Session 01

Introduction to JAVA

Trinh Thi Van Anh – PTIT

What is Java?

An island

- Largest island of the equatorial achipelago of Indonesia
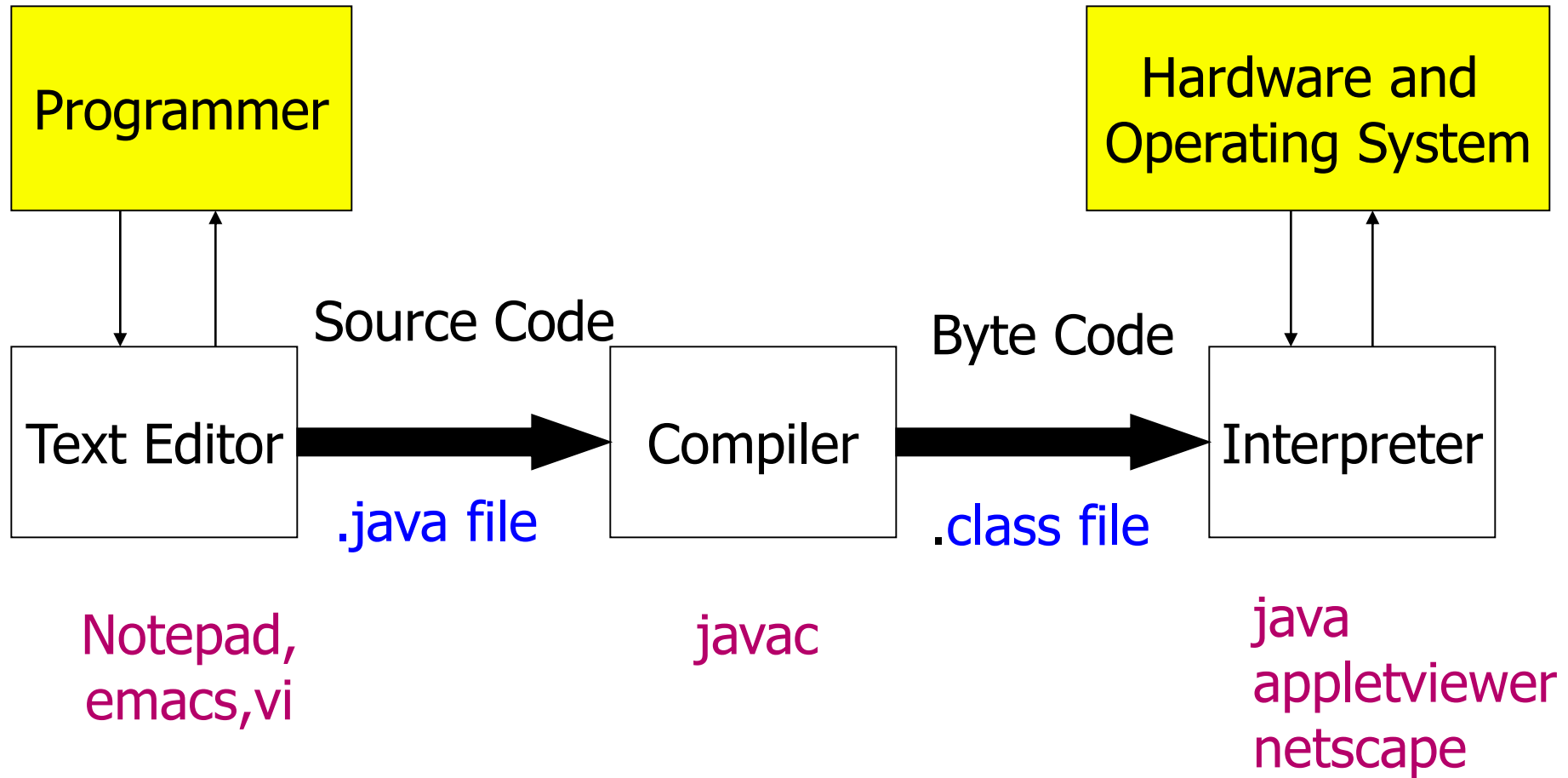
- Famous for beaches and coffee

A language

- Developed by Sun
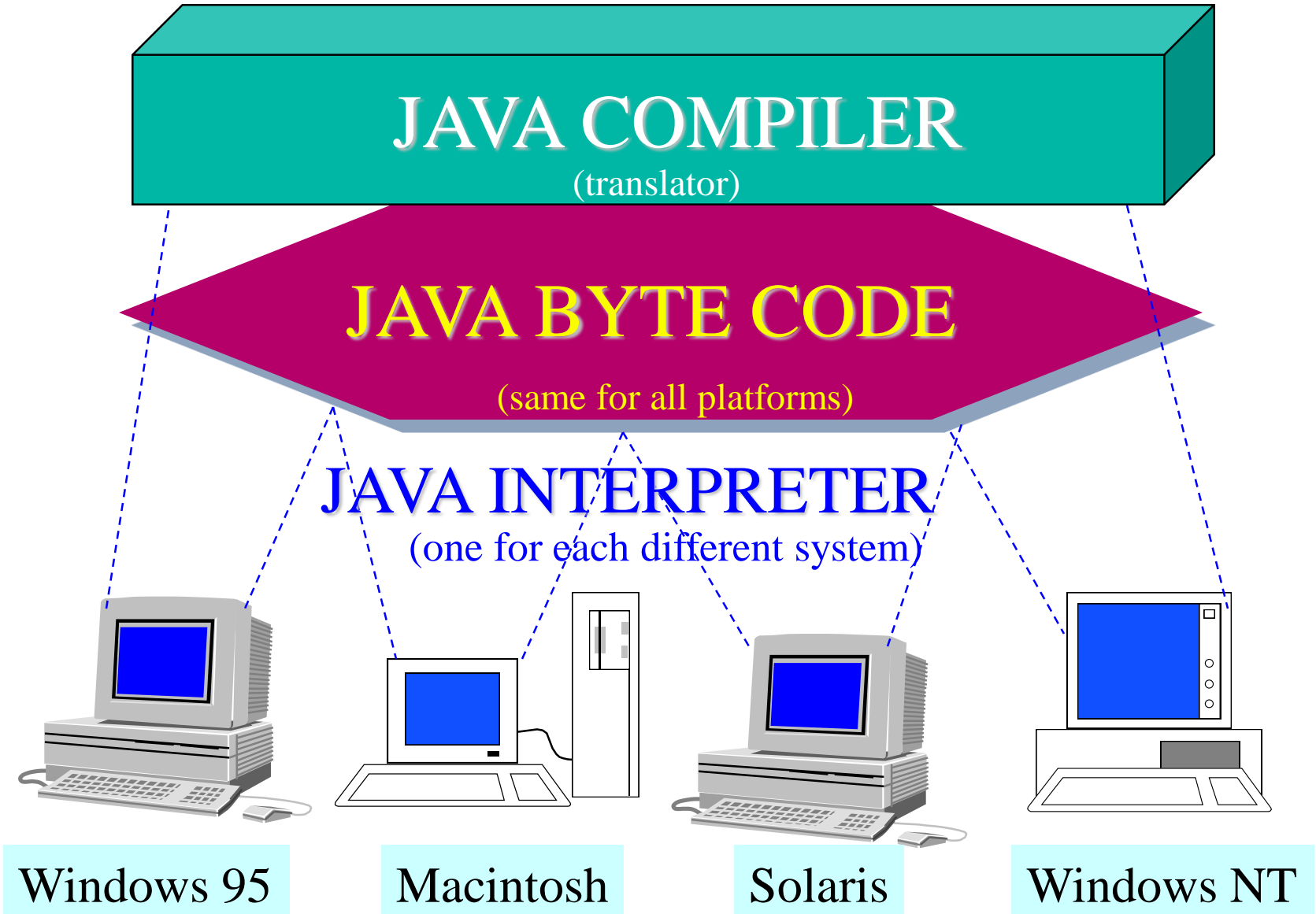
- Open specification

The History of Java Technology

- Java - The new programming language developed by Sun Microsystems in 1991.

- Originally called Oak by James Gosling, one of the inventors of the Java Language.

- Java Authors: James Gosling, Arthur Van , and others

- Originally created for consumer electronics (TV, VCR, Freeze, Washing Machine, Mobile Phone).

- Java - CPU Independent language

Java is Compiled and Interpreted

```
┌─────────────┐                              ┌──────────────────┐
│ Programmer  │                              │   Hardware and   │
│             │                              │ Operating System │
└─────────────┘                              └──────────────────┘

        Source Code              Byte Code

┌─────────────┐      ┌──────────┐      ┌─────────────┐
│ Text Editor │ ───► │ Compiler │ ───► │ Interpreter │
└─────────────┘      └──────────┘      └─────────────┘

      .java file            .class file

   Notepad,              javac              java
   emacs,vi                                 appletviewer
                                            netscape
```

Total Platform Independence

Rich Class Environment

- Core Classes
  - **language**
  - **Utilities**
  - **Input/Output**
  - **Low-Level Networking**
  - **Abstract Graphical User Interface**
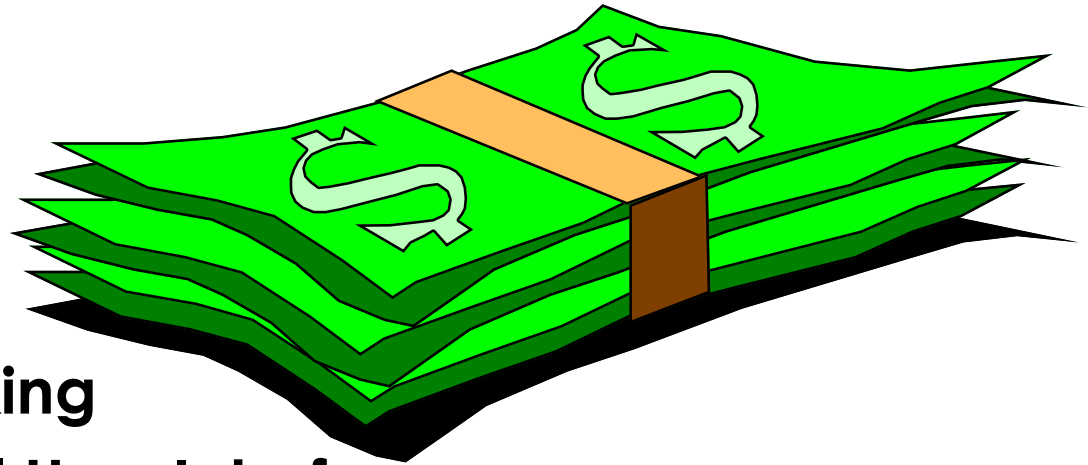
- Internet Classes
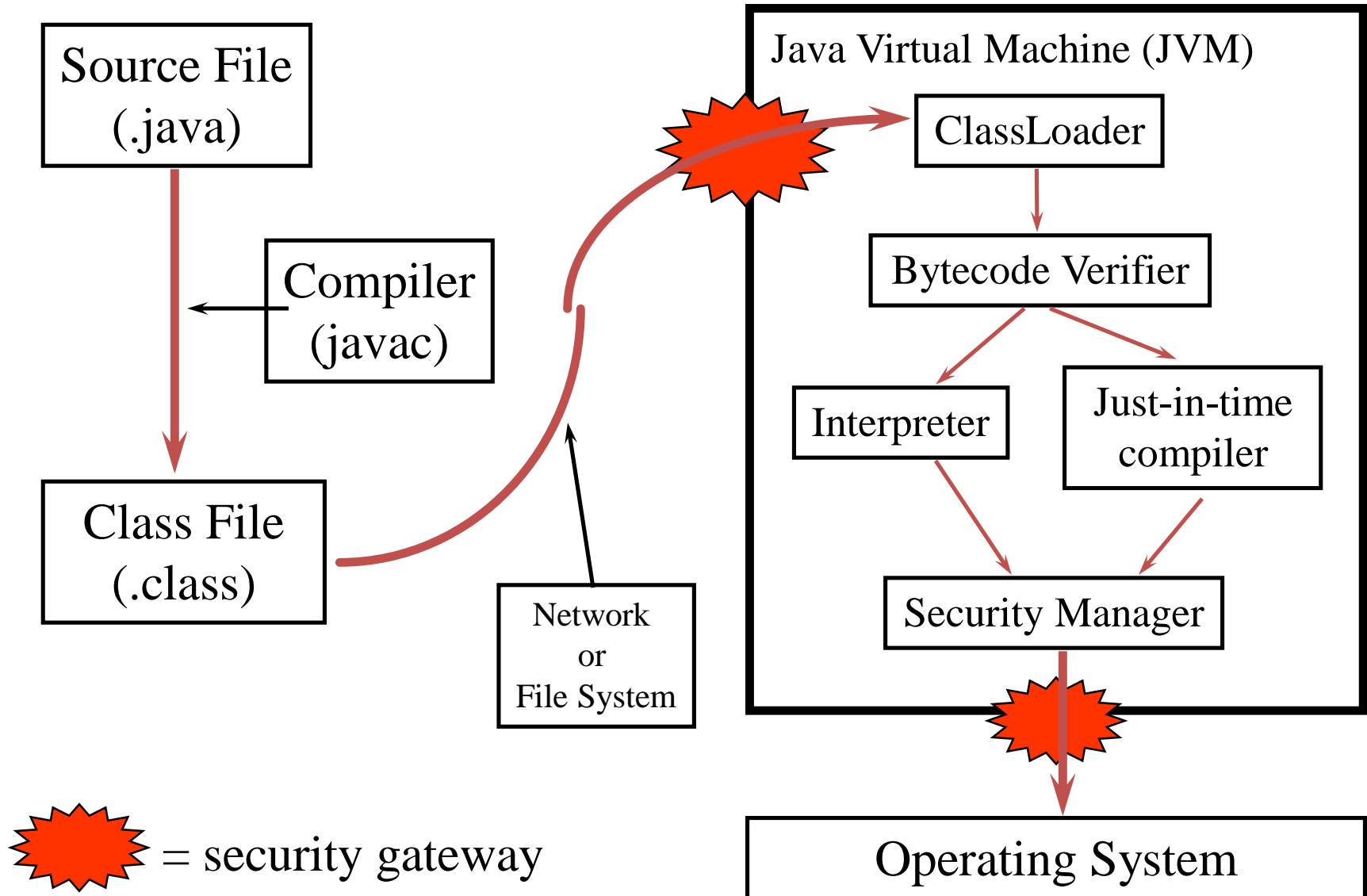 - **TCP/IP Networking**
  - **WWW and HTML**
  - **Distributed Programs**

Java Applications

- We can develop two types of Java programs:
  - Stand-alone applications

    Application- A stand-alone program that can be invoked from command line . A program that has a "main" method
  - Web applications (applets)

    Applet- A program embedded in a web page , to be run when the page is browsed . A program that contains no "main" method
- Application –Executed by the Java interpreter.
- Applet- Java enabled web browser.

Java Class Lifecycle

Source File (.java)

Compiler (javac)

Class File (.class)

Network or File System

Java Virtual Machine (JVM)

ClassLoader

Bytecode Verifier

Interpreter

Just-in-time compiler

Security Manager

Operating System

= security gateway
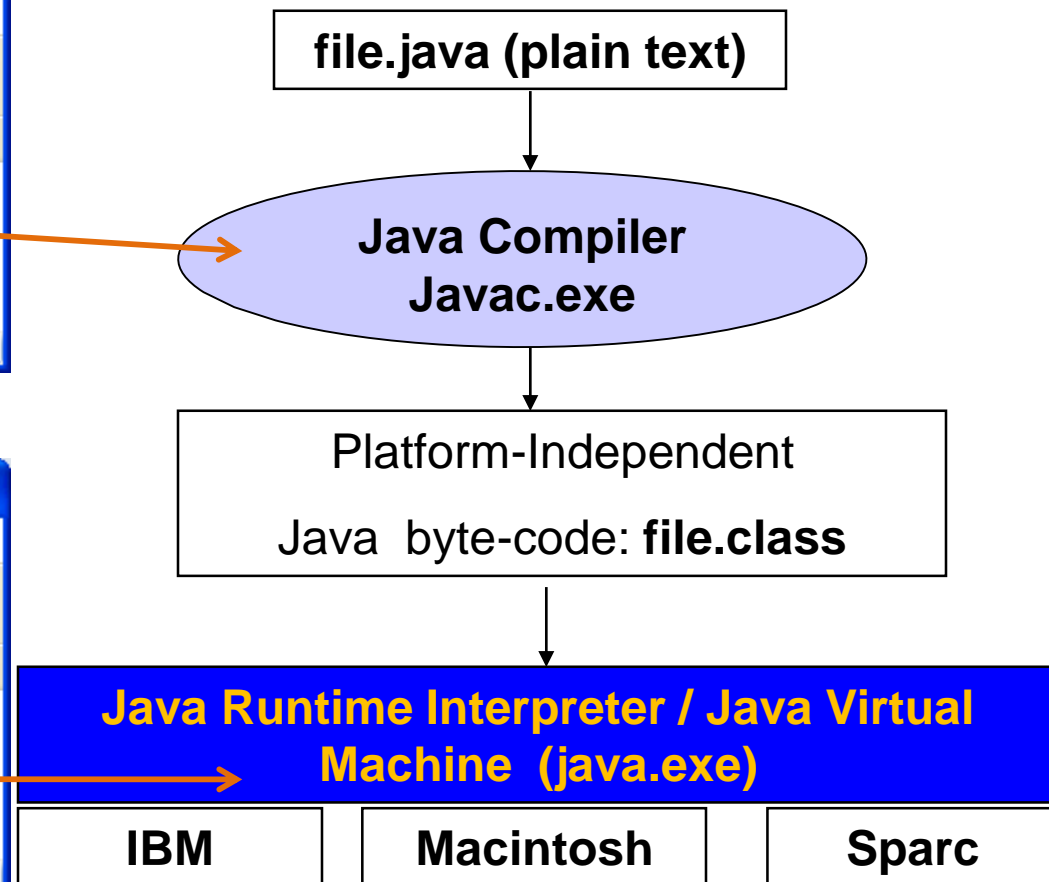
Let us Try Out

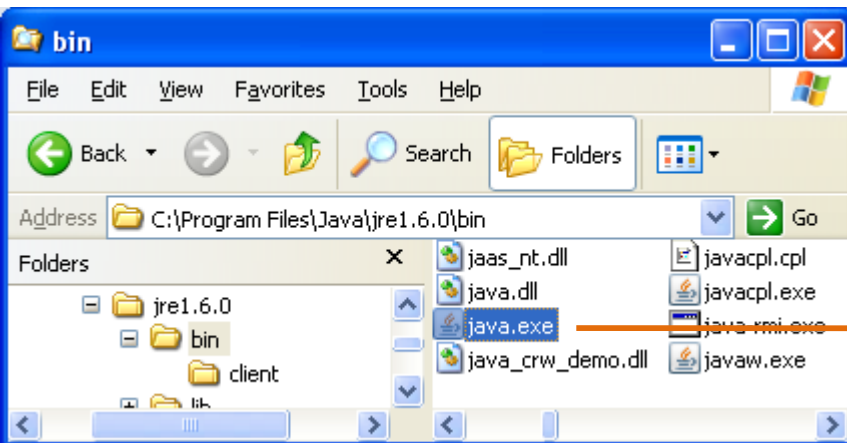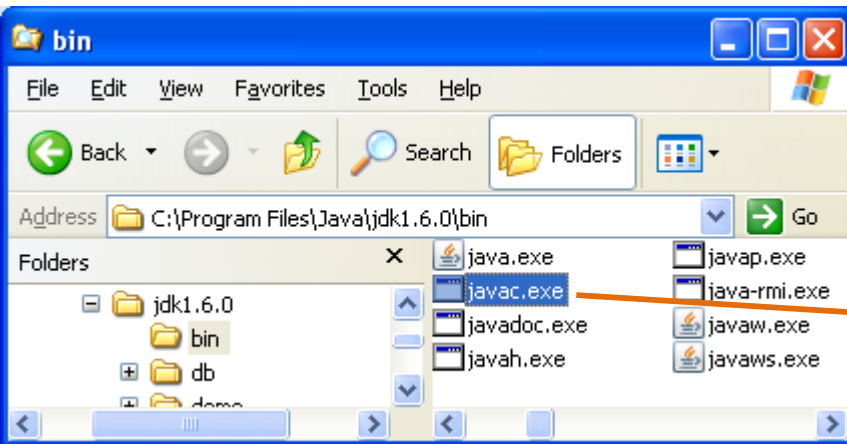Building your first Java Program

Hello World

```java
// HelloWorld.java: Hello World program
public class HelloWorld
{
    public static void main(String args[])
    {
        System.out.println("Hello World");
    }
}
```
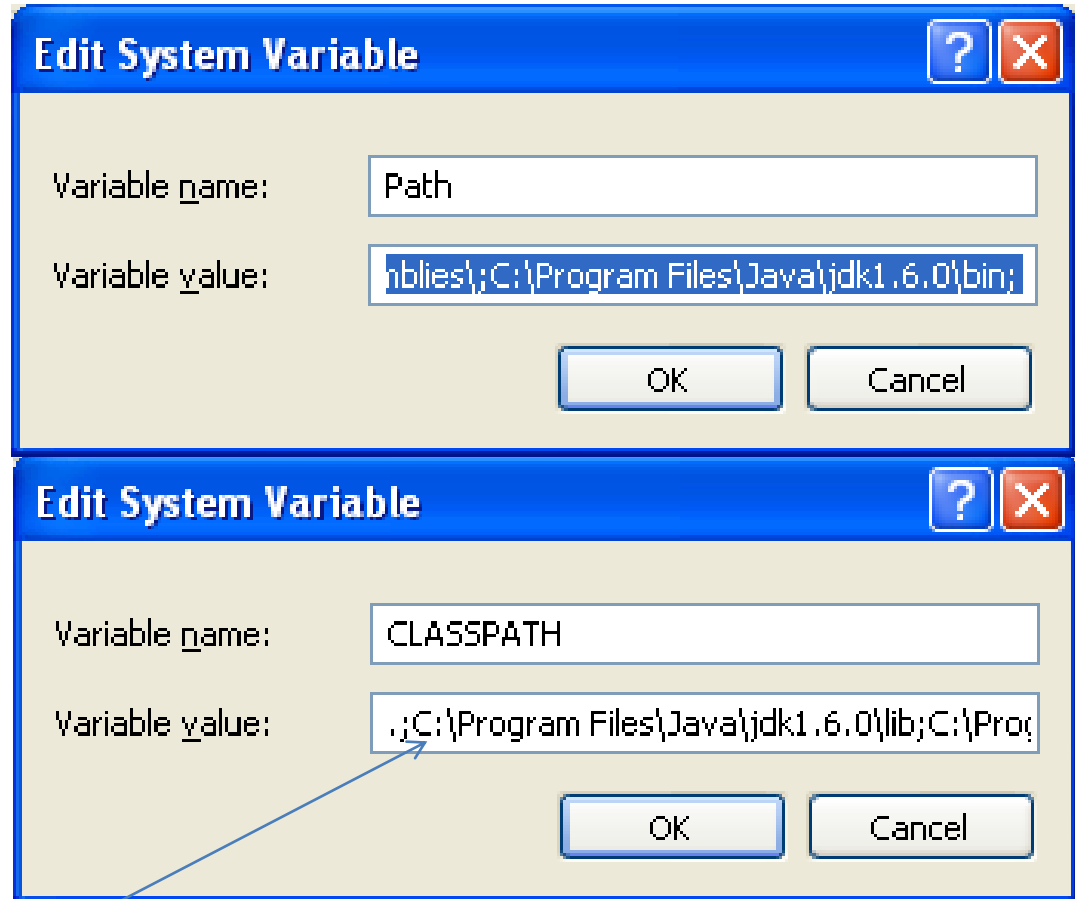
Program Processing

- Compilation

  `# javac HelloWorld.java`

  results in HelloWorld.class

- Execution

  `# java HelloWorld`

  Hello World

  `#`

How can Java support platform-independence?

file.java (plain text)

Java Compiler Javac.exe

Platform-Independent

Java byte-code: **file.class**

Java Runtime Interpreter / Java Virtual Machine (java.exe)

| **IBM** | **Macintosh** | **Sparc** |

Set up Environment Variables

- After installing JavaSE (Java Development Kit Standard Edition), environment variables should be setup to point to the folder in which JavaSE is installed.

- Steps: My Computer/ Properties/ Advanced/Environment Variables/System Variables/ Path/ Edit

- **Why?**

Edit System Variable

Variable name:	Path
Variable value:	nblies\;C:\Program Files\Java\jdk1.6.0\bin;

OK   Cancel

Edit System Variable

Variable name:	CLASSPATH
Variable value:	.;C:\Program Files\Java\jdk1.6.0\lib;C:\Prog

OK   Cancel

The point at the beginning of the CLASSPATH means that classes will be searched first in the current working folder.
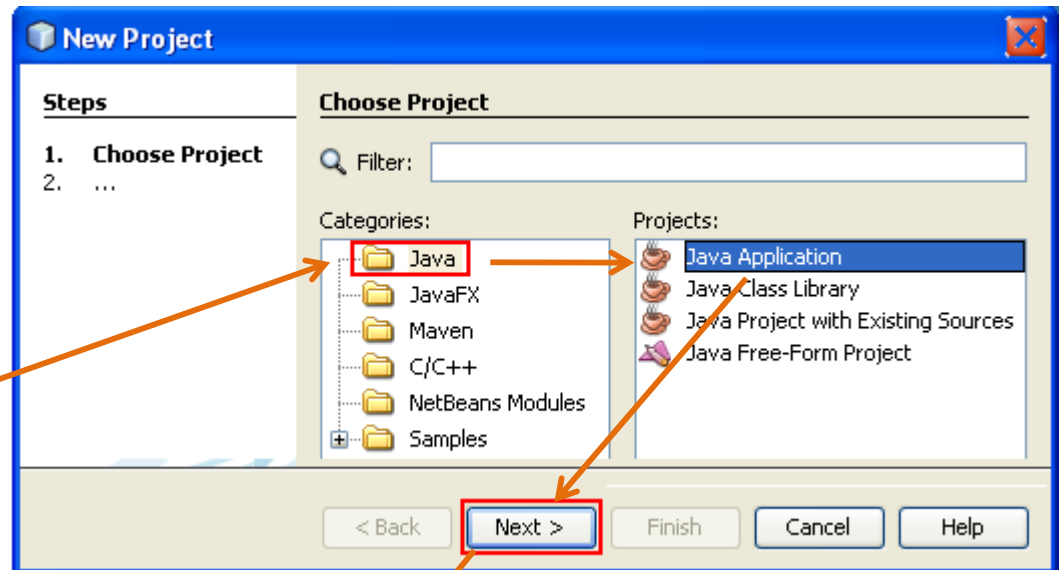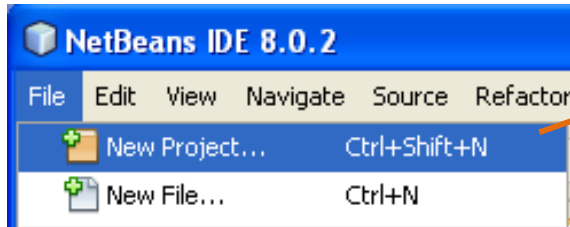
The first Java program in the NetBeans

This program will show the string "Hello World" to the screen.

Steps

1- Create a new Java NetBeans project

2- Add a Java class

3- Write code

4- Compile/Run the program

Step 1- New Project

NetBeans IDE 8.0.2

| File | Edit | View | Navigate | Source | Refactor |

New Project... Ctrl+Shift+N
New File... Ctrl+N

New Project

Steps

1. **Choose Project**
2. ...

Choose Project

Filter:

Categories:
- Java
- JavaFX
- Maven
- C/C++
- NetBeans Modules
- Samples

Projects:
- Java Application
- Java Class Library
- Java Project with Existing Sources
- Java Free-Form Project

< Back | Next > | Finish | Cancel | Help

New Java Application

Steps

1. Choose Project
2. **Name and Location**

Name and Location

Project Name: FirstPrj

Project Location: K:\GiangDay\FU\Java-OOP\Demos Browse...

Project Folder: K:\GiangDay\FU\Java-OOP\Demos\FirstPrj

☐ Use Dedicated Folder for Storing Libraries

Libraries Folder: Browse...

Different users and projects can share the same compilation libraries (see Help for details).

☐ Create Main Class firstprj.FirstPrj
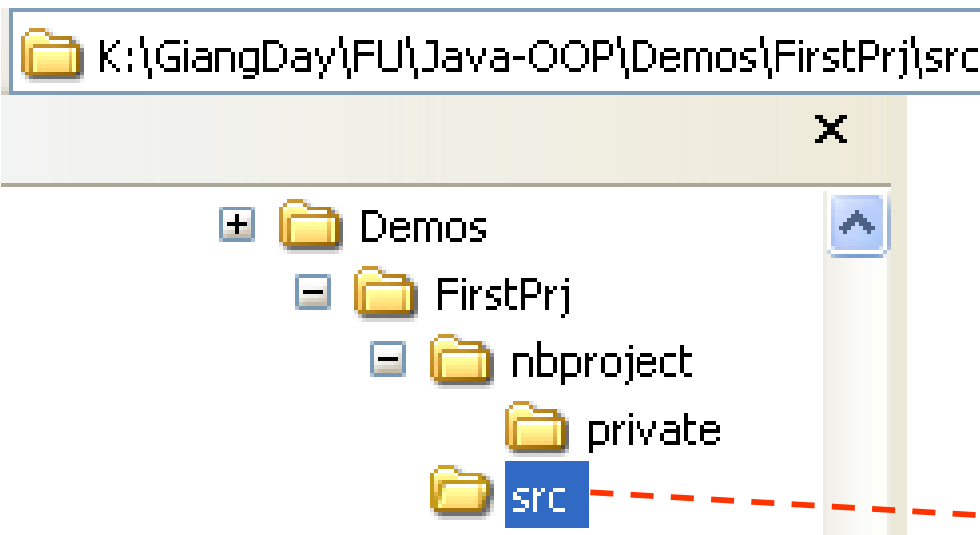
< Back | Next > | Finish | Cancel | Help

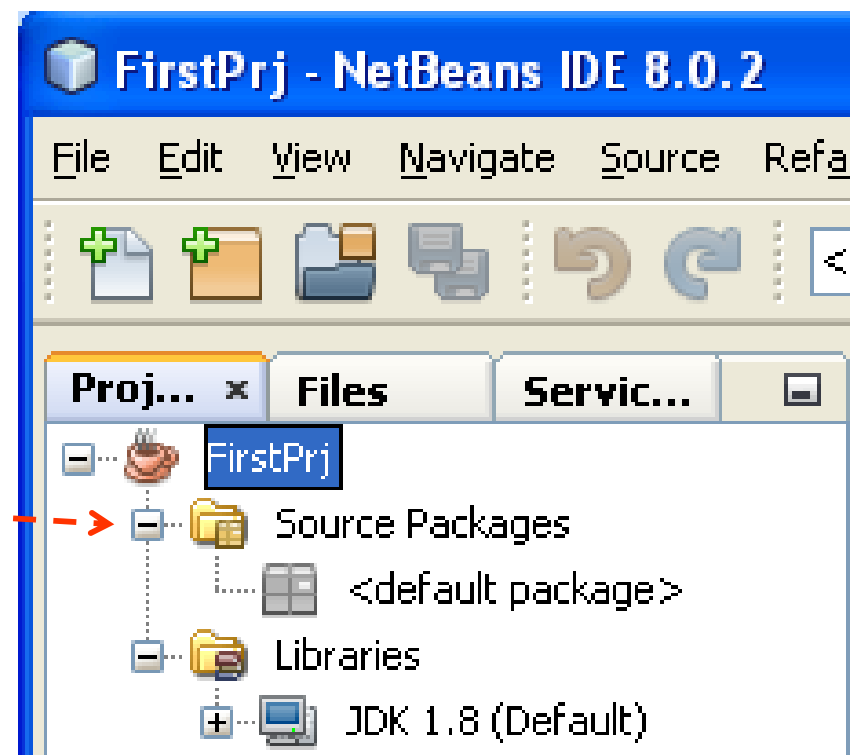If this option is checked, NetBeans will automatically generate a class, named Main, for the project.
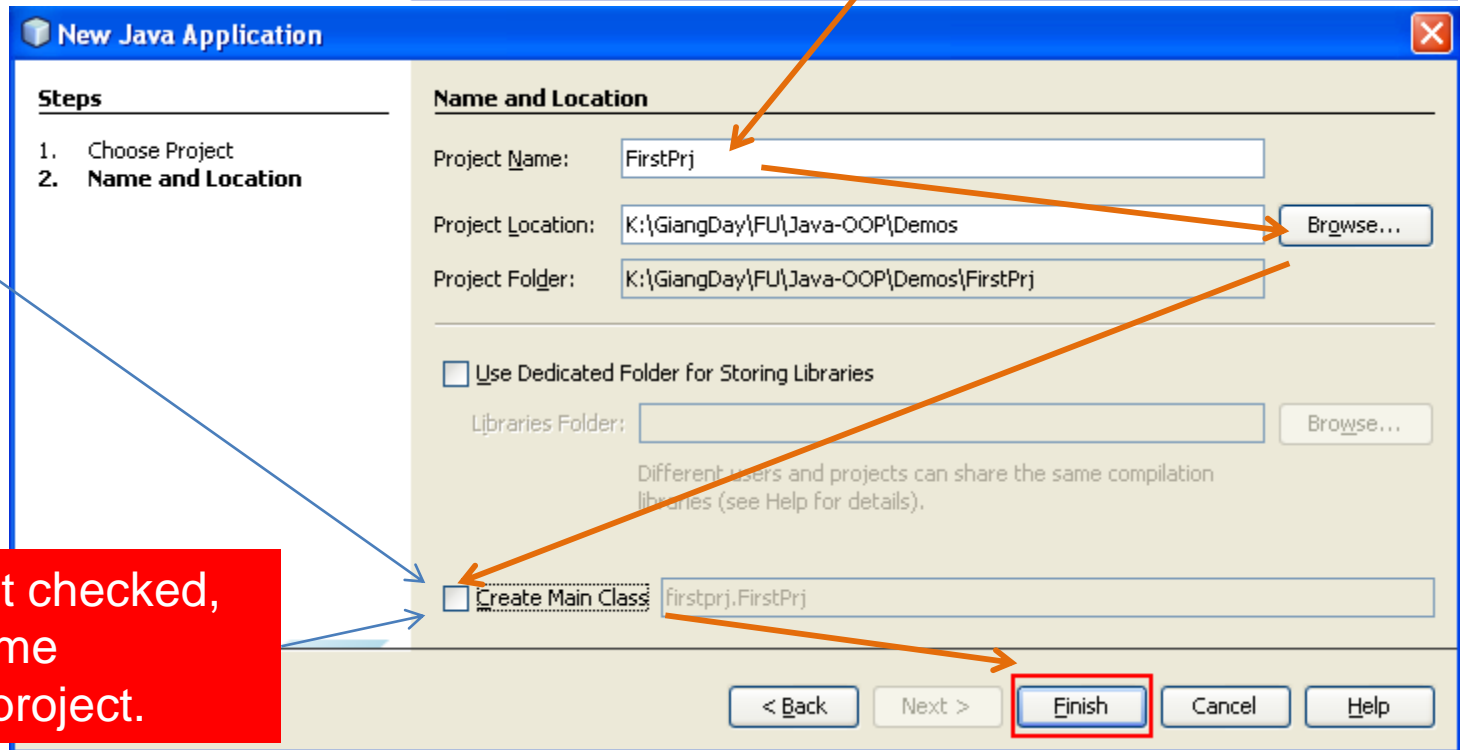
If this option is not checked, we can create some programs in one project.
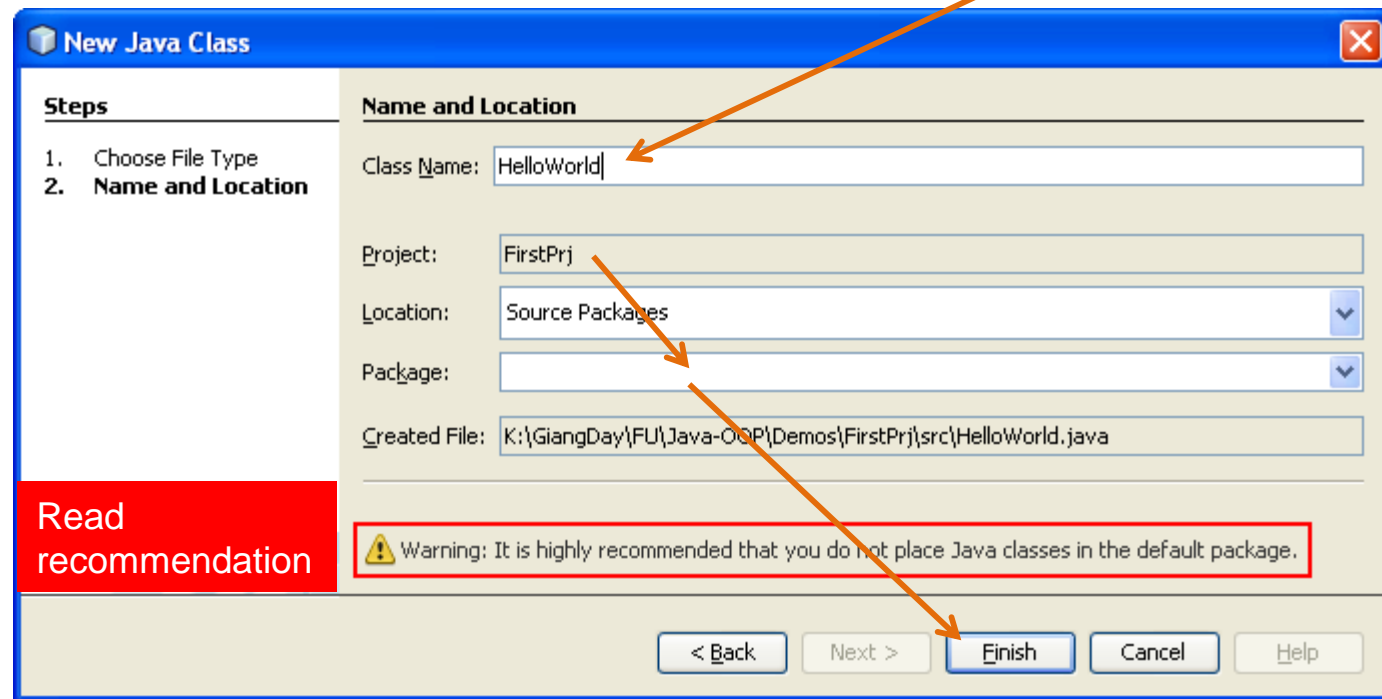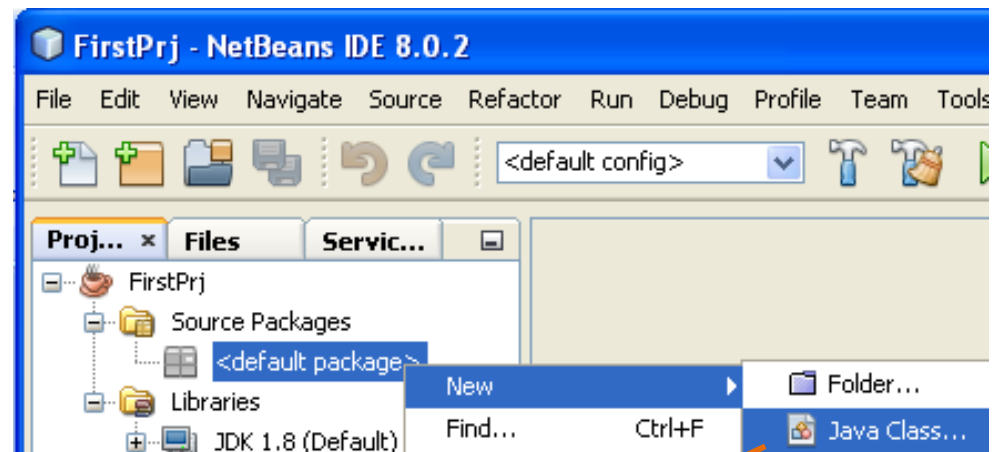
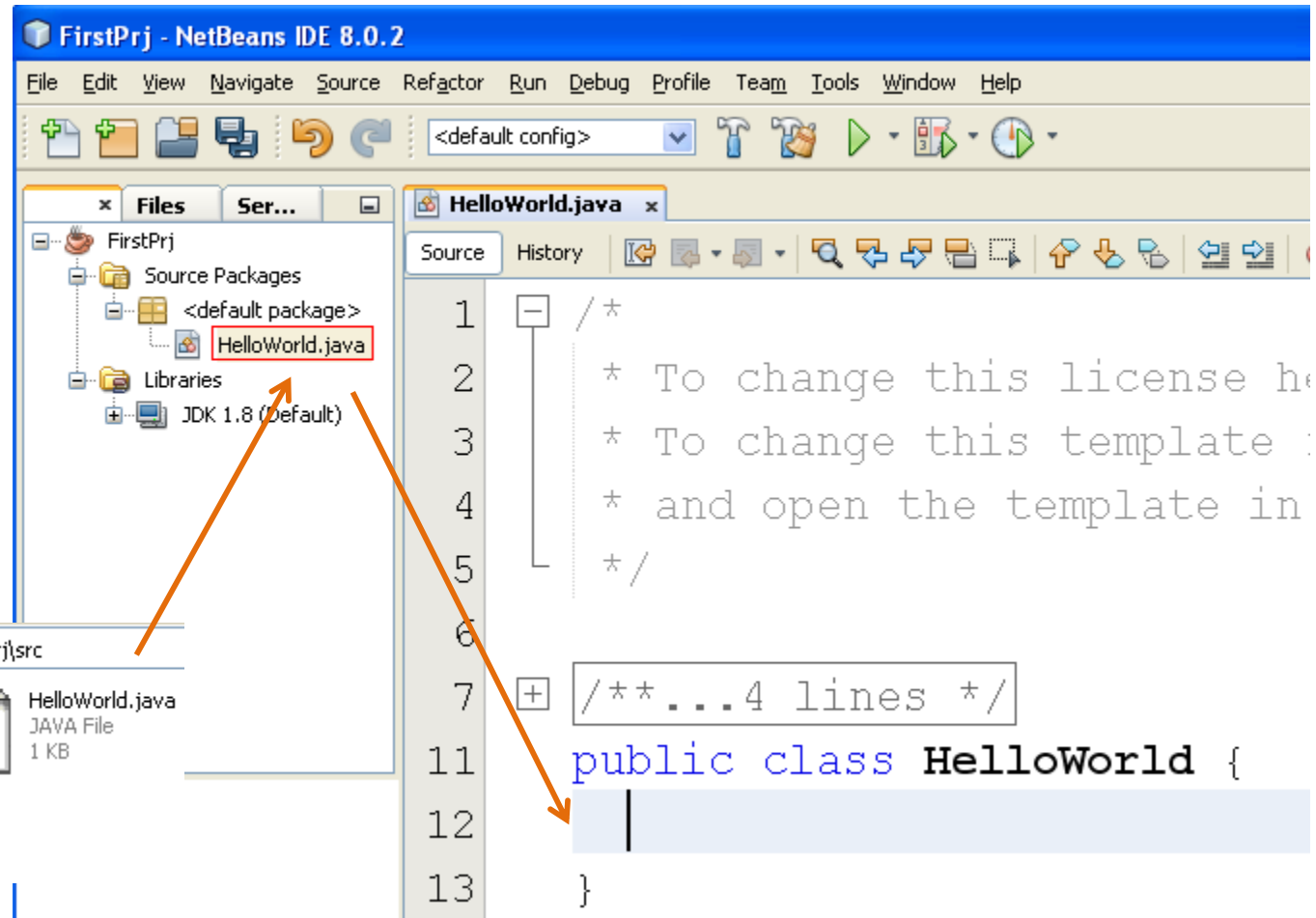# New Project…: Initial Project Structure

In Windows Explorer

In NetBeans

Step 2: Add a Java Class

Package:
Subdirectory of the folder Project/**SRC**

Read recommendation

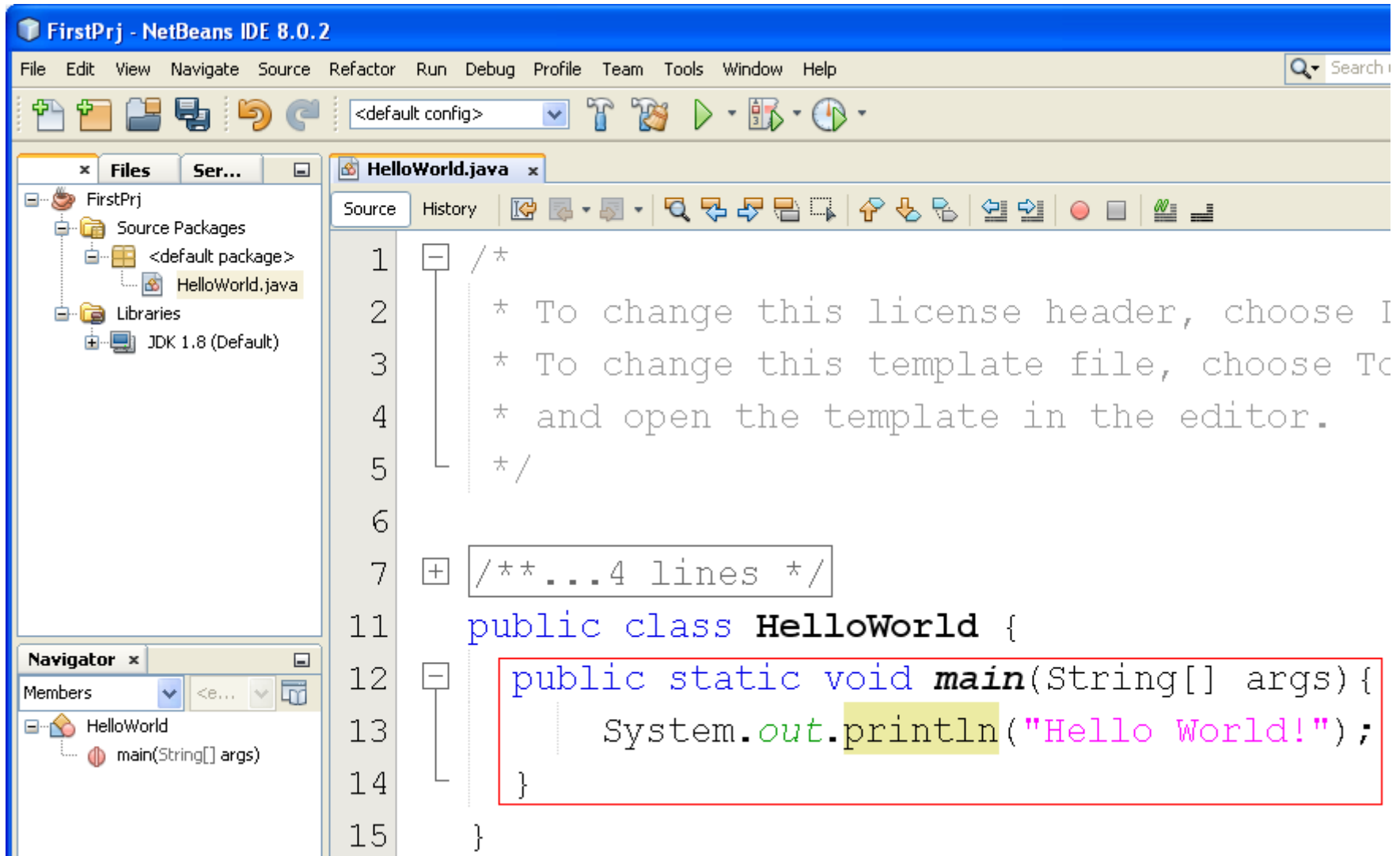In this demo, we do not specify package intentionally

Add a Java Class…

In Windows Explorer

In NetBeans

Step 3: Write code

Explain JDK and its tools

- javac (Java compiler)
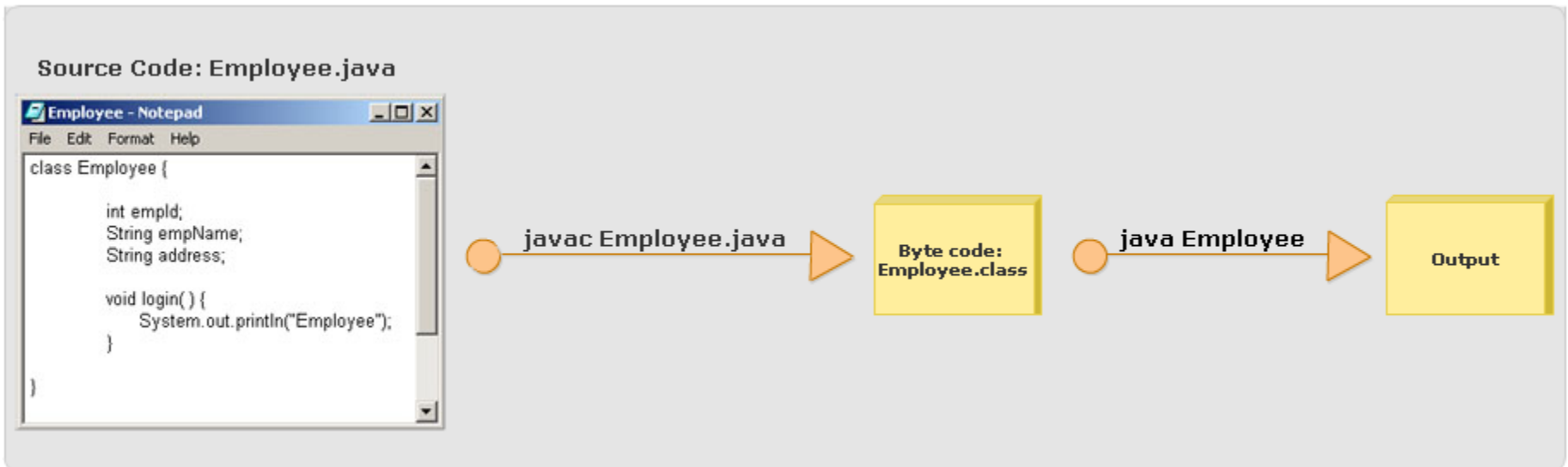
```
javac [option] source
where,
source is one or more file names that end with the extension
.java.
```

- java (Java interpreter)

```
java [option] classname [arguments]
where,
classname is the name of the class file.
```

Source Code: Employee.java

Employee - Notepad

File Edit Format Help

```
class Employee {

        int empId;
        String empName;
        String address;

        void login( ) {
                System.out.println("Employee");
        }

}
```

javac Employee.java → Byte code: Employee.class → java Employee → Output

Summary

- An overview of Java technology as a whole.

- What to download, what to install, and what to type, for creating a simple "Hello World!" application.

- Discusses the "Hello World!" application.