind variable

A variable in a SQL statement that must be replaced with a valid value, or the address of a value, in order for the statement to successfully execute.

bit

The smallest unit of data. A bit only has two possible values, 0 or 1. Bits can be combined into groups of eight called bytes; each byte represents a single character of data. See also [byte](#).

block

In PL/SQL, a group of SQL and PL/SQL commands related to each other through procedural logic.

body

A report region that contains the bulk of the report (text, graphics, data, and computations).

break

An event, such as a change in the value of an expression, that occurs while SQL*Plus processes a query or report. You can direct SQL*Plus to perform various operations, such as printing subtotals, whenever specified breaks occur.

break column

A column in a report that causes a break when its value changes and for which the user has defined break operations.

break group

A group containing one or more break columns.

break hierarchy

The order in which SQL*Plus checks for the occurrence of breaks and triggers the corresponding break operations.

break order

Indicates the order in which to display a break column's data. Valid options are Ascending and Descending.

break report

A report that divides rows of a table into "sets", based on a common value in the break column.

buffer

An area where the user's SQL statements or PL/SQL blocks are temporarily stored. The SQL buffer is the default buffer. You can edit or execute commands from multiple buffers; however, SQL*Plus does not require the use of multiple buffers.

byte

A group of eight sequential bits that represents a letter, number, or symbol (that is, a character). Treated as a unit of data by a computer.

CGI script

See [Common Gateway Interface](#).

CHAR datatype

An Oracle datatype provided for ANSI/ISO compatibility. A CHAR column is a fixed-length column and can contain any printable characters, such as A, 3, &, or blanks, and can have from 1 to 2000 characters or can be null.

character

A single location on a computer system capable of holding one alphabetic character or numeric digit. One or more characters are held in a field. One or more fields make up a record, and one or more records may be held in a file or database table.

character string

A group of sequential letters, numerals, or symbols, usually comprising a word or name, or portion thereof.

clause

A part of a SQL statement that does not constitute the full statement; for example, a "WHERE clause".

client

A user, software application, or computer that requests the services, data, or processing of another application or computer (the "server"). In a two-task environment, the client is the user process. In a network environment, the client is the local user process and the server may be local or remote.

CLOB datatype

A standard Oracle datatype. The CLOB datatype is used to store single-byte character large object data, and can store up to 4 gigabytes of character data.

column

A vertical space in a database table that represents a particular domain of data. A column has a column name and a specific datatype. For example, in a table of employee information, all of the employees' dates of hire would constitute one column. A record group column represents a database column.

column expression

An expression in a SELECT statement that defines which database column(s) are retrieved. It may be a column name or a valid SQL expression referencing a column name.

column heading

A heading created for each column appearing in a report.

command

An instruction to or request of a program, application, operating system, or other software, to perform a particular task. Commands may be single words or may require additional phrases, variously called arguments, options, parameters, and qualifiers. Unlike statements, commands execute as soon as you enter them. ACCEPT, CLEAR, and COPY are examples of commands in SQL*Plus.

fcommand file

A file containing a sequence of commands that you can otherwise enter interactively. The file is saved for convenience and re-execution. Command files are often called by operating-system specific names. In SQL*Plus, you can execute the command file with the START, @ or @@ commands.

command line

A line on a computer display on which typed in commands appear. An example of a command line is the area next to the DOS prompt on a personal computer. See also [prompt](#).

command prompt

The text, by default SQL>, with which SQL*Plus requests your next command.

comment

A language construct for the inclusion of explanatory text in a program, the execution of which remains unaffected.

commit

To make permanent changes to data (inserts, updates, deletes) in the database. Before changes are committed, both the old and new data exist so that changes can be stored or the data can be restored to its prior state.

Common Gateway Interface

The Common Gateway Interface (CGI) describes a part of a web server that allows user interaction, typically via a web browser, with programs running on the server. CGI scripts enable this user interaction to create dynamic web pages or web page elements, or to take user input and respond accordingly. A very common use is to provide an interactive form which a user completes online and then submits. Some common languages in use for CGI scripts are Perl, JavaScript and Java

computation

Used to perform runtime calculations on data fetched from the database. These calculations are a superset of the kinds of calculations that can be done directly with a SELECT statement. See also [formula column](#).

computed column

See [computation](#).

configuration

In Net8, the set of instructions for preparing network communications, as outlined in the Net8 documentation.

configuration files

Files that are used to identify and characterize the components of a network. Configuration is largely a process of naming network components and identifying relationships among those components.

connect

To identify yourself to Oracle by entering your username and password in order to gain access to the database. In SQL*Plus, the CONNECT command allows you to log off Oracle and then log back on with a specified username.

connect identifier

The set of parameters, including a protocol, that Net8 uses to connect to a specific Oracle instance on the network.

current line

In an editor, such as the SQL*Plus editor, the line in the current buffer that editing commands will currently affect.

database

A set of operating system files, treated as a unit, in which an Oracle database server stores a set of data dictionary tables and user tables. A database requires three types of files: database files, redo log files, and control files.

database administrator (DBA)

(1) A person responsible for the operation and maintenance of an Oracle database server or a database application. The database administrator monitors its use in order to customize it to meet the needs of the local community of users. (2) An Oracle username that has been given DBA privileges and can perform database administration functions. Usually the two meanings coincide. There may be more than one DBA per site.

database instance failure

Failure that occurs when a problem arises that prevents an Oracle database instance (SGA and background processes) from continuing to work. Instance failure may result from a hardware problem such as power outage, or a software problem, such as operating system crash. When an instance failure occurs, the data in the buffers of the SGA is not written to the datafiles.

database link

An object stored in the local database that identifies a remote database, a communication path to the remote database, and optionally, a username and password for it. Once defined, a database link can be used to perform queries on tables in the remote database. Also called *DBlink*. In SQL*Plus, you can reference a database link in a DESCRIBE or COPY command.

database object

Something created and stored in a database. Tables, views, synonyms, indexes, sequences, clusters, and columns are all examples of database objects.

database server

The computer which runs the ORACLE Server kernel and contains the database.

database specification

An alphanumeric code that identifies a database, used to specify the database in Net8 operations and to define a database link. In SQL*Plus, you can reference a database specification in a COPY, CONNECT, or SQLPLUS command.

database string

A string of Net8 parameters used to indicate the network prefix, the host system you want to connect to, and the system ID of the database on the host system.

Data Control Language (DCL)

The category of SQL statements that control access to the data and to the database. Examples are the GRANT and REVOKE statements. Occasionally DCL statements are grouped with DML statements.

Data Definition Language (DDL)

The category of SQL statements that define or delete database objects such as tables or views. Examples are the CREATE, ALTER, and DROP statements.

data dictionary

A comprehensive set of tables and views automatically created and updated by the Oracle database server, which contains administrative information about users, data storage, and privileges. It is installed when Oracle is initially installed and is a central source of information for the Oracle database server itself and for all users of Oracle. The tables are automatically maintained by Oracle. It is sometimes referred to as the *catalog*.

Data Manipulation Language (DML)

The category of SQL statements that query and update the database data. Common DML statements are SELECT, INSERT, UPDATE, and DELETE. Occasionally DCL statements are grouped with DML statements.

data security

The mechanisms that control the access and use of the database at the object level. For example, data security includes access to a specific schema object and the specific types of actions allowed for each user on the object (for example, user SCOTT can issue SELECT and INSERT statements but not DELETE statements using the EMP table). It also includes the actions, if any, that are audited for each schema object.

datatype

(1) A standard form of data. The Oracle datatypes are CHAR, NCHAR, VARCHAR2, NVARCHAR2, DATE, NUMBER, LONG, CLOB, NCLOB, RAW, and LONG RAW; however, the Oracle database server recognizes and converts other standard datatypes. (2) A named set of fixed attributes that can be associated with an item as a property. Data typing provides a way to define the behavior of data.

DATE datatype

A standard Oracle datatype used to store date and time data. Standard date format is DD-MMM-YY, as in 23-NOV-98. A DATE column may contain a date and time between January 1, 4712 BC to December 31, 9999 AD.

DBA

See [database administrator \(DBA\)](#).

DCL

See [Data Control Language \(DCL\)](#).

DDL

See [Data Definition Language \(DDL\)](#).

default

A clause or option value that SQL*Plus uses if you do not specify an alternative.

default database

See [local database](#).

directory

On some operating systems, a named storage space for a group of files. It is actually one file that lists a set of files on a particular device.

dismounted database

A database that is not mounted by any instance, and thus cannot be opened and is not currently available for use.

display format

See [format](#).

display width

The number of characters or spaces allowed to display the values for an output field.

DML

See [Data Manipulation Language \(DML\)](#).

DUAL table

A standard Oracle database table named DUAL, which contains exactly one row. The DUAL table is useful for applications that require a small "dummy" table (the data is irrelevant) to guarantee a known result, such as "true."

editor

A program that creates or modifies files.

end user

The person for whom a system is being developed; for example, an airline reservations clerk is an end user of an airline reservations system. See also [SQL*Plus](#).

error message

A message from a computer program (for example, SQL*Plus) informing you of a potential problem preventing program or command execution.

expression

A formula, such as SALARY + COMMISSION, used to calculate a new value from existing values. An expression can be made up of column names, functions, operators, and constants. Formulas are found in commands or SQL statements.

extension

On some operating systems, the second part of the full file specification. Several standard file extensions are used to indicate the type or purpose of the file, as in file extensions of SQL, LOG, LIS, EXE, BAT, and DIR. Called file type on some operating systems.

file

A collection of data treated as a unit, such as a list, document, index, note, set of procedures, and so on. Generally used to refer to data stored on magnetic tapes or disks. See also [filename](#), [extension](#), and [file type](#).

filename

The name component of a file specification. A filename is assigned by either the user or the system when the file itself is created. See also [extension](#) and [file type](#).

file type

On some operating systems, the part of the filename that usually denotes the use or purpose of the file. See [extension](#).

format

Columns contain information in one of four types; users can specify how they want a query to format information it retrieves from character, number, date, or long columns. For example, they can choose to have information of type date appear as 23/11/98, or Monday Twenty-third November 1998, or any other valid date format.

format model

A clause element that controls the appearance of a value in a report column. You specify predefined format models in the COLUMN, TTITLE, and BTITLE commands' FORMAT clauses. You can also use format models for DATE columns in SQL date conversion functions, such as TO_DATE.

form feed

A control character that, when executed, causes the printer to skip to the top of a new sheet of paper (top of form). When SQL*Plus displays a form feed on most terminals, the form feed clears the screen.

formula column

Manually-created column that gets its data from a PL/SQL procedure, function, or expression, user exit, SQL statement, or any combination of these.

function

A PL/SQL subprogram that executes an operation and returns a value at the completion of the operation. A function can be either built-in or user-named. Contrast with [procedure](#).

heading

In SQL*Plus, text that names an output column, appearing above the column. See also [column heading](#).

host computer

The computer from which you run SQL*Plus.

HTML

HTML (Hyper Text Markup Language) is the language used to write most of the documents available on the World Wide Web. It provides display and linking specifications that are recognized by most web browsers. The HTML recommendation is sponsored by the World Wide Web Consortium (w3c) and further details about the w3c and the HTML recommendation can be found at the w3c web site: <http://www.w3c.org>.

instance

The background processes and memory area required to access an Oracle database. A database system requires one instance and one database. An Oracle database server consists of an SGA and a set of Oracle database server system processes.

instance failure

See [database instance failure](#).

instance recovery

Recovery of an instance in the event of software or hardware failure, so that the database is again available to users. If the instance terminates abnormally, then the instance recovery automatically occurs at the next instance startup.

Julian date

An algorithm for expressing a date in integer form, using the SQL function JDATE. Julian dates allow additional arithmetic functions to be performed on dates.

justification

See [alignment](#).

label

Defines the label to be printed for the computed value in the COMPUTE command. The maximum length of a COMPUTE label is 500 characters.

LGWR

See [Log Writer \(LGWR\)](#).

local database

The database that SQL*Plus connects to when you start SQL*Plus, ordinarily a database on your host computer. Also called a default database. See also [remote database](#).

log in (or log on)

To perform a sequence of actions at a terminal that establishes a user's communication with the operating system and sets up default characteristics for the user's terminal session.

log off (or log out)

To terminate interactive communication with the operating system, and end a terminal session.

Log Writer (LGWR)

A background process used by an Oracle instance. LGWR writes redo log entries to disk. Redo log data is generated in the redo log buffer of the system global area. As transactions commit and the log buffer fills, LGWR writes redo log entries into an online redo log file.

logon string

A user-specified command line, used to run an application that is connected to either a local or remote database. The logon string either explicitly includes a connect identifier or implicitly uses a default connect identifier.

LONG datatype

One of the standard Oracle datatypes. A LONG column can contain any printable characters such as A, 3, &, or a blank, and can have any length from 0 to 2 gigabytes.

MARKUP

Refers to the SET MARKUP clause or the SQLPLUS -MARKUP clause that permits SQL*Plus output to be generated in HTML format for delivery on the Internet. SQL*Plus output generated in HTML can be viewed with any web browser supporting HTML 3.2.

mounted database

A database associated with an Oracle instance. The database may be opened or closed. A database must be both mounted and opened to be accessed by users. A database that has been mounted but not opened can be accessed by DBAs for some maintenance purposes.

multi-threaded server

Allows many user processes to share a small number of server processes, minimizing the number of server processes and maximizing the utilization of available system resources.

NCHAR datatype

A standard Oracle datatype. The NCHAR datatype specifies a fixed-width national character set character string, and can have a maximum column size up to 2000 bytes.

NCLOB datatype

A standard Oracle datatype. The NCLOB datatype is used to store fixed-width national character set character (NCHAR) data, and can store up to 4 gigabytes of character text data.

Net8

Oracle's remote data access software that enables both client-server and server-server communications across any network. Net8 supports distributed processing and distributed database capability. Net8 runs over and interconnects many communications protocols. Net8 is backward compatible with SQL*Net version 2.

network

A group of two or more computers linked together through hardware and software to allow the sharing of data and/or peripherals.

null

A value that means, "a value is not applicable" or "the value is unknown". Nulls are not equal to any specific value, even to each other. Comparisons with nulls are always false.

NULL value

The absence of a value.

NUMBER datatype

A standard Oracle datatype. A NUMBER column can contain a number, with or without a decimal point and a sign, and can have from 1 to 105 decimal digits (only 38 digits are significant).

NVARCHAR2 datatype

A standard Oracle datatype. The NVARCHAR2 datatype specifies a variable-length NCHAR string. NVARCHAR2 width specifications refer to the number of characters if the national character set is fixed-width, and to the number of bytes if the national character set is varying-width. The maximum column size allowed is 4000 bytes.

object

An object is an instance of an object type. In Oracle8, objects can be persistent (i.e. stored in the database) or transient (i.e. PL/SQL or Oracle Call Interface™ (OCI) variables). See also [object type](#).

object-relational model

A database model that combines the key aspects of the relational and object data models into a single system. Oracle8 is an object-relational database system.

object type

A user-defined type that models a structure and behavior of an object. Equivalent to the concept of a class in different programming languages. In Oracle8, object types have public interfaces with attributes and methods. Object types are also known as abstract data types.

online redo log

(1) Redo log files that have not been archived, but are either available to the instance for recording database activity or are filled and waiting to be archived or reused. (2) A set of two or more online redo log files that record all committed changes made to the database.

open database

A database that has been mounted and opened by an instance and is available for access by users. If a database is open, users can access the information it contains. See also [mounted database](#).

operating system

The system software that manages a computer's resources, performing basic tasks such as allocating memory and allowing computer components to communicate.

Oracle Server

The relational database management system (RDBMS) sold by Oracle Corporation. Components of Oracle Server include the kernel and various utilities for use by DBAs and database users.

output

Results of a report after it is run. Output can be displayed on a screen, stored in a file, or printed on paper.

output file

File to which the computer transfers data.

packages

A method of encapsulating and storing related procedures, functions, and other package constructs together as a unit in the database. While packages provide the database administrator or application developer organizational benefits, they also offer increased functionality and database performance.

page

A screen of displayed data or a sheet of printed data in a report.

parallel server

Some hardware architectures (for example, loosely coupled processors) allow multiple computers to share access to data, software, or peripheral devices. With systems that have the parallel server option, Oracle can take advantage of such hardware platforms by running multiple database instances that share a single physical database. In appropriate applications, the Oracle Parallel Server allows access to a single database by the users on multiple machines with increased database performance.

parameter

A substitution variable consisting of an ampersand followed by a numeral (&1, &2, and so on.). You use parameters in a command file and pass values into them through the arguments of the START command.

parameter file

A file used by Oracle 8i Server to provide specific values and configuration settings to be used on database startup. For more information about the function of the parameter file, see the *Oracle8i Administrator's Guide*.

password

A secondary identification word (or string of alphanumeric characters) associated with a username. A password is used for data security and known only to its owner. Passwords are entered in conjunction with an operating system login ID, Oracle username, or account name in order to connect to an operating system or software application (such as the Oracle database). Whereas the username or ID is public, the secret password ensures that only the owner of the username can use that name, or access that data.

PL/SQL

The 3GL Oracle procedural language extension of SQL. PL/SQL combines the ease and flexibility of SQL with the procedural functionality of a structured programming language, such as IF...THEN, WHILE, and LOOP. Even when PL/SQL is not stored in the database, applications can send blocks of PL/SQL to the database rather than individual SQL statements, thereby reducing network traffic.

PL/SQL is interpreted and parsed at runtime, it does not need to be compiled.

procedure

A set of SQL and PL/SQL statements grouped together as an executable unit to perform a very specific task. Procedures and functions are nearly identical; the only difference between the two is that functions always return a single value to the caller, while procedures do not return a value to the caller.

process

(1) A thread of control in an operating system; that is, a mechanism in an operating system that can execute a series of steps. Some operating systems use the terms job or task. A process normally has its own private memory area in which it runs.

prompt

(1) A message from a computer program that instructs you to enter data or take some other action. (2) Word(s) used by the system as a cue to assist a user's response. Such messages generally ask the user to respond by typing some information in the adjacent field. See also [command line](#).

query

A SQL SELECT statement that retrieves data, in any combination, expression, or order. Queries are read-only operations; they do not change any data, they only retrieve data. Queries are often considered to be DML statements.

query results

The data retrieved by a query.

RAW datatype

A standard Oracle datatype, a RAW data column may contain data in any form, including binary. You can use RAW columns for storing binary (non-character) data.

RDBMS (Relational Database Management System)

An Oracle7 (and earlier) term. Refers to the software used to create and maintain the system, as well as the actual data stored in the database. See also [Relational Database Management System \(RDBMS\)](#), [Server](#) and [Oracle Server](#).

record

A synonym for row; one row of data in a database table, having values for one or more columns.

recover

The Oracle process of restoring all or part of a database from specified redo log files.

redo log

A sequential log of all changes made to the data. The redo log is written and used in the event of a failure that prevents changes from being written to disk. The redo log consists of two or more redo log files.

redo log file

A file containing records of all changes made to the database. These files are used for recovery purposes. See also [redo log](#).

Relational Database Management System (RDBMS)

An Oracle7 (and earlier) term. A computer program designed to store and retrieve shared data. In a relational system, data is stored in tables consisting of one or more rows, each containing the same set of columns. Oracle is a relational database management system. Other types of database systems are called hierarchical or network database systems.

remark

In SQL*Plus, a comment you can insert into a command file with the REMARK command.

remote computer

A computer on a network other than the local computer.

remote database

A database other than your default database, which may reside on a remote computer; in particular, one that you reference in the CONNECT, COPY, and SQLPLUS commands.

report

(1) The results of a query. (2) Any output, but especially output that has been formatted for quick reading, in particular, output from SQL*Plus.

reserved word

(1) A word that has a special meaning in a particular software or operating system. (2) In SQL, a set of words reserved for use in SQL statements; you cannot use a reserved word as the name of a database object.

roles

Named groups of related privileges that are granted to users or other roles.

rollback

To discard pending changes made to the data in the current transaction using the SQL ROLLBACK command. You can roll back a portion of a transaction by identifying a savepoint.

row

(1) Synonym for record; one row of data in a database table, having values for one or more columns. Also called tuple. (2) One set of field values in the output of a query. See also [column](#).

schema

A collection of logical structures of data, or schema objects. A schema is owned by a database user and has the same name as that user.

security level

The combination of a hierarchical classification and a set of non-hierarchical compartments that represent the sensitivity of information.

select

To fetch rows from one or more database tables using a query (the SQL statement SELECT).

SELECT list

The list of items that follow the keyword SELECT in a query. These items may include column names, SQL functions, constants, pseudo-columns, calculations on columns, and aliases. The number of columns in the result of the query will match the number of items in the SELECT list.

SELECT statement

A SQL statement that specifies which rows and columns to fetch from one or more tables or views. See also [SQL statement](#).

Server

Oracle software that handles the functions required for concurrent, shared data access to an Oracle database. The server portion receives and processes SQL and PL/SQL statements originating from client applications. The computer that manages the server portion must be optimized for its duties.

session

The time after a username connects to an Oracle database and before disconnecting, and the events that happen in that time.

SET command variable

See [system variable](#).

SGA

See also [System Global Area \(SGA\)](#).

spooling

Sending or saving output to a disk storage area. Often used in order to print or transfer files. The SQL*Plus SPOOL command controls spooling.

SQL (Structured Query Language)

The internationally accepted standard for relational systems, covering not only query but also data definition, manipulation, security and some aspects of referential integrity. See also [Data Manipulation Language \(DML\)](#), [Data Definition Language \(DDL\)](#), and [Data Control Language \(DCL\)](#).

SQL buffer

The default buffer containing your most recently entered SQL command or PL/SQL block. SQL*Plus commands are not stored in the SQL buffer.

SQL command

See [SQL statement](#).

SQL script

A file containing SQL statements that you can run in SQL*Plus to perform database administration quickly and easily.

SQL statement

A complete command or statement written in the SQL language. Synonymous with statement (SQL).

SQL*Loader

An Oracle tool used to load data from operating system files into Oracle database tables.

SQL*Net

Net8's precursor. An Oracle product that works with the Oracle Server and enables two or more computers that run the Oracle RDBMS or Oracle tools such as SQL*Forms to exchange data through a network. SQL*Net supports distributed processing and distributed database capability. SQL*Net runs over and interconnects many communications protocols.

SQL*Plus

An interactive SQL-based language for data manipulation, data definition and the definition of access rights for an Oracle database. Often used as an end-user reporting tool.

statement (SQL)

A SQL statement, and analogous to a complete sentence, as opposed to a phrase. Portions of SQL statements or commands are called expressions, predicates, or clauses. See also [SQL statement](#).

string

Any sequence of words or characters on a line.

substitution variable

In SQL*Plus, a variable name or numeral preceded by one or two ampersands (&). Substitution variables are used in a command file to represent values to be provided when the command file is run.

subtotal

In a report, a total of values in a number column, taken over a group of rows that have the same value in a break field. See also [summary](#).

summary

Summaries, or summary columns, are used to compute subtotals, grand totals, running totals, and other summarizations of the data in a report.

summary line

A line in a report containing totals, averages, maximums, or other computed values. You create summary lines through the BREAK and COMPUTE commands.

syntax

The orderly system by which commands, qualifiers, and parameters are combined to form valid command strings.

SYS username

See also [SYSTEM username](#).

SYSDBA

Privilege that contains all system privileges with the ADMIN OPTION and the SYSOPER system privilege. See also [SYSOPER](#).

SYSOPER

Privilege that allows a DBA to perform operations such as STARTUP, SHUTDOWN, ARCHIVE LOG and RECOVER. See also [SYSDBA](#).

system administrator

A person responsible for operation and maintenance of the operating system of a computer.

system editor

The text editor provided by the operating system.

System Global Area (SGA)

A shared storage area that contains information required by user processes and background processes, such as data and control information for one Oracle instance.

The SGA is allocated when an Oracle instance is started, and is deallocated when the instance shuts down.

SYSTEM username

One of two standard DBA usernames automatically created with each database (the other is SYS). The Oracle user SYSTEM is created with the password MANAGER. The SYSTEM username is the preferred username for DBAs to use when performing database maintenance.

system variable

A variable that indicates status or environment, which is given a default value by Oracle or SQL*Plus. Examples are LINESIZE and PAGESIZE. Use the SQL*Plus commands SHOW and SET to see and alter the value of system variables.

table

The basic unit of storage in a relational database management system. A table represents entities and relationships, and consists of one or more units of information (rows), each of which contains the same kinds of values (columns). Each column is given a column name, a datatype (such as CHAR, NCHAR, VARCHAR2, NVARCHAR2, DATE, or NUMBER), and a width (the width may be predetermined by the datatype, as in DATE). Once a table is created, valid rows of data can be inserted into it. Table information can then be queried, deleted, or updated. To enforce defined business rules on a table's data, integrity constraints and triggers can also be defined for a table.

table alias

A temporary substitute name for a table, defined in a query and only good during that query. If used, an alias is set in the FROM clause of a SELECT statement and may appear in the SELECT list. See also [alias](#).

text editor

A program run under your host computer's operating system that you use to create and edit host system files and SQL*Plus command files containing SQL commands, SQL*Plus commands, and/or PL/SQL blocks.

timer

An internal storage area created by the TIMING command.

title

One or more lines that appears at the top or bottom of each report page. You establish and format titles through the TTITLE and BTITLE commands.

transaction

A logical unit of work that comprises one or more SQL statements executed by a single user. According to the ANSI/ISO SQL standard, with which Oracle is compatible, a transaction begins with the user's first executable SQL statement. A transaction ends when it is explicitly committed or rolled back by the user.

truncate

To discard or lose one or more characters from the beginning or end of a value, whether intentionally or unintentionally.

type

A column contains information in one of four types: character, date, number or long. The operations users can perform on the contents of a column depend on the type of information it contains. See also [format](#).

USERID

A command line argument that allows you to specify your Oracle username and password with an optional Net8 address.

username

The name by which a user is known to the Oracle database server and to other users. Every username is associated with a private password, and both must be entered to connect to an Oracle database. See also [account](#).

user variable

A variable defined and set by you explicitly with the DEFINE command or implicitly with an argument to the START command.

VARCHAR

An Oracle Corporation datatype. Specifically, this datatype functions identically to the Oracle VARCHAR2 datatype (see definition below). However, Oracle Corporation recommends that you use VARCHAR2 instead of VARCHAR because Oracle Corporation may change the functionality of VARCHAR in the future.

VARCHAR2

An Oracle Corporation datatype. Specifically, it is a variable-length, alpha-numeric string with a maximum length of 4000 characters. If data entered for a column of type VARCHAR2 is less than 4000 no spaces will be padded; the data is stored with a length as entered. If data entered is more than 4000, an error occurs.

variable

A named object that holds a single value. SQL*Plus uses bind substitution, system, and user variables.

width

The width of a column, parameter, or layout object. Width is measured in characters; a space is a character.

wrapping

A reporting or output feature in which a portion of text is moved to a new line when the entire text does not fit on one line.

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