

# Java Platform, Standard Edition

## Javadoc Guide



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The Oracle logo, consisting of a solid red square with the word "ORACLE" in white, uppercase, sans-serif font centered within it.

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# Preface

This guide provides information about using the `javadoc` command, its options, and the Standard Doclet.

## Audience

This document is intended for Javadoc tool users. Users who are developing Javadoc content should also see the [Javadoc specification](#) for detailed information required to create javadoc content.

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## Related Documents

- See [JDK 11 Documentation](#).
- The Javadoc developers can refer to the Javadoc specifications.

## Conventions

The following text conventions are used in this document:

Convention	Meaning
<b>boldface</b>	Boldface type indicates graphical user interface elements associated with an action, or terms defined in text or the glossary.
<i>italic</i>	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.

# 1

## Javadoc

The `javadoc` tool is a program that reads a collection of source files into an internal form.

The structure is: `(source-files)->[javadoc-tool:doclet]->(generated files)`.

The [Javadoc doclet](#) is like a pluggable back end that analyzes this internal form with some goal in mind. It can generate HTML, MIF, or XML files, depending on the doclet.

The content of the generated files is specific to the doclet. The standard doclet generates HTML documentation, but a different doclet, for example, could generate a report of misspelled words or grammatical errors.

If you specify a doclet other than the standard doclet, then the descriptions in this guide might not apply to the operation of that doclet or the files (if any) that are generated.

To use the `javadoc` tool, you must:

- Write source code, containing documentation comments. Documentation comments are formatted in HTML and are interspersed with the `javadoc` tool.
- Run the `javadoc` tool. You need to specify a doclet to analyze the documentation comments and any other special tags. However, if you don't specify any doclet, by default, the [Standard Doclet](#) is included. You specify a number of command-line options, some of which are directed at the `javadoc` tool itself, and some of which are specific to the selected doclet. The command-line help shows and distinguishes the options for the tool that apply to the currently selected doclet. When the standard doclet is used, the output generated by the standard doclet consists of a series of HTML pages. If you specify a different doclet, then the operation of that doclet and what files (if any) are generated may or may not be equivalent to the standard doclet described in this guide.

## Javadoc Features

Javadoc features include the following: Javadoc search, support for generating HTML5 output, support for documentation comments in module systems, and simplified Doclet API.

### Search

The `javadoc` tool runs the doclet that may generate output. The standard doclet generates output that lets you search the generated documentation. A search box is available on the generated APIs and provides the following:

- You can search for elements and additional key phrases defined in the API
- Results, including results that exactly match the entered characters followed by results that contains the entered characters anywhere in the string. Multiple results are displayed as simple scrolling lists below the search box. Results are categorized as follows, for easier classification and appropriate user selection:

- Modules
- Packages
- Types
- Members
- Search Tags

Multiple results with different program element names are displayed if the search term or a phrase is inherited using the `@inheritDoc` tag.

- Page redirection based on user selection.

You can search for the following:

- **Declared names of modules, packages, types, and members:** Because methods can be overloaded, the simple names of method parameter types are also indexed and can be searched for. The method parameter names can't be indexed.
- **A search term or a phrase indexed using a new inline tag, `@index`:** Other inline tags cannot be nested inside `@index`. You can only search a phrase or search term marked with `@index` within a declaration's `javadoc` comment. For example, the domain-specific term `ulps` is used throughout the `java.lang.Math` class, but doesn't appear in any class or method declaration names. To help users of the Math API, the API designer could tag various occurrences of `ulps` in a class-level `javadoc` comment or a method-level `javadoc` comment. Tagging is achieved using `{@index ulps}`. The term `ulps` is indexed by the `javadoc` tool.

### Module System

The `javadoc` tool supports documentation comments in module declarations. Some Javadoc command-line options enable you to specify the set of modules to document and generate a new summary page for any modules being documented. It has new command-line options to configure the set of modules to be documented and generates a new summary page for any modules being documented. See the `javadoc` chapter of the *Java Platform, Standard Edition Tools Reference*.

### HTML 5 Support

You can generate HTML5 output. To get fully-compliant HTML5 output, ensure that any HTML content provided in documentation comments are compliant with HTML5.

### Simplified Doclet API

The Doclet API uses powerful APIs that can better represent all the language features. See [Javadoc Standard Doclet](#).

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## Source Files

The `javadoc` tool generates output that originates from the following types of source files: Java language source files for classes (`.java`), package comment files, overview comment files, and miscellaneous unprocessed files.

This topic describes source files, test files, and template files that can also be in the source tree, but that must be sure not to document.

### Class Source Files

The source file of each class can have their own documentation comments.

### Overview Comment Files

Each application or set of packages that you're documenting can have its own overview documentation comment that's kept in its own source file, which the `javadoc` tool then merges into the generated overview page. You typically include in this comment any documentation that applies to the entire application or set of packages. You can name the file anything that you want, such as `overview.html` and place it anywhere. A typical location is at the top of the source tree.

**Oracle Solaris, Linux, and macOS:** For example, if the source files for the `java.math` package are contained in the `/home/user/src/java/math` directory, then you could create an overview comment file in `/home/user/src/overview.html`.

**Windows:** For example, if the source files for the `java.math` package are contained in the `C:\user\src\java\math` directory, then you could create an overview comment file in `C:\user\src\overview.html`.

You can have multiple overview comment files for the same set of source files in case you want to run the `javadoc` tool multiple times on different sets of packages. For example, you could run the `javadoc` tool once with `-private` option for internal documentation and again without that option for public documentation. In this case, you could describe the documentation as public or internal in the first sentence of each overview comment file.

The content of the overview comment file is one big documentation comment that's written in HTML. Make the first sentence a summary about the application or set of packages. Don't put a title or any other text between the `<body>` tag and the first sentence. All tags, except inline tags, such as an `{@link}` tag, must appear after the main description. If you add an `@see` tag, then it must have a fully qualified name. When you run the `javadoc` tool, specify the overview comment file name with the `-overview` option. The file is then processed similarly to that of a package comment file. The `javadoc` tool does the following:

- Copies all content between the `<body>` and `</body>` tags for processing.
- Processes the overview tags that are present.
- Inserts the processed text at the bottom of the generated overview page.
- Copies the first sentence of the overview comment to the top of the overview summary page.

### Unprocessed Files

Your source files can include any files that you want the `javadoc` tool to copy to the destination directory. These files usually include graphic files, example Java source and class files, and self standing HTML files with a lot of content that would overwhelm the documentation comment of a typical Java source file.

To include unprocessed files, put them in a directory called `doc-files`. The `doc-files` directory can be a subdirectory of any package directory that contains source files. You can have one `doc-files` subdirectory for each package.

**Oracle Solaris, Linux, and macOS:** For example, if you want to include the image of a button in the `java.awt.Button` class documentation, then place the image file in the `/home/user/src/java/awt/doc-files/` directory. Don't place the `doc-files` directory at `/home/user/src/java/doc-files`, because `java` isn't a package. It doesn't contain any source files.

**Windows:** For example, if you want to include the image of a button in the `java.awt.Button` class documentation, then place the image file in the `\src\java\awt\doc-files` directory. Don't place the `doc-files` directory at `\src\java\doc-files`, because `java` is not a package. It doesn't contain any source files.

All links to the unprocessed files must be included in the code because the `javadoc` tool doesn't look at the files. The `javadoc` tool copies the directory and all of its contents to the destination. The following example shows how the link in the `Button.java` documentation comment might look:

```
/**
 * <p> This button looks like this:</p>
 * 
 */
```

### Test and Template Files

You can store test and template files in the source tree in the same directory with or in a subdirectory of the directory where the source files reside. To prevent test and template files from being processed, run the `javadoc` tool and explicitly pass in individual source file names.

Test files are valid, compilable source files. Template files aren't valid, compatible source files, but they often have the `.java` suffix.

- **Test Files** : If you want your test files to belong to either an unnamed package or to a package other than the package that the source files are in, then put the test files in a subdirectory underneath the source files and give the directory an invalid name. If you put the test files in the same directory with the source files and call the `javadoc` tool with a command-line argument that indicates its package name, then the test files cause warnings or errors. If the files are in a subdirectory with an invalid name, then the test file directory is skipped and no errors or warnings are issued. For example, to add test files for source files in `com.package1`, put them in a subdirectory in an invalid package name. The following directory name is invalid because it contains a hyphen:

- **Oracle Solaris, Linux, and macOS:** `com/package1/test-files/`
- **Windows:** `com\package1\test-files\`

If your test files contain documentation comments, then you can set up a separate run of the `javadoc` tool to produce test file documentation by passing in their test source file names with wild cards, such as `com/package1/test-files/*.java`.



- **Template Files** : If you want a template file to be in the source directory, but not generate errors when you execute the `javadoc` tool, then give it an invalid file name such as `Buffer-Template.java` to prevent it from being processed. The `javadoc` tool processes only source files with names, when stripped of the `.java` suffix, that are valid class names.

### Processing the Package Comment File

When the `javadoc` tool runs, it searches for the package comment file. If the package comment file is found, then the `javadoc` tool does the following:

- Copies the comment for processing. For `package.html`, the `javadoc` tool copies all content between the `<body>` and `</body>` HTML tags. You can include a `<head>` section to put a `<title>` tag, source file copyright statement, or other information, but none of these appears in the generated documentation.
- Processes the package tags.
- Inserts the processed text at the bottom of the generated package summary page.
- Copies the first sentence of the package comment to the top of the package summary page. The `javadoc` tool also adds the package name and this first sentence to the list of packages on the overview page.

The end of the sentence is determined by the rules used for the end of the first sentence of class and member main descriptions.

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## Javadoc Command

The `javadoc` command-line synopsis is `javadoc [options] [packagenames] [sourcefiles] [@files]`. The options can either be Doclet options or Standard Doclet options. The `javadoc` command can also be run programmatically.

This topic contains the following sections:

- [Javadoc Doclet](#)
- [Standard Doclet](#)
- [Examples of Running the Javadoc Command](#)

## Javadoc Doclets

You use the `javadoc` tool and its options to generate HTML pages of API documentation from Java source files.

## Javadoc Doclet Options

The `javadoc` command has options for doclets. The Standard Doclet provides additional options.

The `javadoc` command uses doclets to determine its output and uses the default Standard Doclet unless a custom doclet is specified with the `-doclet` option. While option names are not case-sensitive, their arguments are. Options are described in the `javadoc` chapter of the *Java Platform, Standard Edition Tools Reference*.

### Process Source Files

The `javadoc` command processes files that end in the source file extension and other files described in [Source Files](#). If you run the `javadoc` command by passing in individual source file names, then you can determine exactly which source files are processed. However, that isn't how most developers want to work because it's simpler to pass in package names. The `javadoc` command can be run three ways, without explicitly specifying the source file names. You can pass in package names, use the `-subpackages` option, or use wild cards with source file names. In these cases, the `javadoc` command processes a source file only when the file fulfills all of the following requirements:

- The file name prefix (with `.java` removed) is a valid class name.
- The path name relative to the root of the source tree is a valid package name after the separators are converted to dots.
- The package statement contains the valid package name.

## Processing Links

During a run, the `javadoc` command adds cross-reference links to package, class, and member names that are being documented as part of that run. Links appear in the following places:

- Declarations (return types, argument types, and field types)
- See Also sections that are generated from `@see` tags
- Inline text generated from `{@link}` tags
- Exception names generated from `@throws` tags
- *Specified by* links to interface members and *Overrides* links to class members
- Summary tables listing packages, classes, and members
- Package and class inheritance trees
- The index

## Processing Details

The `javadoc` command produces one complete document every time it runs. It doesn't perform incremental builds that modify or directly incorporate the results from earlier runs. However, the `javadoc` command can link to results from other runs.

The `javadoc` command implementation requires and relies on the Java compiler. The `javadoc` command calls part of the `javac` command to compile the declarations and ignore the member implementations. The `javadoc` command builds a rich internal representation of the classes that includes the class hierarchy and use relationships to generate the HTML documentation. The `javadoc` command also picks up user-supplied documentation from documentation comments in the source code.

The `javadoc` command can run on source files that are pure stub files with no method bodies. This means that you can write documentation comments and run the `javadoc` command in the early stages of design before API implementation.

Relying on the compiler ensures that the HTML output corresponds exactly with the actual implementation, which may rely on implicit, rather than explicit, source code. For example, the `javadoc` command documents default constructors that are present in the compiled class files but not in the source code.

In many cases, the `javadoc` command lets you generate documentation for source files with incomplete or erroneous code. You can generate documentation before any debugging and troubleshooting is done. The `javadoc` command does primitive checking of documentation comments.

When the `javadoc` command builds its internal structure for the documentation, it loads all referenced classes. Because of this, the `javadoc` command must be able to find all referenced classes, and whether they're bootstrap classes, extensions, or user classes.

## Javadoc Doclets

You can customize the content and format of the `javadoc` command output with doclets. The `javadoc` command has a default built-in doclet, called the Standard Doclet, that generates HTML-formatted API documentation. You can write your own doclet to generate HTML, XML, MIF, RTF or whatever output format you want.

When a custom doclet isn't specified with the `-doclet` option, the `javadoc` command uses the default Standard Doclet. The `javadoc` command has several options that are available regardless of which doclet is being used. The Standard Doclet adds a supplementary set of command-line options.

## Using the link Option

You use `-link` option to classes referenced to by your code, but not documented in the current `javadoc` command run.

For links to go to valid pages, you must know where those HTML pages are located and specify that location with the `extdocURL` option. This allows third-party documentation to link to Java. Omit the `-link` option when you want the `javadoc` command to create links only to APIs within the documentation it's generating in the current run. Without the `-link` option, the `javadoc` command doesn't create links to documentation for external references because it doesn't know whether or where that documentation exists. The `-link` option can create links in several places in the generated documentation. See [Javadoc Doclets](#). Another use is for cross-links between sets of packages: Execute the `javadoc` command on one set of packages, then run the `javadoc` command again on another set of packages, creating links both ways between both sets.

### Differences Between the `-link` and `-linkoffline` Options

Use the `-link` option in the following cases:

- When you use a relative path to the external API document.
- When you use an absolute URL to the external API document if your shell lets you open a connection to that URL for reading.

Use the `-linkoffline` option when you use an absolute URL to the external API document, if your shell doesn't allow a program to open a connection to that URL for reading. This can occur when you're behind a firewall and the document you want to link to is on the other side.

### Example 3-1 Example of Using an Absolute Link to External Documents

Use the following command if you want to link to the `java.lang`, `java.io` and other Java platform packages.

```
javadoc -link http://docs.oracle.com/javase/8/docs/api/com.mypackage
```

The command generates documentation for the package `com.mypackage` with links to the Java SE packages. The generated documentation contains links to the `Object` class, for example, in the class `trees`. Other options, such as the `-sourcepath` and `-d` options, aren't shown.

### Example 3-2 Example of Using a Relative Link to External Documents

- In this example, there are two packages with documents that are generated in different runs of the `javadoc` command, and those documents are separated by a relative path.
- The packages are `com.apipackage`, an API, and `com.spipackage`, a service provider Interface (SPI).
- You want the documentation to reside in `docs/api/com/apipackage` and `docs/spi/com/spipackage`.

- Assuming that the API package documentation is already generated, and that docs is the current directory, you document the SPI package with links to the API documentation by running: `javadoc -d ./spi -link ../api com.spipackage`.

 **Note:**

The `-link` option is relative to the destination directory (`docs/spi`).

### How to Reference a Class

For a link to an externally referenced class to appear (and not just its text label), the class must be referenced in a particular way. It isn't sufficient for the class to be referenced in the body of a method. It must be referenced in either of the following: `import` statement or in a declaration.

- In any kind of import statement. By wildcard import, import explicitly by name, or automatically import for `java.lang.*`.
- In a declaration: `void mymethod(File f) {}`.

The reference can be in the return type or parameter type of a method, constructor, field, class, or interface, or in an `implements`, `extends`, or `throws` statement.

When you use the `-link` option, there can be many links that unintentionally don't appear. The text would appear without being a link. You can detect such text by the warnings they emit. The simplest way to properly reference a class and add the link is to import that class.

In a declaration: `void mymethod(File f) {}`

### Package List

The `-link` option requires that a file named `package-list`, which is generated by the `javadoc` command, exists at the URL that you specify with the `-link` option. In JDK 8, the `package-list` file is a simple text file that lists the names of packages documented at that location.

When `javadoc` is run without the `-link` option and encounters a name that belongs to an externally referenced class, it prints the name with no link. However, when the `-link` option is used, the `javadoc` command searches the `package-list` file at the specified `extdocURL` location for that package name. When it finds the package name, it prefixes the name with `extdocURL`.

For there to be no broken links, all of the documentation for the external references must exist at the specified URLs. The `javadoc` command does not check that these pages exist, but only that the `package-list` exists.

### Multiple Links

You can supply multiple `-link` options to link to any number of externally generated documents. Specify a different link option for each external document to link to `javadoc -link extdocURL1 -link extdocURL2 ... -link extdocURLn com.mypackage` where `extdocURL1`, `extdocURL2`, ... `extdocURLn` point respectively to the roots of external documents, each of which contains a file named `package-list`.

## Cross Linking

### Note:

Bootstrapping might be required when cross-linking two or more documents that were previously generated. If the `package-list` file doesn't exist for either document when you run the `javadoc` command on the first document, then the `package-list` doesn't yet exist for the second document. Therefore, to create the external links, you must regenerate the first document after you generate the second document.

In this case, the purpose of first generating a document is to create its `package-list` (or you can create it by hand if you are certain of the package names). Then, generate the second document with its external links. The `javadoc` command prints a warning when a needed external `package-list` file doesn't exist.

## Using the `linkoffline` Option

You use `linkoffline` option to link to the `java.lang`, `java.io` and other Java SE packages

### Absolute Links to External Documents

You might have a situation where you want to link to the `java.lang`, `java.io` and other Java SE packages. However, your shell doesn't have web access. In this case, do the following:

1. Open the `package-list` file in a browser at [API Specification](#).
2. Save the file to a local directory, and point to this local copy with the second argument, `packagelistLoc`. In this example, the package list file was saved to the current directory.

The following command generates documentation for the package `com.mypackage` with links to the Java SE packages. The generated documentation contains links to the `Object` class, for example, in the class `trees`. Other necessary options, such as `-sourcepath`, aren't shown.

```
javadoc -linkoffline http://docs.oracle.com/javase/8/docs/api/.com.mypackage
```

### Relative Links to External Documents

It's not very common to use `-linkoffline` with relative paths, for the simple reason that the `-link` option is usually enough. When you use the `-linkoffline` option, the `package-list` file is usually local, and when you use relative links, the file you're linking to is also local, so it's usually unnecessary to give a different path for the two arguments to the `-linkoffline` option. When the two arguments are identical, you can use the `-link` option.

### Create a `package-list` File Manually

If a `package-list` file doesn't exist yet, but you know what package names your document will link to, then you can manually create your own copy of this file and specify its path with `packagelistLoc`. An example would be where the `package-list`

file for `com.spipackage` didn't exist when `com.apipackage` package was first generated. This technique is useful when you need to generate documentation that links to new external documentation whose package names you know, but which isn't yet published. Similarly, two companies can share their unpublished `package-list` files so they can release their cross-linked documentation simultaneously.

### Link to Multiple Documents

You can include the `-linkoffline` option once for each generated document that you want to refer to:

```
javadoc -linkoffline extdocURL1 packagelistLoc1 -linkoffline extdocURL2  
packagelistLoc2 ...
```

### Update Documents

You can also use the `-linkoffline` option when your project has dozens or hundreds of packages. If you've already run the `javadoc` command on the entire source tree, then you can quickly make small changes to documentation comments and rerun the `javadoc` command on a portion of the source tree. Be aware that the second run works properly only when your changes are to documentation comments and not to declarations. If you were to add, remove, or change any declarations from the source code, then broken links could show up in the index, package tree, inherited member lists, Use page, and other places.

First, create a new destination directory, such as `update`, for this new small run. In this example, the original destination directory is named `html`. In the simplest example, change the directory to the parent of `html`. Set the first argument of the `-linkoffline` option to the current directory and set the second argument to the relative path to `html`, where it can find the `package-list` file and pass in only the package names of the packages that you want to update:

```
javadoc -d update -linkoffline . html com.mypackage
```

**Oracle Solaris, Linux, and macOS:** When the `javadoc` command completes, copy these generated class pages in `update/com/package` (not the overview or index) to the original files in the `html/com/package`.

**Windows:** When the `javadoc` command completes, copy these generated class pages in `update\com\package` (not the overview or index) to the original files in `html\com\package`.

## Using the Tag Option

Use `Xaoptcmf` arguments to determine where in the source code the tag is allowed to be placed, and whether the tag can be disabled (using `x`).

### Placement of Tags

You can supply either `a`, to allow the tag in all places, or any combination of the other letters:

- `x` (disable tag)
- `a` (all)
- `o` (overview)
- `p` (packages)

- `t` (types, that is classes and interfaces)
- `c` (constructors)
- `m` (methods)
- `f` (fields)
- `s` (modules)

### Examples of Single Tags

An example of a tag option for a tag that can be used anywhere in the source code is:

```
-tag todo:a:"To Do:".
```

If you want the `@todo` tag to be used only with constructors, methods, and fields, then you use: `-tag todo:cmf:"To Do:"`.

Notice the last colon (:) isn't a parameter separator, but is part of the heading text. You can use either tag option for source code that contains the `@todo` tag, such as: `@todo`  
The documentation for this method needs work.

### Colons in Tag Names

Use a backslash to escape a colon that you want to use in a tag name. Use the `-tag` `ejb\\:bean:a:"EJB Bean:"` option for the following documentation comment:

```
/**  
 * @ejb:bean  
 */
```

### Spell-Checking Tag Names

Some developers put custom tags in the source code that they don't always want to produce as output. In these cases, it's important to list all tags that are in the source code, enabling the ones you want to output and disabling the ones you don't want to output. The presence of `x` disables the tag, while its absence enables the tag. This gives the `javadoc` command enough information to know whether a tag it encounters is unknown, which is probably the results of a typographical error or a misspelling. The `javadoc` command prints a warning in these cases. You can add `x` to the placement values already present, so that when you want to enable the tag, you can simply delete the `x`. For example, if the `@todo` tag is a tag that you want to suppress on output, then you would use: `-tag todo:Xcmf:"To Do:"`. If you would rather keep it simple, then use this: `-tag todo:X`. The syntax `-tag todo:X` works even when the `@todo` tag is defined by a taglet.

### Order of Tags

The order of the `-tag` and `-taglet` options determines the order that the tags are produced. You can mix the custom tags with the standard tags to intersperse them. The tag options for standard tags are placeholders only for determining the order. They take only the standard tag's name. Subheadings for standard tags can't be altered. For example, if the `-tag` option is missing, then the position of the `-taglet` option determines its order. If they're both present, then whichever appears last on the command line determines its order. This happens because the tags and taglets are processed in the order that they appear on the command line. For example, if the `-taglet` and `-tag` options have the name `todo` value, then the one that appears last on the command line determines the order.



### Example of a Complete Set of Tags

This example inserts `To Do` after `Parameters` and before `Throws` in the output. By using `X`, it also specifies that the `@example` tag might be encountered in the source code that shouldn't be displayed during this run. If you use `@argfile` on the command line to specify a file containing options, then you can put the tags on separate lines in an argument file similar to this (no line continuation characters needed):

```
-tag param
-tag return
-tag todo:a:"To Do:"
-tag throws
-tag see
-tag example:X
```

When the `javadoc` command parses the documentation comments, any tag encountered that's neither a standard tag nor passed in with the `-tag` or `-taglet` options is considered unknown, and a warning is thrown.

The standard tags are initially stored internally in a list in their default order. Whenever the `-tag` options are used, those tags get appended to this list. Standard tags are moved from their default position. Therefore, if a `-tag` option is omitted for a standard tag, then it remains in its default position.

### Avoiding Conflicts

If you want to create your own namespace, then you can use a dot-separated naming convention similar to that used for packages: `com.mycompany.todo`. Oracle continues to create standard tags whose names don't contain dots. Any tag that you create overrides the behavior of a tag by the same name defined by Oracle. If you create a `@todo` tag or taglet, then it always has the same behavior that you define, even when Oracle later creates a standard tag of the same name.

### Annotations Versus Javadoc Tags

In general, if the markup that you want to add is intended to affect or produce documentation, then it should be a Javadoc tag. Otherwise, it should be an annotation. See [Custom Tags and Annotations](#) in *How to Write Doc Comments for the Javadoc Tool*.

You can also create more complex block tags or custom inline tags with the `-taglet` option.

## javadoc Command-Line Argument Files

To shorten or simplify the `javadoc` command, you specify one or more files that contain arguments to the `javadoc` command (except `-J` options). This lets you to create `javadoc` commands of any length on any operating system.

When you run the `javadoc` command, pass the path and name of each argument file with the `@` leading character. When the `javadoc` command encounters an argument beginning with the `@` character, it expands the contents of that file into the argument list.

## Examples

### Single Argument File

You can use a single argument file named `argfile` to hold all javadoc command arguments: `javadoc @argfile`.

### Two Argument Files

The argument file contains the contents of both files. You can create two argument files: One for the javadoc command options and the other for the package names or source file names. Notice the following lists have no line-continuation characters.

Create a file named `options` that contains:

#### Oracle Solaris, Linux, and macOS:

```
-d docs-filelist
-use
-splitindex
-windowtitle 'Javadoc'
-doctitle 'Javadoc Guide'
-header '<b>Java™ SE </b>'
-bottom 'Copyright &copy; 1993-2011 Oracle and/or its affiliates. All rights reserved.'
-group "Core Packages" "java.*"
-overview /java/jdk9/docs/api/overview-summary
-sourcepath /java/
```

#### Windows:

```
-d docs-filelist
-use
-splitindex
-windowtitle 'Javadoc'
-doctitle 'Javadoc Guide'
-header '<b>Java™ SE 7</b>'
-bottom 'Copyright &copy; 1993-2011 Oracle and/or its affiliates. All rights reserved.'
-group "Core Packages" "java.*"
-overview \java\jdk9\docs\api\overview-summary.html
-sourcepath \java\
```

Create a file named `packages` that contains:

```
com.mypackage1
com.mypackage2
com.mypackage3
```

Run the javadoc command as follows:

```
javadoc @options @packages
```

### Argument Files with Paths

The argument files can have paths, but any file names inside the files are relative to the current working directory (not `path1` or `path2`):

#### Oracle Solaris, Linux, and macOS:

```
javadoc @path1/options @path2/packages
```

#### Windows:

```
javadoc @path1\options @path2\packages
```

### Option Arguments

The following example saves an argument to a `javadoc` command option in an argument file. The `-bottom` option is used because it can have a lengthy argument. You can create a file named `bottom` to contain the text argument:

```
<font size="-1">  
  <a href="http://bugreport.java.com/bugreport/">Submit a bug or feature</a> </  
font>
```

Run the `javadoc` command as follows: `javadoc -bottom @bottom @packages`.

You can also include the `-bottom` option at the start of the argument file and run the `javadoc` command as follows: `javadoc @bottom @packages`.

## The Standard Doclet

The Standard Doclet is the doclet provided by Oracle that produces Javadoc's default HTML-formatted API output.

This topic contains the following sections:

- [Javadoc Standard Doclet](#)
- [Generated Files](#)

## Javadoc Standard Doclet

Javadoc uses the Standard Doclet if no other doclet is specified using the Javadoc's `-doclet` option on the command line. In JDK 9, the Doclet API has been updated to use newer, more powerful APIs, that can better represent all the recent new language features. The Standard Doclet is updated to use this Doclet API.

The Standard Doclet is the doclet provided by Oracle that produces Javadoc's default HTML-formatted API output. The [API Specification](#) for the Java platform in this JDK documentation is an example of the Standard Doclet's output.

Standard doclet options are described in the `javadoc` section of the *Java Platform, Standard Edition Tools Reference*.

The `-group name p1:p2` groups specified packages together in overview page.

The `-group groupheading packagepattern:packagepattern` separates packages on the overview page into whatever groups you specify, one group per table. You specify each group with a different `-group` option. The groups appear on the page in the order specified on the command line. Packages are alphabetized within a group. For a specified `-group` option, the packages matching the list of `packagepattern` expressions appear in a table with the heading `groupheading`.

- The `groupheading` value can be any text and can include white space. This text is placed in the table heading for the group.
- The `packagepattern` value can be any package name at the start of any package name followed by an asterisk (\*). The asterisk is the only wildcard allowed and means match any characters. Multiple patterns can be included in a group by separating them with colons (:). If you use an asterisk in a pattern or pattern list, then the pattern list must be inside quotation marks, such as `"java.lang*:java.util"`.

When you don't supply a `-group` option, all packages are placed in one group with the heading *Packages* and appropriate subheadings. If the subheadings don't include all documented packages (all groups), then the remaining packages appear in a separate group with the subheading *Other Packages*.

For example, the following `javadoc` command separates the three documented packages into *Core*, *Extension*, and *Other Packages*. The trailing dot (.) doesn't appear in `java.lang*`. Including the dot, such as `java.lang.*` omits the `java.lang` package.

```
javadoc -group "Core Packages" "java.lang*:java.util"  
        -group "Extension Packages" "javax.*"  
        java.lang java.lang.reflect java.util javax.servlet java.new
```

### Core Packages

```
java.lang  
  
java.lang.reflect  
  
java.util
```

### Extension Packages

```
javax.servlet
```

### Other Packages

```
java.new
```

## Generated Files

You use the `javadoc` command as a Standard Doclet that generates HTML-formatted documentation.

The Standard Doclet generates the basic content, cross-reference, and support pages. Each HTML page corresponds to a separate file. The `javadoc` command generates two types of files. The first type is named after classes and interfaces. The second type contains hyphens (such as `package-summary.html`) to prevent conflicts with the first type of file.

### Basic Content Pages

- One class or interface page (`classname.html`) for each class or interface being documented.
- One package page (`package-summary.html`) for each package being documented. The `javadoc` command includes any HTML text provided in a file with the name `package.html` or `package-info.java` in the `package` directory of the source tree.
- One overview page (`overview-summary.html`) for the entire set of packages. The overview page is the front page of the generated document. The `javadoc` command includes any HTML text provided in a file specified by the `-overview` option. The overview page is created only when you pass two or more package names into the `javadoc` command. See [HTML Frames](#) and [Javadoc Doclet Options](#).

## Cross-Reference Pages

- One class hierarchy page for the entire set of packages (`overview-tree.html`). To view the hierarchy page, click **Overview** in the navigation bar and click **Tree**.
- One class hierarchy page for each package (`package-tree.html`). To view the hierarchy page, go to a particular package, class, or interface page, and click **Tree** to display the hierarchy for that package.
- One Use page for each package (`package-use.html`) and a separate Use page for each class and interface (`class-use/classname.html`). The Use page describes what packages, classes, methods, constructors and fields use any part of the specified class, interface, or package. For example, given a class or interface `A`, its Use page includes subclasses of `A`, fields declared as `A`, methods that return `A`, and methods and constructors with parameters of type `A`. To view the Use page, go to the package, class, or interface and click the **Use** link in the navigation bar.
- A deprecated API page (`deprecated-list.html`) that lists all deprecated APIs and their suggested replacements. Avoid deprecated APIs because they can be removed in future implementations.  
A constant field values page (`constant-values.html`) for the values of static fields.
- A serialized form page (`serialized-form.html`) that provides information about serializable and externalizable classes with field and method descriptions. The information on this page is of interest to reimplementors, and not to developers who want to use the API. To access the serialized form page, go to any serialized class and click **Serialized Form** in the **See Also** section of the class comment. The Standard Doclet generates a serialized form page that lists any class (public or non-public) that implements `Serializable` with its `readObject` and `writeObject` methods, the fields that are serialized, and the documentation comments from the `@serial`, `@serialField`, and `@serialData` tags. Public `Serializable` classes can be excluded by marking them (or their package) with `@serial exclude`, and package-private `Serializable` classes can be included by marking them (or their package) with an `@serial include`. You can generate the complete serialized form for public and private classes by running the `javadoc` command without specifying the `-private` option. See [Javadoc Doclet Options](#).
- An index page (`index-*.html`) of all class, interface, constructor, field and method names, in alphabetical order. The index page is internationalized for Unicode and can be generated as a single file or as a separate file for each starting character (such as A–Z for English).

## Support Pages

- A help page (`help-doc.html`) that describes the navigation bar and the previous pages. Use `-helpfile` to override the default help file with your own custom help file.
- One `index.html` file that creates the HTML frames for display. Load this file to display the front page with frames. The `index.html` file contains no text content.
- Several frame files (`*-frame.html`) that contains lists of packages, classes, and interfaces. The frame files display the HTML frames.
- A `package-list` file that is used by the `-link` and `-linkoffline` options. The package list file is a text file that is not reachable through links.

- A style sheet file (`stylesheet.css`) that controls a limited amount of color, font family, font size, font style, and positioning information on the generated pages.
- A `doc-files` directory that holds image, example, source code, or other files that you want copied to the destination directory. These files aren't processed by the `javadoc` command. This directory is not processed unless it exists in the source tree.

See [Javadoc Doclet Options](#).

## HTML Frames

The `javadoc` command generates the minimum number of frames necessary (two or three) based on the values passed to the command. It omits the list of packages when you pass a single package name or source files that belong to a single package as an argument to the `javadoc` command. Instead, the `javadoc` command creates one frame in the left-hand column that displays the list of classes. When you pass two or more package names, the `javadoc` command creates a third frame that lists all packages and an overview page (`overview-summary.html`). The HTML frames are disabled by default, but can be enabled by the `--frames` option. To bypass frames, click the **No Frames** link or enter the page set from the `overview-summary.html` page. The Javadoc Search feature provides a better way to navigate and saves screen space.

## Generated File Structure

The generated class and interface files are organized in the same directory hierarchy that Java source files and class files are organized. This structure is one directory per subpackage.

**Oracle Solaris, Linux, and macOS:** For example, the document generated for the `java.math.BigDecimal` class would be located at `java/math/BigDecimal.html`.

**Windows:** For example, the document generated for the `java.math.BigDecimal` class would be located at `java\math\BigDecimal.html`.

The file structure for the `java.math` package follows, assuming that the destination directory is named `apidocs`. All files that contain the word *frame* appear in the upper-left or lower-left frames, as noted. All other HTML files appear in the right-hand frame.

Directories are bold. The asterisks (\*) indicate the files and directories that are omitted when the arguments to the `javadoc` command are source file names rather than package names. When arguments are source file names, an empty package list is created. The `doc-files` directory isn't created in the destination unless it exists in the source tree.

## Generated API Declarations

The `javadoc` command generates a declaration at the start of each class, interface, field, constructor, and method description for that API item. For example, the declaration for the `Boolean` class is:

```
public final class Boolean
extends Object
implements Serializable
```

The declaration for the `Boolean.valueOf` method is:

```
public static Boolean valueOf(String s)
```

The `javadoc` command can include the modifiers `public`, `protected`, `private`, `abstract`, `final`, `static`, `transient`, and `volatile`, but not `synchronized` or `native`. The `synchronized` and `native` modifiers are considered implementation detail and not part of the API specification.

Rather than relying on the keyword `synchronized`, APIs should document their concurrency semantics in the main description of the comment. For example, a description might be:

```
A single enumeration cannot be used by multiple threads concurrently.
```

The document shouldn't describe how to achieve these semantics. As another example, while the `Hashtable` option should be thread-safe, there is no reason to specify that it's achieved by synchronizing all of its exported methods. It's better to reserve the right to synchronize internally for higher concurrency.

## Examples of Running the javadoc Command

You can run the `javadoc` command on entire packages or individual source files. Use the public programmatic interface to call the `javadoc` command from within programs written in the Java language.

The release number of the `javadoc` command can be determined with the `javadoc -J-version` option. The release number of the Standard Doclet appears in the output stream. It can be turned off with the `-quiet` option.

Use the public programmatic interface in `com.sun.tools.javadoc.Main` (and the `javadoc` command is reentrant) to call the `javadoc` command from within programs written in the Java language.

The following instructions call the Standard HTML Doclet. To call a custom doclet, use the `-doclet` and `-docletpath` options.

### Simple Examples

The following are simple examples of running the `javadoc` command on entire packages or individual source files. Each package name has a corresponding directory name.

**Oracle Solaris, Linux, and macOS:** In the following examples, the source files are located at `/home/src/java/awt/*.java`. The destination directory is `/home/html`.

**Windows:** In the following examples, the source files are located at `C:\home\src\java\awt*.java`. The destination directory is `C:\home\html`.

**Document One or More Packages:** To document a package, the source files for that package must be located in a directory that has the same name as the package.

### Oracle Solaris, Linux, and macOS:

- If a package name has several identifiers (separated by dots, such as `java.awt.color`), then each subsequent identifier must correspond to a deeper subdirectory (such as `java/awt/color`).
- You can split the source files for a single package among two such directory trees located at different places, as long as the `-sourcepath` option points to them both. For example, `src1/java/awt/color` and `src2/java/awt/color`.

### Windows:

- If a package name has several identifiers (separated by dots, such as `java.awt.color`), then each subsequent identifier must correspond to a deeper subdirectory (such as `java\awt\color`).
- You can split the source files for a single package among two such directory trees located at different places, as long as the `-sourcepath` option points to them both. For example, `src1\java\awt\color` and `src2\java\awt\color`.

You can run the `javadoc` command either by changing directories (with the `cd` command) or by using the `-sourcepath` option. The following examples illustrate both alternatives:

### Example 1 Recursive Run from One or More Packages

This example uses `-sourcepath` so the `javadoc` command can be run from any directory for recursion. It traverses the subpackages of the Java directory excluding packages rooted at `java.net` and `java.lang`. Notice this excludes `java.lang.ref`, a subpackage of `java.lang`. To also traverse down other package trees, append their names to the `-subpackages` argument, such as `java:javax:org.xml.sax`.

```
javadoc -d /home/html -sourcepath /home/src -subpackages java -exclude
```

### Example 2 Change to Root and Run Explicit Packages

1. Change to the parent directory of the fully qualified package.
2. Run the `javadoc` command with the names of one or more packages that you want to document:

#### Oracle Solaris, Linux, and macOS:

```
cd /home/src/  
javadoc -d /home/html java.awt java.awt.event
```

#### Windows:

```
cd C:\home\src\  
javadoc -d C:\home\html java.awt java.awt.event
```

To also traverse down other package trees, append their names to the `-subpackages` argument, such as `java:javax:org.xml.sax`.

### Example 3 Run from Any Directory on Explicit Packages in One Tree

In this case, it doesn't matter what the current directory is. Run the `javadoc` command and use the `-sourcepath` option with the parent directory of the top-level package. Provide the names of one or more packages that you want to document:

#### Oracle Solaris, Linux, and macOS:

```
javadoc -d /home/html -sourcepath /home/src java.awt java.awt.event
```

#### Windows:

```
javadoc -d C:\home\html -sourcepath C:\home\src java.awt java.awt.event
```

### Example 4 Run from Any Directory on Explicit Packages in Multiple Trees

Run the `javadoc` command and use the `-sourcepath` option with a colon-separated list of the paths to each tree's root. Provide the names of one or more packages that you want to document. All source files for a specified package don't need to be located under a single root directory, but they must be found somewhere along the source path.

#### Oracle Solaris, Linux, and macOS:



```
javadoc -d /home/html -sourcepath /home/src1:/home/src2 java.awt java.awt.event
```

**Windows:**

```
javadoc -d C:\home\html -sourcepath C:\home\src1;C:\home\src2 java.awt  
java.awt.event
```

The result is that all cases generate HTML-formatted documentation for the `public` and `protected` classes and interfaces in packages `java.awt` and `java.awt.event` and save the HTML files in the specified destination directory. Because two or more packages are being generated, the document has three HTML frames: one for the list of packages, another for the list of classes, and the third for the main class pages.

**Document One or More Classes**

The second way to run the `javadoc` command is to pass one or more source files. You can run `javadoc` either of the following two ways: by changing directories (with the `cd` command) or by fully specifying the path to the source files. Relative paths are relative to the current directory. The `-sourcepath` option is ignored when passing source files. You can use command-line wildcards, such as an asterisk (\*), to specify groups of classes.

**Example 1 Change to the Source Directory**

Change to the directory that holds the source files. Then run the `javadoc` command with the names of one or more source files, you want to document.

This example generates HTML-formatted documentation for the classes `Button`, `Canvas`, and classes that begin with `Graphics`. Because source files rather than package names were passed in as arguments to the `javadoc` command, the document has two frames: one for the list of classes and the other for the main page.

**Oracle Solaris, Linux, and macOS:**

```
cd /home/src/java/awt  
javadoc -d /home/html Button.java Canvas.java Graphics*.java
```

**Windows:**

```
cd C:\home\src\java\awt  
javadoc -d C:\home\html Button.java Canvas.java Graphics*.java
```

**Example 2 Change to the Root Directory of the Package**

This is useful for documenting individual source files from different subpackages off of the same root. Change to the package root directory, and specify the source files with paths from the root.

**Oracle Solaris, Linux, and macOS:**

```
cd /home/src/  
javadoc -d /home/html java/awt/Button.java java/math/BigDecimal.java
```

**Windows:**

```
cd C:\home\src  
javadoc -d \home\html java\awt\Button.java java\math\BigDecimal.java
```

**Example 3 Document Files from Any Directory**

In this case, it doesn't matter what the current directory is. Run the `javadoc` command with the absolute path (or path relative to the current directory) to the source files that you want to document.

**Oracle Solaris, Linux, and macOS:**

```
javadoc -d /home/html /home/src/java/awt/Button.java \  
/home/src/java/awt/Graphics*.java
```

**Windows:**

```
javadoc -d C:\home\html C:\home\src\java\awt\Button.java ^  
C:\home\src\java\awt\Graphics*.java
```

**Document Packages and Classes**

You can document entire packages and individual classes at the same time. The following is an example that mixes two of the previous examples. You can use the `-sourcepath` option for the path to the packages but not for the path to the individual classes.

**Example 1****Oracle Solaris, Linux, and macOS:**

```
javadoc -d /home/html -sourcepath /home/src java.awt \  
/home/src/java/math/BigDecimal.java
```

**Example 2****Windows:**

```
javadoc -d C:\home\html -sourcepath C:\home\src java.awt ^  
C:\home\src\java\math\BigDecimal.java
```

**Notes**

- If you omit the `-windowtitle` option, then the `javadoc` command copies the document title to the window title. The `-windowtitle` option text is similar to the `-doctitle` option, but without HTML tags to prevent those tags from appearing as just characters (plain text) in the window title.
- If you omit the `-footer` option, then the `javadoc` command copies the header text to the footer.
- Other important options you might want to use, but weren't needed in the previous example, are the `-classpath` and `-link` options.
- The `javadoc` command reads only files that contain valid class names. If the `javadoc` command isn't correctly reading the contents of a file, then verify that the class names are valid.