Lab 2. Using Maven

In this lab, we will cover the following topics:

- Creating a simple project with Maven
- Building a simple project with Maven
- Creating a new Maven project in Eclipse
- Importing an existing Maven project in Eclipse

Creating a simple project with Maven

Let's start creating the first simple project using Maven, by performing the following steps:

1. Open a command prompt and change the directory to the folder in which you want to create your first Maven project.
2. Run the following command:

```
mvn archetype:generate -DgroupId=com.fenago.maven -DartifactId=simple-project -
DarchetypeArtifactId=maven-archetype-quickstart -DinteractiveMode=false
```

```
You can change the `groupId` and `artifactId`
values in the preceding command as per your requirement.
```

3. You will see Maven downloading a bunch of files:

```
Downloading:
https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-
plugin/2.5/maven-clean-plugin-2.5.pom
Downloaded:
https://repo.maven.apache.org/maven2/org/apache/maven/plugins/maven-clean-
plugin/2.5/maven-clean-plugin-2.5.pom (4 KB at 1.4 KB/sec)
```

4. Then it will start generating sources:

```
[INFO] >>> maven-archetype-plugin:2.2:generate (default-cli) > generate-sources
@ standalone-pom >>>
```

5. When Maven has completed generating sources, it will create the project that we want:

```
[INFO] Using following parameters for creating project from Old (1.x)
Archetype:
maven-archetype-quickstart:1.0
[INFO] ----------------------------------------------------------------------
----
[INFO] Parameter: groupId, Value: com.fenago.maven
[INFO] Parameter: packageName, Value: com.fenago.maven
[INFO] Parameter: package, Value: com.fenago.maven
[INFO] Parameter: artifactId, Value: simple-project
[INFO] Parameter: basedir, Value: maven-course
[INFO] Parameter: version, Value: 1.0-SNAPSHOT
```

```
[INFO] project created from Old (1.x) Archetype in dir: maven-course\simple-
project
```

How it works...

You will notice the following things:

- The Maven project configuration file `pom.xml` is created in the root of the `simple-project` folder. We will explore this file in detail in subsequent sections.
- A bunch of folders are created:
    - `src\main\java` : This is for Java source files
    - `src\test\java` : This is for Java test source files
    - `src\main\resources` : This is for resource files for the project
    - `src\test\resources` : This is for resource files for the test
- Within each of the preceding folders, a folder structure corresponding to the `groupId` (`org.fenago.maven`) is created.

The following are essentially Maven conventions at work:

- Maven expects all Java source files to reside `in src\main\java`
- Similarly, it expects all Java test files to reside in `src\test\java`
- It expects all project resources to reside in `src\main\resources` and test resources to reside in `src\test\resources`
- It expects that source files will typically have the same package structure as the `groupId` parameter (though this is not mandatory)
- Two sample classes, namely `App.java` and `AppTest.java`, are also created and it is not expected that they will be used beyond testing how Maven works

In this case, Maven downloads the `archetype` plugin. This plugin, in turn, can depend on another plugin. In this case, the latter plugin gets downloaded. This happens in a recursive fashion and, at the end of the process, all the relevant plugins required to run the specified command are downloaded.

Building a simple project with Maven

Let us now build the project that was created in the preceding section.

How to do it...

To build the previously created simple project with Maven, perform the following steps:

1. Open the command prompt and run the following command, changing the directory to the folder the project was created:

```
cd simple-project/

mvn package
```

2. Observe the following things in the output:

   Notice the following warning (we will see how to resolve this later in this course):

   ```
   [INFO] --- maven-resources-plugin:2.6:resources (default-resources) @ simple-
   project ---
   [WARNING] Using platform encoding (Cp1252 actually) to copy filtered resources,
   i.e. build is platform dependent!
   ```

```
Check if the sources are compiled:

```
[INFO] --- maven-compiler-plugin:3.1:compile (default-compile) @ simple-project
```


Check if the tests are run:

```
[INFO] --- maven-surefire-plugin:2.12.4:test (default-test) @ simple-project ---
[INFO] Surefire report directory: maven-course\simple-project\target\surefire-reports
-------------------------------------------------------
 T E S T S
-------------------------------------------------------
Running com.fenago.maven.AppTest
Tests run: 1, Failures: 0, Errors: 0, Skipped: 0, Time elapsed: 0.005 sec
```
```

3. A JAR file is now created.

How it works...

In this case, the `package` phase executes in the following order:

- Validate
- Compile
- Test
- Package

The `validate` phase makes sure that the project (specifically the `pom.xml` file that describes the project) is in order and all the necessary information to run the project is available.

The `compile` phase compiles the sources.

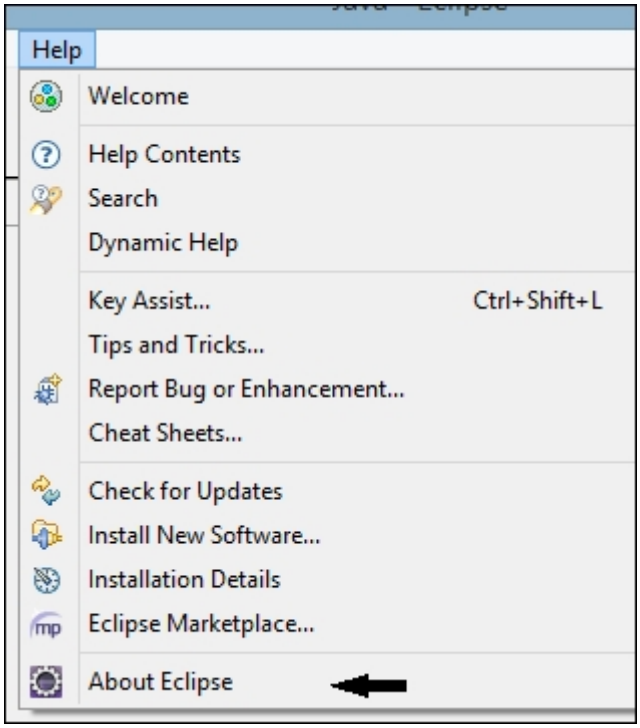
The `test` phase compiles the test sources and then runs the test using a suitable test framework. In the earlier example, the **JUnit** framework is used to run the tests.

The `package` phase packages the artifacts to the format specified in the `pom.xml` file.

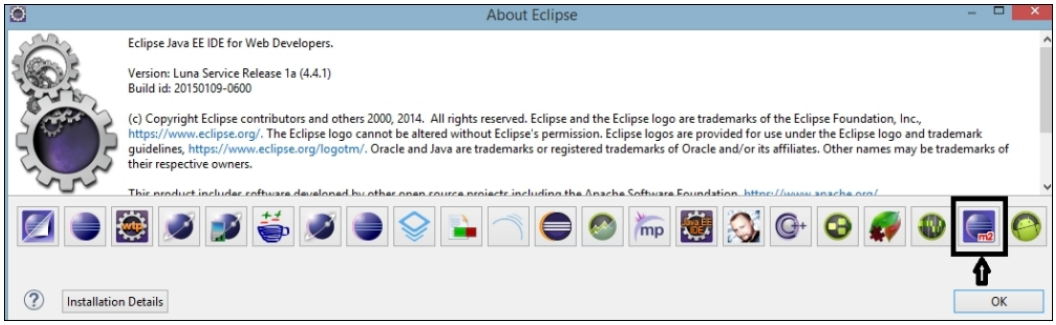
Creating a new Maven project in Eclipse

The recent versions of Eclipse come preinstalled with Maven support. Let us confirm this by performing the following steps:

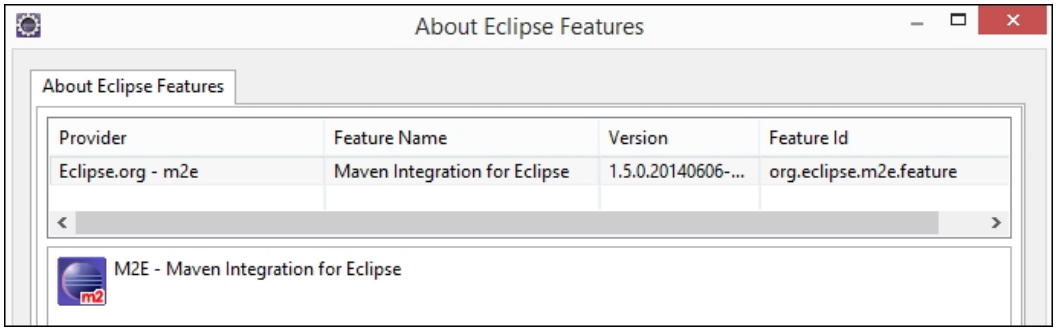
1. Launch Eclipse and click on the **About Eclipse** button in the **Help** menu, as shown in the following screenshot:



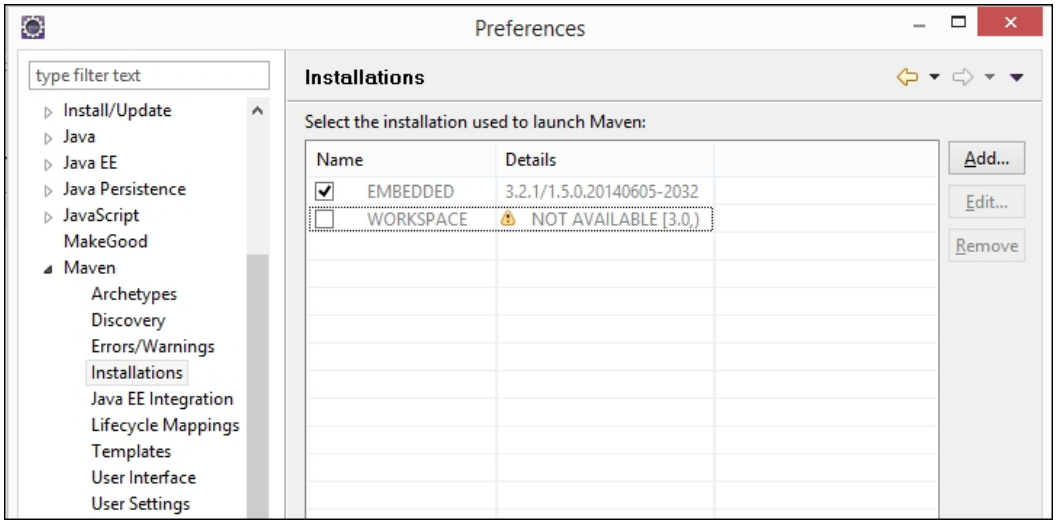
2. Click on the **m2** icon from the list of icons that you see:



3. On clicking the **m2** icon, you should see something similar to the following screenshot:



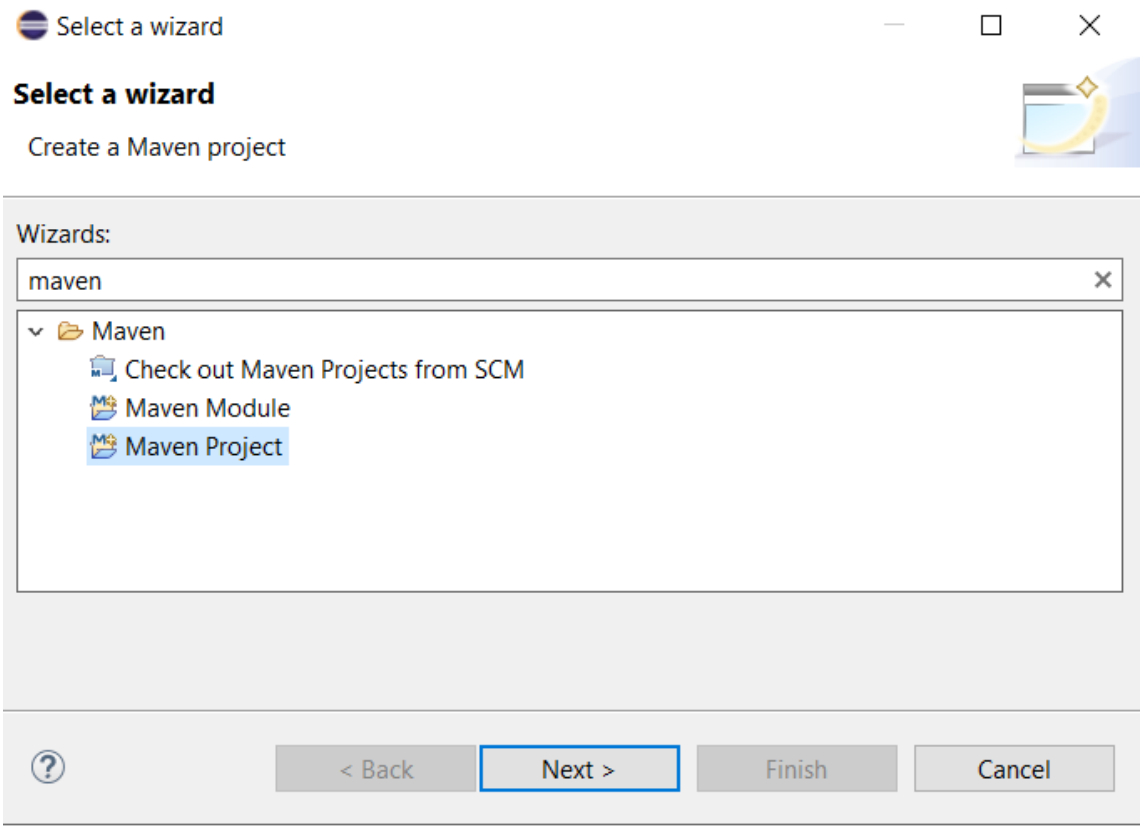
4. Click on the **Maven** link by navigating to **Window** | **Preferences** from the Eclipse menu bar.
5. Click on **Installations**. You will see the existing installations available to Eclipse. It uses an **EMBEDDED** installation of Maven that comes with Eclipse, as shown in the following screenshot:

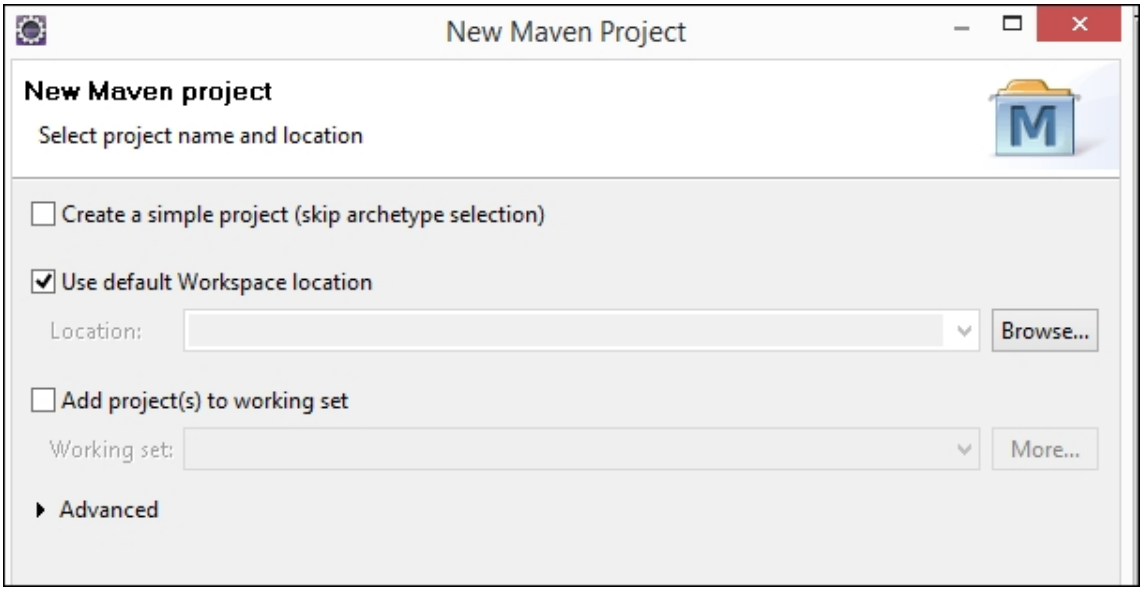


Create Maven project

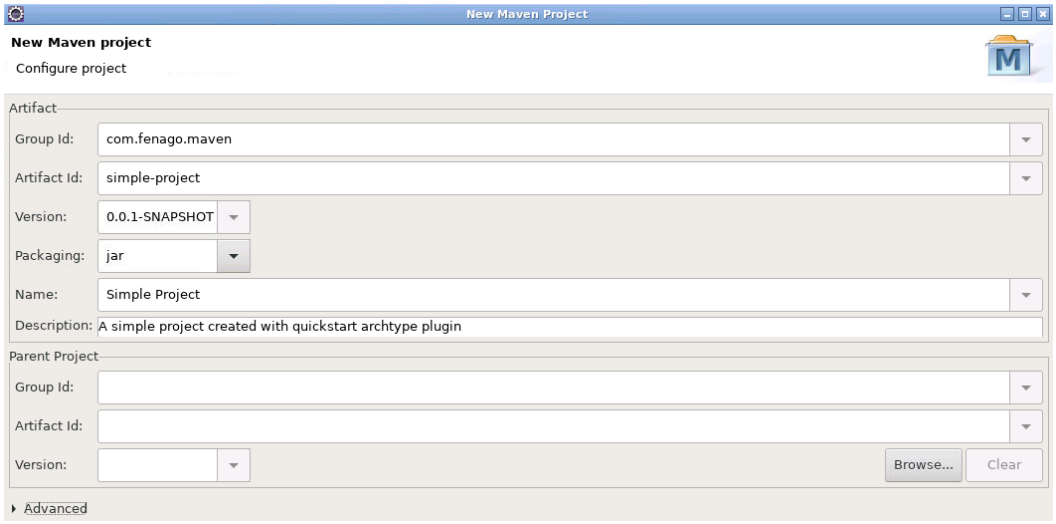
To create a new Maven project, perform the following steps:

1. Navigate to **File** | **New** | **Other** | **Maven Project**. You will see the following screen:

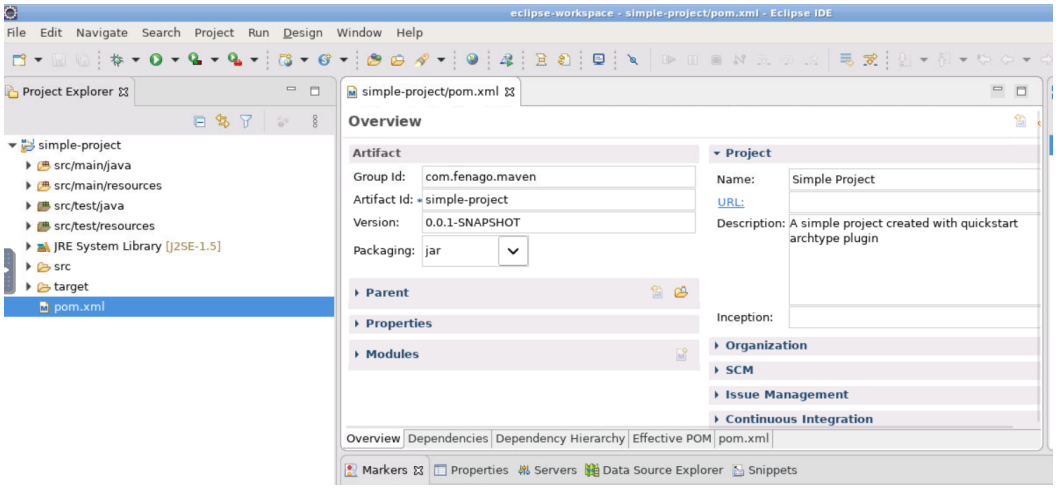




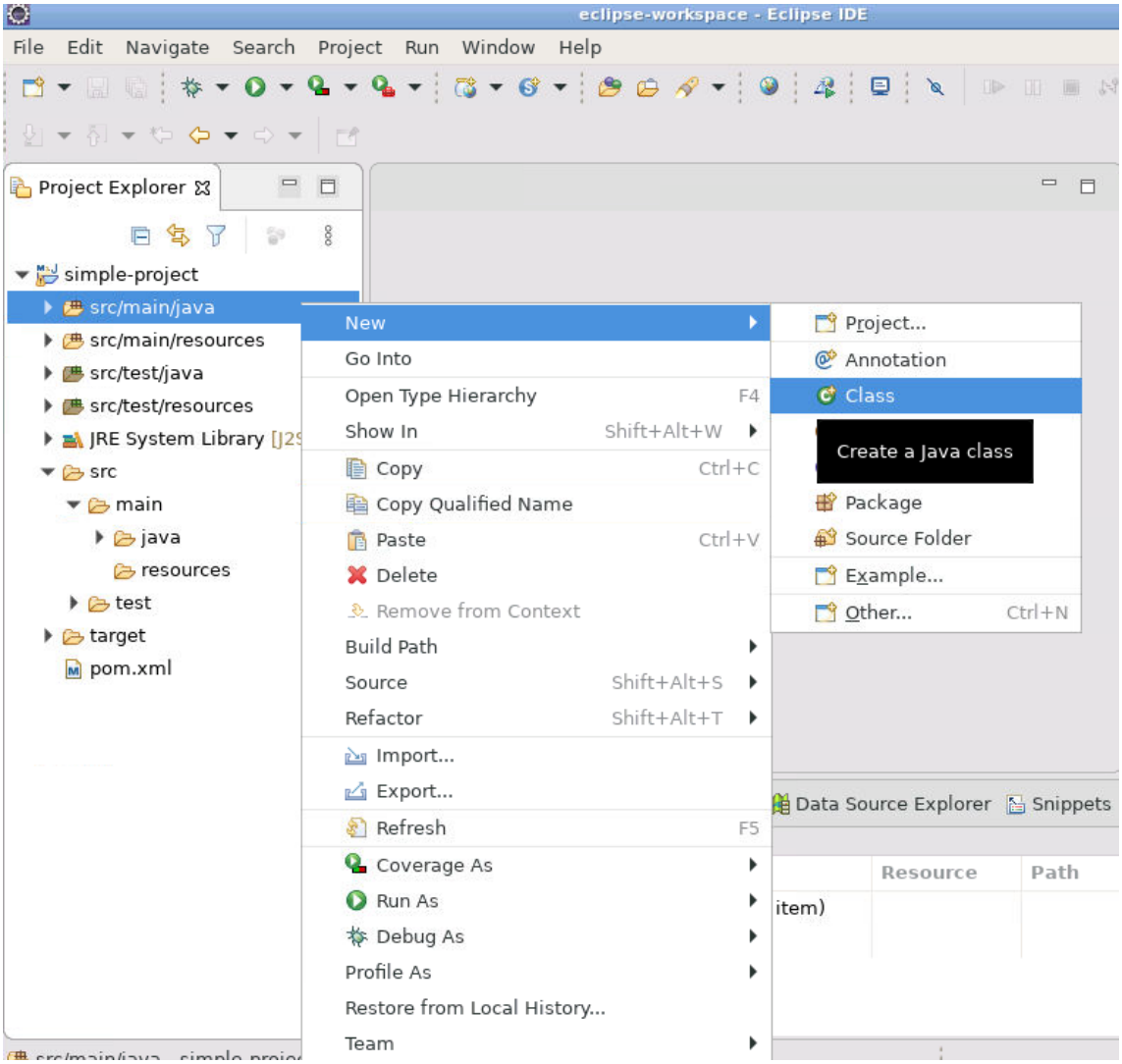
2. Check the **Create a simple project (skip archetype selection)** option to avoid choosing what to create.
3. Fill the same values that we specified as parameters in the *Lab 1*, (**Group Id:** `com.fenago.maven`, **Artifact Id:** `simple-project`) to create a simple Maven project.



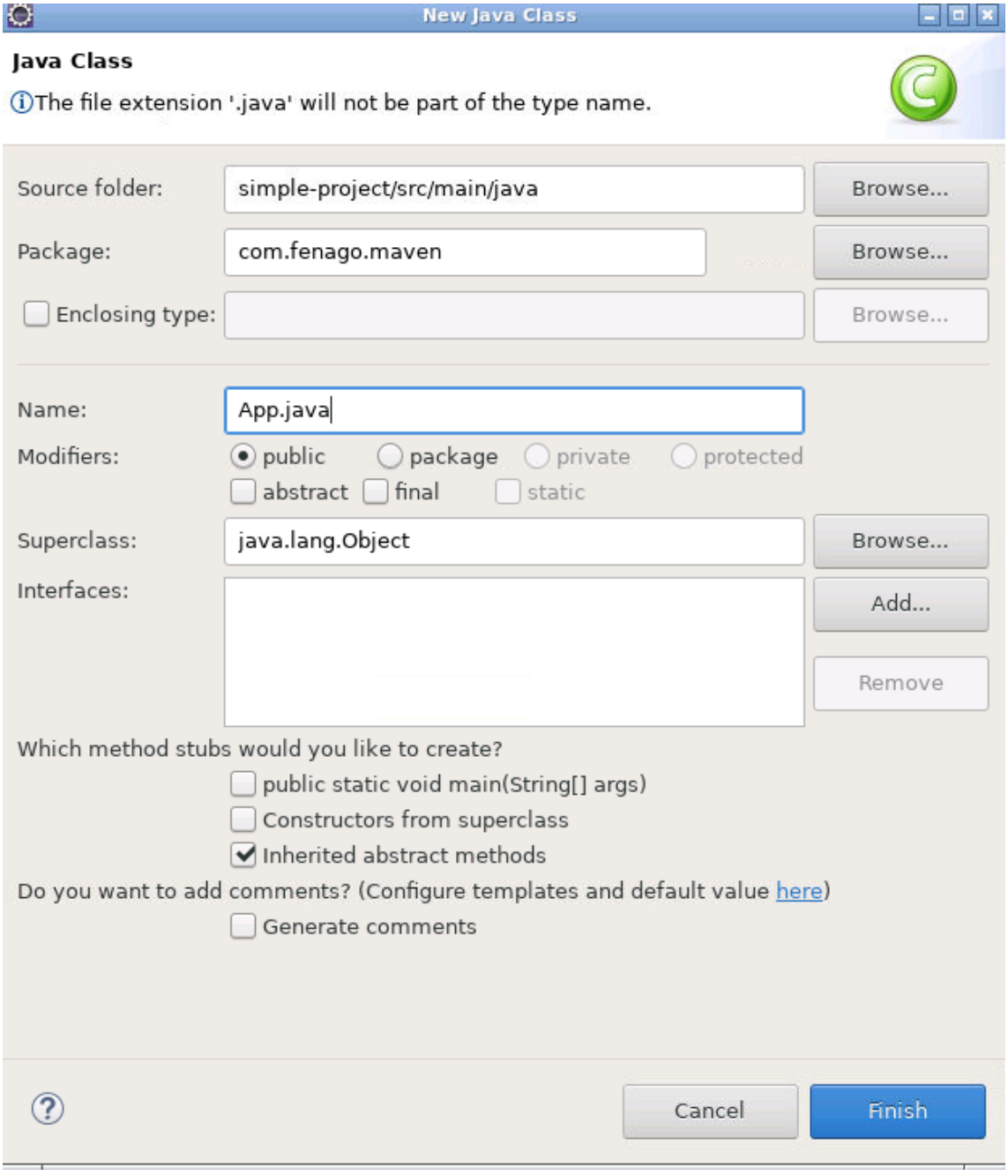
4. Click on **Finish**. Your project is now set up. Click on the `pom.xml` file. You will see the following screenshot:



5. Create New Class as shown below:



6. Use following parameters and click `Finish`:

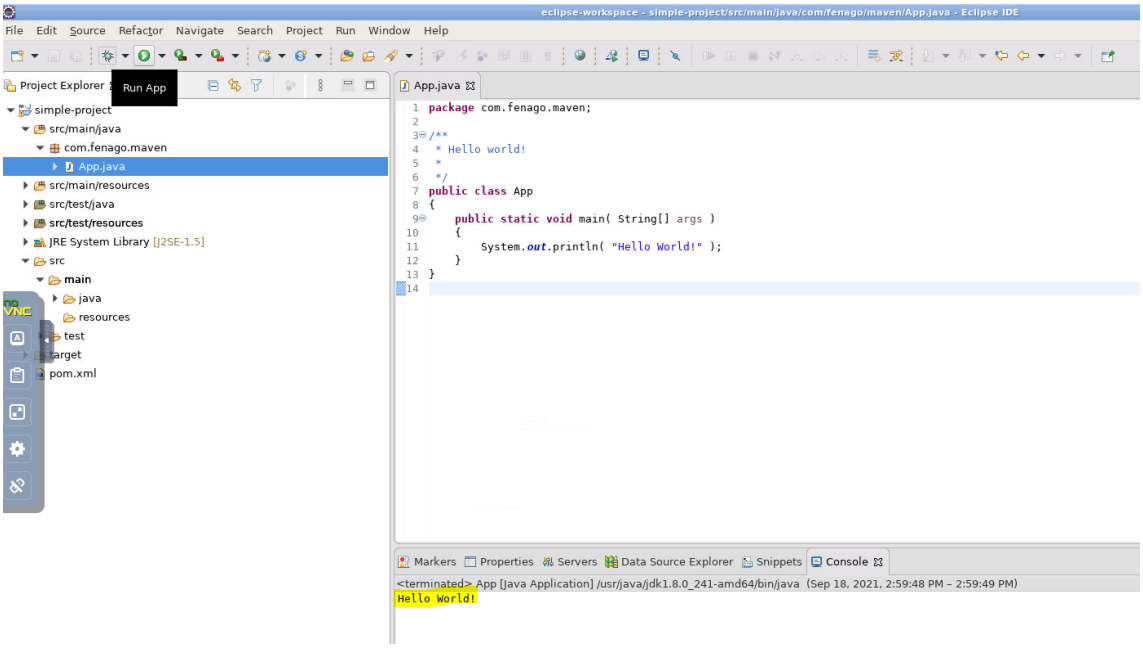


6. Copy following code in `App.java` and run the application:

```
package com.fenago.maven;

/**
 * Hello world!
 *
 */
public class App
{
    public static void main( String[] args )
```

```
    {
        System.out.println( "Hello World!" );
    }
}
```



Eclipse invokes the Maven archetype plugin to create a quick start project. The Eclipse console shows the steps performed, and the project is created.

The folder structure and contents are identical to the project created from the command-line.

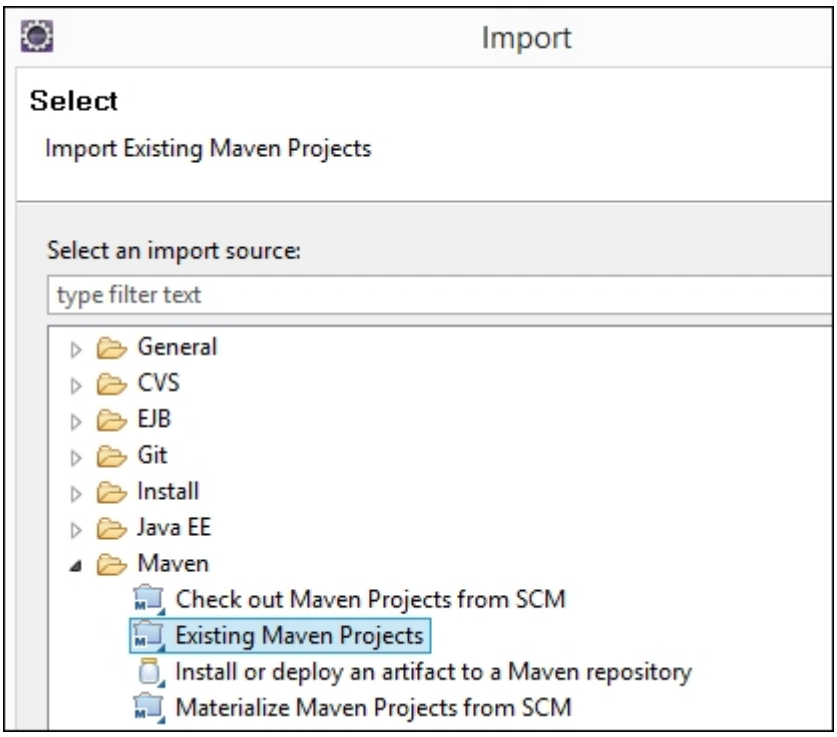
Importing an existing Maven project in Eclipse

If you have already set up a Maven project from the command-line, then it can easily be imported to Eclipse.

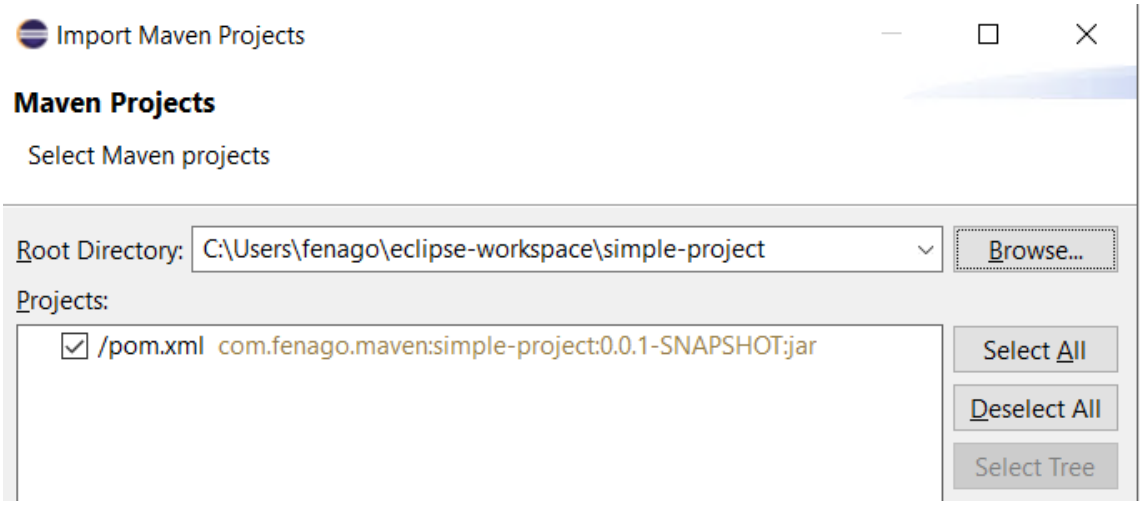
How to do it...

To import an existing Maven project in Eclipse, perform the following steps:

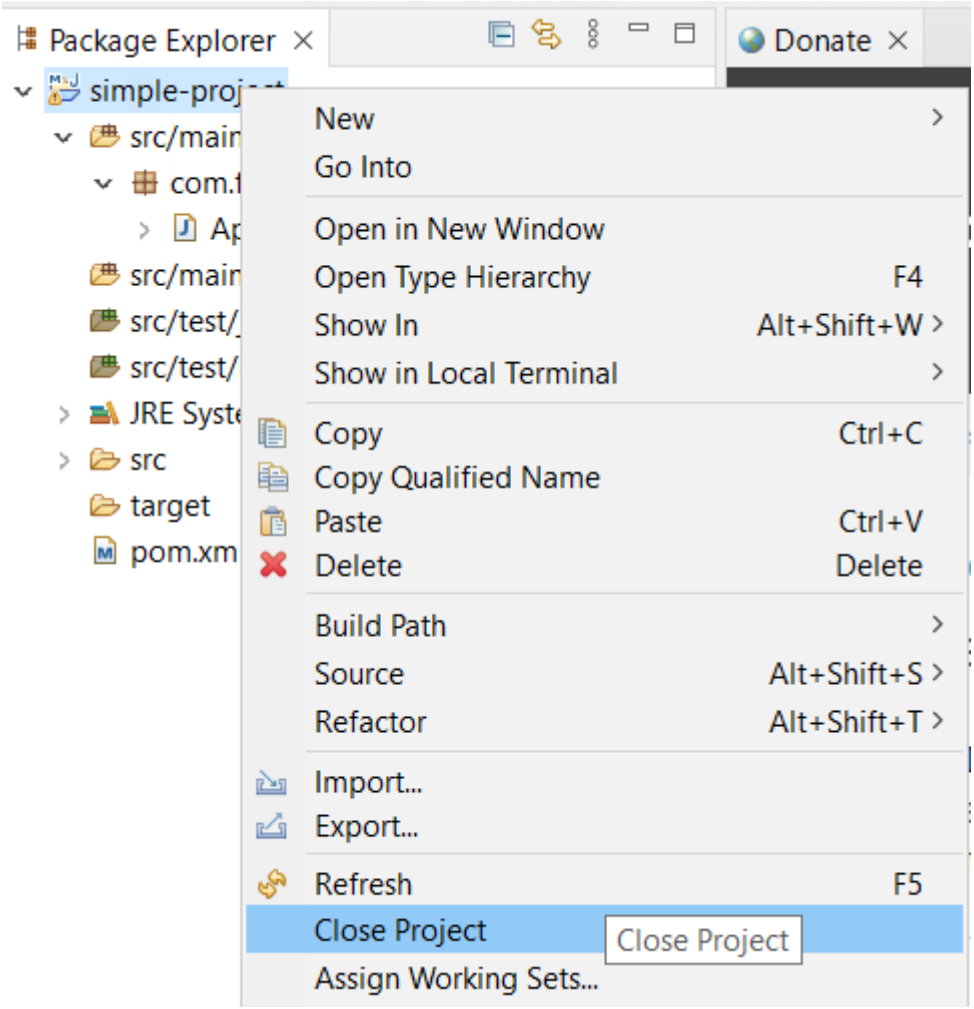
1. Navigate to **File** | **Import...** and click on **Maven**:



2. Choose the project we created earlier:



Note: You will need to close project first to be able to import it:



3. Import the project. You will see contents identical to what we saw when creating a new Maven project.

How it works...

Eclipse has built-in support for Maven projects. When a Maven project is imported, it parses the pom file, `pom.xml`, for the specified project. Based on the project's pom configuration file, it creates relevant Eclipse configurations to recognize source files, tests, and artifacts.