Oracle® SQL Developer for VS Code



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ORACLE

Oracle SQL Developer for VS Code, Release 24.1

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Preface

This guide provides usage information about Oracle SQL Developer for VS Code.

Audience

This guide is intended for those using the Oracle SQL Developer extension in Visual Studio Code.

Conventions

The following text conventions are used in this document:

Convention	Meaning
boldface	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
italic	Italic type indicates book titles, emphasis, or placeholder variables for which you supply particular values.
monospace	Monospace type indicates commands within a paragraph, URLs, code in examples, text that appears on the screen, or text that you enter.

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1 Changes in Release 24.1 for SQL Developer for VS Code

The new features in this release are:

- Open multiple sessions in SQL Worksheet.
 See Connection Management
- Sort and Search options available in SQL History.
 See SQL History
- A new diagram view for Explain Plan.
 See Explain Plan
- Enabling filters for schema or object types.
 See Using Filters



2 Getting Started

Oracle SQL Developer for VS code is a new, more powerful version of Oracle SQL Developer desktop that is now freely available as an extension in Visual Studio Code. In the first release, you can browse, edit, and delete objects, run SQL statements and scripts, edit and run PL/SQL code, and manipulate and export data.

You can connect to any target Oracle Database schema using standard Oracle Database authentication. Once connected, you can perform operations on objects in the database.

Topics:

- Installing Oracle SQL Developer for VS Code
- Connecting to Your Database

2.1 Installing Oracle SQL Developer for VS Code

Oracle SQL Developer for VS code is available for all major platforms.

Perform the following steps to install Oracle SQL Developer for VS Code:

Note:

After installing it the first time, the SQL Developer extension for VS Code is automatically updated as new versions become available.

- Click the Extensions icon in the Activity Bar on the left side or use the View: Extensions command (Ctrl+Shift+X).
- 2. In the Extensions pane, in the Search field, enter SQL Developer.

SQL Developer appears as one of the search results.

3. In the result entry, click Install.

SQL Developer appears in the left pane under INSTALLED along with a SQL Developer icon in the left side bar.

 Click the icon to open SQL Developer. In the left pane, Connections and SQL Snippets appear.



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	> CONNECTIONS	
\mathcal{Q}	> SQL SNIPPETS	
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	SQL Developer	
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2.1.1 File Permissions for User Accounts in Windows Domain

If there are both local and domain accounts for a user in Windows, the directory is assigned to the local account, creating inaccessible secure storage for the domain account. That is, a DBTools directory owned by the local user is created in the domain user's AppData\Roaming location.

To resolve this issue:

- 1. Uninstall SQL Developer for VS Code release 23.4.0.
- 2. Remove the DBTools directory.

As the domain user, if you try to open <domain-user>/AppData/Roaming/DBTools, you will get an error message.

\rightarrow \uparrow ×	□ > ···· Local Disk (C:)	> Users >	> AppData > Roam	ing >	Search Roaming
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 im2 invm ivscode AppData Local LocalLow Roaming 	Name Adob Code DBTo Micro npm-	ols osoft DBTools -cach You don't ct access this f			Size
> 📩 Adobe > 🛅 Code		folder.	to permanently get access to this		

To resolve this, do one of the following:



- If you are also an administrator, you are prompted for access, then you can delete the directory before installing a new version.
- If you are not an administrator, contact an administrator who can help to delete the directory.
- If you know both local and domain passwords, provide local account access to your domain user directory.

Properties X	Pictures	
General Sharing Security Previous Versions Customize	Permissions for X	Select Users or Groups
Object name: C:\Users'	Security	Select this object type:
Group or user names:	Object name: C:\Users\	Users, Groups, or Built-In security principals Object Types.
E S-1-15-3-65536-3852923496-3228631905-2361761901-132		From this location:
SYSTEM	Group or user names:	PHOENIX431439 Locations
Administrators (PHOENIX431439\Administrators)	S-1-15-3-65536-3852923496-3228631905-2361761901-132 SYSTEM	Enter the object names to select (examples):
	4	PHOENIX431439\ Check Names
To change permissions, click Edit. Edit	Administrators (PHOENIX431439\Administrators)	
Permissions for S-1-15-3-65536-3852923496-322 Allow Deny	5, 1	
Full control	Add Remove	Advanced OK Cancel
Modify	Permissions for	
Read & execute	S-1-15-3-65536-3852923496-322 Allow Deny	
Deat		
Write	Home O	
click Advanced.		
	Apply	

Ignore any errors as the focus is on the path to AppData\Roaming\DBTools. Permissions are as shown in the following figure:

eneral Sharing Security Previous Versions Customize	General Sharing Security Previous Versions Customize
Dbject name: C:\Users\	Object name: C:\Users\ \AppData\Roaming\DBToo
Group or user names:	Group or user names:
S-1-15-3-65536-3852923496-3228631905-2361761901-13	local (PHOENIX431439\)
SYSTEM	
local (PHOENIX431439)	
Fo change permissions, click Edit.	To change permissions, click Edit.
Luk	To change permissions, click Edit.
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Full control	
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Modify Read & execute	Modify V Read & execute V
Modfy Read & execute ✓ List folder contents ✓	
Modify Read & execute List folder contents Read	Read & execute
Modify Read & execute ✓ List folder contents ✓	Read & execute List folder contents
Modify Read & execute List folder contents Read	Read & execute

Log in as local user and navigate to <domain <code>user>\AppData\Roaming</code>, and then delete DBTools.

Log in as domain user and remove local account access to the domain account home directory.



eneral Sharing Security Previous Versions Customize	Security	
Object name: C:\Users\	Object name: C:\Users\	
Group or user names:	Group or user names:	
S-1-15-3-65536-3852923496-3228631905-2361761901-13 SYSTEM	E S-1-15-3-65536-385292349 SYSTEM	
local (PHOENIX431439)	local (PHOENIX4314	39\)
	Administrators (PHOENIX43	1439\Administrators)
To change permissions, click Edit. Edit	Administrators (PHOENIX43	1439\Administrators)
	Administrators (PHOENIX43	Add Remove
Permissions for local Allow Deny Full control	Permissions for local	
Permissions for local Allow Deny Full control Modify		Add Remove
Permissions for local Allow Deny Full control Modify Read & execute	Permissions for local Full control Modify	Add Remove
Permissions for local Allow Deny Full control Modify	Permissions for tocal Full control Modify Read & execute	Add Remove
Permissions for local Allow Deny Full control Modify Read & execute List folder contents	Permissions for local Full control Modify	Add Remove

3. Install SQL Developer for VS Code release 23.4.1.

2.2 Connecting to Your Database

A connection is a SQL Developer object that specifies the necessary information for connecting to a specific database as a specific user of that database. You must have at least one database connection (existing or created) to use SQL Developer for VS Code.

You can connect to any target Oracle database schema using standard Oracle database authentication. Once connected, you can perform operations on objects in the database.

The actions that you can perform for connections are:

- Add: To create a new connection. Click the Add icon next to Connections, enter the connection information and click Connect. For more information, see Creating a Connection.
- Edit: To edit an existing connection. In the Connections panel, right-click the connection name and select Edit. Change any connection information except the connection name, and click Save or Connect.
- **Clone**: To create a new connection when one or more connections already exist. In the Connections panel, select an existing connection, right-click and click **Clone**. Change the Connection name to the desired name, edit other connection information as needed, and click **Save** or **Connect** to create the new connection.
- Refresh: To update the connection to include any changes that were made. Click the Refresh icon next to the connection name to refresh the connection.
- Open SQL Worksheet: To open a SQL Worksheet pane for the connection. Right-click the connection name, and select Open SQL Worksheet. See Using the SQL Worksheet
- Open SQLcI: To start the SQLcI command line in the Terminal tab for the opened database connection. Right-click the connection name, and select Open SQLcI.
- Reconnect: To reconnect to a connection where the session has been terminated. Rightclick the name in the Connections panel, and select Reconnect.
- **Disconnect**: To disconnect from the current connection. Right-click the name in the Connections panel, and select **Disconnect**.



 Delete: To delete a connection (that is, delete it from SQL Developer, not merely disconnect from the current connection), right-click the connection name in the Connections panel display and select Delete. Deleting a connection does not delete the user associated with that connection.

2.2.1 Creating a Connection

Perform the following steps to create a new connection:

1. In the Connections panel, click the Add icon.

The Create Connection pane appears.

SQL DEVELOPER	New Connection: HR ×		Ш					
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> 🗍 Test Connection Database	User Info Proxy User							
	Authentication Type	Role						
	Default ~	Default	~					
	Username	Password						
	hr							
	Save Password							
	Connection Type							
	Basic		~					
	Details Advanced							
	Hostname	Port						
	localhost	1521						
	Туре	Service Name						
	Service Name 🗸 🗸 🗸 🗸 🗸	eg. XEPDB1						
	Cancel Test	Connect Sav						
> SQL SNIPPETS			R					

2. Enter the fields as follows:

Connection Name: An alias for a connection to the database using the information that you enter. (The connection name is not stored in the database, and the connection is not a database object.) Suggestion: Include the database name (SID) and user name in the connection name. Example: personnel_joe for connecting to the personnel database as user Joe.

User Info Tab

- **Role**: The set of privileges to be associated with the connection. For a user that has been granted the SYSDBA system privilege, you can specify a connection that includes the privilege.
- **Username**: Name of the database user for the connection. This user must have sufficient privileges to perform the tasks that you want to perform while connected to the database, such as creating, editing, and deleting tables, views, and other objects.
- Password: Password associated with the specified database user.
- **Save Password**: If this option is checked, the password is saved with the connection information, and you will not be prompted for the password on subsequent attempts to connect using this connection.
- **Connection Type**: Select Basic, TNS, Cloud Wallet, or Custom JDBC URL. The display of fields changes to reflect any change in connection type. For any Oracle

connection type, there is an **Advanced** tab that you can use to set custom JDBC properties.

- Basic Connection Type
 - * **Hostname**: Host system for the Oracle database.
 - * **Port**: Listener port.
 - * **Type**: Database name.
 - * **Service Name**: Network service name of the database (for a remote database connection over a secure connection).
- TNS Connection Type
 - * Network Alias: Oracle Net alias for the database.
 - * **TNS File Location**: Displays the directory where your TNSNAMES.ORA file is located. Click the **Edit in Settings** link to add or change the location.
 - * Connect Identifier: Oracle Net connect identifier.
- Cloud Wallet Connection Type

This connection type is relevant for Oracle Cloud connections that use Oracle Wallet.

- **Configuration File**: Client credentials zip file downloaded from the Cloud service console.
- * **Service**: Service name in the client credentials file. This field is automatically prefilled after the client credential file is selected.
- * **Proxy** tab: Cloud Wallet connections support a custom proxy.
- Custom JDBC Connection Type
 - * **Custom JDBC URL**: URL for connecting directly from Java to the database, it overrides any other connection type specification. If you are using TNS or a naming service with the OCI driver, you must specify this information: Example:

jdbc:oracle:thin:scott/@localhost:1521:orcl

Note that in this example, the "/" is required, and the user will be prompted to enter the password.

- 3. Click Test to test the database connection before opening it.
- 4. Click Save to save the connection details, or click Connect to open the connection.



3 Using SQL Developer for VS Code

This chapter covers the following topics:

Topics:

- Working with Database Objects
- Using Filters
- Entering and Modifying Data
- Using the SQL Worksheet
- Running Functions and Procedures
- Using Preferences

3.1 Working with Database Objects

The SQL Developer for VS code interface uses the left side for navigation to find and select objects, and the right side to display information about selected objects.

In the Connections panel, you can browse, edit and delete objects.

To search for an object within an object type, for example, a specific table, click **Tables** and type the name of the object. Even as you type, objects matching the letters entered are highlighted.

Click a database object to open it in the right panel. A tabular display of the object's properties are displayed. In the following figure, click the SQL tab to see the corresponding SQL source code for the COUNTRIES table.

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> Fag Queues > 國 Queues Table > 중 Triggers > 립 Types	s	15 16 17 18 19	COMMENT COMMENT	ON COLUMN ON COLUMN	"HR"."CO "HR"."CO	UNTRIES"." UNTRIES"."	COUNTRY_N REGION_ID	AME" IS 'C " IS 'Regi	mary key of co ountry name'; on ID for the ontains 25 row	country.	Foreign k		

The object types available are:



- Tables
- Views
- Indexes
- Functions
- Procedures
- Packages
- Triggers
- Types
- Sequences
- Synonyms (Public and Private)
- Other Users

3.1.1 Tables

You can perform the following operations on a table by right-clicking the table name in the Connections navigator and selecting an item from the menu:

- **Open**: Opens the table in the right panel.
- **Table**: Table actions include Rename, Copy (create a copy using a different name), Drop (delete the table), Truncate (delete existing data without affecting the table definition), Lock (set the table lock mode: row share, exclusive, and so on), Comment (descriptive comment explaining the use or purpose of the table), Parallel (change the default degree of parallelism for queries and DML on the table), No Parallel (specify serial execution), Count Rows (return the number of rows), and Generate Table API (generate statements for a PL/SQL procedure to perform operations on the table).
- **Column**: Column actions include Comment (descriptive comment about a column), Add, Drop, Rename and Normalize.
- Index: Options include Create (create an index on specified columns), Create Text (create an Oracle Text index on a column), Create Text (create a function-based index on a column), and Drop.
- **Constraint**: Options include Enable or Disable Single, Drop (delete a constraint), Add Check (add a check constraint), Add Foreign Key, and Add Unique.
- **Statistics**: Options include Gather Statistics (compute exact table and column statistics and store them in the data dictionary) and Validate Structure (verifies the integrity of each data block and row, and for an index-organized table also generates the optimal prefix compression count for the primary key index on the table). Statistics are used by the Oracle Database optimizer to choose the execution plan for SQL statements that access analyzed objects.
- **Storage**: Options include Shrink Table (shrink space in a table, for segments in tablespaces with automatic segment management) and Move Table (to another tablespace). The Shrink Table options include Compact (only defragments the segment space and compacts the table rows for subsequent release, but does not readjust the high water mark and does not release the space immediately) and Cascade (performs the same operations on all dependent objects of the table, including secondary indexes on index-organized tables).

 Trigger: Options include Create, Create PK from Sequence (create a before-insert trigger to populate the primary key using values from a specified sequence), Enable or Disable All, Enable or Disable Single, and Drop (delete the trigger).

You can perform the following operations on a column in a table by right-clicking the column name in the Connections navigator and selecting an item from the menu:

- Rename: Renames the column.
- **Drop**: Deletes the column (including all data in that column) from the table.
- **Comment**: Adds a descriptive comment about the column.
- **Encrypt** (for Oracle Database Release 10.2 and higher, and only if the Transparent Data Encryption feature is enabled for the database): Displays a dialog box in which you specify a supported encryption algorithm to be used for encrypting all data in the column. Current data and subsequently inserted data are encrypted.
- **Decrypt** (for Oracle Database Release 10.2 and higher, and only if the Transparent Data Encryption feature is enabled for the database): Decrypts data in the column that had been encrypted, and causes data that is subsequently inserted not to be encrypted.
- **Normalize**: Creates a new table using the distinct values in the specified column. You must specify names for the new table and its primary key column, as well as a sequence name and trigger name.

3.1.2 Views

You can perform the following operations on a view by right-clicking the view name in the Connections panel and selecting an item from the menu:

- **Open**: Opens the view in the right pane.
- Rename: Renames the view.
- **Drop**: Deletes the view.
- **Compile**: Recompiles the view, to enable you to locate possible errors before runtime. You may want to recompile a view after altering one of its base tables to ensure that the change does not affect the view or other objects that depend on it.

To create a view:

- 1. Right-click the Views node and select Create (simple).
- 2. Enter View Name and SQL Query.
- 3. Click Apply.

3.1.3 Indexes

You can perform the following operations on an index by right-clicking the index name in the Connections navigator and selecting an item from the menu:

- **Open**: Opens the index in the right pane.
- **Drop**: Deletes the index.
- **Rebuild**: Recreates the index or one of its partitions or subpartitions. If the index is unusable, a successful rebuild operation makes the index usable. For a function-based index, rebuilding also enables the index; however, if the function on which the index is based does not exist, the rebuild operation fails.



- **Rename**: Changes the name of the index.
- **Make Unusable**: Prevents the index from being used by Oracle in executing queries. An unusable index must be rebuilt, or dropped and re-created, before it can be used again.
- Coalesce: Merges the contents of index blocks, where possible, to free blocks for reuse.
- Compute Statistics: For a function-based index, collects statistics on both the index and its base table using the DBMS_STATS package. Such statistics will enable Oracle Database to correctly decide when to use the index.
- **Rebuild Index Partition**: Rebuilds a specified index partition.
- Drop Index Partition: Drops (deletes) a specified index partition.

3.1.4 Functions

You can perform the following operations on a function by right-clicking the function name in the Connections navigator and selecting an item from the menu:

- **Open**: Opens the function in the right pane.
- Drop: Deletes the function.
- Grant: Enables you to grant available privileges on the function to selected users.
- **Revoke**: Enables you to revoke available privileges on the function from selected users.

3.1.5 Packages

You can perform the following operations on a package by right-clicking the package name in the Connections navigator and selecting an item from the menu:

- **Open**: Opens the package in the right pane.
- Run: Lets you select a member in the package and run it.
- **Drop Package**: Deletes the package.

3.1.6 Procedures

You can perform the following operations on a procedure by right-clicking the procedure name in the Connections navigator and selecting an item from the menu:

- **Open**: Displays the procedure text so that you can view and edit it.
- Run: Displays the PL/SQL dialog box, and then executes the procedure.
- **Drop**: Deletes the procedure.

3.1.7 Triggers

Triggers are stored PL/SQL blocks associated with a table, a schema, or the database, or anonymous PL/SQL blocks or calls to a procedure implemented in PL/SQL or Java. Oracle Database automatically executes a trigger when specified conditions occur.

See Oracle Database 2 Day Developer's Guide



3.1.8 Types

A data type associates a fixed set of properties with the values that can be used in a column of a table or in an argument of a function or procedure. These properties cause Oracle Database to treat values of one data type differently from values of another data type. Most data types are supplied by Oracle, although users can create data types.

See Oracle Database Concepts

3.1.9 Sequences

Sequences are used to generate unique integers. You can use sequences to automatically generate primary key values.

See Oracle Database 2 Day Developer's Guide

3.1.10 Synonyms (Public and Private)

Synonyms provide alternative names for tables, views, sequences, procedures, stored functions, packages, materialized views, Java class database objects, user-defined object types, or other synonyms. The Connections navigator has a Synonyms node for all synonyms (public and private) owned by the user associated with the specified connection, and a Public Synonyms node for all public synonyms on the database associated with the connection.

See Oracle Database 2 Day Developer's Guide

3.1.11 Other Users

Database users are accounts through which you can log in to the database. In the Connections navigator, you can see the Other Users in the database associated with a connection, but the objects that you are allowed to see for each user are determined by the privileges of the database user associated with the current database connection.

3.2 Using Filters

Filters enable you to control the objects that appear in the Connections navigator display. The filter can be applied on the following:

- Schema (Connection Tree Node or User Tree Node)
- Object Type (Table, View, Procedure and so on)

To access the Filter pane, right-click a connection node or an object type node (such as Tables) in the Connections navigator and select **Apply Filter**. Use the pane to limit the number of objects of that type that are displayed, according to one or more filter criteria that you specify. For each criterion, specify the following:

- Name (list always includes NAME, other criteria depend on the object type)
- Operator (for example, LIKE)
- Value for comparison (for example EM%)



Case-sensitive option for character data comparison

For example, to display only tables with names that start with EM, specify NAME, LIKE, and EM% (with the percent sign as a wildcard character).

The following attributes are applicable for object type filters.

Ignore Schema Filter (object type node filters): If this option is checked, any filter criterion specified at the connection level is ignored. Only the object type node filter criteria are applied.

Include Synonym (object type node filters): If this option is checked, synonyms for objects of this object type are included.

To add another filter criterion, click the Add (+) icon. To delete a criterion, select it and click the Delete (X) icon. To move a criterion up or down in the list, select it and use the arrow icons.

To apply the filter criteria to the Connections navigator display, click **OK**.

To remove the effects of applying a filter, right-click the object type node in the Connections navigator display and select **Clear Filter**.

3.3 Entering and Modifying Data

You can enter data into tables and views and also edit and delete existing data. To do any of these operations, select the object in the Connections panel, and then click the Data tab in the table detail display. If you click one of the other tabs, Columns, Constraints, Grants, Statistics, Triggers, and so on, you can view the information and perform relevant context menu (right-click) operations.

The following figure shows the Data pane for a table named EMPLOYEES, with a filter applied to show only those employees whose department_id is 60. A filter icon appears next to the department_id column name in the table.

Columns	Data (Constraints Gra	ants Statistics	Triggers Fla	ishback Depende	encies Details	Partitions In	dexes S	QL		
+ Insert	🖵 Exp	ort X Delete									70
	EM	FIRST_NAME	LAST_NAME	EMAIL	PHONE_NU	HIRE_DATE	JOB_ID	SAL	со	MA	D 🍸
1	103	Alexander	Hunold	AHUNOLD	590.423.4567	03/01/1990	IT_PROG	9000	(null)	102	60
2	104	Bruce	Ernst	BERNST	590.423.4568	21/05/1991	IT_PROG	6000	(null)	103	60
3	105	David	Austin	DAUSTIN	590.423.4569	25/06/1997	IT_PROG	4800	(null)	103	60
4	106	Valli	Pataballa	VPATABAL	590.423.4560	05/02/1998	IT_PROG	4800	(null)	103	60
5	107	Diana	Lorentz	DLORENTZ	590.423.5567	07/02/1999	IT_PROG	4200	(null)	103	60

The Data tab provides the following options:

- **Insert** adds an empty row at the beginning of the table, for you to enter new data.
- **Export** enables you to export some or all of the table data to a file or to the system clipboard, in any of the following formats: XML (XML tags and data), CSV (commaseparated values including a header row for column identifiers), SQL Insert (INSERT statements), or SQL Loader (SQL*Loader control file). After you select a format, the Database Export (Unload Database Objects and Data) wizard is displayed.
- Delete Selected marks the selected rows for deletion. The actual deletion does not occur until you commit changes.
- Commit ends the current transaction and makes permanent all changes performed in the transaction.



- Undo All reverts back to the previous state before any changes were made in the current transaction.
- Filter icon enables you to add a filter to limit the display of data. Enter the column name, operator and value, and click Add. The filter is added below. Add more filters if needed. Click Apply to apply the filters.

Filter		
Column		
DEPARTMENT_ID		\sim
Operator		
Equals		\sim
Value		
0		
Add		
DEPARTMENT_ID Equals '60'		×
C	ancel	Apply

• **Refresh** icon queries the database to update the data display. If a filter is specified, the refresh operation uses the filter.

In the data grid, the context menu (right-click) includes the following commands:

- **Single Record View** displays the Single Record View dialog box, which enables you to edit data for a table or view, one record at a time.
- Count Rows displays the number of rows in the table.
- Export enables you to export some or all of the table data to a file or to the system clipboard, in any of the following formats: XML (XML tags and data), CSV (commaseparated values including a header row for column identifiers), SQL Insert (INSERT statements), or SQL Loader (SQL*Loader control file). After you select a format, the Database Export (Unload Database Objects and Data) wizard is displayed.

When you right-click a column name, the context menu commands are:

- Auto-fit All Columns adjusts the width of all columns according to your specification (by column header, by column data, or best fit).
- Auto-fit Selected Columns adjusts the width of the selected columns according to your specification (by column header, by column data, or best fit).
- Columns enables you to reorder, hide or show columns.
- Sort enables you to sort columns in ascending or descending order.

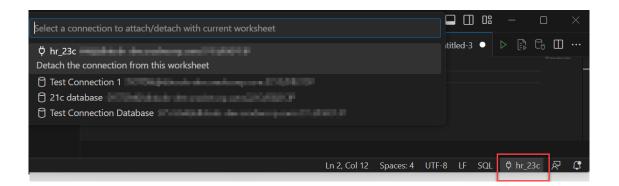


3.4 Using the SQL Worksheet

You can use the SQL Worksheet to enter and execute SQL, PL/SQL, and SQLcl statements. You can specify any action that can be processed by the database connection associated with the worksheet, such as creating a table, inserting data, creating and editing a trigger, selecting data from a table, and saving that data to a file.

You can display a SQL Worksheet by right-clicking a connection name in the Connections panel and selecting **Open SQL Worksheet**.

When SQL Worksheet is open and if you also have existing SQL files open, you can attach a connection by clicking the connection icon in the lower right corner. Once a connection is associated with your editor or file, you see the name of your connection displayed in the lower right corner.



In the editor, you can enter one or more SQL or statements that you intend to execute. For multiple statements, each non-PL/SQL statement must be terminated with either a semicolon or (on a new line) a slash (/), and each PL/SQL statement must be terminated with a slash (/) on a new line. SQL keywords are automatically highlighted.

You can drag some kinds of objects such as tables or views from the Connections navigator and drop them into the editor pane. When you do this, the following options appear: Object Name, Select, Insert, Delete, Update. If you select SELECT, a SELECT statement is constructed with all columns in the table or view. You can then edit the statement, for example, modifying the column list or adding a WHERE clause.

When you press **Ctrl+Space**, a context-sensitive popup window appears. This provides you with a list of possible completions at the insertion point that you can use to autocomplete code that you are editing. This list is based on the code context at the insertion point. To exit at any time, press **Esc** or continue typing.

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_	\vee connections								
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\sim	> I DEPARTMENTS				RAISE_APPLICATION_ER				
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	EMPLOYEE_ID								
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_	LAST_NAME								
E C	EMAIL								
	✓ SQL SNIPPETS		lems 🕕		LE TERMINAL QUERY RESULT	👓 🕗 powersh	ell + ~ 🖽	ŵ ···	
	> Character Functions								
	> Conversion Functions								

SQL Worksheet has the following icons at the top right corner:

- Run Statement (Ctrl+Enter) executes the statement at the mouse pointer in the SQL Worksheet. The SQL statements can include bind variables and substitution variables of type VARCHAR2. A pop-up box is displayed for entering variable values. The output is displayed under the Query Result tab in the lower pane.
- **Run Script (F5)** executes all statements in the SQL Worksheet using the Script Runner. The SQL statements can include substitution variables (but not bind variables) of type VARCHAR2. A pop-up box is displayed for entering substitution variable values. The output is displayed under the Script Output tab in the lower pane.
- Run in SQLcl (Ctrl+Shift+Enter) executes the statement or script by opening a SQLcl command line session and displaying the output.
- Explain Plan (F10) generates the execution plan for the statement (internally executing the EXPLAIN PLAN statement). The results appear under the Explain tab in the lower pane.

3.4.1 SQLcl Commands Supported in the SQL Worksheet

The SQL Worksheet supports SQLcl commands. SQLcl commands must be interpreted by the SQL Worksheet before being passed to the database. Any commands that are not supported by the SQL Worksheet are ignored and not passed to the database.

For information about SQLcl commands, you can enter the help command. For information about a specific command or topic, include it as the parameter (for example, help @, help exit, or help reserved words). If the command is not supported, or if there are restrictions or usage notes, the help display includes this information.

3.4.2 Script Runner

With Script Runner, you have access to commands such as @, @@, CONNECT, EXIT, QUIT, UNDEFINE, WHENEVER, and substitution variables. For example, to run a script named c:\myscripts\mytest.sql, type @c:\myscripts\mytest in the editor, and select the Run Script icon.

The following considerations apply to using the script runner:

• You cannot use bind variables. (However, you can use bind variables of type VARCHAR2, NUMBER, and DATE.)



- For substitution variables, the syntax &&variable assigns a permanent variable value, and the syntax &variable assigns a temporary (not stored) variable value.
- For EXIT and QUIT, commit is the default behavior, but you can specify rollback. In either case, the context is reset, for example, WHENEVER command information and substitution variable values are cleared.
- DESCRIBE works for most, but not all object types.

3.4.3 Explain Plan

The Execute Explain Plan icon generates the execution plan, which you can see by clicking the Explain Plan tab. The execution plan is the sequence of operations that will be performed to execute the statement.

The Explain Plain diagram view is a graphical representation of the contents of PLAN_TABLE, which is the default table for the results of the EXPLAIN PLAN statement.

By default, three levels of steps are visible in the diagram. You can use the +*I*- signs at the bottom of each step (available when the step has children) to expand or collapse. To view all

steps in the diagram, use Expand All in the toolbar.

The diagram also provides the following details:

- Cardinality (number on the arrow to the parent step), which is the number of rows processed
- Operation and options applied in that step
- · Execution order, which is the sequential number in the order of execution
- Access predicates CPU cost in percentage (orange bar)
- Total CPU cost for the step in percentage (blue circle)
- Estimated I/O Cost, Bytes processed and Cost metrics

		KOUP BY DEPA									
		AVING COUNT	DEPARTMENT								
		P BY COUNTRY	I_NAME, CIT	r;							
	COMMENTS	PROBLEMS	OUTPUT		TERMINAL	SQL HISTORY	PORTS	EXPLAIN PLA	an	Ē	
k	E H E	@ Q ↔	ν [∞] μ ζ) (i) 1.553 seco	nds			Minir	num Visible Total CPU Cost (%)	0	
	O Paristic cauce					anu anu a		e exa Reconstruction (a	CPU intensive steps (7) SELECT STATEMENT (6) HASH GROUP BY		14%

You see a brief description pop-up when you hover over any of the statistics in a step. The icons in the toolbar are:



• Text View: Displays the execution steps in a plain text format.

For the Text View, you can select the level of detail displayed in explain plan by selecting the appropriate option in Using Preferences.

- Diagram View: Displays the steps in a flowchart format.
- **Zoom In, Zoom Out**: If a step is selected in the diagram, clicking the Zoom In icon ensures that it remains at the center of the screen.
- Fit Screen: Fits the entire diagram in the visible area.
- Actual Size: Sets the zoom factor to 1.
- **Expand All**: Displays all steps in the diagram.
- Reset Diagram: Resets the diagram to the initial status, that is, only three levels of steps are displayed.
- Show Info: Shows the SELECT statement used by the Explain Plan functionality.
- Min Visible Total CPU Cost(%): Defines the threshold to filter steps with total CPU cost equal or more than the provided value.

Enter a value between 0 and 100. There is no filtering for 0.

• **Plan Notes**: Displays the Explain Plan notes.

Properties

Double-click or press **Enter** on a selected step to open the Properties slider, which provides more information about that step. See PLAN_TABLE in *Oracle Database Reference* for a description of each property.

The Properties slider shows:

 All information for that step extracted from PLAN_TABLE in a tabular format. Nulls are excluded.

You can select **JSON** to view the properties in JSON format.

• Information from OTHER XML column of PLAN TABLE.

The information is displayed in JSON format.

Navigation

 Press the Tab key to move through the steps in the execution order. The selected step has a blue border around it.

To move in the reverse direction, press the **Shift + Tab** keys.

If no step is selected, pressing the **Tab** key selects the step with execution number 1.

 Depending on the zoom level, use horizontal and vertical scrollbars to view different parts of diagram.

Click the left mouse button and hold it to pan the diagram around up and down.



icon at the bottom right to scroll to the top of the diagram.

Diagram Navigator

The Diagram Navigator is at the top right corner and represents a smaller copy of the diagram. The rectangle border allows zoom-in and zoom-out operations and moves to show different parts of the diagram.



The diagram navigator shows a list with steps having more than 1% CPU cost in descending order. Click a step in the list to navigate to the same step in the diagram, enabling you to see it in the context of the other steps.

3.4.4 SQL History

You can click the SQL History tab in the lower right pane to view a list of SQL statements and scripts that you have executed, and optionally double-click one or more statements to have them either replace the statements currently on the SQL Worksheet or be added to the statements currently on the SQL Worksheet. The list is at first organized by date, and then by connection name.

The SQL history list will not contain any statement that can include a password. Such statements include (but are not necessarily limited to) CONNECT, ALTER USER, and CREATE DATABASE LINK.

You can control the maximum number of statements in the history by setting the SQL History Limit in Preferences.

When a SQL statement in the SQL History list is selected, it automatically opens the PL/SQL subprogram in the SQL Worksheet pane.

To **sort** the statements in the list, double-click the column header that you want to sort on and the statements are sorted in ascending order. Double-click the header again to sort in descending order. To remove sorting applied to the column, double-click the column header again.

To display the **Search** functionality, in the SQL History pane, press **Ctrl+F** (**Cmd+F** for MacOS).

"					Search	×
Statement	\uparrow	Connection	Created	Туре	Executions	Duration
runner for HR.	LIST	21c simple	01/12/2023 04:53:23	SCRIPT		02.726s
runner for HR.	LIST	21c simple	30/11/2023 05:07:40	SCRIPT		02.477s
runner for HR.	LIST	21c simple	30/11/2023 05:08:10	SCRIPT		02.290s
runner for SYS	TE	21c simple	29/11/2023 03:46:14	SCRIPT		02.748s
CALL list_a_rating	g(10);	21c simple	29/11/2023 12:24:14	SQL		01.393s
CREATE OR REPLACE		21c simple	29/11/2023 04:02:48	SQL		02.869s
CREATE OR REPL	ACE	21c simple	01/12/2023 04:46:33	SQL		02.249s

3.4.5 Using Snippets to Insert Code Fragments

Snippets are code fragments, such as SQL functions, Optimizer hints, and miscellaneous PL/SQL programming techniques. Some snippets are just syntax, and others are examples. You can insert and edit snippets when you are using the SQL Worksheet or creating or editing a PL/SQL function or procedure.

Snippets are displayed in the lower part of the Connections panel. Click the Expand icon to view all the available sinppets in each group (such as Aggregate Functions or Character Functions). In most cases, the fragments in each group do not represent all available objects in that logical grouping, or all formats and options of each fragment shown. For complete and detailed information, see the Oracle Database documentation.



∽ Co⇔hr_21c							
> 급 Tables 🛛 🕐							
> ᅜ꾧 Views							
〉 🛱 Indexes							
> 🗟 Packages							
∨ SQL SNIPPETS 🗐							
> Aggregate unctions							
> Analytic Functions							
> Character Functions							
> Conversion Functions							
> Date Formats							
> Date/Time Functions							
> Number Formats							
> Numeric Functions							
> Optimizer Hints							
> PL/SOL Programmi							

To insert a snippet into your code in a SQL Worksheet or in a PL/SQL function or procedure, drag the snippet from the left bottom pane and drop it into the desired place in your code. Edit the syntax so that the SQL function is valid in the current context.

For example, you could type SELECT and then drag CONCAT(char1, char2) from the Character Functions group. Then, edit the CONCAT function syntax and type the rest of the statement, such as in the following:

```
SELECT CONCAT(title, ' is a book in the library.') FROM books;
```

3.4.6 Connection Management

Starting with release 24.1.1, opening a new SQL Worksheet creates a new, dedicated connection to the database. This means that long-running queries in your SQL Worksheet do not block other database requests.

You can control this behaviour using the $\ensuremath{\mathsf{Session}}$ per attached worksheet setting in $\ensuremath{\mathsf{Preferences}}$.

- 1. From the File menu, go to Preferences and then select Settings from the sub-menu.
- 2. Under User, expand Extensions and then expand Oracle SQL Developer Extension for VS Code.
- 3. In the right panel, under **Database Connections**, in the **Session per attached worksheet** field, select **off** from the drop-down list to remove this setting.

The default setting is on.



3.5 Running Functions and Procedures

You can open and run PL/SQL subprograms (functions and procedures).

- To open a subprogram, click the name in the Connections panel to open, or right-click and select Open.
- To compile a subprogram, open it in the SQL Worksheet, and then select the Compile icon in the top right corner.

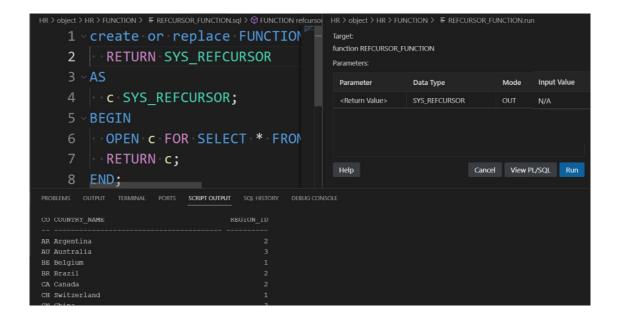
To debug a subprogram, open it in the SQL Worksheet, and then select the **Compile for Debug** icon.

If there are any issues during compilation, these are shown under the Script Output tab in the lower pane.

 To run a subprogram, open it in the SQL Worksheet and then select the Run icon. You can then view the PL/SQL code and edit if needed, and then click Run. The results are displayed in the Script Output pane below.

The Run, Compile and Compile for Debug icons are also available when opening PL/SQL files with any of the following extensions, KLR, PKB, PKH, PKS, PLB and PLS, from your local device.

In the following figure, the REFCURSOR_FUNCTION is run and the output is displayed below.



3.6 Using Preferences

To modify SQL Developer preferences, from the **File** menu, select **Preferences** and then **Settings**. Under **User**, expand **Extensions** and select **Oracle SQL Developer Extension for VS Code**.

The preferences available are:

Database Connections



- Ths Configuration Path: Enter the location of the thsnames.ora file.
- **Startup Script Path**: Specify the location for the startup script to run when an Oracle database connection is opened. The default location is the default path for scripts.
- Connections Tree

Folders Fetch Size: Specifies the maximum number of rows to be fetched at a time into the data grid display for nodes such as Tables, Views, Materialized Views,

Database NLS

The NLS settings specify values for globalization support parameters, such as the language, territory, sort preference, and date format. These parameter values are used for SQL Developer session operations, such as for statements executed using the SQL Worksheet and for the National Language Support Parameters report. Specifying values in this preferences pane does not apply those values to the underlying database itself. To change the database settings, you must change the appropriate initialization parameters and restart the database.

Note that SQL Developer does not use default values from the current system for globalization support parameters; instead, SQL Developer, when initially installed, by default uses parameter values that include the following:

NLS_LANG, "ENGLISH" NLS_TERR, "AMERICA" NLS_CHAR, "AL32UTF8" NLS_SORT, "BINARY" NLS_CAL, "GREGORIAN" NLS_DATE_LANG, "ENGLISH" NLS_DATE_FORM, "DD-MM-RR"

SQL History

History Limit: Maximum number of statements that can be stored in SQL History.

Telemetry

 Allow automated usage reporting to Oracle: Determines whether you consent to usage reporting. If you consent, automated reports can occasionally be sent to Oracle describing the product features in use. No personally identifiable information will be sent and the report will not affect performance.

SQL Worksheet

• **Explain Plan**: Determines the level of details displayed in the Explain Plan.



4

Tutorial: Creating Objects for a Small Database

Create objects for a simplified library database, which will include tables for books, patrons (people who have library cards), and transactions (checking a book out, returning a book, and so on).

The tables are deliberately oversimplified for this tutorial. They would not be adequate for any actual public or organizational library.

This tutorial assumes that you have a database connection to a database user that will own the tables and other objects that you create.

The major steps are:

- Create a Table (BOOKS)
- Create a Table (PATRONS)
- Create a Table (TRANSACTIONS)
- Create Two Sequences
- Insert Data into the Tables
- Create a View
- Create a PL/SQL Procedure
- Use the SQL Worksheet for Queries

4.1 Create a Table (BOOKS)

The BOOKS table contains a row for each book in the library. It includes columns of character and number types, a primary key, a unique constraint, and a check constraint.

- 1. Right-click the connection name, and select Open SQL Worksheet.
- 2. Enter the following statement:

```
CREATE TABLE books (
    book_id VARCHAR2(20),
    title VARCHAR2(50)
        CONSTRAINT title_not_null NOT NULL,
    author_last_name VARCHAR2(30)
        CONSTRAINT last_name_not_null NOT NULL,
    author_first_name VARCHAR2(30),
    rating NUMBER,
    CONSTRAINT books_pk PRIMARY KEY (book_id),
    CONSTRAINT rating_1_to_10 CHECK (rating IS NULL OR
        (rating >= 1 and rating <= 10)),
    CONSTRAINT author_title_unique UNIQUE (author_last_name, title));</pre>
```

3. Click the Run Statement icon.



The following notification is displayed in the Script Output pane:

Table BOOKS created.

4.2 Create a Table (PATRONS)

The PATRONS table contains a row for each patron who can check books out of the library.

1. In the SQL Worksheet, enter the following statement:

```
CREATE TABLE patrons (
   patron_id NUMBER,
   last_name VARCHAR2(30)
        CONSTRAINT patron_last_not_null NOT NULL,
   first_name VARCHAR2(30),
   street_address VARCHAR2(50),
   city_state_zip VARCHAR2(50),
   CONSTRAINT patrons pk PRIMARY KEY (patron id));
```

2. Click the Run Statement icon.

The following notification is displayed in the Script Output pane:

Table PATRONS created.

4.3 Create a Table (TRANSACTIONS)

The TRANSACTIONS table contains a row for each transaction involving a patron and a book (for example, someone checking a book out or returning a book). It includes two foreign key columns.

1. In the SQL Worksheet, enter the following statement:

```
CREATE TABLE transactions (

transaction_id NUMBER,

patron_id CONSTRAINT for_key_patron_id

REFERENCES patrons(patron_id),

book_id CONSTRAINT for_key_book_id

REFERENCES books(book_id),

transaction_date DATE

CONSTRAINT tran_date_not_null NOT NULL,

transaction_type NUMBER

CONSTRAINT tran_type_not_null NOT NULL,

CONSTRAINT tran_type_not_null NOT NULL,

CONSTRAINT tran_sections pk PRIMARY KEY (transaction id));
```

2. Click the Run Statement icon.

The following notification is displayed in the Script Output pane:

Table TRANSACTIONS created.



4.4 Create Two Sequences

Create two sequence objects, which will be used in INSERT statements to generate unique primary key values in the PATRONS and TRANSACTIONS tables.

1. In the SQL Worksheet, enter the following statements:

```
CREATE SEQUENCE patron_id_seq
START WITH 100
INCREMENT BY 1;
CREATE SEQUENCE transaction_id_seq
START WITH 100
INCREMENT BY 1;
```

4.5 Insert Data into the Tables

Add some sample data to the BOOKS, PATRONS, and TRANSACTIONS tables.

Copy and paste the following INSERT statements into the SQL Worksheet:

```
INSERT INTO books VALUES ('A1111', 'Moby Dick', 'Melville', 'Herman', 10);
INSERT INTO books VALUES ('A2222', 'Get Rich Really Fast', 'Scammer',
'Ima', 1);
INSERT INTO books VALUES ('A3333', 'Finding Inner Peace', 'Blissford',
'Serenity', null);
INSERT INTO books VALUES ('A4444', 'Great Mystery Stories', 'Whodunit',
'Rodney', 5);
INSERT INTO books VALUES ('A5555', 'Software Wizardry', 'Abugov', 'D.',
10):
INSERT INTO patrons VALUES (patron id seq.nextval,
   'Smith', 'Jane', '123 Main Street', 'Mytown, MA 01234');
INSERT INTO patrons VALUES (patron id seq.nextval,
   'Chen', 'William', '16 S. Maple Road', 'Mytown, MA 01234');
INSERT INTO patrons VALUES (patron id seq.nextval,
   'Fernandez', 'Maria', '502 Harrison Blvd.', 'Sometown, NH 03078');
INSERT INTO patrons VALUES (patron id seq.nextval,
   'Murphy', 'Sam', '57 Main Street', 'Mytown, MA 01234');
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 100, 'A1111', SYSDATE, 1);
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 100, 'A2222', SYSDATE, 2);
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 101, 'A3333', SYSDATE, 3);
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 101, 'A2222', SYSDATE, 1);
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 102, 'A3333', SYSDATE, 1);
INSERT INTO transactions
 VALUES (transaction id seq.nextval, 103, 'A4444', SYSDATE, 2);
```

```
INSERT INTO transactions
VALUES (transaction_id_seq.nextval, 100, 'A4444', SYSDATE, 1);
INSERT INTO transactions
VALUES (transaction_id_seq.nextval, 102, 'A2222', SYSDATE, 2);
INSERT INTO transactions
VALUES (transaction_id_seq.nextval, 102, 'A5555', SYSDATE, 1);
INSERT INTO transactions
VALUES (transaction id seq.nextval, 101, 'A2222', SYSDATE, 1);
```

2. Click Run Script.

4.6 Create a View

Create a view that returns information about patrons and their transactions. This view queries the PATRONS and TRANSACTIONS tables, and returns rows that contain a patron's ID, last name, and first name, along with a transaction and the transaction type. The rows are ordered by patron ID, and by transaction type within patron IDs.

- Right-click the Views node in the schema hierarchy on the left side, and select Create (simple).
- 2. Enter the following information:
 - View Name: Enter patrons_trans_view.
 - In SQL Query, enter the following statement:

```
SELECT p.patron_id,
    p.last_name,
    p.first_name,
    t.transaction_type,
    t.transaction_date
FROM patrons p, transactions t
WHERE p.patron_id = t.patron_id
ORDER BY p.patron id, t.transaction type
```

3. Click Apply.

4.7 Create a PL/SQL Procedure

Create a procedure that lists all books with a specified rating. You can then call this procedure with an input parameter (a number from 1 to 10), and the output will be all the titles of all books with that rating.

To create the procedure:

Enter the following procedure text:

```
CREATE OR REPLACE

PROCEDURE list_a_rating(in_rating IN NUMBER) AS

matching_title VARCHAR2(50);

TYPE my_cursor IS REF CURSOR;

the_cursor my_cursor;

BEGIN

OPEN the_cursor

FOR 'SELECT title

FROM books
```

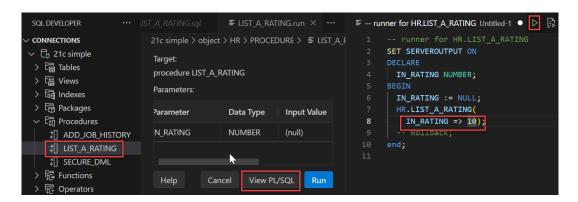
```
WHERE rating = :in_rating'
USING in_rating;
DBMS_OUTPUT.PUT_LINE('All books with a rating of ' || in_rating || ':');
LOOP
FETCH the_cursor INTO matching_title;
EXIT WHEN the_cursor%NOTFOUND;
DBMS_OUTPUT.PUT_LINE(matching_title);
END LOOP;
CLOSE the_cursor;
END list a rating;
```

2. Click Run Script.

The following notificaton is displayed in the Script Output tab:

Procedure LIST A RATING compiled

- 3. To run this procedure, right-click LIST_A_RATING in the Connections navigator and select **Run**. The parameter and it's properties are displayed.
- 4. Click View PL/SQL.
- 5. Change IN_RATING => IN_RATING to IN_RATING => 10, and click Run Statement.



The result is shown in the Script Output pane:

```
All books with a rating of
10:
Moby
Dick
Software Wizardry
```

4.8 Use the SQL Worksheet for Queries

You can use the SQL Worksheet to test SQL statements using a database connection.

 In the right pane, enter the following statement (the semicolon is optional for the SQL Worksheet):

SELECT author last name, title FROM books;

Notice the automatic highlighting of SQL keywords (SELECT and FROM in this example).



- 2. Click the **Run Statement** icon in the SQL Worksheet toolbar. The results of the query are displayed in the Query Result tab under the area in which you entered the SQL statement.
- 3. Enter (or copy and paste) the following statement:

```
SELECT p.patron_id,
    p.last_name,
    p.first_name,
    t.transaction_type,
    t.transaction_date
    FROM patrons p, transactions t
    WHERE p.patron_id = t.patron_id
    ORDER BY p.patron_id, t.transaction_type;
```

- Click the Run Statement icon in the SQL Worksheet toolbar, and view the results of the query.
- Click the Explain Plan icon in the SQL Worksheet toolbar to see the execution plan (displayed on the Explain tab) that Oracle Database follows to execute the SQL statement. The information includes the optimizer strategy and the cost of executing the statement.

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5.6 ag-grid-community 30.2.1

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5.8 babel-standalone 7.23.3

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5.9 cross-fetch 4.0.0

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5.10 dayjs 1.11.10

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5.11 isomorphic-ws 5.0.0

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- * org.apache.tomcat:tomcat-jasper-el
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- * org.apache.tomcat:tomcat-util-scan
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* org.eclipse.jetty.toolchain:jetty-schemas

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immediate

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setimmediate
https://github.com/yuzujs/setImmediate

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inherits

https://github.com/isaacs/inherits

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string decoder

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safe-buffer

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util-deprecate

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5.14 monaco-editor 0.44.0

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5.15 react 18.2.0

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