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Test Automation Engineering Fundamentals: Java

Module 2: Introduction to Java

Module Objective

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- **At the end of this module, you will be able to:**
  - Describe the primary concepts that support Java technology
  - Explain how Java achieves platform independence
  - Discuss the different tools and libraries available as part of the Standard Java Development KIT (J2SE JDK)
  - Install and configure the required software, tools, and libraries to get started with Java
  - Write, compile and execute simple Java applications

Brief History of Java

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- Java was originally called “Oak”
- Java was meant to be a programming language specifically for appliances and various small devices
- The original specification:
  - Targeted set-top boxes for cable television that allowed users a control and interactivity when using the service
  - Java specification is owned by Sun Microsystems
- The newly emerging Internet proved to be a much better platform for the specification:
  - The way the Net was being used had the same interactivity they planned for cable television customers

The Java Programming Language

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- The Java programming language is a fully object-oriented language.
- The standard edition provides pre-built libraries and APIs that provide useful capabilities out of the box.
- Java is:

Portable → The Java language and libraries are platform-independent.

Multi-Threaded → Java has a sophisticated set of synchronization primitives that are based on the widely used monitor and condition variable paradigm.

Robust → Programmers don't have to worry about freeing or corrupting memory.

The Java Technology Platform

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- Java applications run on a virtual machine environment that:
  - Isolates the underlying platform
  - Achieves portability and performance
  - Provides security
- Java source code is written as plain text files (.java) that are compiled as platform independent byte-codes (.class)
- Java byte-codes are interpreted and executed by the virtual machine that passes the instructions to the actual platform

The Java Technology Platform

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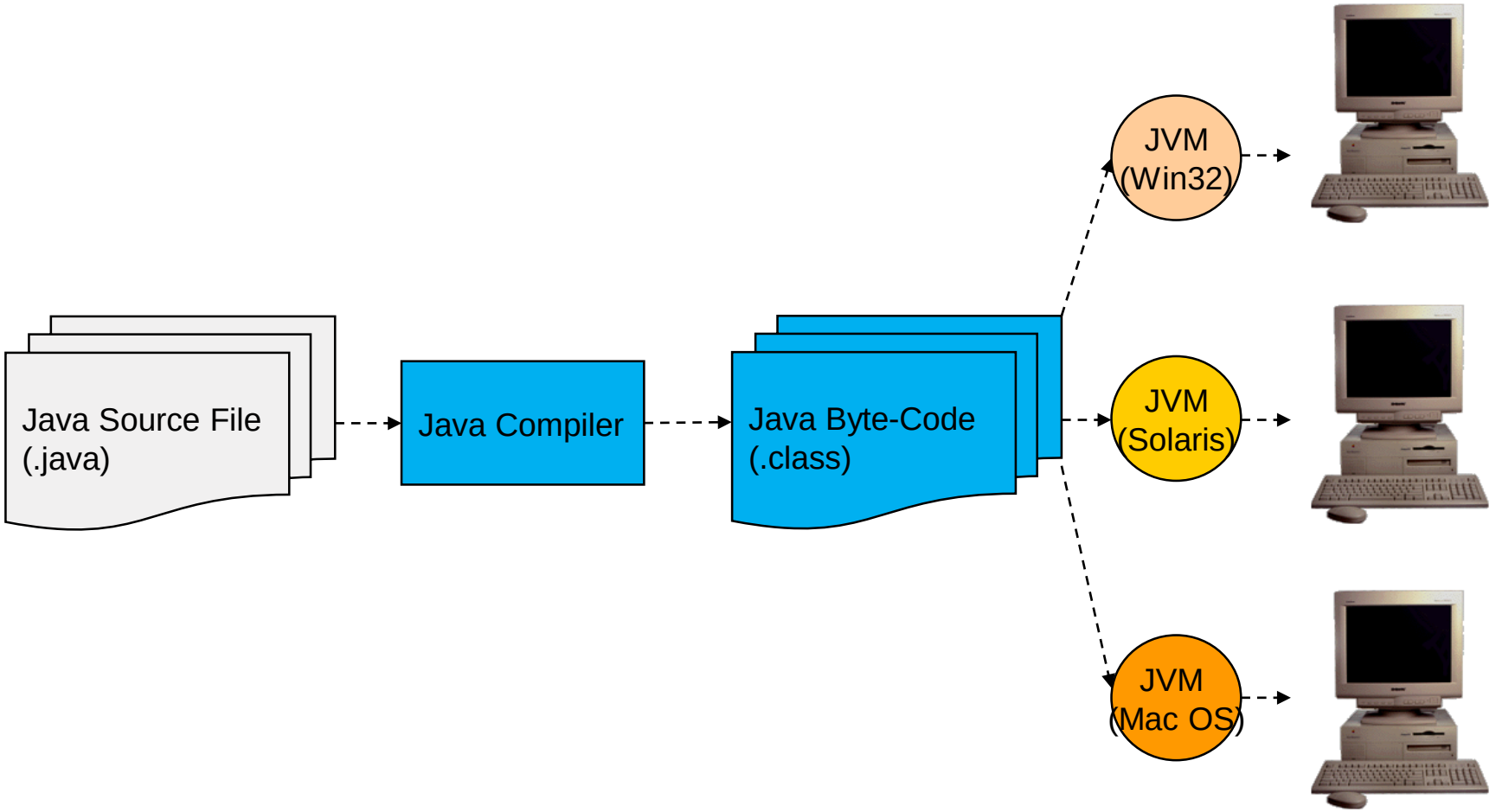

Java Development Kit

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- Java Development Kit (JDK):
  - Is a set of software, tools, and libraries that need to be installed in order to start writing and compiling Java applications
  - Installs the virtual machine (runtime environment) needed to execute Java applications on the platform
    - The virtual machine can be downloaded separately from the JDK as a JRE (Java Runtime Environment) download

Activity

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1. Install the Java Development Kit
2. Install an IDE (IDEA)
3. Create HelloWorld program and compile it using javac
4. Create and configure a project inside Idea importing the SEF work files
5. Compile and execute a simple Java application

Installing the JDK

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- The License Agreement of the JDK used in this course is found in the Appendix section of this module
- If the installer isn't locally available, go to https://www.oracle.com/technetwork/java/index.html and download Java 8 SE installer
  - Make sure to download the appropriate 'JDK' version for your platform
- Once the installer is available, execute the installer and follow the prompted procedures.
  - Just choose the default choices for any installation options

Installing the JDK

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- In the JDK<version number>\bin directory, the compiler can be invoked by executing the application called ‘javac’:

  Syntax:
  javac <source file>
  Example:
  javac HelloWorld.java

- In the same directory, an application can be run using the virtual machine by executing the application called ‘java’:

  Syntax:
  java <class file>
  Example:
  java HelloWorld

‘HelloWorld’ program using javac

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Write “HelloWorld” java program using javac

```
public class HelloWorld {

    public static void main(String arg[]){
        System.out.println("Hello World!");
    }
}
```

Note: The focus of this activity is to show how .class and .java files
are created. We will study about ‘class’ and ‘main’ method in detail in the next module.

Integrated Development Environment

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- Java source files are in text format and can be written using any text editor.
- For greater productivity, download and install an Integrated Development Environment (IDE). An IDE:
  - Provides you with a set of tools that assist in developing, testing, and debugging Java applications.
  - Popular IDEs are:
    - NetBeans (from http://java.sun.com).
    - Eclipse (http://eclipse.org).
    - IntelliJ IDEA (https://www.jetbrains.com/idea/)

Installing and Configuring Eclipse

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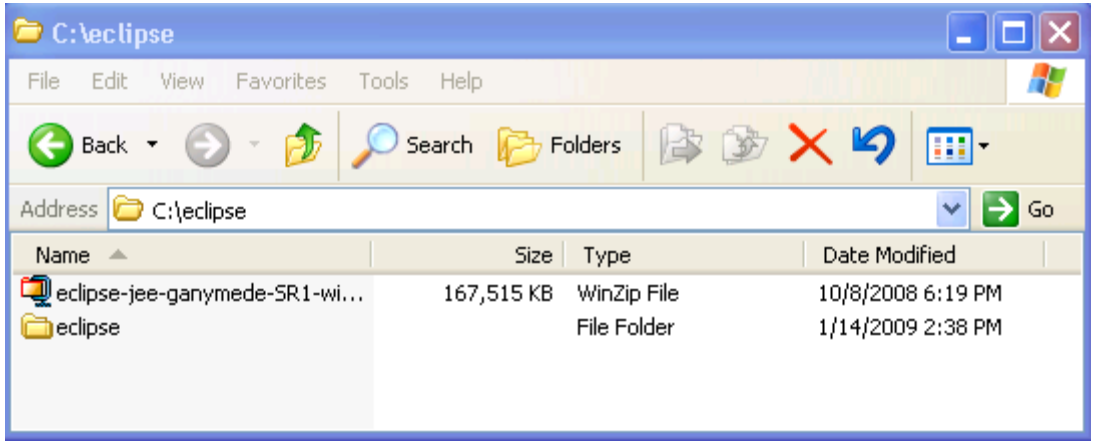
- Eclipse 3.4 used in this course is an Accenture approved OSS. The License Agreement is found in the Appendix section of this module.
- http://www.eclipse.org/ and download the Eclipse IDE.
- The installer should be an archive file.
- Extract the files in the archive to a directory of your choice (c:\eclipse in the example below).



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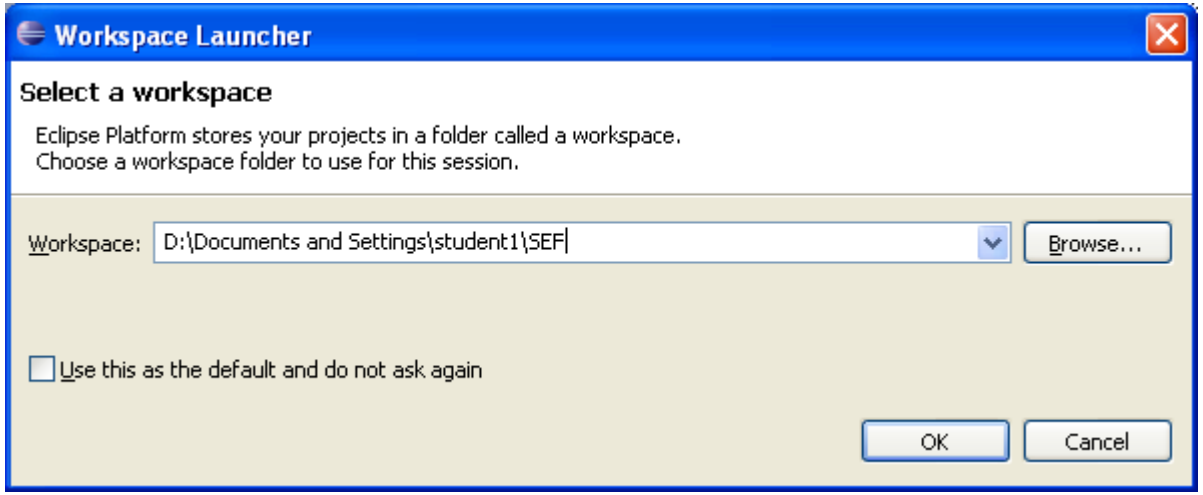
- Once extracted, go to the directory, find the executable ‘eclipse.exe’ and create a shortcut to it.
- Place the shortcut in a convenient location and double- click the shortcut to launch the Eclipse IDE.
- After the splash screen, the IDE will prompt you to create a workspace. Name the workspace ‘SEF’.



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- If it is your first time using eclipse, the ‘Welcome’ window should give you some first-timer options and tutorials.
- Close the window for now. This can be accessed any time under the ‘Help->Welcome’ menu.

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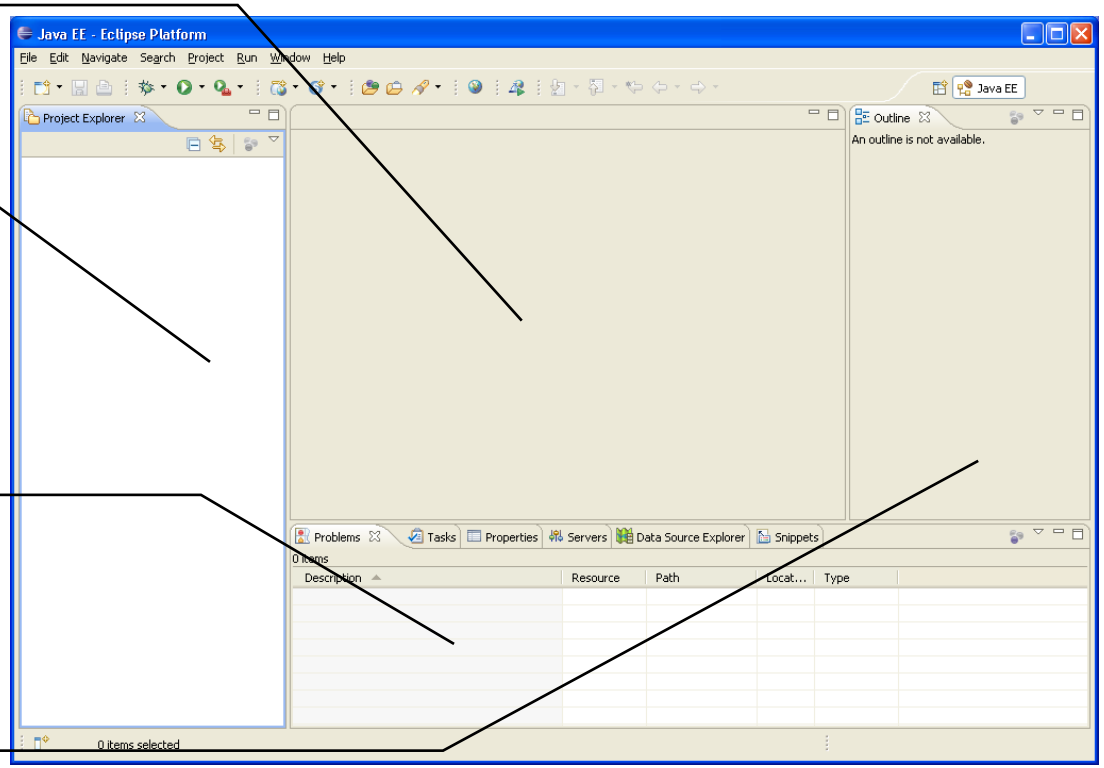
The editor window is where the selected component can be viewed and edited

The Project explorer allows you to browse the contents of the various projects you have created under the workspace

Information tabs at the bottom provide additional information about the application/component selected

The outline view allows you to look at the various elements of a component selected from the project explorer



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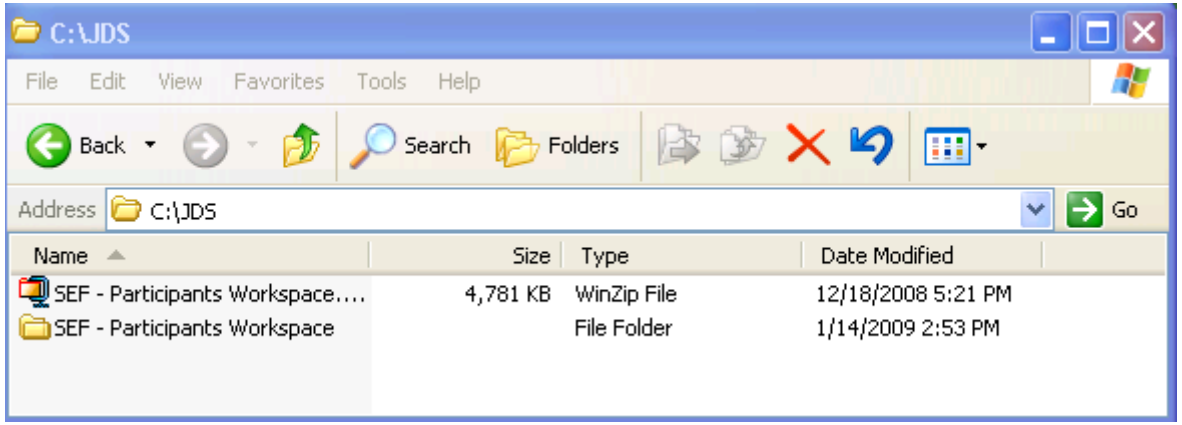
- Extract the SEF – Participants Workspace to any directory you want.
- In this example, the zip file is extracted to C:\JDS



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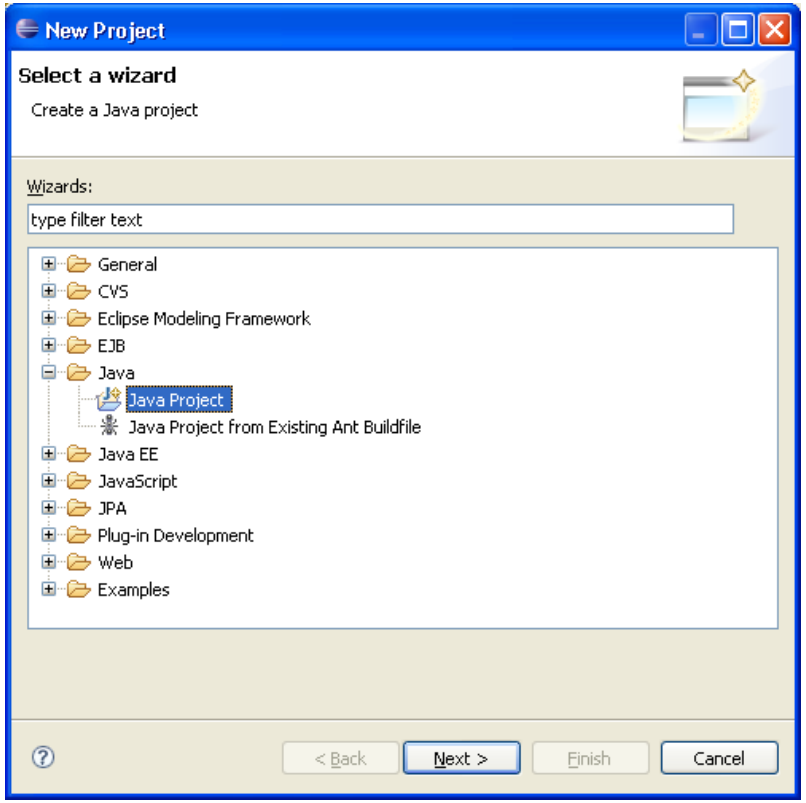
- Create a new project by selecting File->New->Project
- In the wizard, select Java Project



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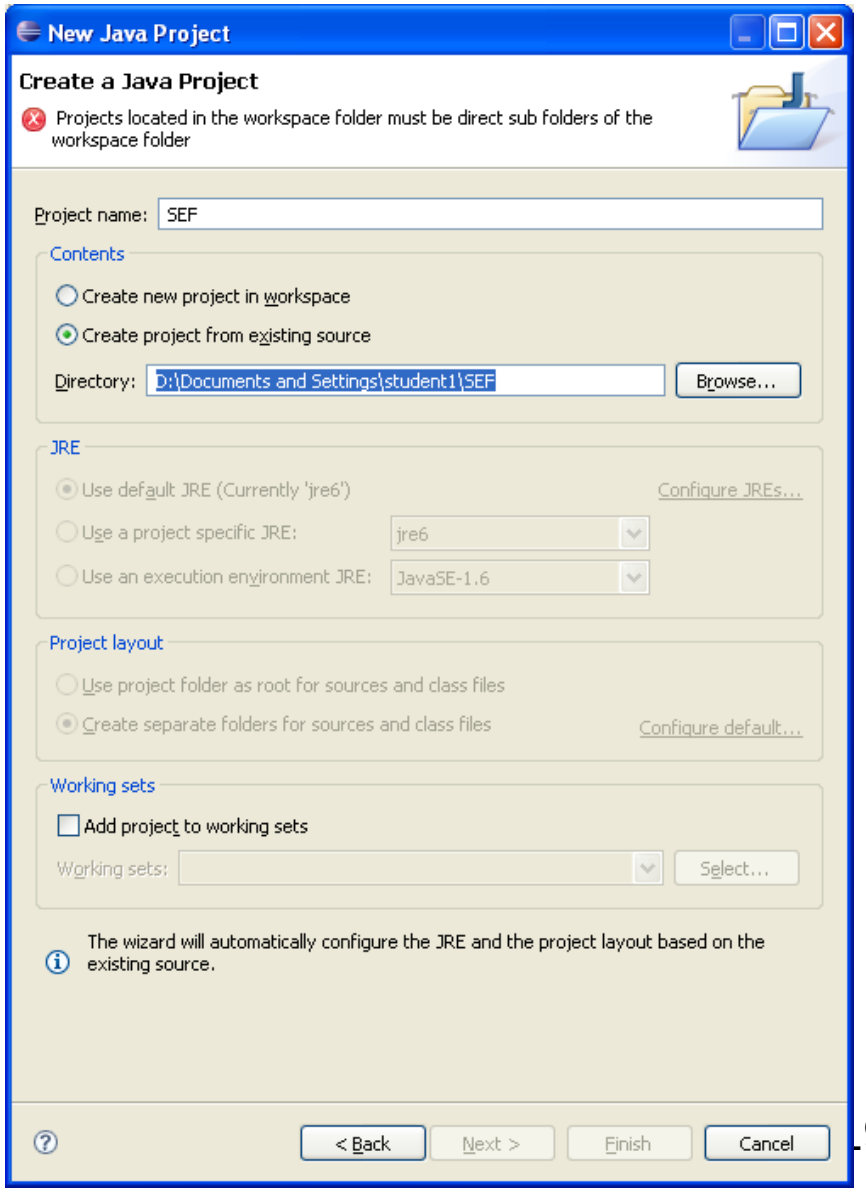
Use ‘SEF’ as the project name
Select ‘Create Project from an existing source’ and browse to the directory named SEF under the directory where the Eclipse SEF Participants Workspace archive is extracted

Click ‘Finish’ as we don’t need the other steps



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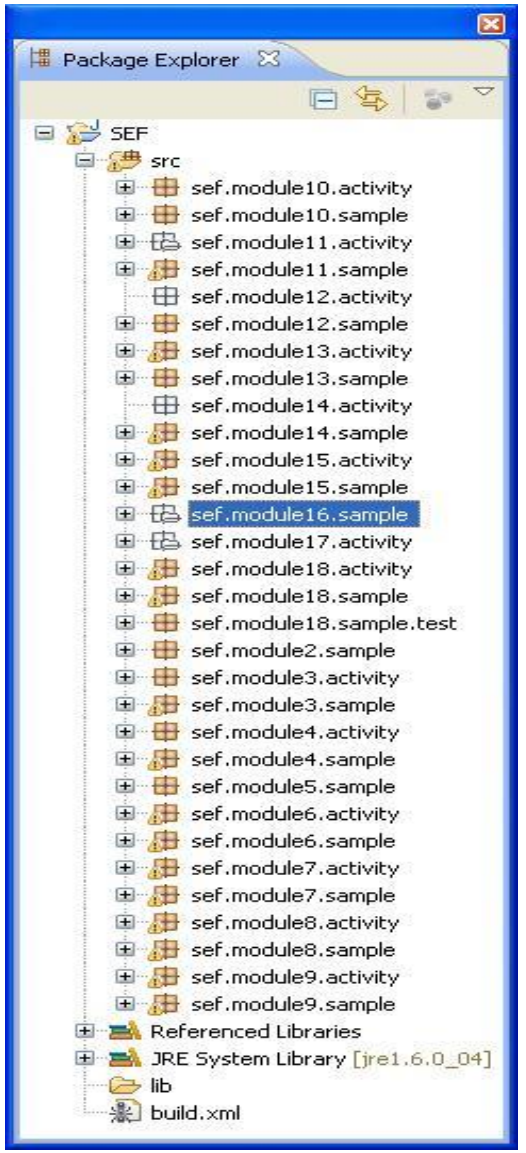
The work files for this training is divided into packages for each module
In the package explorer, go to sef.module2.sample and double click the file ‘HelloWorld.java’
The main editor view should show the contents of the HelloWorld.java file and the outline view should show the different elements of that file



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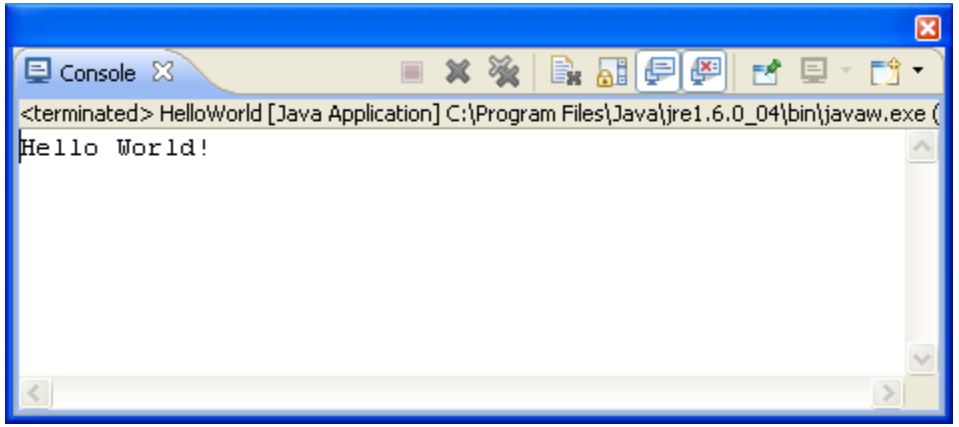
The HelloWorld file is a Java executable
Execute the file by right- clicking on the file->Run As->Java application
The console tab below the main editor should show the results of the application



What is a Java Class?

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- Classes are fundamental building blocks of a Java program.
- The initial letter in the name of a class should be capitalized.
- main() method in a class serves as a default entry point.
  - When a class is executed with the Java interpreter, the runtime system starts by calling the class's main() method.

Create a new Java Class

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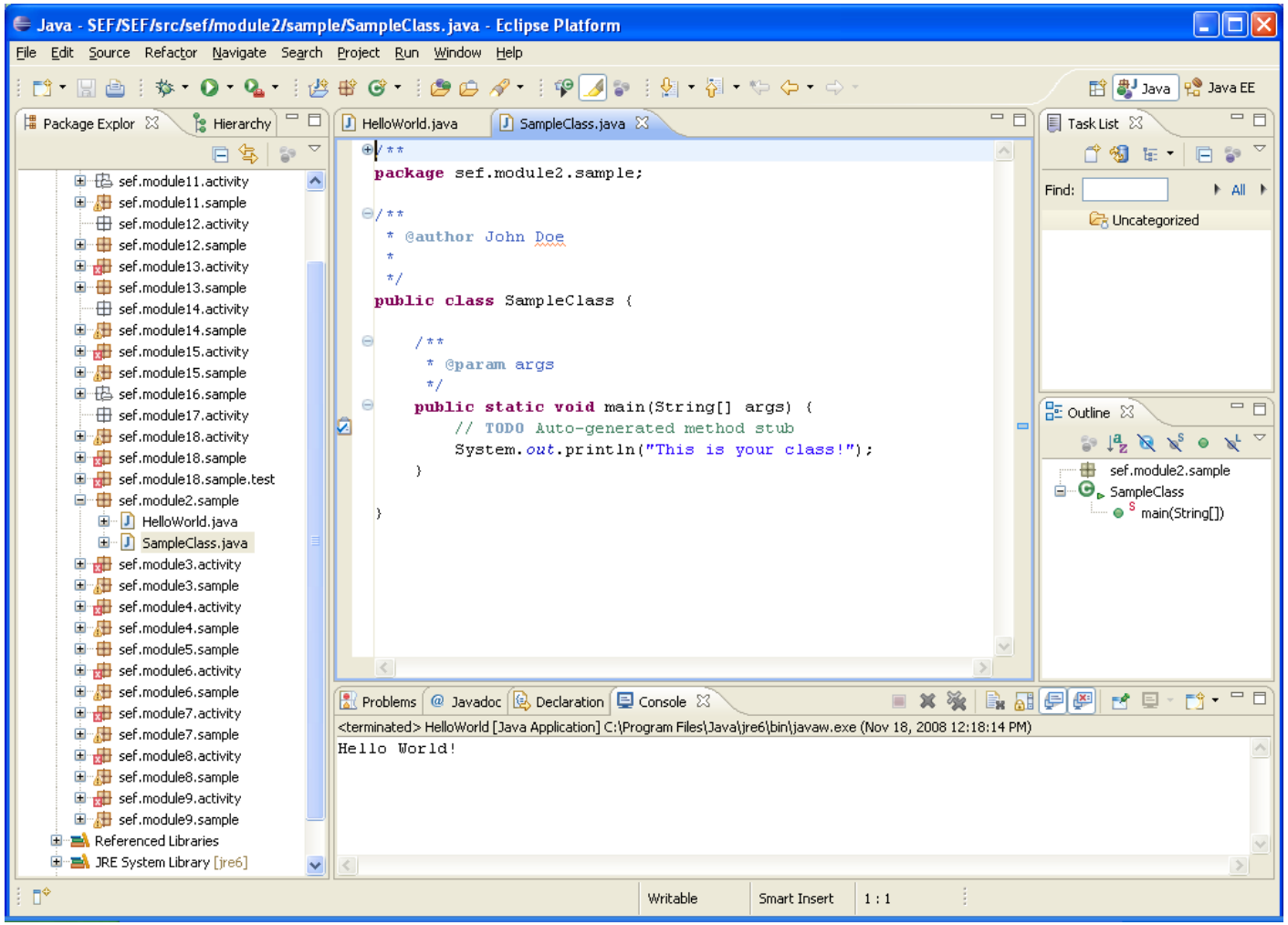
- Right-click on the package sef.module2.sample and select New->Class
- Give the class a name ‘SampleClass’
- Add ‘public static void main(String arg[]) in the method stubs
- Click ‘Generate Comments’
- Click Finish when done



Create a new Java Class

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- Complete the *main* method by typing:

```
public static void main(String[] args) {
// TODO Auto-generated method stub
System.out.println("This is your class!");
}
```

- Compile and execute the new class and view the results!

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Appendix

- ECLIPSE
  - Version : 3.4
  - License : http://www.opensource.org/licenses/eclipse-1.0.php
- JDK
  - Version : 1.8
  - License : https://www.oracle.com/technetwork/java/javase/terms/license/index.html

Questions and Comments

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- What questions or comments do you have?