AMBIENTE DI SVILUPPO JAVA

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argomenti

- Risorse per la programmazione
- Ambiente di sviluppo (IDE)

risorse per la programmazione

- "The Java Tutorial"

  http://docs.oracle.com/javase/tutorial/

"*The Java Tutorials are practical guides for programmers who want to use the Java programming language to create applications. They include hundreds of complete, working examples, and dozens of lessons.*"

- JDK Documentation

  http://docs.oracle.com/javase/11/docs/
- JAVA API

  http://docs.oracle.com/javase/11/docs/api/

*Le Application Programming Interface **API**, sono ogni insieme di procedure disponibili, in genere raggruppate a formare un set di strumenti specifici per un determinato compito.*

risorse per la programmazione

LIBRI:

- "Thinking in Java", Bruce Eckel (www.bruceeckel.com)

LINK:

- www.mokabyte.it, rivista italiana su Java

Versione di JAVA in laboratorio:

Java SE Development Kit (JDK) 7 - build 51

ambienti di sviluppo

- Netbeans (**www.netbeans.org**), potente ambiente di sviluppo multi-linguaggio scritto in JAVA. Ufficialmente scelto da SUN. (gratuito)

- Eclipse (**www.eclipse.org**), un IDE gratuito con molte funzioni utili.

- JUnit (**www.junit.org**), per il testing.

- IntelliJ IDEA (**www.jetbrains.com/idea/**), IDE scaricabile gratuitamente, con versione a pagamento con maggiori funzionalità.

Hello World 1

```
public class Hello {

  public static void main(String[] args){

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

}
```

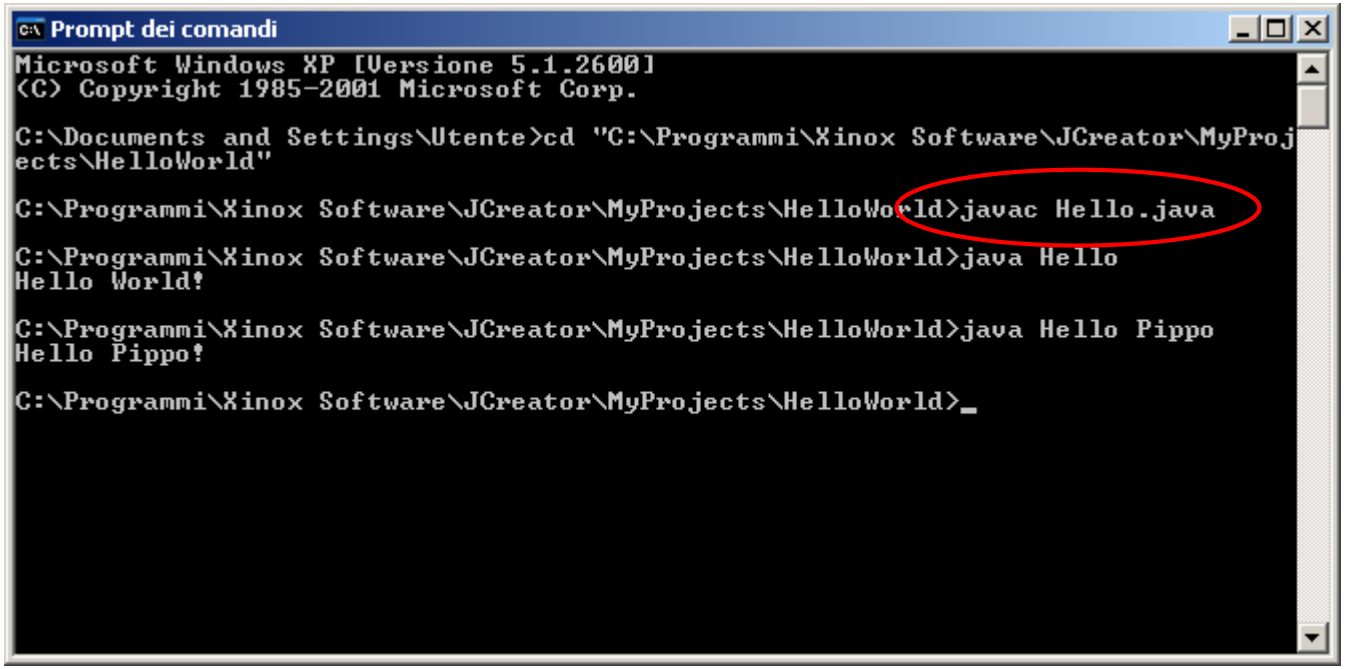
Hello World 2

```
public class Hello {

  public static void main(String[] args){

    if (args.length >= 1) {
      System.out.println("Hello " + args[0] + "!");
    } else {
      System.out.println("Hello World!");
    }
  }

}
```

Hello World

Eseguire il programma da riga di comando.

Assicurarsi che il percorso dove risiedono “java.exe” e “javac.exe” sia nel PATH di sistema.



Compilazione

Eclipse Tutorial

Thanks to Sandeep Pasuparthy

- In this tutorial we will be walking through a small demo application using the Eclipse Development Environment. Previous knowledge of any kind of tool is not necessary, but can be helpful when understanding why we are following certain steps or how we are making this application work.

- **www.eclipse.org**

What's Eclipse?

- It is a free software / **open source** platform-independent software framework for delivering what the project calls "rich-client applications"
- It is an **Integrated Development Environment** (IDE), that allows to manage the whole development process of Java applications, by providing many features for programming (editor, debugger, etc.)
- It supports other languages by means of plug-ins (C/C++)
- Multi-platform (Linux, Windows, Mac OS)

What's Eclipse?

- Eclipse is also a community of users, constantly extending the covered application areas.
- Eclipse was originally developed by IBM as the successor of its VisualAge family of tools.
- Eclipse is now managed by the Eclipse Foundation, an independent not-for-profit consortium of software industry vendors.

Getting Eclipse

- In the Lab: already installed.

- On your laptop
  - You will need to install a Java Virtual Machine (JVM)
    - http://www.oracle.com/technetwork/java/javase/downloads/index.html (JDK)
  - Download the latest version at:
    - https://eclipse.org/downloads/ (Eclipse IDE for Java Developers)
    - Decompress the downloaded package and click eclipse.exe (under Windows) or run eclipse (under Linux)
  - Installation steps at http://wiki.eclipse.org/Eclipse/Installation

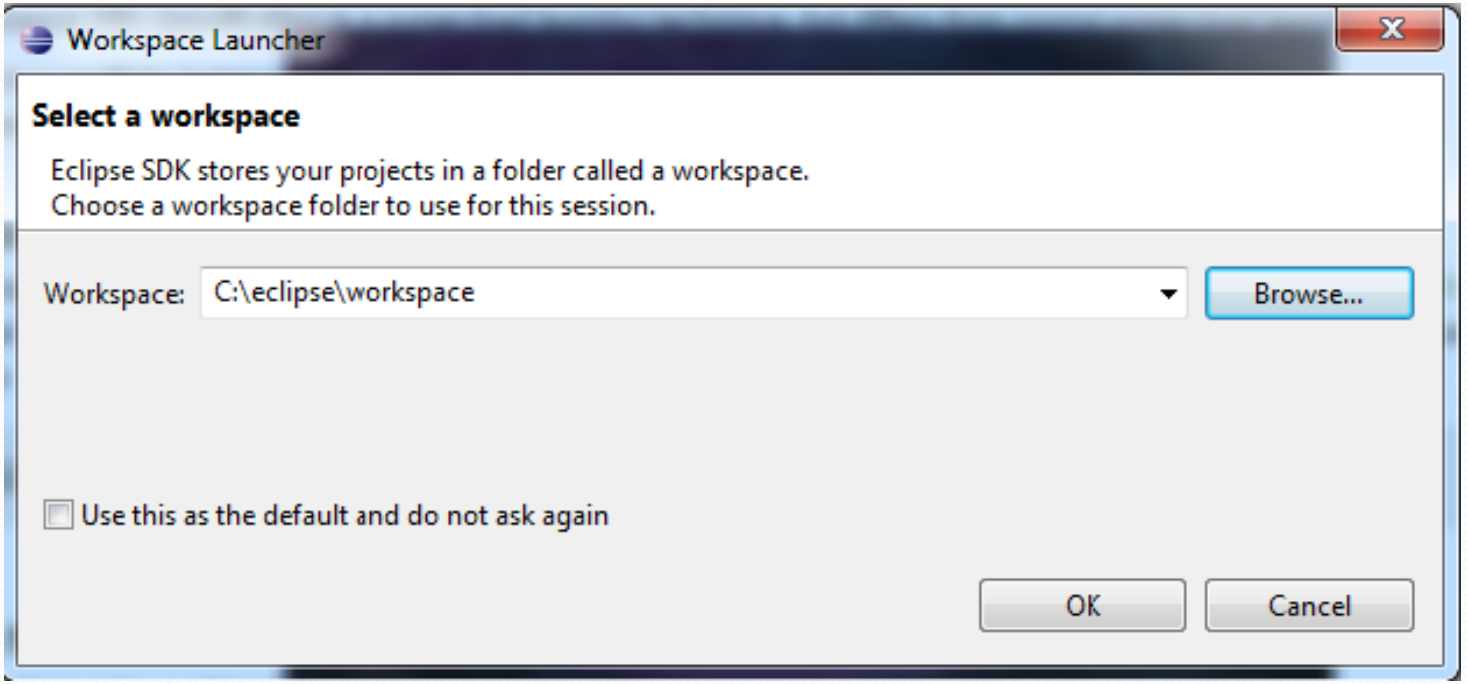
Essentials of Eclipse

Before going into Eclipse, some of the basic stuff you need to know are:

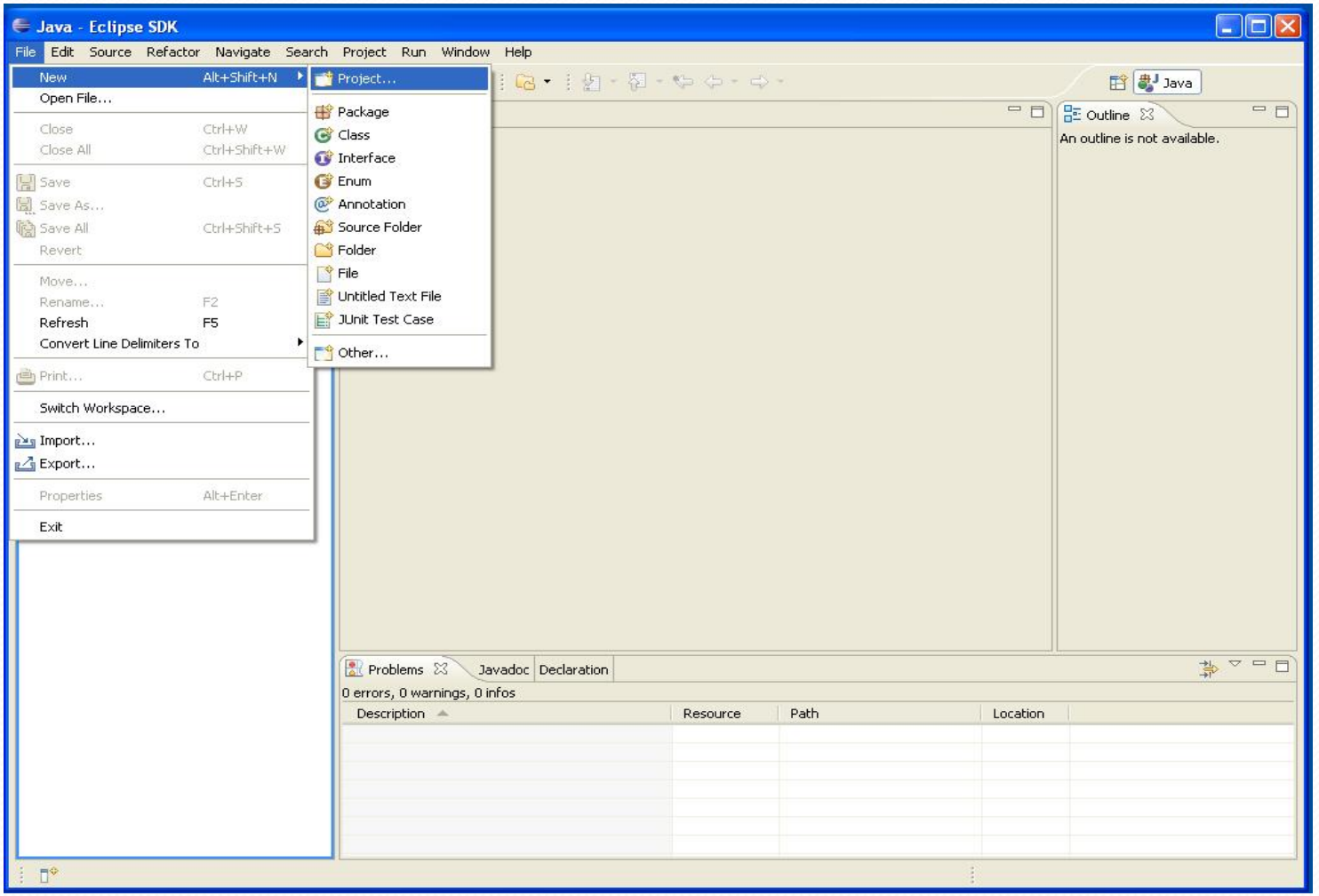
- In Eclipse you need to start of with **creating a project**.
- Then choosing a particular project, we **create** our **java file** in it. No need to worry, it is simple and you will learn it by the end of this presentation.
- In Eclipse you need not remember the exact command syntax, it helps you writing the commands.
- Just by saving a file, Eclipse compiles the program by default. It makes work easy for programmers.
- Just go step by step.

Let’s start with basic stuff

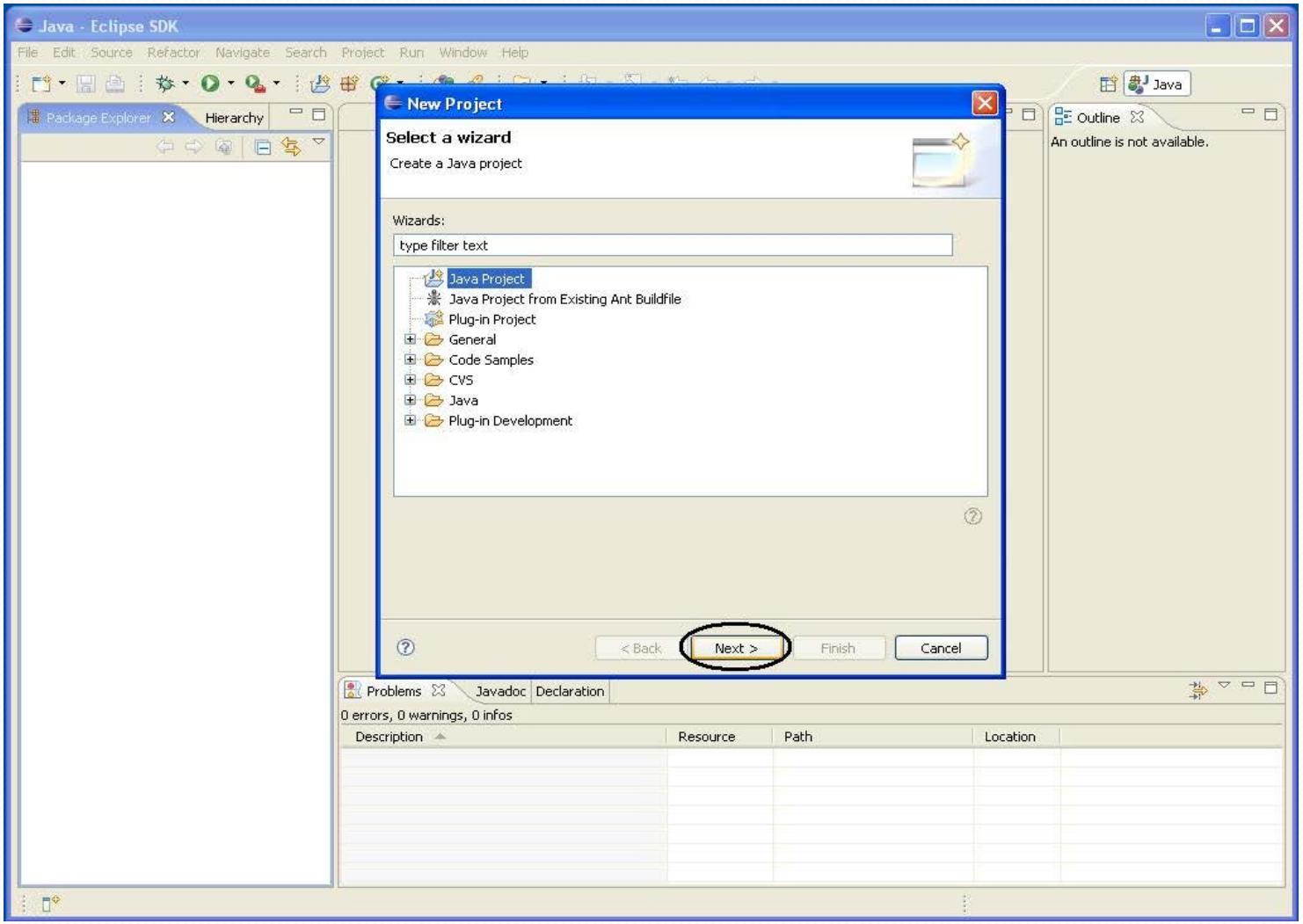
Step1: Open Eclipse from start on your system, choose your workspace: workspace is the directory where the projects will be stored.



Step2: In Eclipse when ever you want to create a class, you need to select the new project by default (File → New → Project).

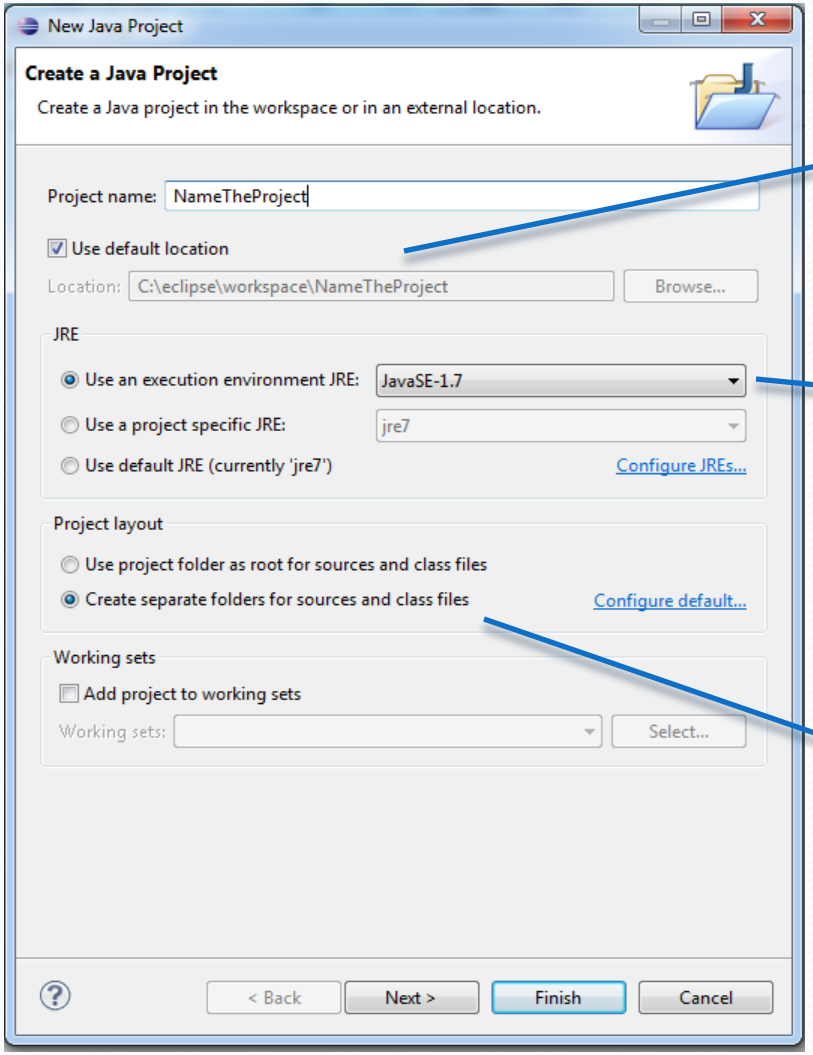


Step3: Select *Java project* and click next.



You can also choose *File* → *New* → *Java project* directly.

Step4: Name the project and click finish.

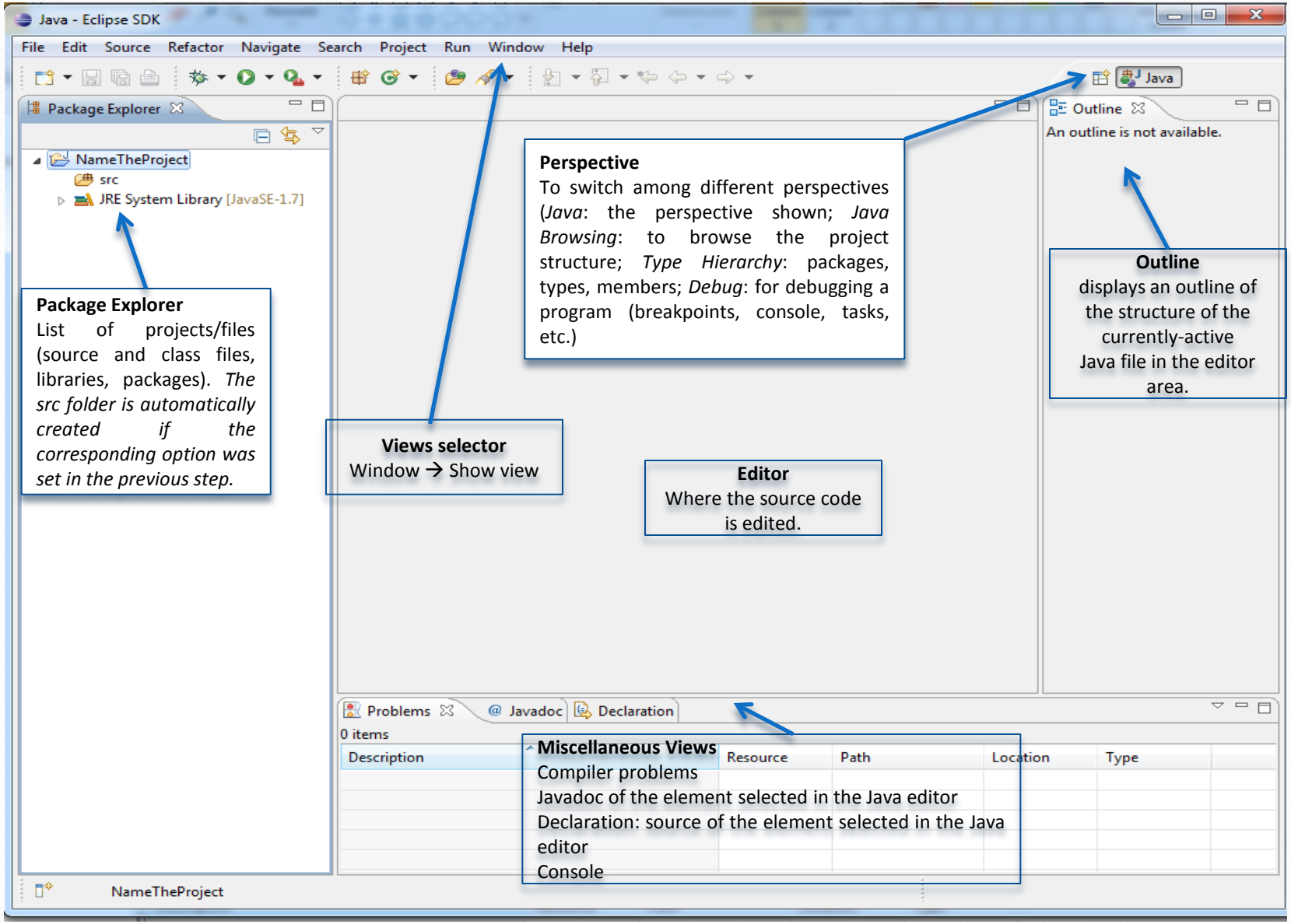


Creates the directory with the specified «project name» in the workspace path.

Specifies an execution environment to be used for the new project (Java Runtime Environment).

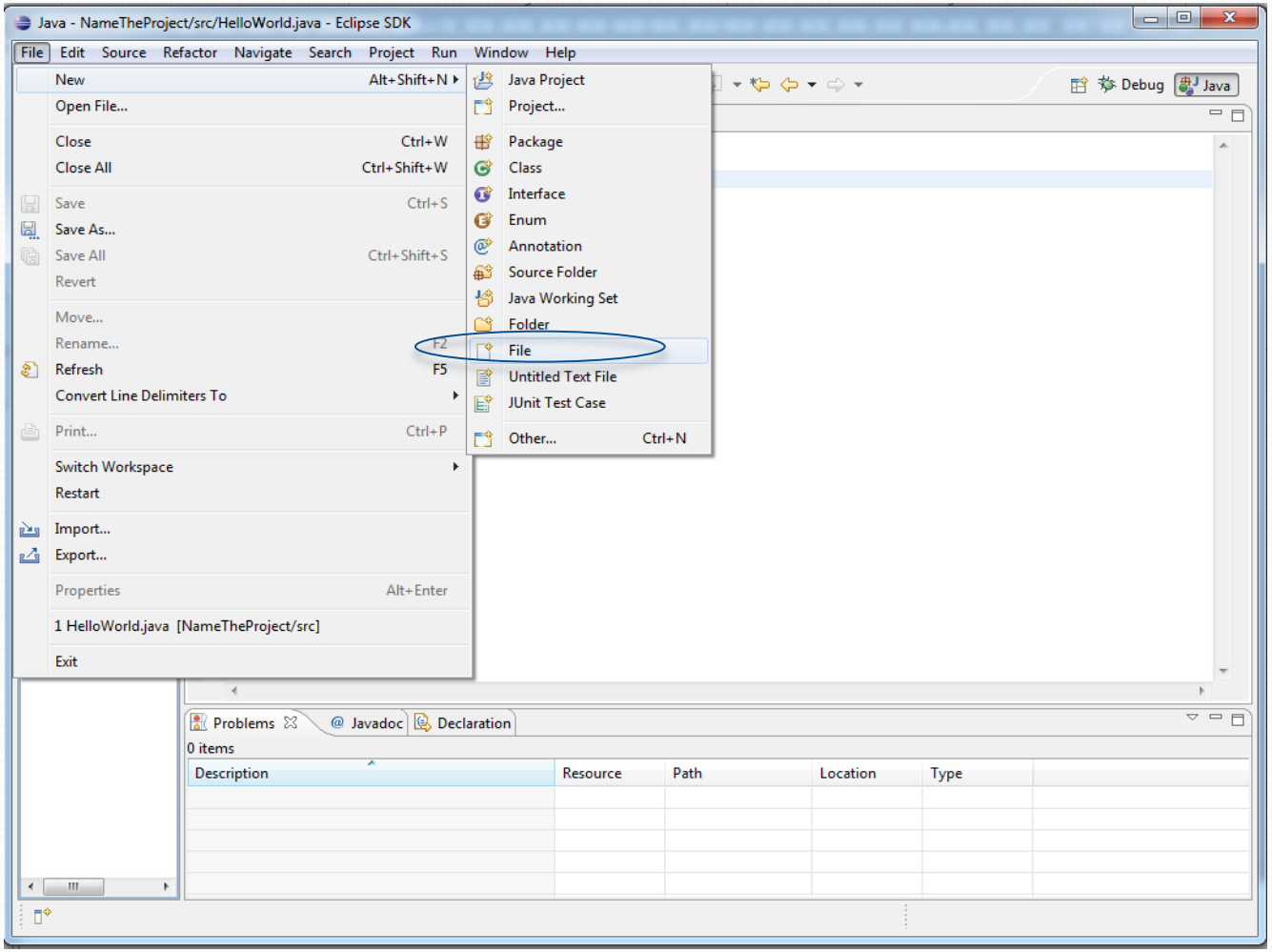
Creates a source folder (*src*) for Java source files and an output folder which holds the class files of the project. When selecting the other option, the project folder is used both as source folder and as output folder for class files.

Step5: IDE views

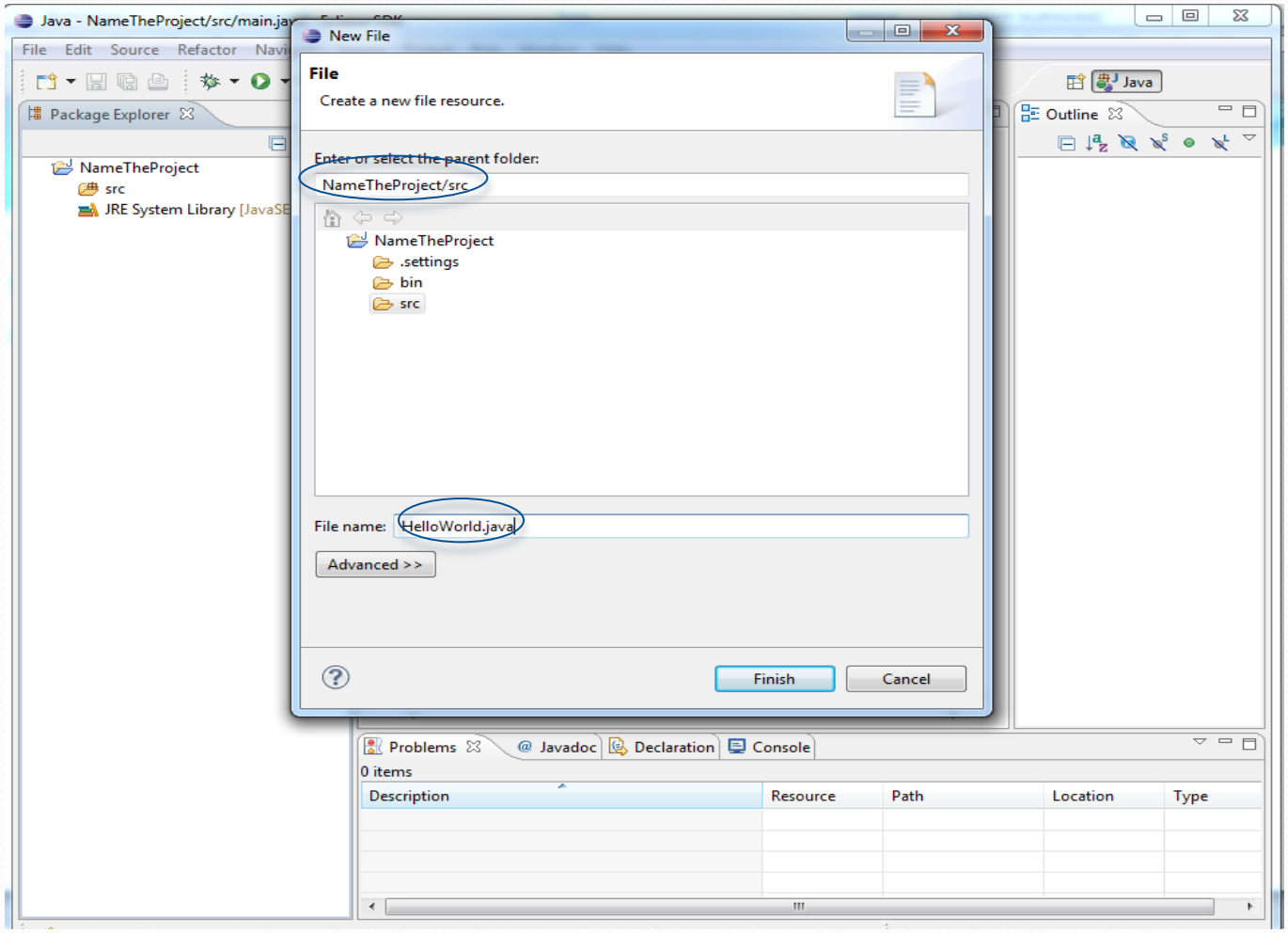


- **Now, make a choice…**
  - Create a file directly
  - Import a file
  - Creating/Exporting a .jar file
  - F A Q

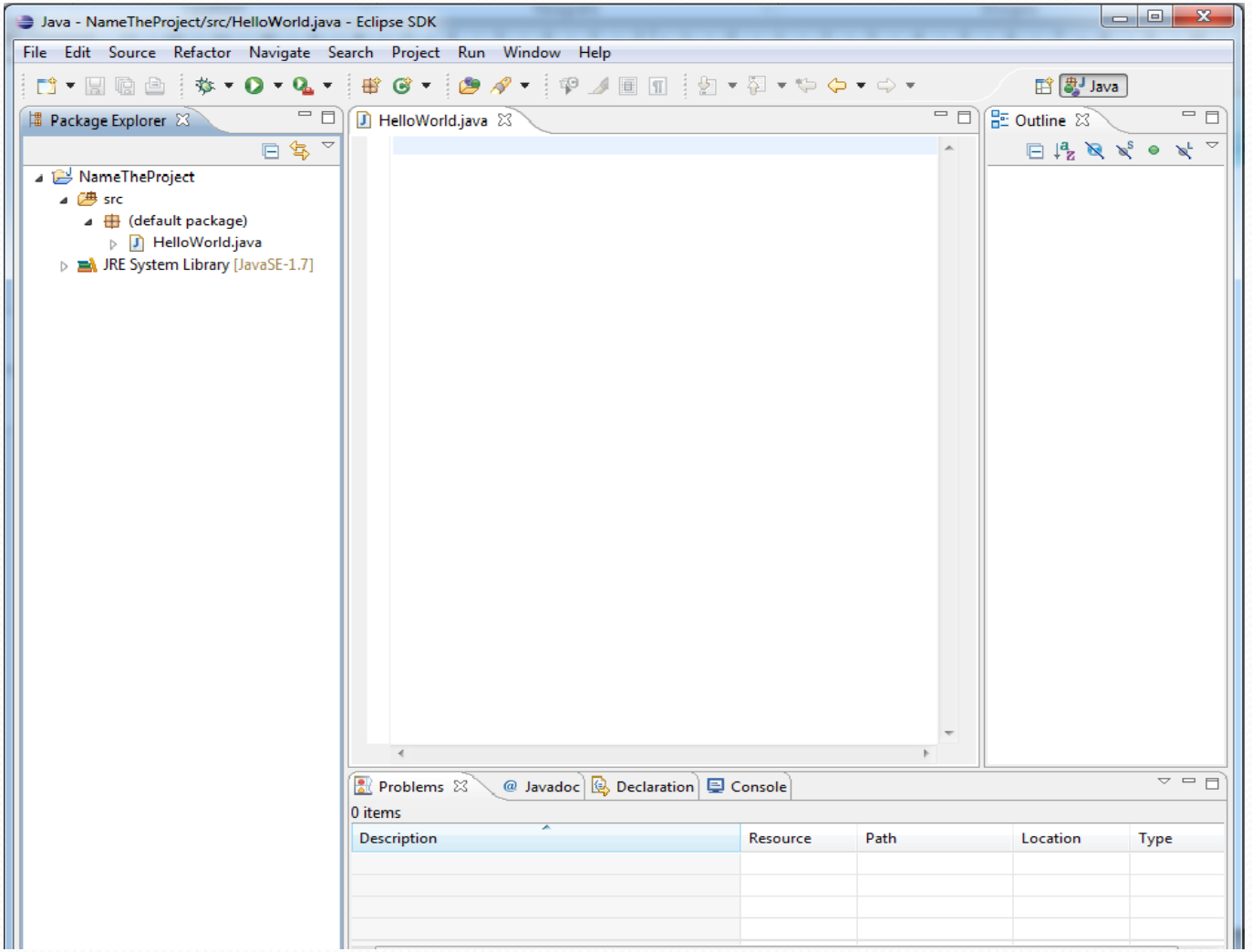
Step6: Now we create the java file by selecting the “File” menu, then “New” and “File”.



Step7: Now select the project in which you want to write, and the *src* folder if present. Then name the java class with extension (“.java”) and click “Finish”.



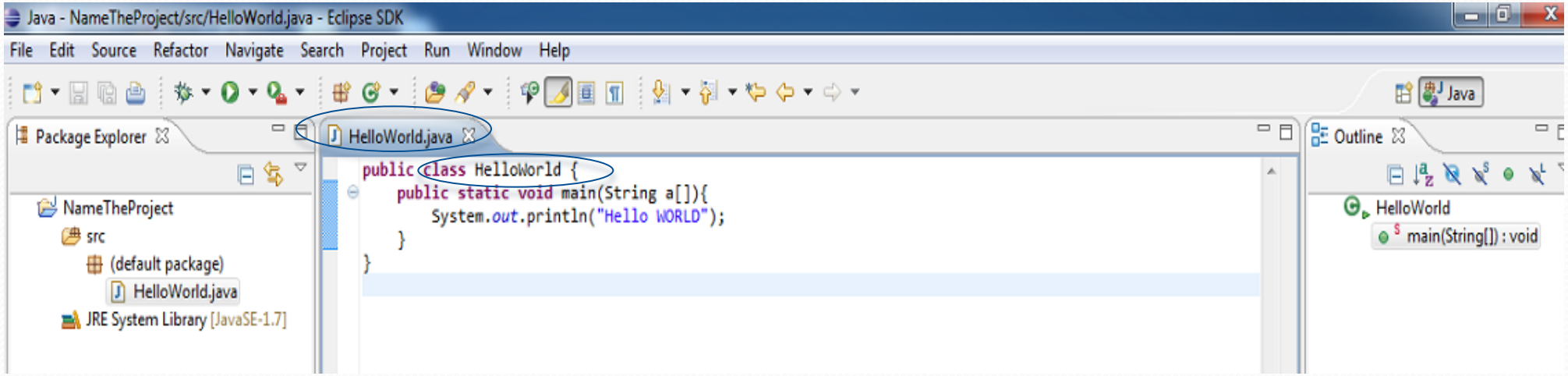
Step8: Now you have the editor space, start coding.



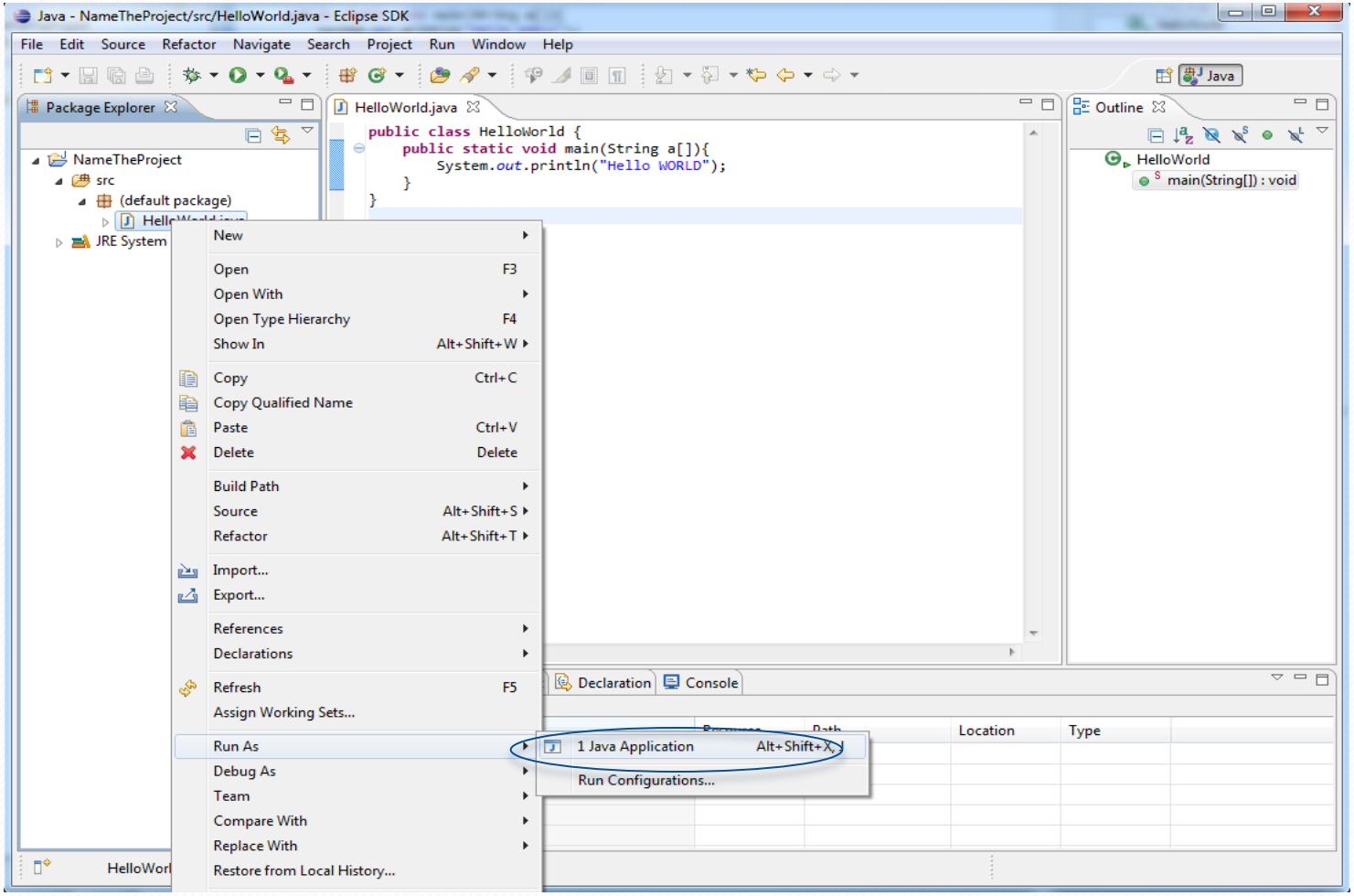
Writing the code

Step9: In Eclipse when ever you save the file, it will compile the code by default.

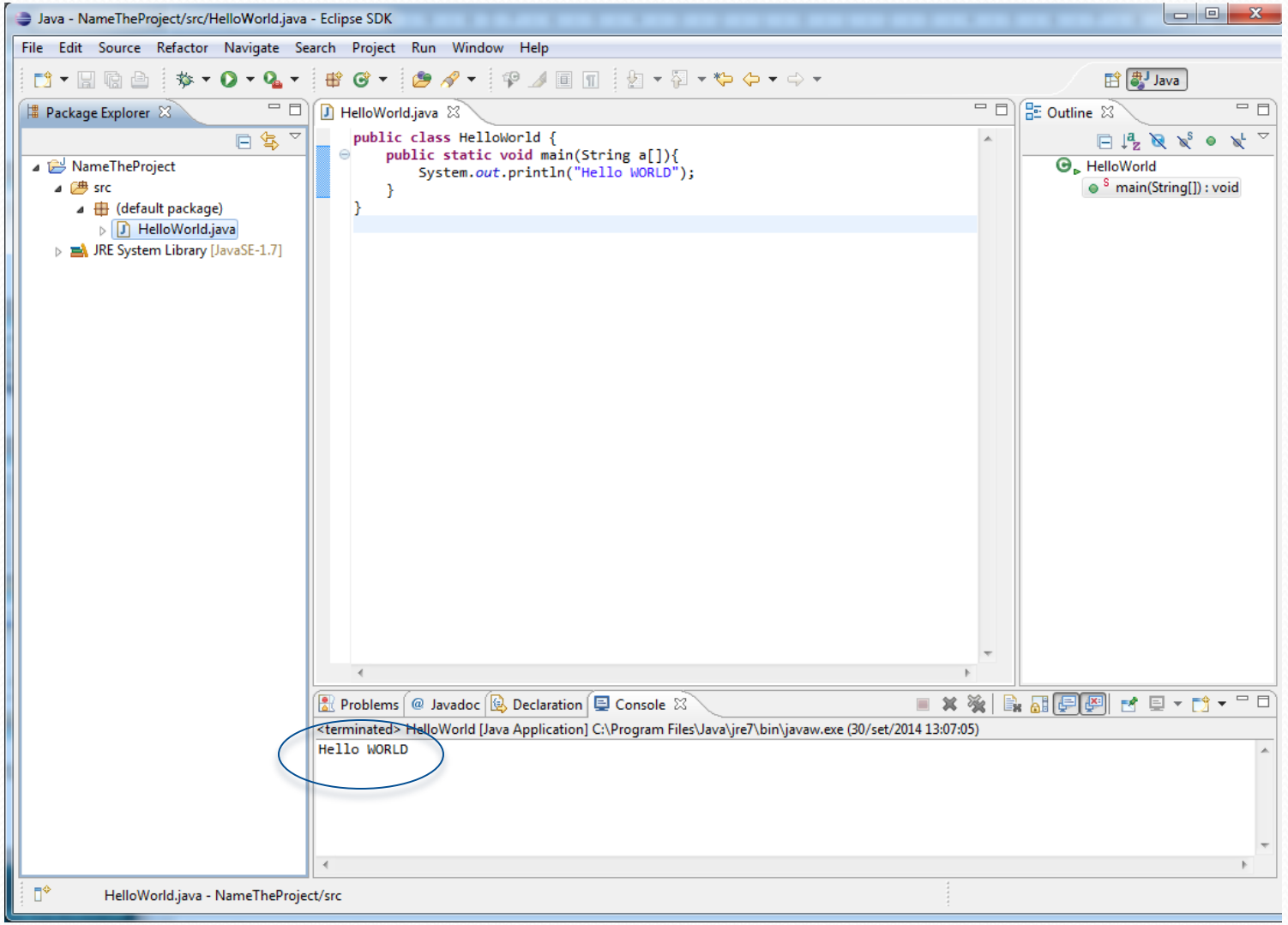
- Basic tip: Class name and the file name should be same.



Step10: Running the java class. Right click on the class file and choose “Run as Java Application”.



Step11: Here you can find the output (Console).



Using the command line

- Type the Java program using an editor (vi/emacs on Linux, Notepad on Windows, etc.) and save it with the *.java* extension
- Compile the program with the Java compiler:
  - javac HelloWorld.java
  - The compiler produces a .class file called HelloWorld.class. It translates the Java source code into bytecodes for the Java Virtual Machine (JVM)—a part of the JDK.

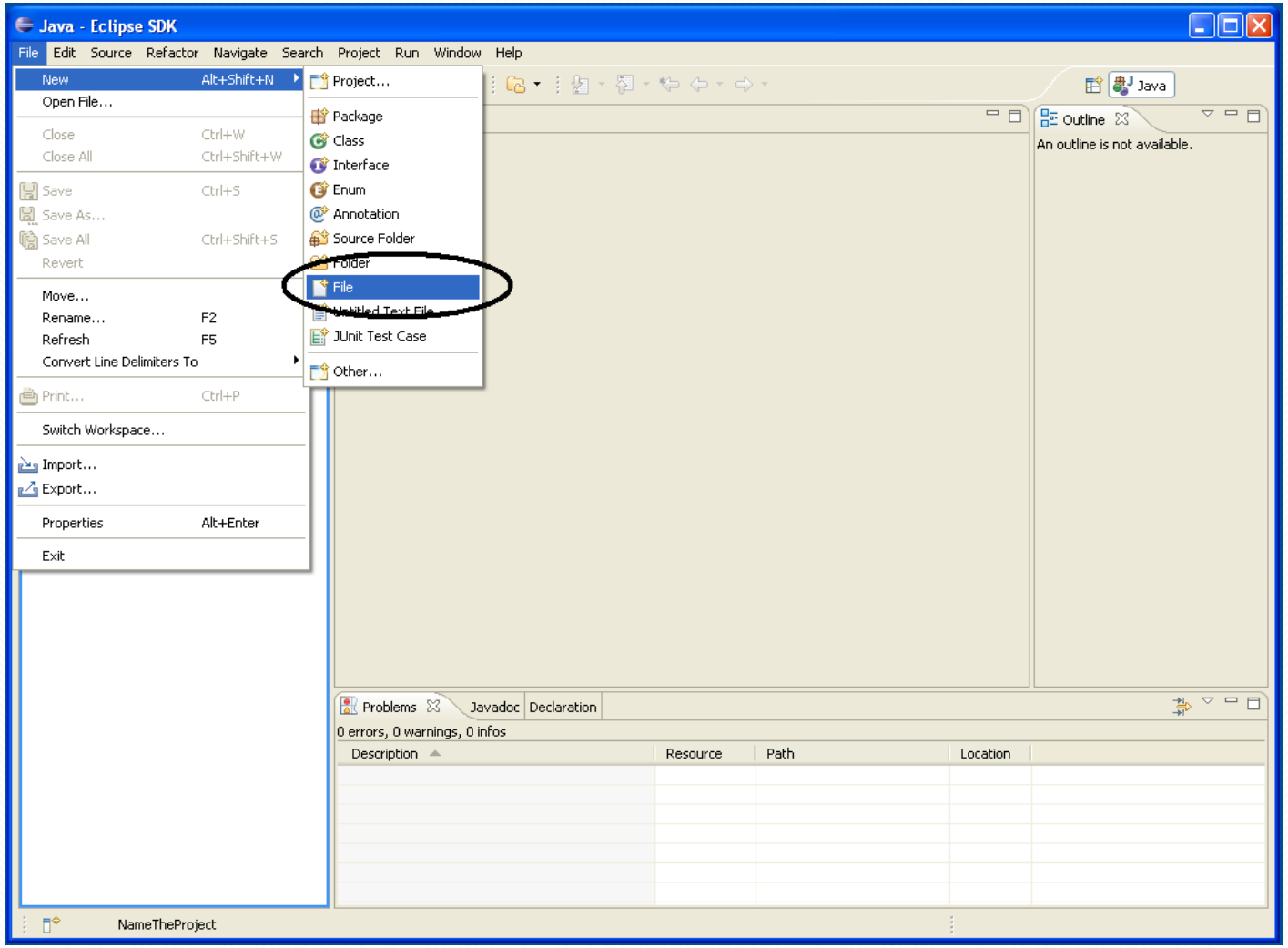
Using the command line

- The JVM is invoked by the **java** command. For example, to execute the example Java application type:
  - java HelloWorld
  - The output will be shown in the command window.
  - In general (more than one source file), specify the name of the class which is the application's entry point (contains the main() method)

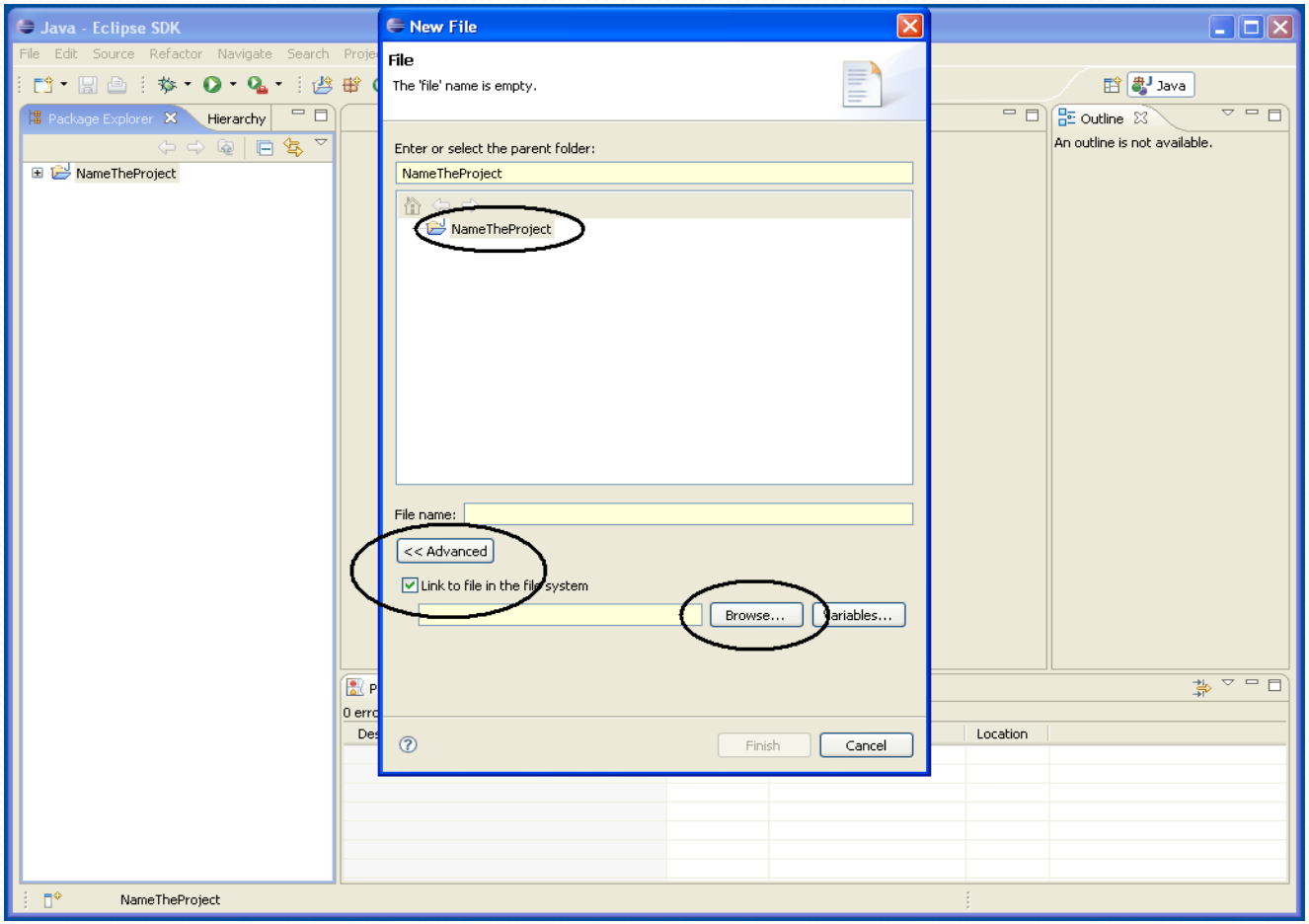
Importing a File into Eclipse

No need to code everytime.

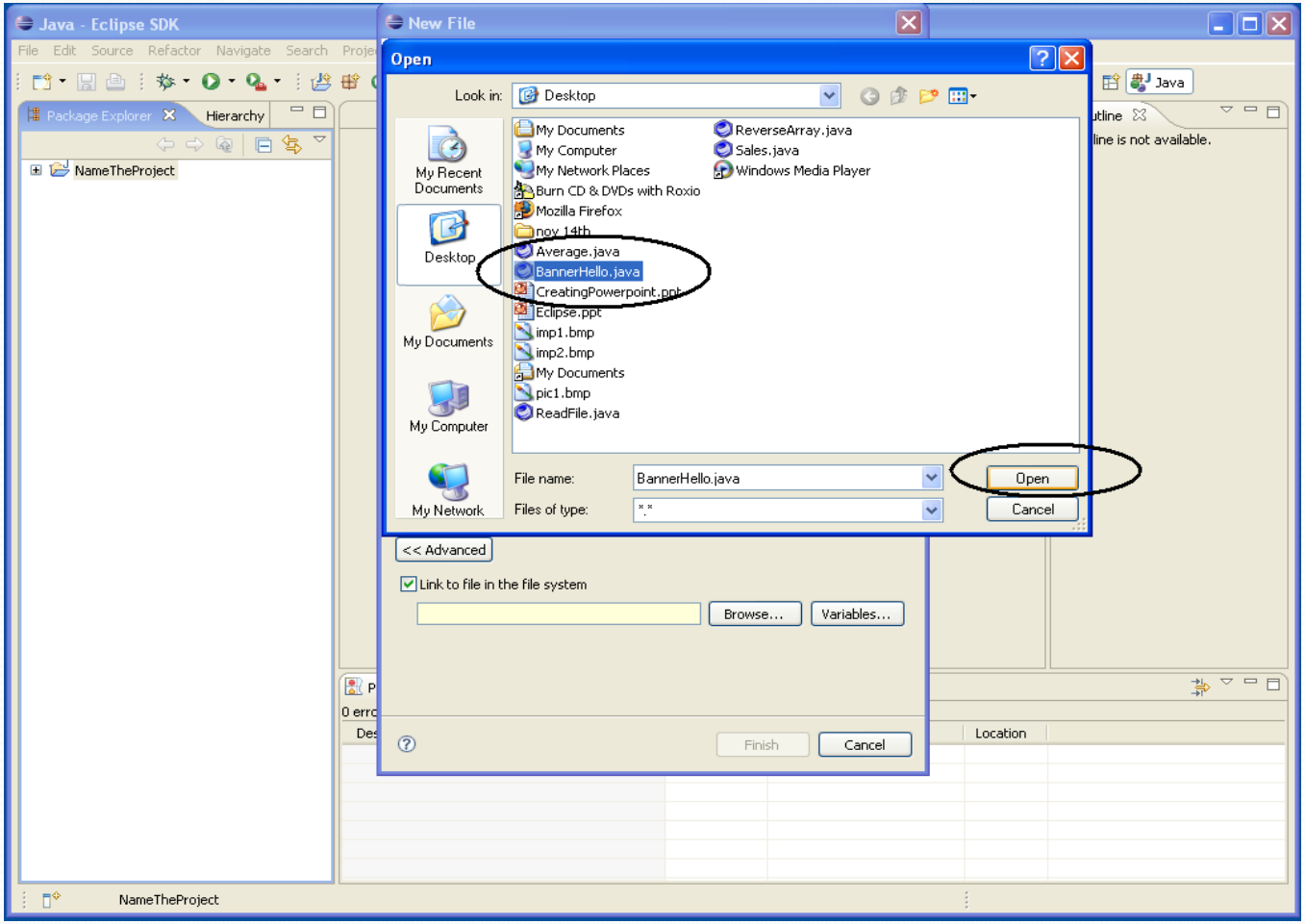
Step1: Go to the “File” option , choose “New” and then “File” as shown in the figure below.



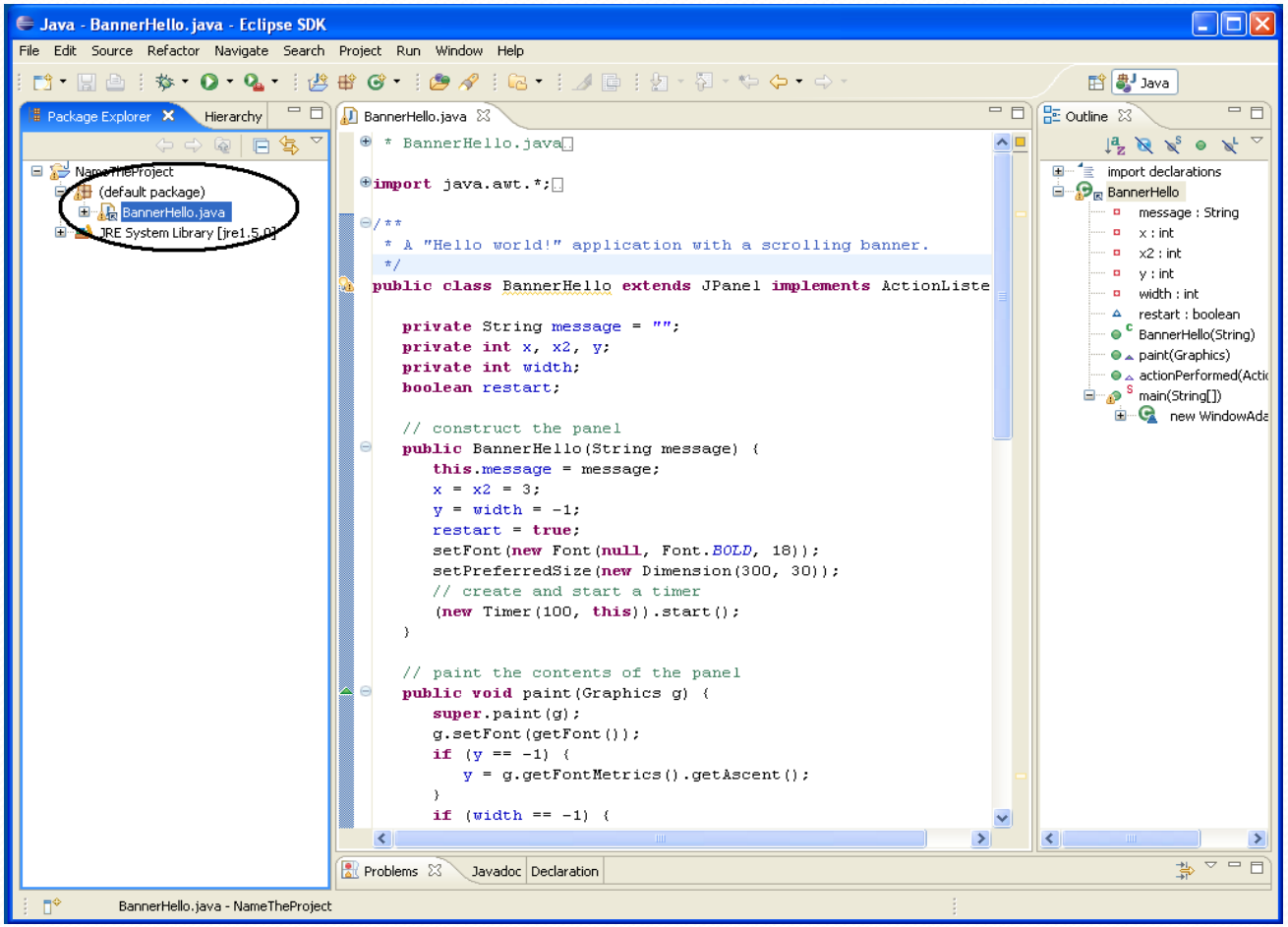
Step2: Select the project in which you want to import the file and then the advanced option, click the check box and browse.



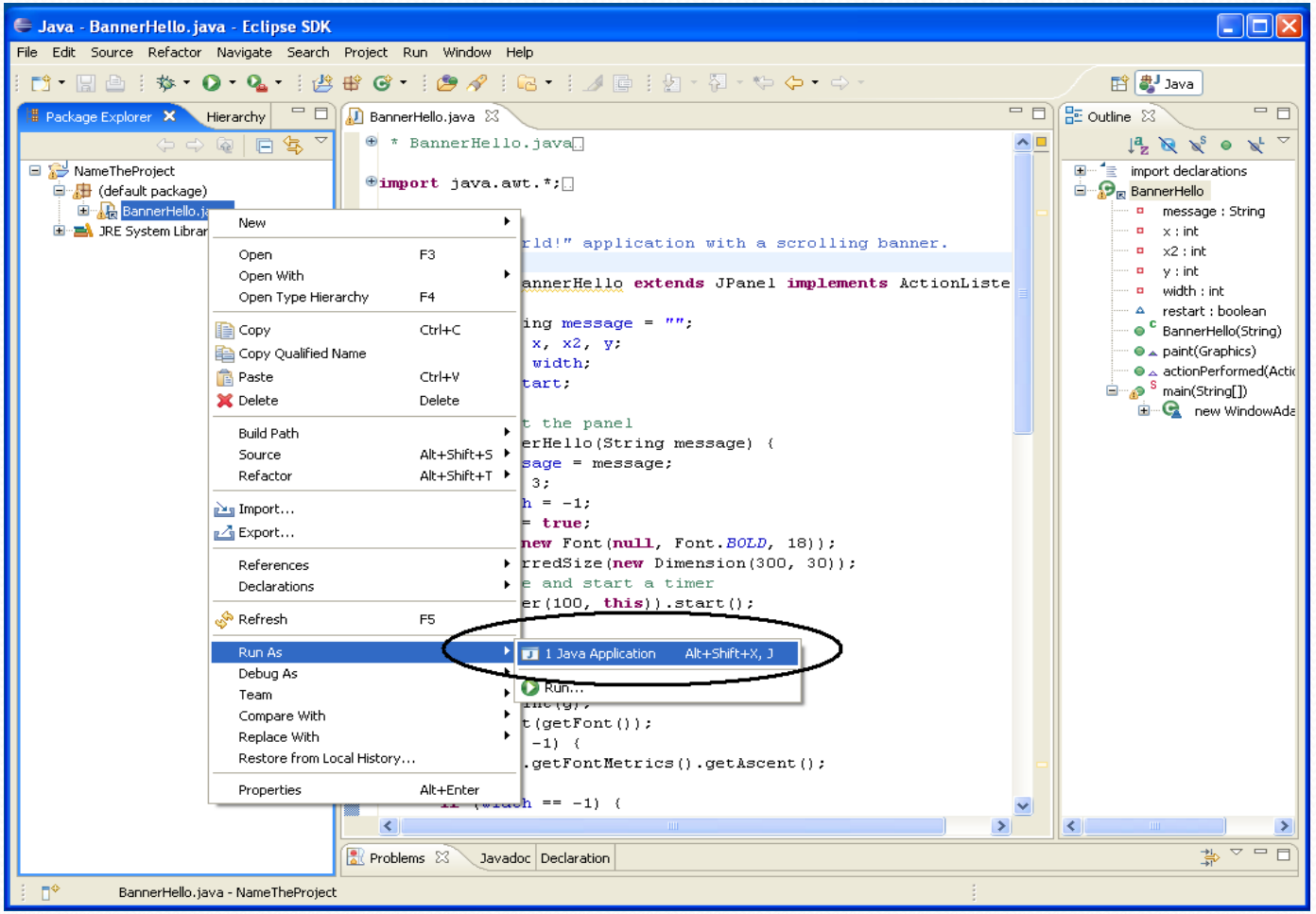
Step3: Select your file from the location and click the “Open” option.



You can see that the imported file is shown in the workspace and is loaded in the default package space of the selected project.



Step4: Now all you need to do is to select the file and run it. You can see the output.

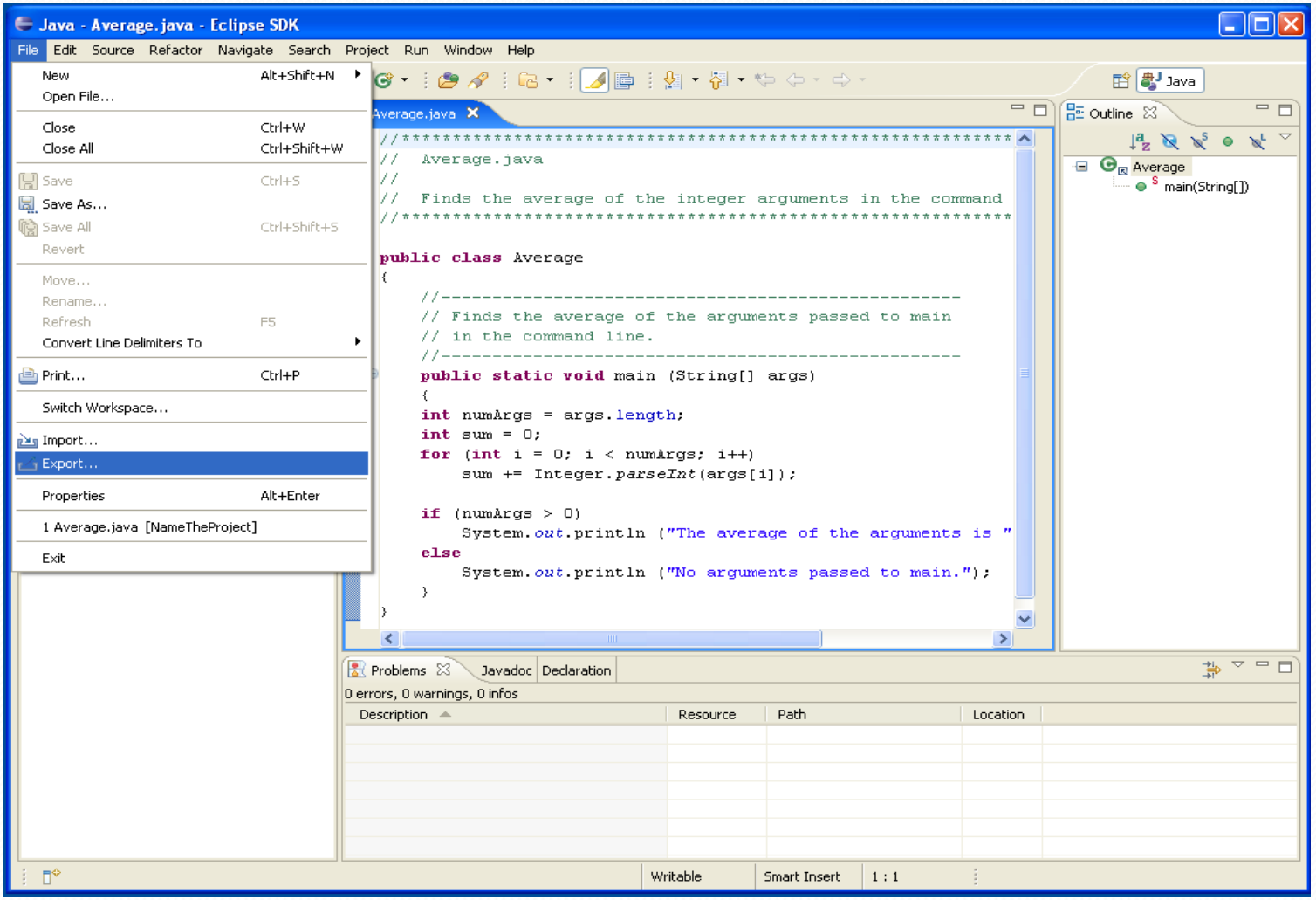


Creating a .jar file

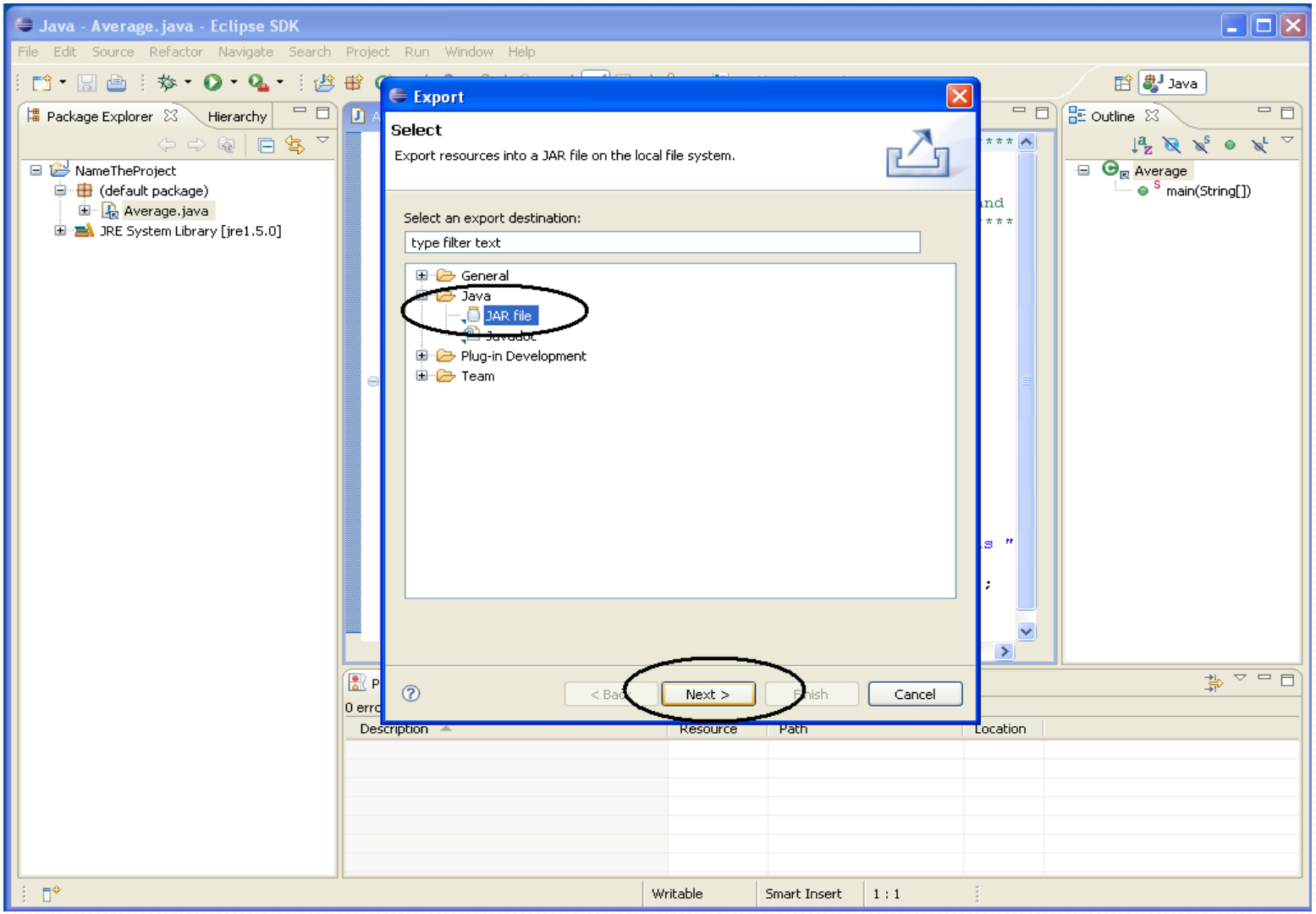
Creating a .jar file is very useful especially when we are working on different systems every time.

Before going further one should know that to create a .jar file, we need to have that particular project present in the Eclipse.

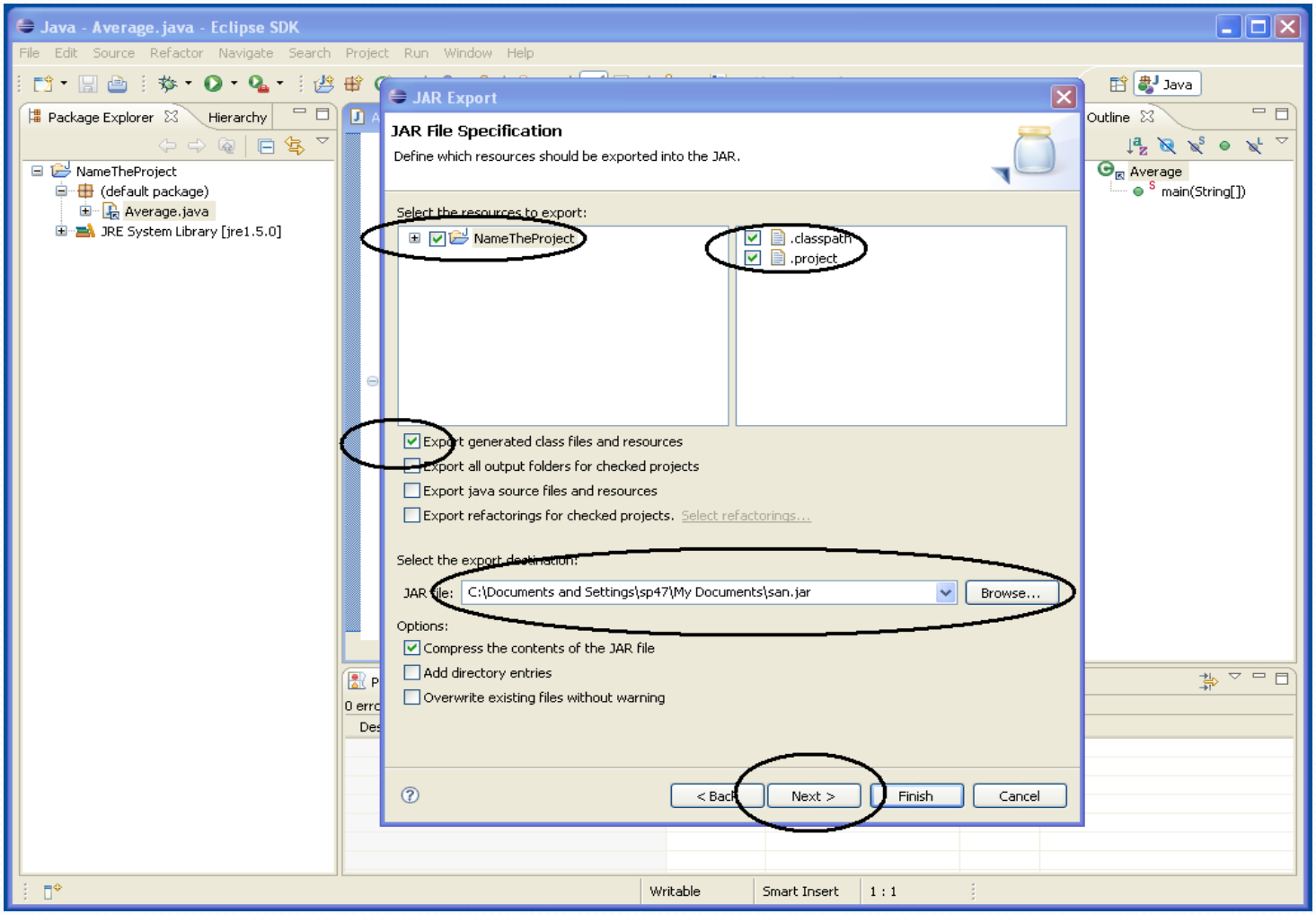
Step1: Select “File” and choose “export” option as shown below.



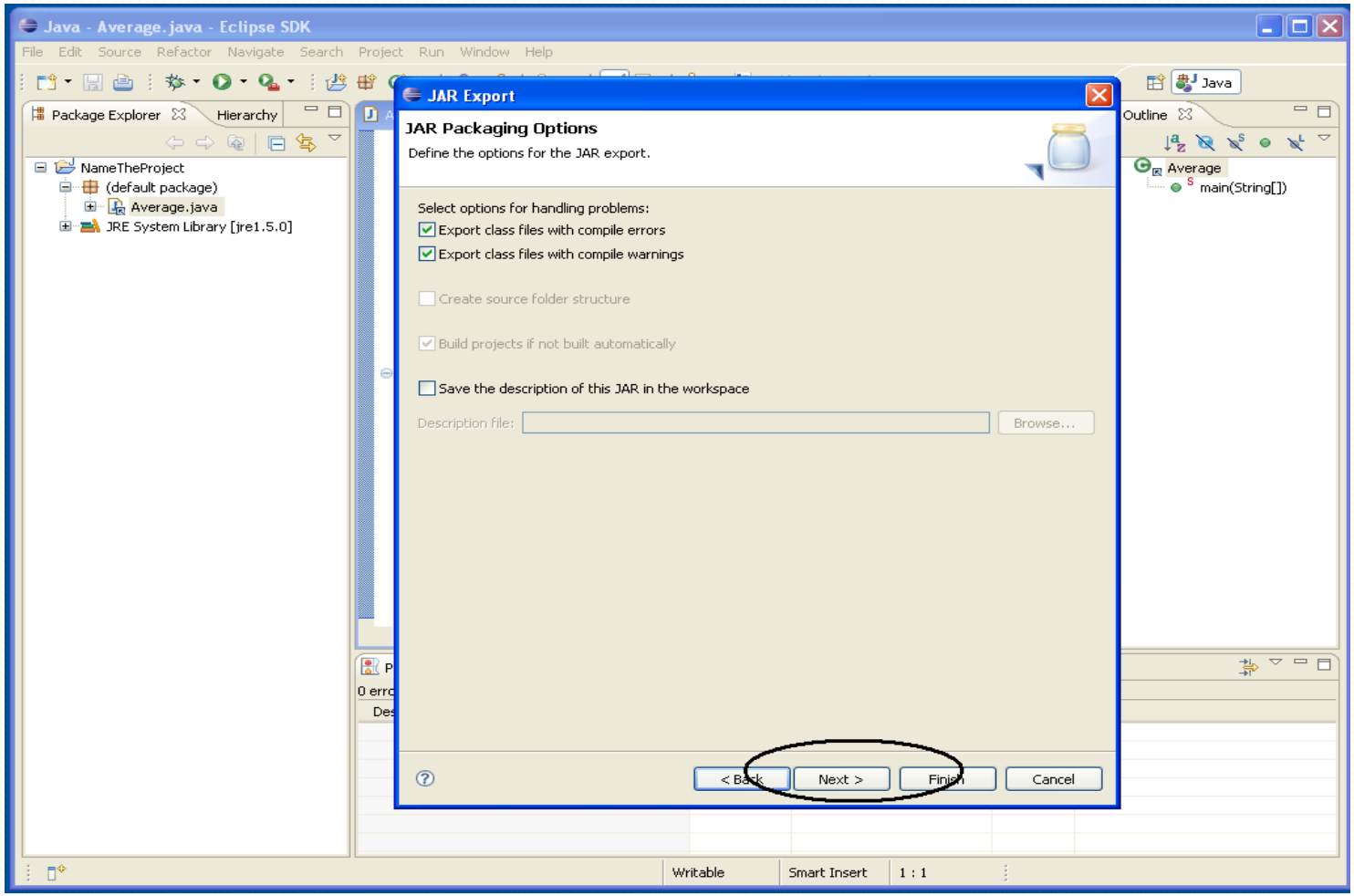
Step2: Choose “jar file” and “next”.



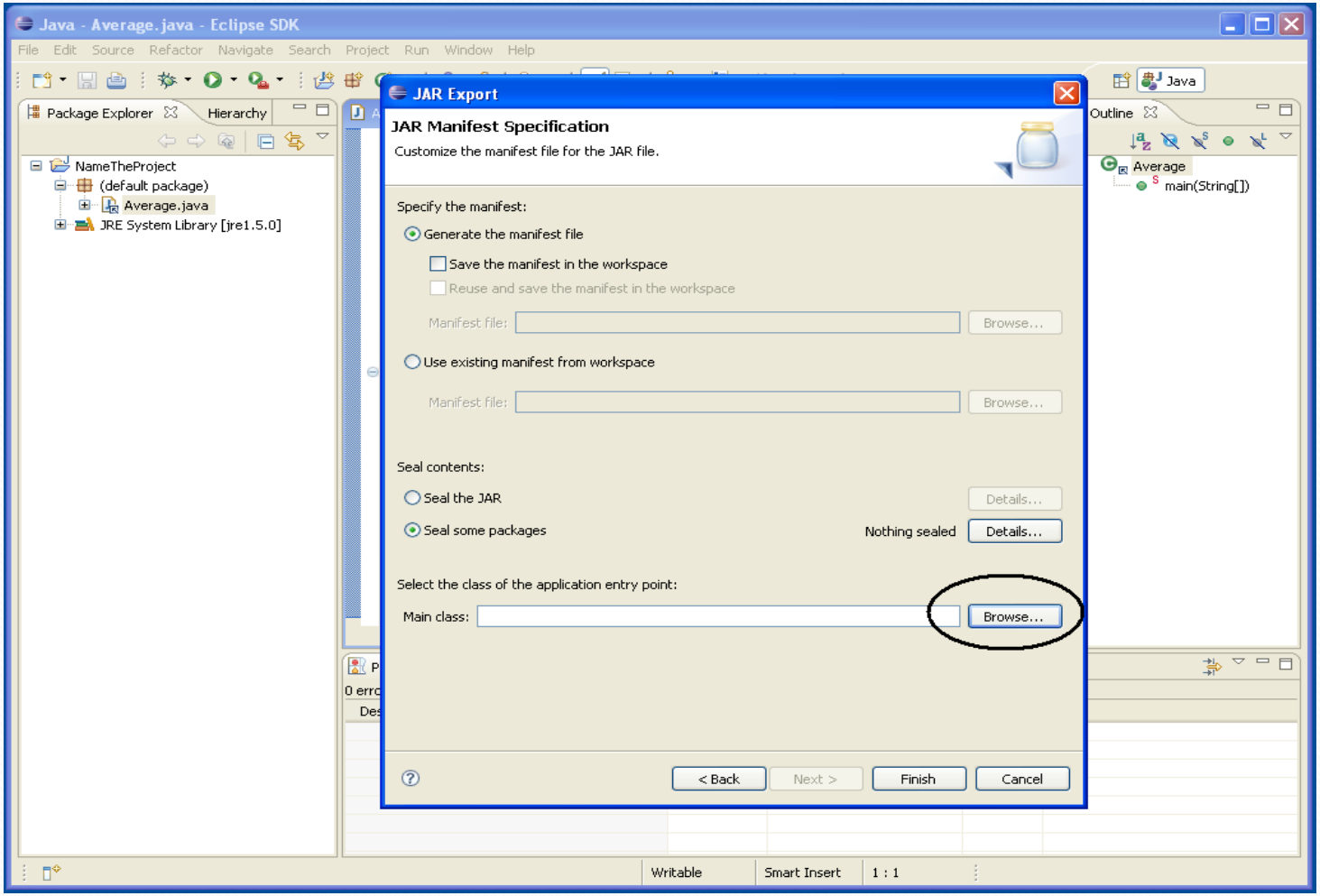
Step3: Select the project and the files you want to add. Browse through and select your destination file.



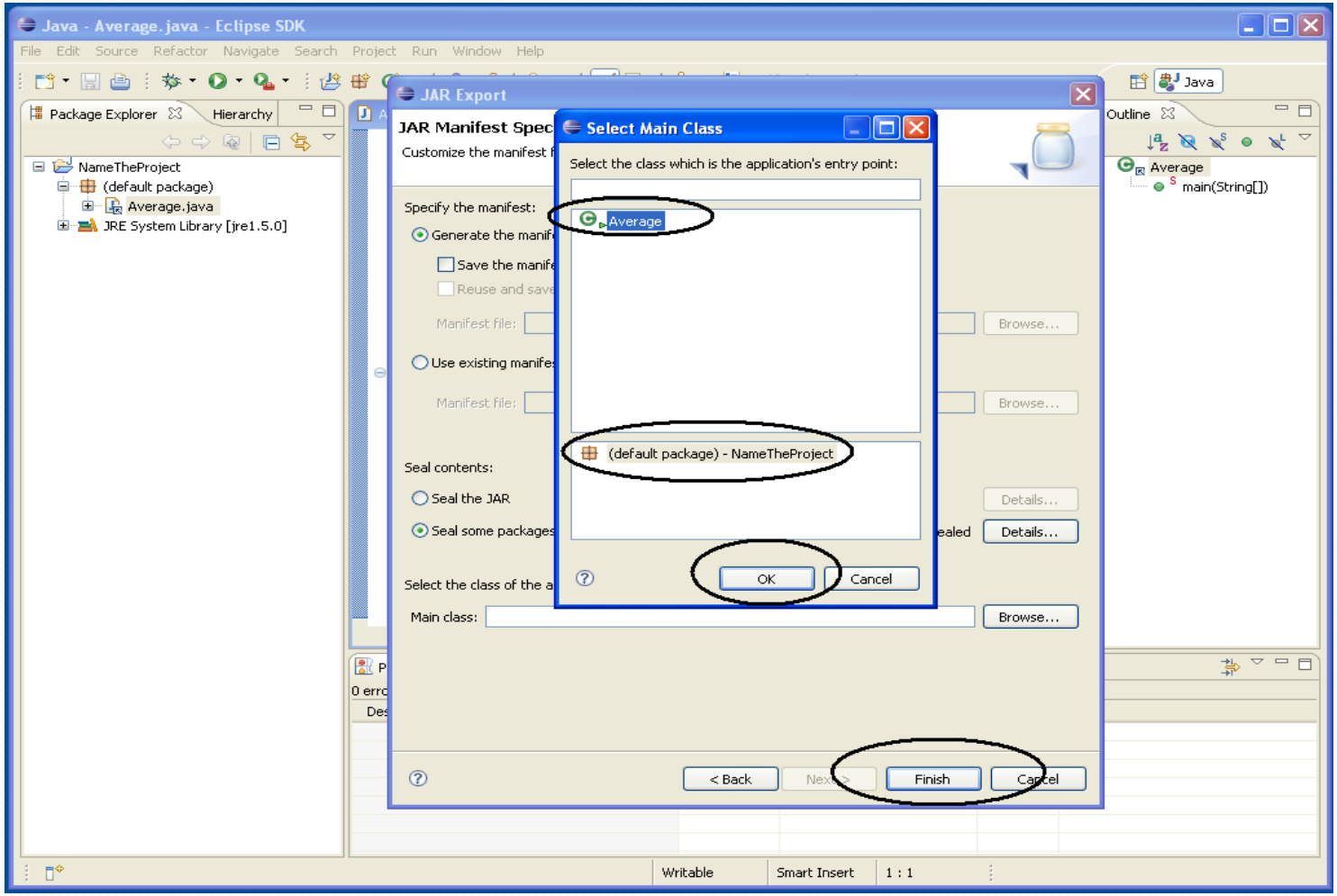
Step4: In the Packaging options, the first 2 options are usually enough. You can choose the other advanced options depending on your requirements.



Step5: Jar export. The options chosen here are the standard ones. We then browse through and select the class file which is the entry point. (Read carefully before selecting options).



Step6: Eclipse by default shows the class files and the projects available. We just need to choose the right one and the jar file is created.



Step7: Executing a jar file

- The basic command is: java -jar *jar-file*
- If the runtime environment has no information about which class within the jar file is the application's entry point (class containing the main method of your application), you must add a Main-Class header to the JAR file's manifest. See: http://docs.oracle.com/javase/tutorial/deployment/jar/appman.html

Some Information and FAQ on Eclipse

Will help starters a lot

Features of Eclipse

- Eclipse has the basic features required for editing, running, and debugging Java code, although they do some things slightly differently. In addition to basic programming features, Eclipse support for **more advanced Java development tools** such as Ant, CVS, JUnit, and refactoring.
- Often, the hardest thing about migrating to Eclipse is learning how to do old things in the new environment. But Eclipse has a complete and easy-to-use help system with online **documentation** (http://help.eclipse.org/mars/index.jsp).
- Eclipse's GUI builder is a separate component.

Adding Eclipse plugin

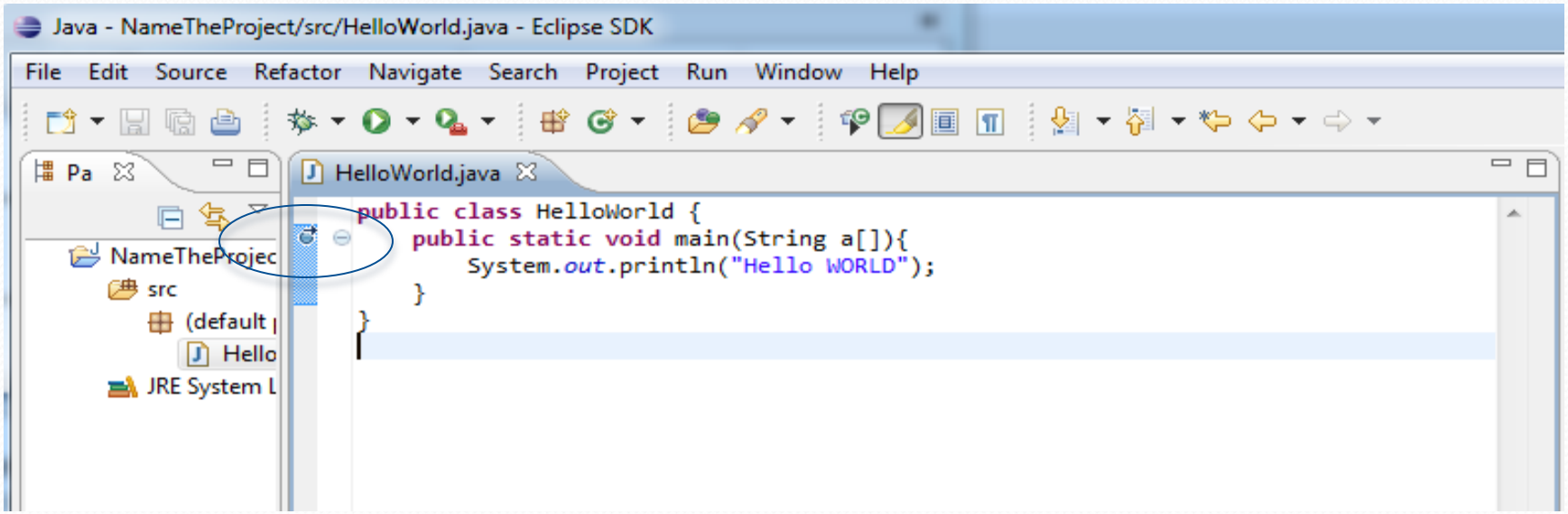
The simplest way is to copy the plugin's folder to the plugins subfolder of the appropriate Eclipse binary folder. This method however, requires that separate copies of plugin binaries be created for different platforms.

Running code

- Eclipse uses an incremental compiler, so it isn't necessary to explicitly compile your Java files; **the compiled class files are saved automatically when you save your Java files.**
- To run a program, the easiest way is to **select the file containing a main()** method in the Package Explorer and then select **Run > Run As > Java Application** from the main Eclipse menu.

Debugging

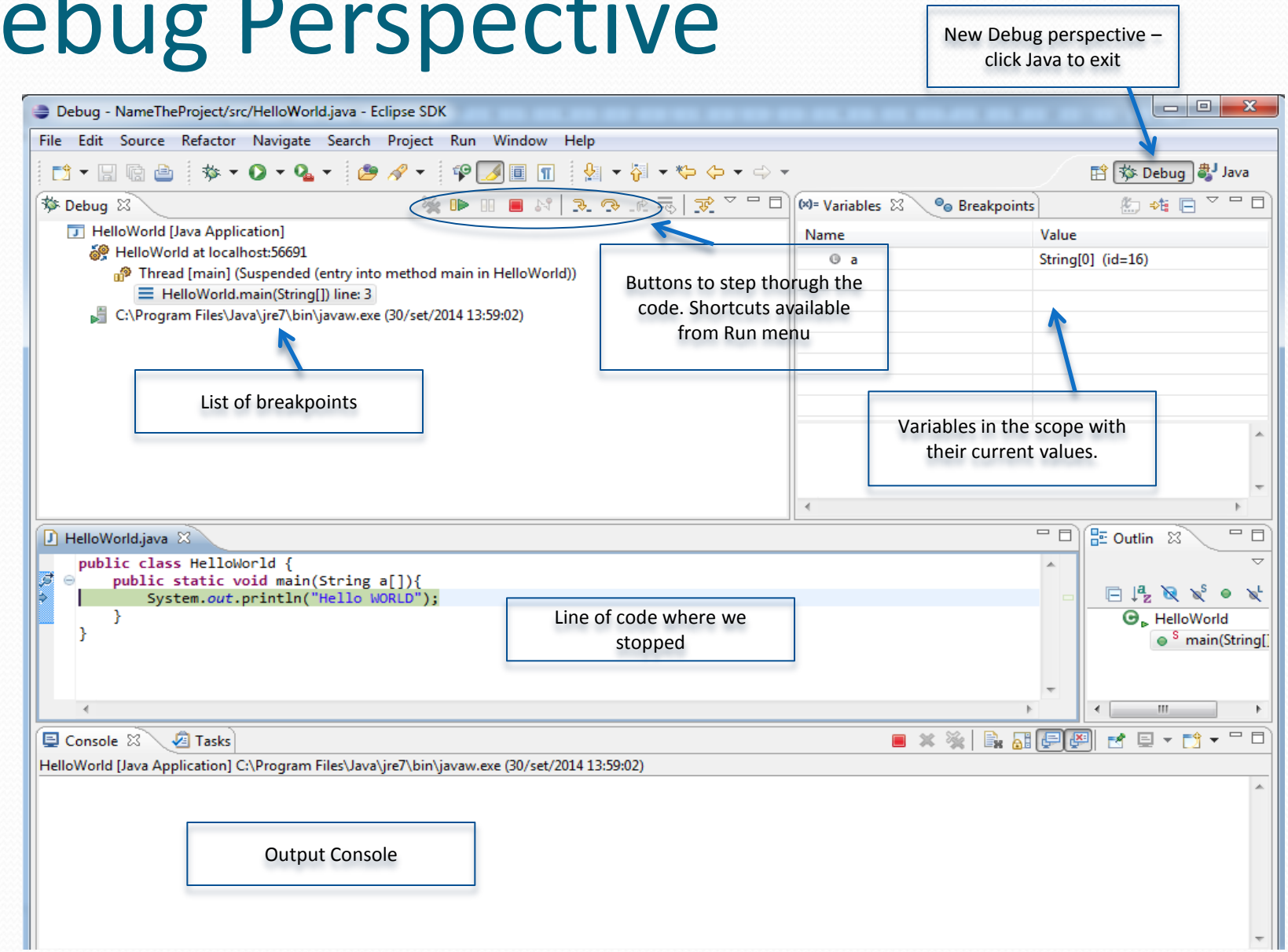
- First, set a breakpoint in the main() method by double-clicking in the left margin next to the call. If this code were a little less trivial, it would also be possible to set a conditional breakpoint -- one that stops when a particular expression is true, or one that stops after a specific number of hits -- by right-clicking the breakpoint and selecting **Breakpoint properties** from the context menu.



Debugging

- To start debugging, select **Run > Debug As > Java Application** from the main menu. Because Eclipse has a *Debug perspective* that is better suited for debugging than the Java perspective, it will ask if you want to change to this perspective - click Yes.

Debug Perspective



The famous Dos and Don’ts:

- Set the workspace of Eclipse where you can easily access it.
- **Never start writing the code without making a project**. You need to create a project folder every time you start a new assignment
- **Main classname and the file name** should always match.

Strange Error:

- The Eclipse IDE reports a strange error similar to: "Cannot create workbench".
- In many situations this problem can be resolved by deleting the workspace / .metadata /.registry file in user's home directory and restarting the IDE.

NetBeans Tutorial

What's NetBeans?

- Like Eclipse:
  - It is a free software / **open source** platform-independent software framework for delivering what the project calls "rich-client applications"
  - It is an **Integrated Development Environment** (IDE), that allows to manage the whole development process of Java applications, by providing many features for programming (editor, debugger, etc.)
  - It supports other languages by means of plug-ins (C/C++)
  - Multi-platform (Linux, Windows, Mac OS)

What's NetBeans?

- NetBeans was originally developed at the Faculty of Mathematics and Physics at Charles University in Prague .
- Then it was bought by Sun Micosystems.
- NetBeans is now managed by Oracle, specialized in developing and marketing database software and technology, cloud engineered systems and enterprise software products.

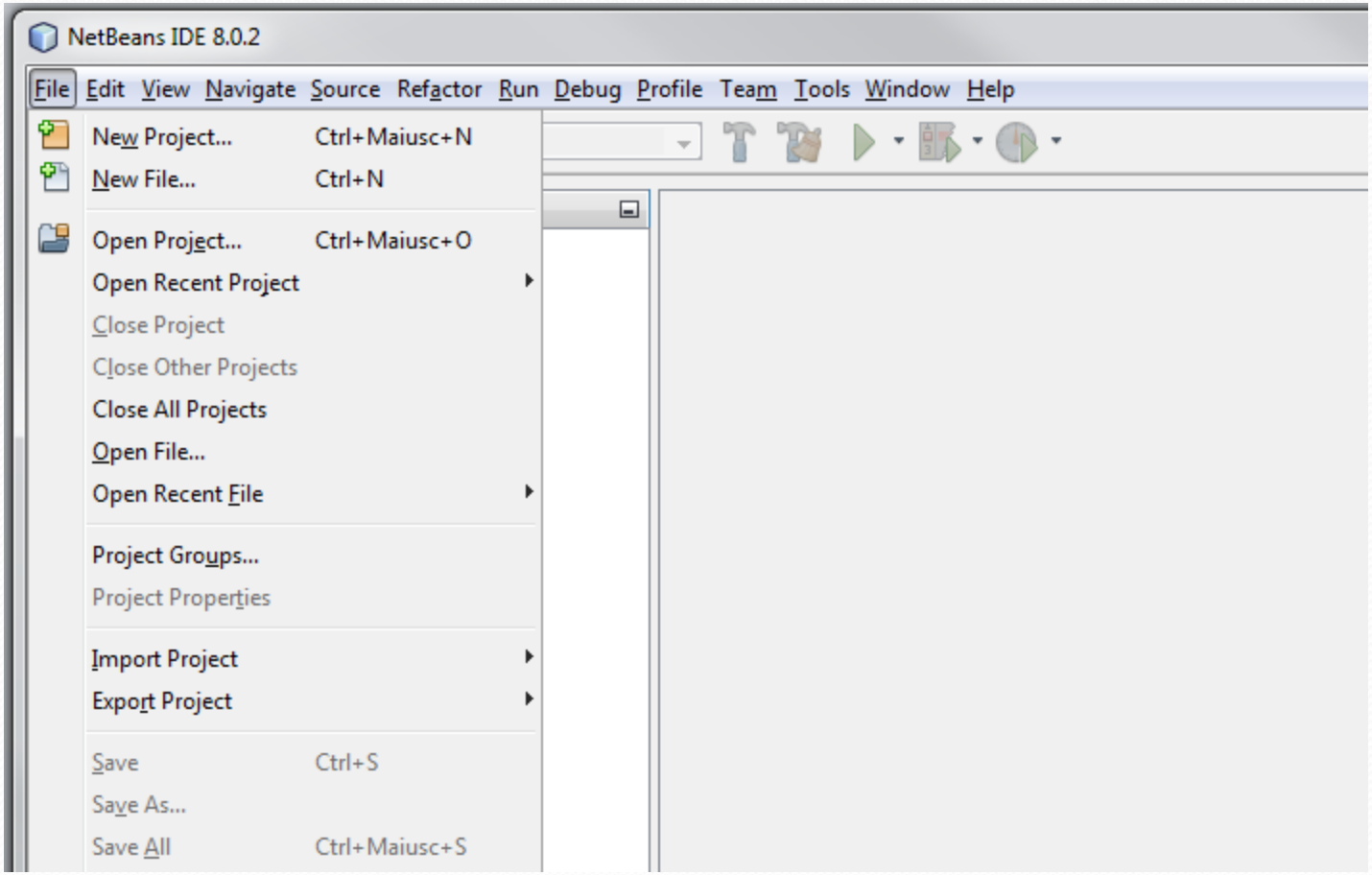
Getting NetBeans

- On your laptop
  - You will need to install a Java Virtual Machine (JVM)
    - http://www.oracle.com/technetwork/java/javase/downloads/index.html (JDK)
  - Download the latest version at:
    - https://netbeans.org/downloads/ (Select your OS and language, then download the Java SE version)
    - Or, select OS independent ZIP, decompress the downloaded archive and run the executable located at **`netbeans/bin/netbeans`**
  - Installation steps (for the last version) at https://netbeans.org/community/releases/80/install.html

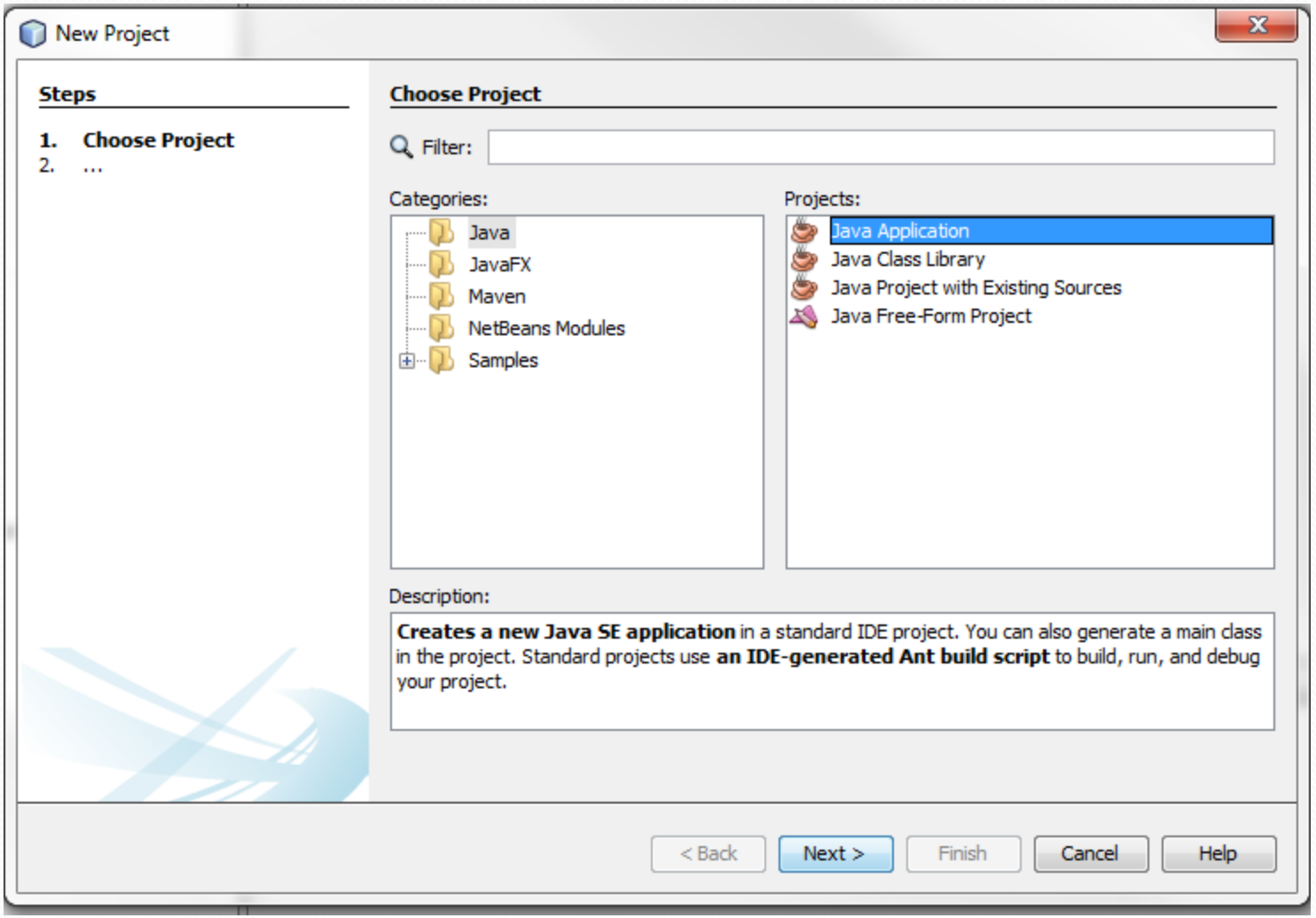
Let’s start with basic stuff

Step1: Open NetBeans from start on your system.

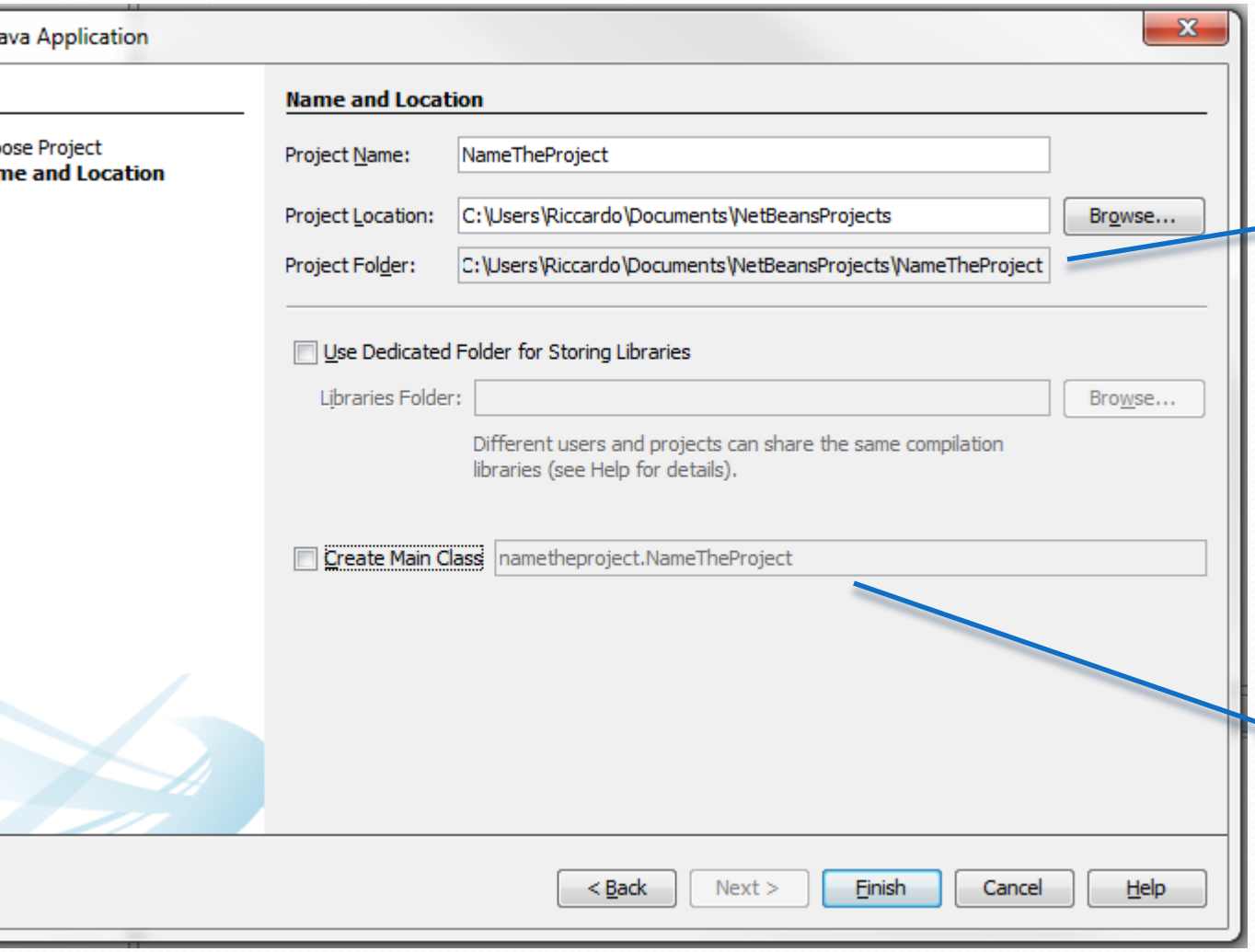
Step2: Create a new project (File → New Project…).



Step3: Select *Java Application* and click next.



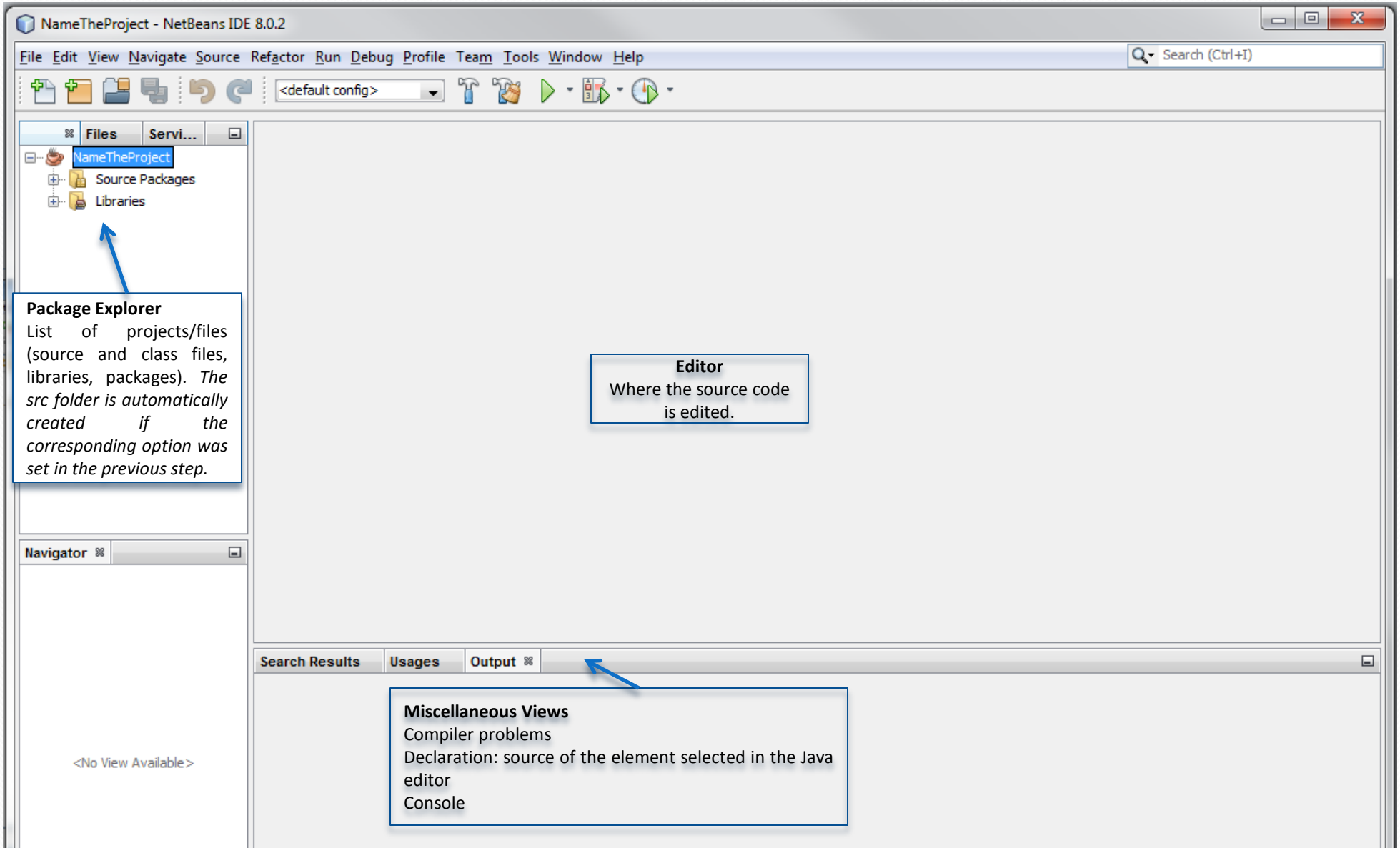
Step4: Name the project and click finish.



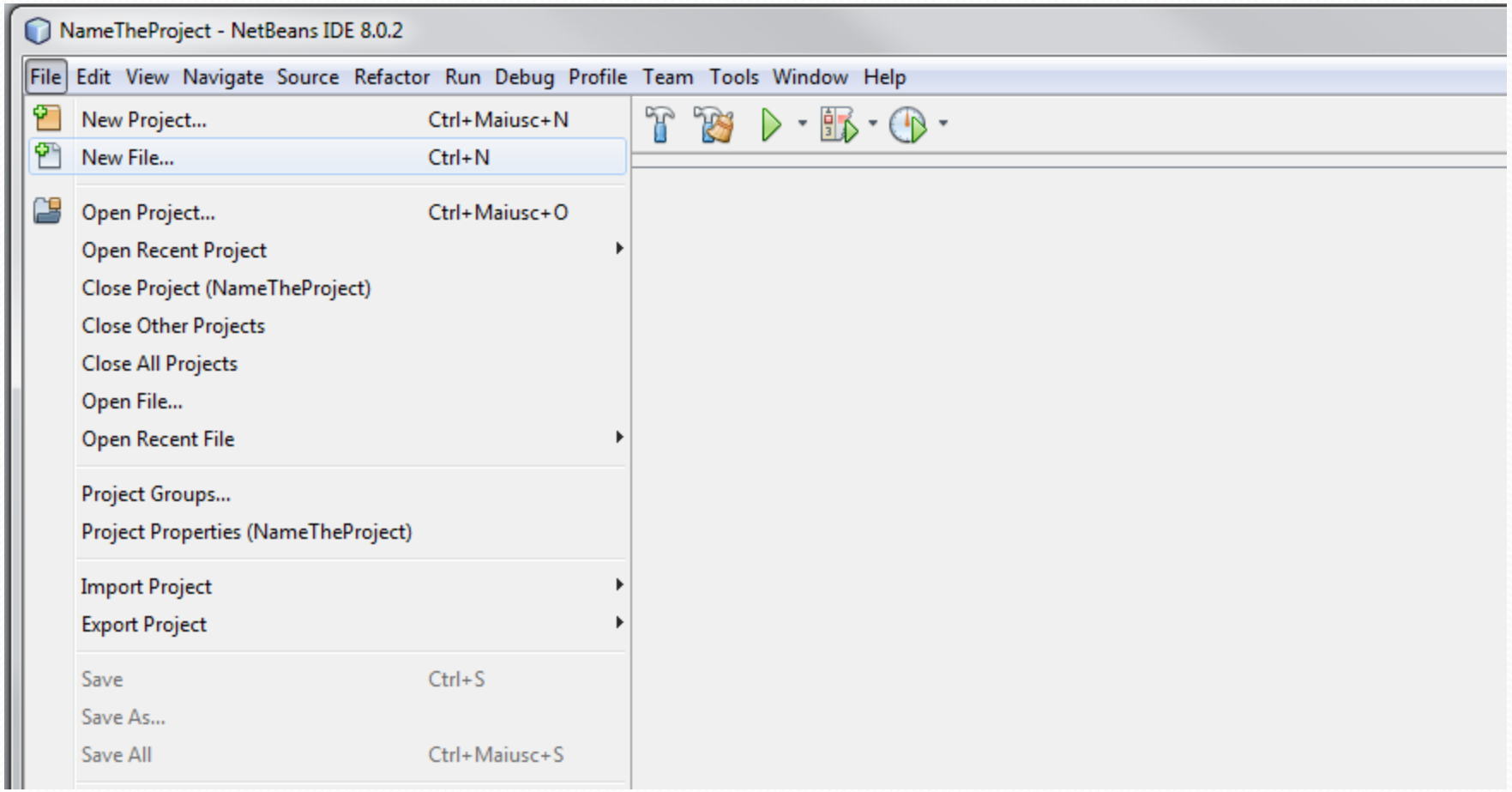
Creates the directory with the specified «project name» in the workspace path.

Deselect the option *Create Main Class*, in this way we will create an empty project

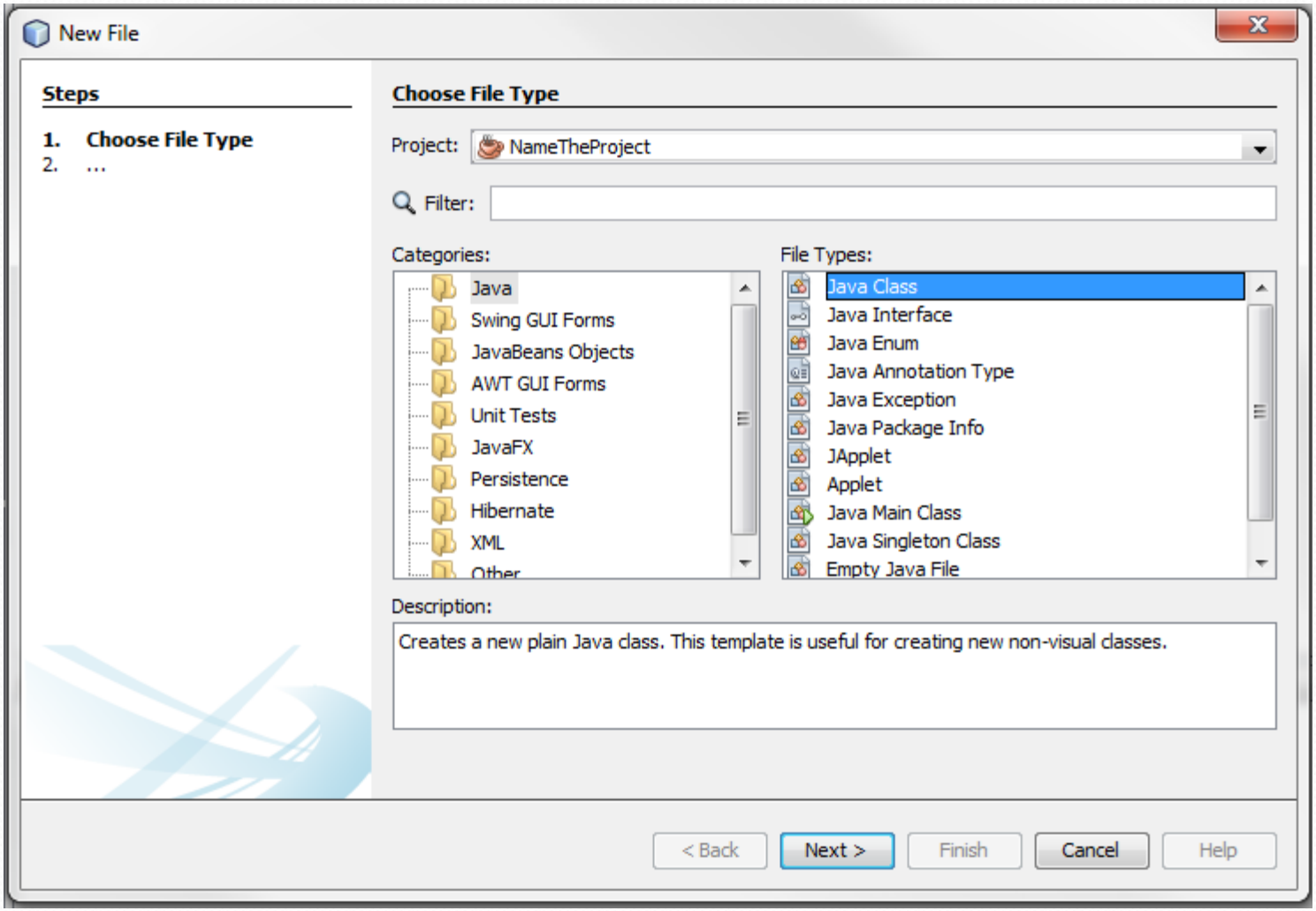
Step5: IDE views



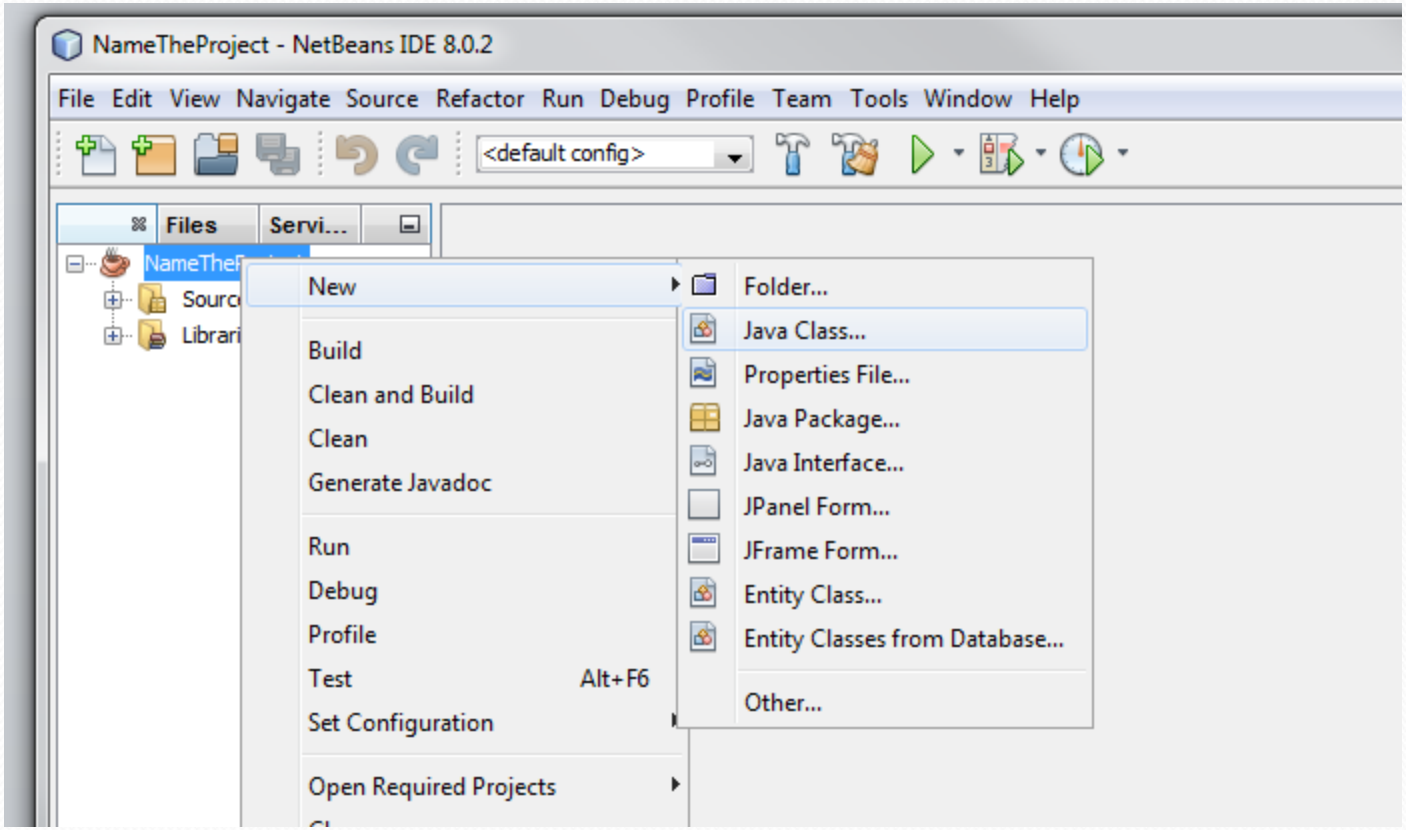
Step6: Now we create the java file by selecting the “File” menu, then “New File…”.



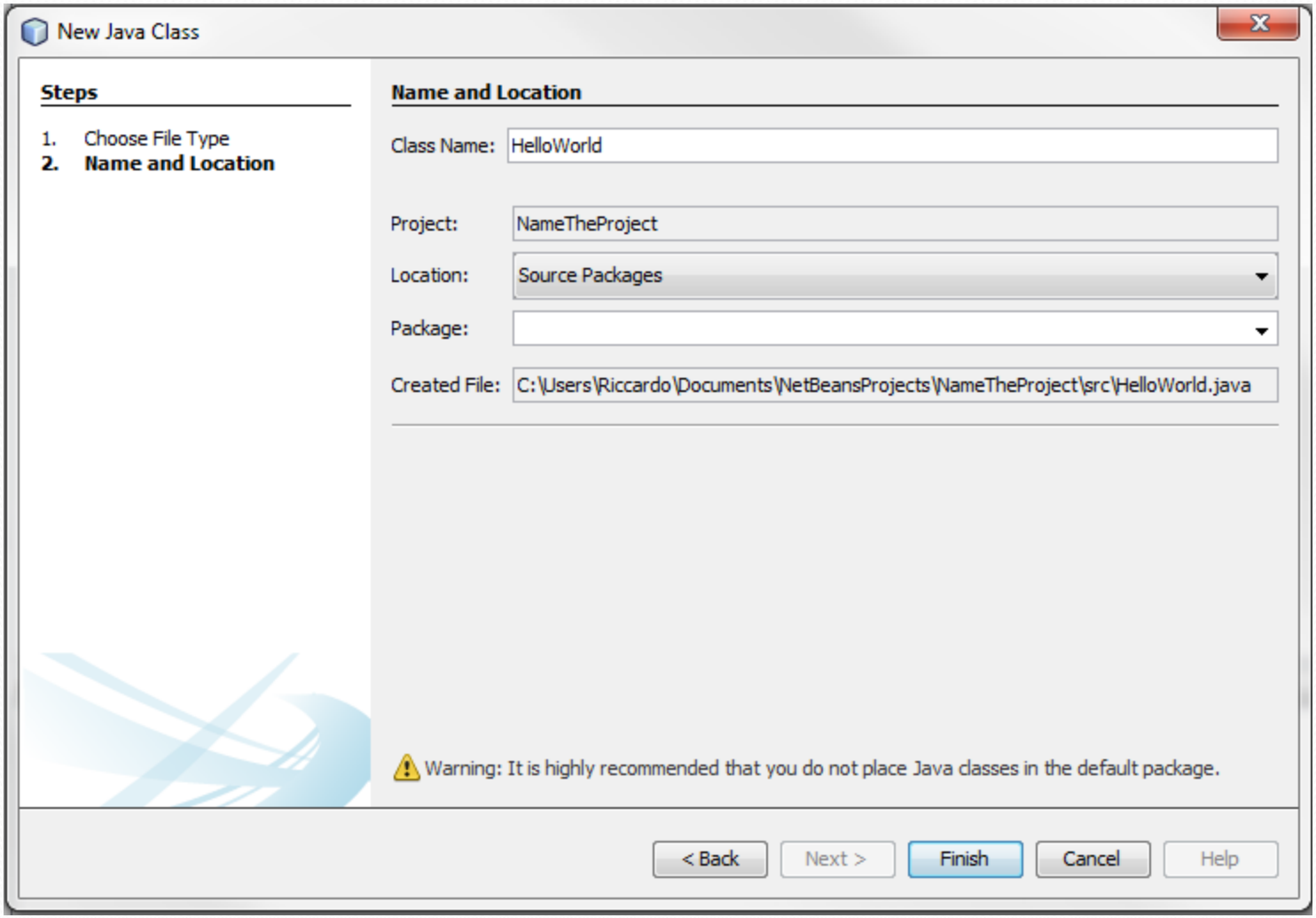
Step7: Now select the project in which you want to write and the type of file you want to add. In the example Java Class is selected.



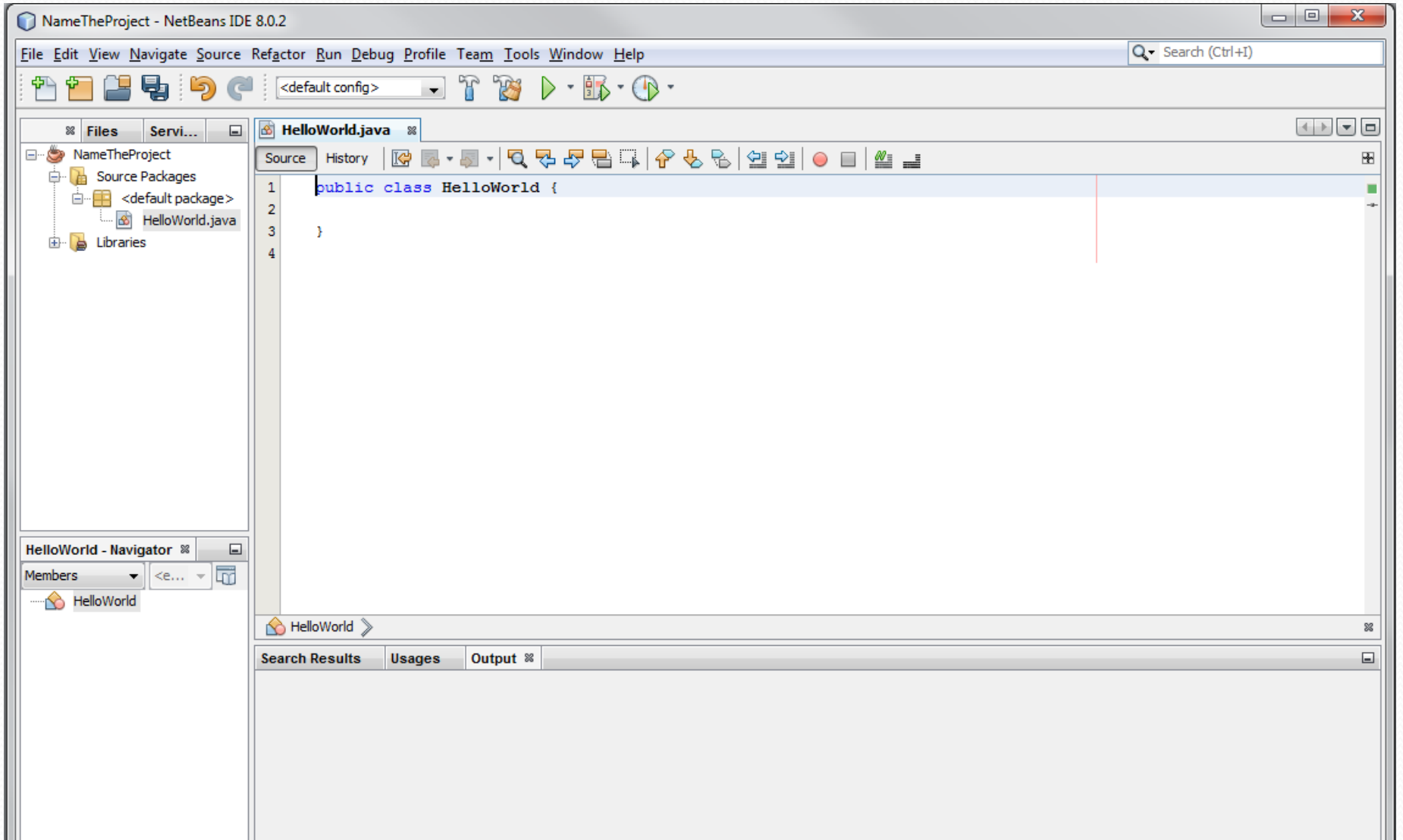
Step6 bis: Or else, we can right-click on the project in the project manager and select “New”, then “Java Class…”.



Step8: Now chose the name of the class you want create and click “Finish”.

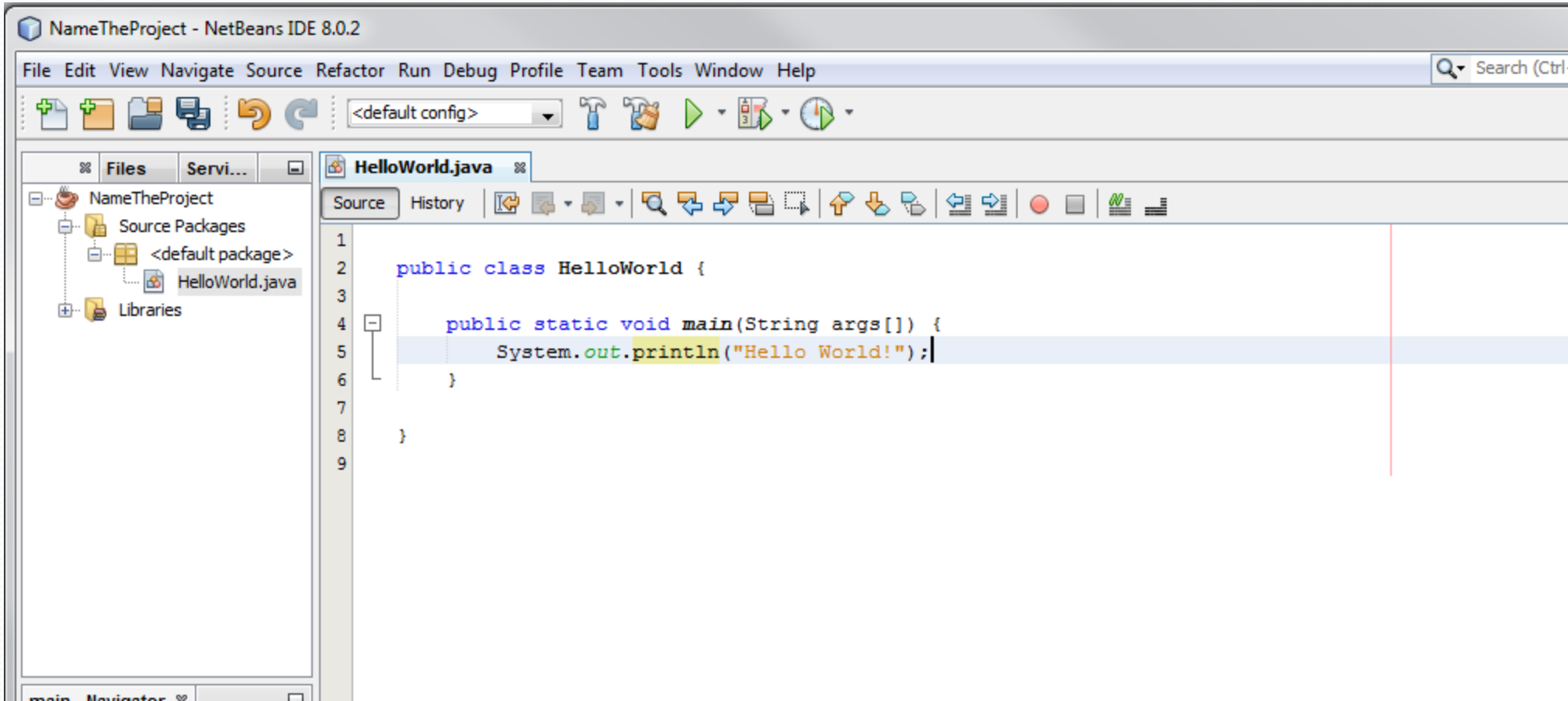


Step9: Now you have the editor space, start coding.

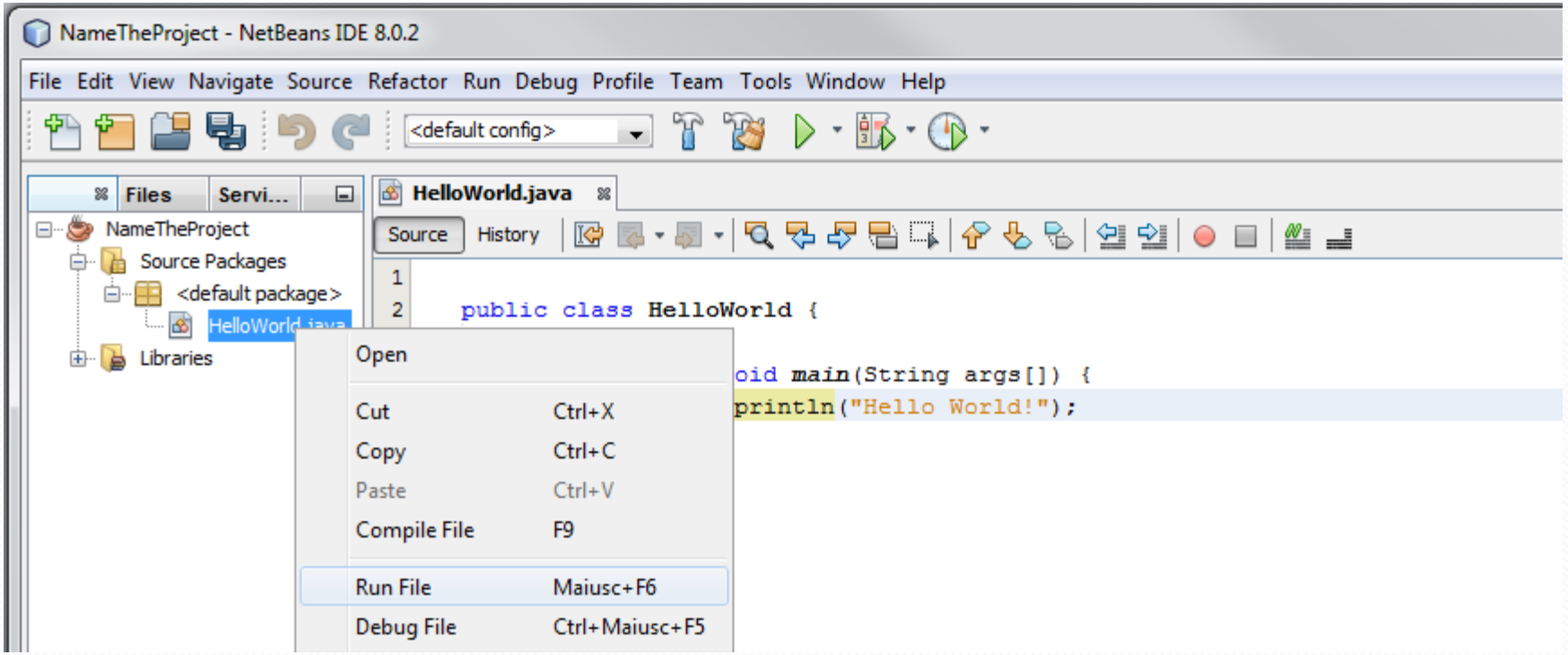


Writing the code

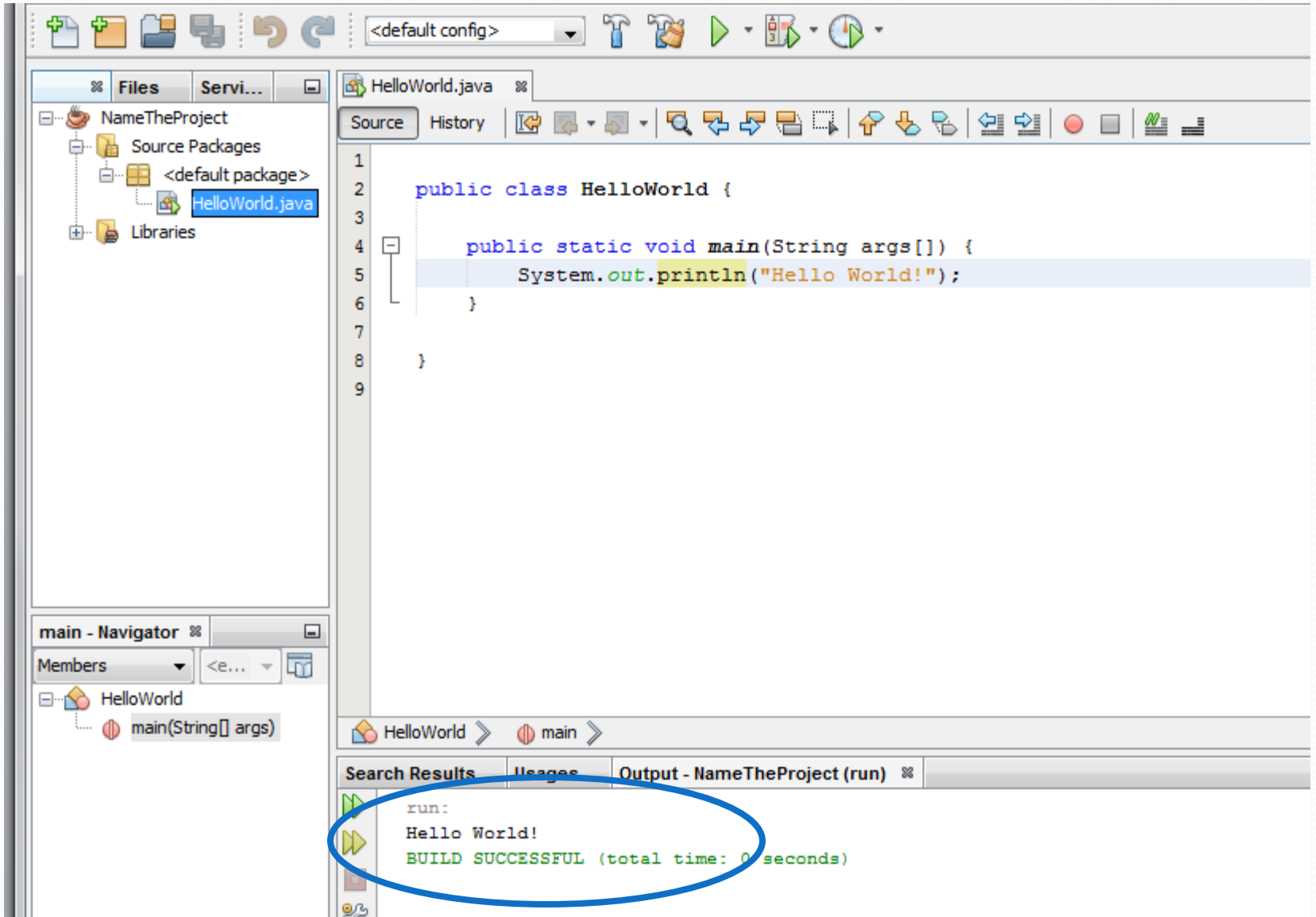
Step10: In NetBeans when ever you save the file, it will compile the code by default.



Step11: Running the java class. Right click on the class file and choose “Run File”.



Step12: Here you can find the output (Console).



Creating a .jar file

In NetBeans every time you build the project, the .jar file is updated and saved in the dist/ folder contained in the project main directory.

Executing a jar file

- The basic command is: java -jar *jar-file*
- If the runtime environment has no information about which class within the jar file is the application's entry point (class containing the main method of your application), you must add a Main-Class header to the JAR file's manifest. See: http://docs.oracle.com/javase/tutorial/deployment/jar/appman.html

Some Information and FAQ on NetBeans

Features of NetBeans

- NetBeans has the basic features required for editing, running, and debugging Java code. In addition to basic programming features, it support for **more advanced Java development tools** such as Ant, CVS, JUnit, and refactoring.

Adding NetBeans plugin

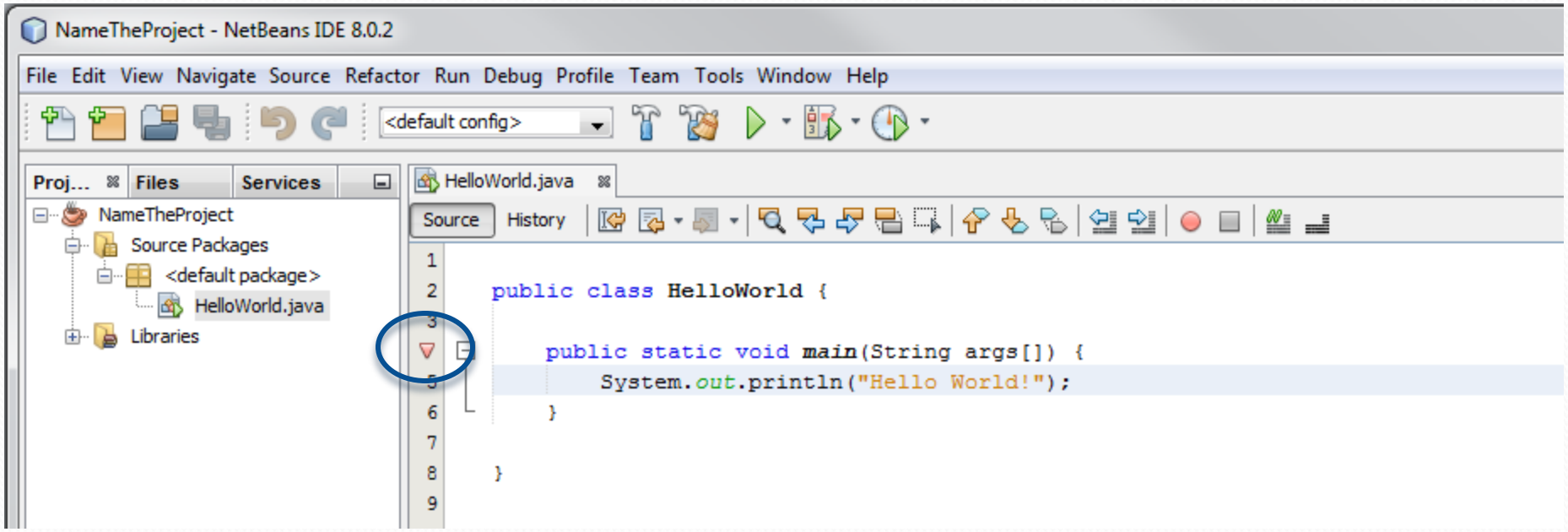
To add plugins you have just click on *Tool* → *Plugins*. A windows will open where you can choice which plugin to download and install.

Running code

- NetBeans uses an incremental compiler, so it isn't necessary to explicitly compile your Java files; **the compiled class files are saved automatically when you save your Java files**. However, it is possible to force recompiling by selecting Clean and Build from the menu opened by right-clicking on the project name.
- To run a program, the easiest way is to **select the file containing a main()** method in the Package Explorer and then select **Run File** from the main NetBeans menu or clicking on the big green triangle in the toolbar.

Debugging

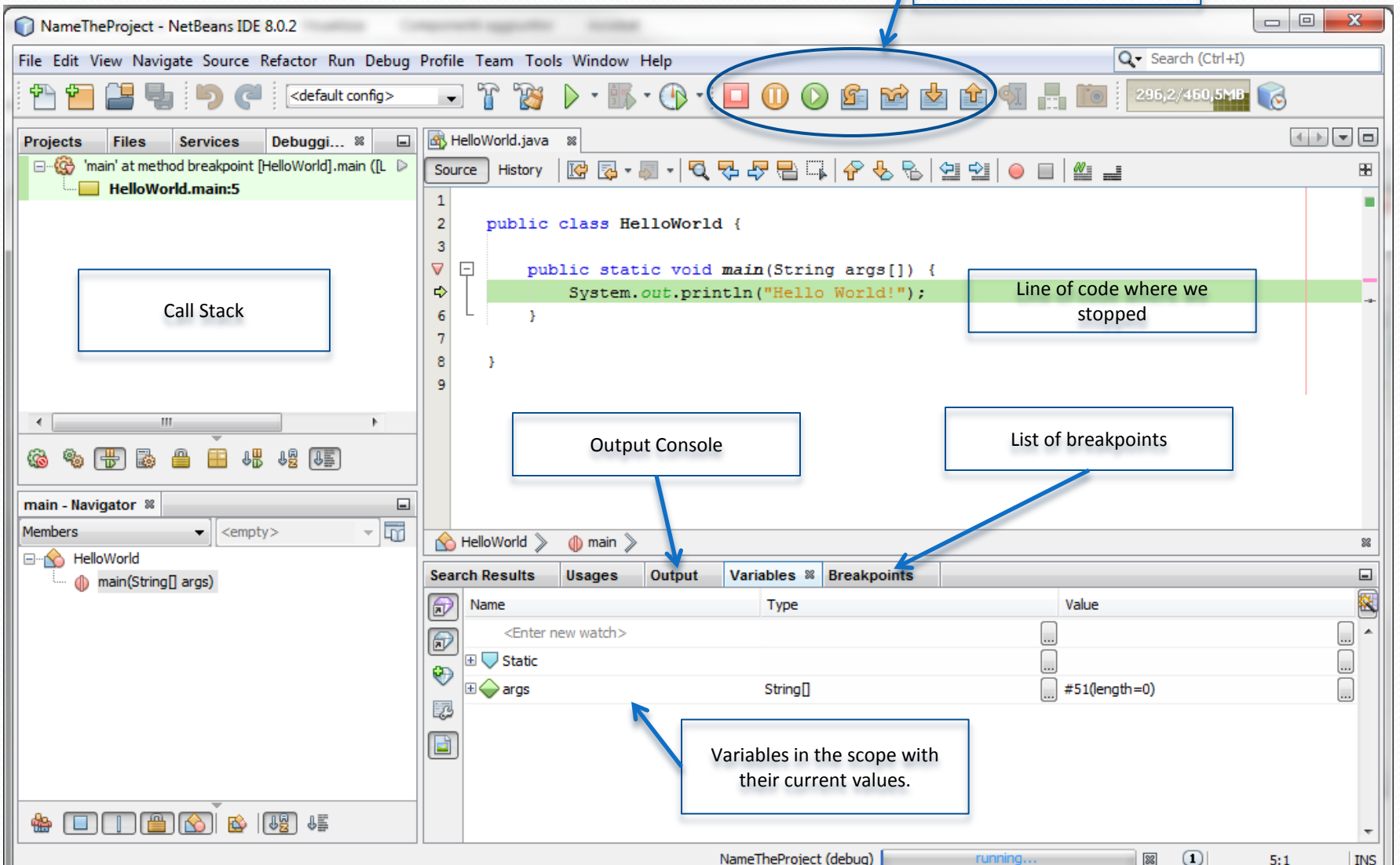
- First, set a breakpoint in the main() method by clicking in the left margin next to the call. If this code were a little less trivial, it would also be possible to set a conditional breakpoint -- one that stops when a particular expression is true, or one that stops after a specific number of hits -- by right-clicking the breakpoint and selecting **Method Breakpoint > properties** from the context menu.



Debugging

- To start debugging, select **Debug > Debug Project** or **Debug > Debug File** from the main menu. Some new toolbars and windows will be opened to show breakpoints and allows step-by-step execution.

Debugging


Buttons to step thorugh the code. Shortcuts available from Run menu
NameTheProject - NetBeans IDE 8.0.2
File Edit View Navigate Source Refactor Run Debug Profile Team Tools Window Help
Search (Ctrl+I)
<default config>
296,2/460,5MB
Projects
Files
Services
Debuggi...
'main' at method breakpoint [HelloWorld].main ([L
HelloWorld.main:5
Call Stack
HelloWorld.java
Source
History
1 public class HelloWorld {
3 public static void main(String args[]) {
4 System.out.println("Hello World!");
6 }
8 }
Line of code where we stopped
main - Navigator
Members
<empty>
HelloWorld
main(String[] args)
Output Console
List of breakpoints
HelloWorld
main
Search Results
Usages
Output
Variables
Breakpoints
Name
Type
Value
<Enter new watch>
Static
args
String[]
#51(length=0)
Variables in the scope with their current values.
NameTheProject (debug)
running...
5:1
INS

The famous Dos and Don’ts:

- Ave the project folder where you can easily access it (normally they are saved in the NetBeans Projects folder in Documents).
- **Never start writing the code without making a project**. You need to create a project folder every time you start a new assignment
- **Main classname and the file name** should always match.