Java Foundations

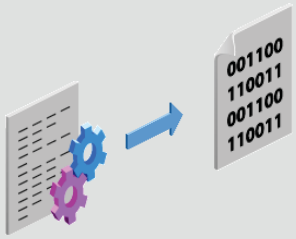
Setting Up Java

Objectives

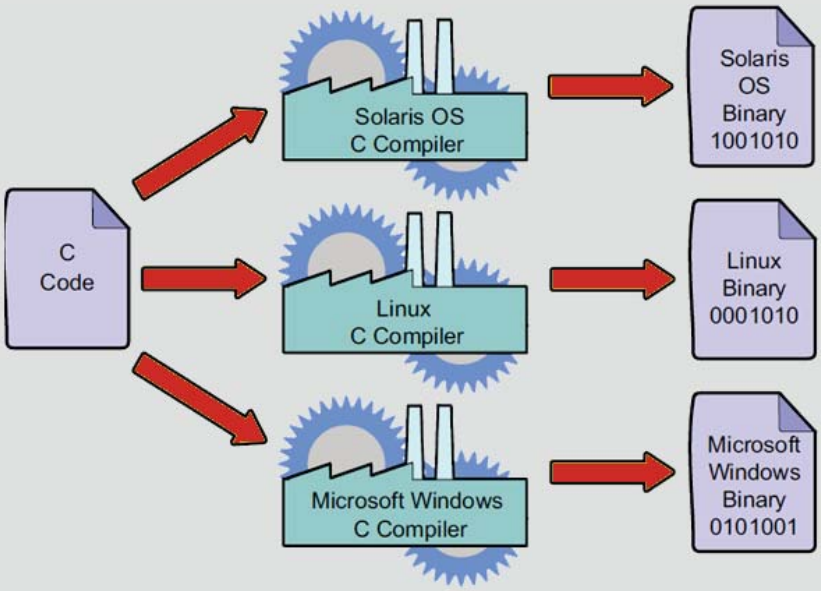
- This lesson covers the following objectives:
  - Understand the difference between the JDK and JRE
  - Understand the difference between .java and .class files
  - Describe the purpose of an integrated development environment (IDE)
  - Download and install the JDK, JRE, and NetBeans IDE
  - Import a project into NetBeans

Purpose of a Computer Program

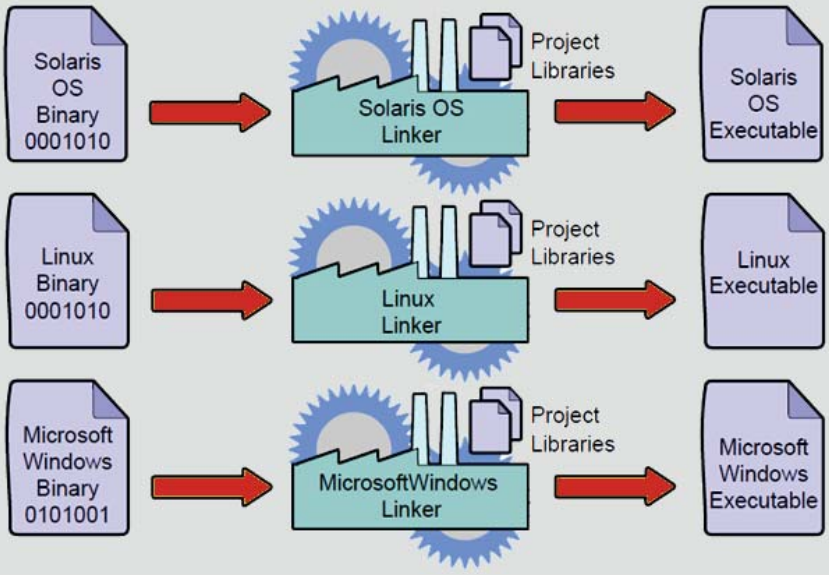
- A computer program is a set of instructions that run on a computer or other digital device
- At the machine level, the program consists of binary instructions (1s and 0s)
  - Machine code
- Most programs are written in high-level code (readable)
  - Must be translated to machine code



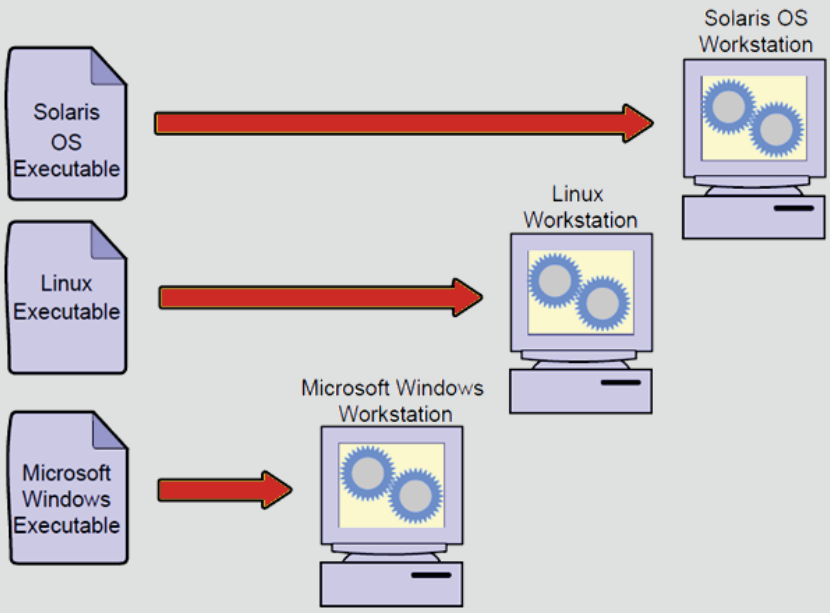
Translating High-Level Code to Machine Code



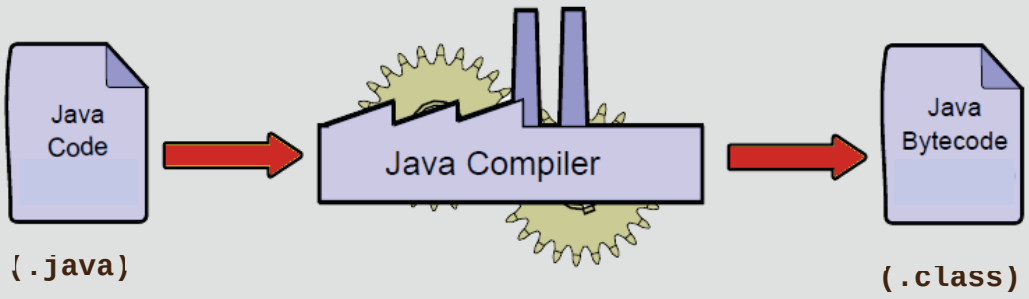
Linked to Platform-Specific Libraries



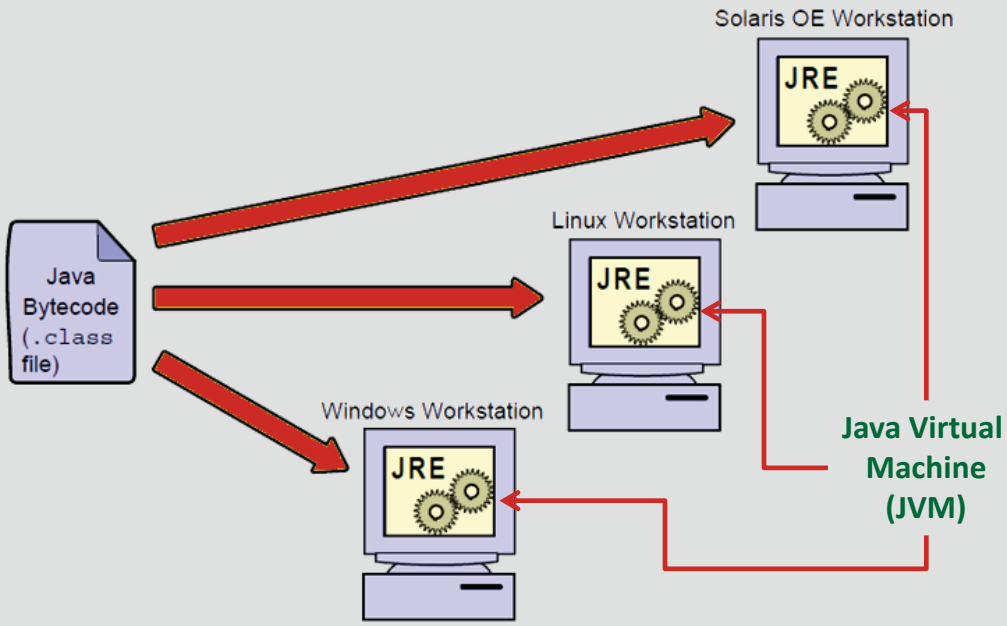
Platform-Dependent Programs



Java Is Platform-Independent



Java Programs Run in a JVM



Java Runtime Environment (JRE)

- Includes:
  - The Java Virtual Machine (JVM)
  - Java class libraries

JRE

- Purpose:
  - Read bytecode (.class)
  - Run the same bytecode anywhere with a JVM

Java Development Kit (JDK)

- Includes:
  - JRE
  - Java Compiler
  - Additional tools

JRE

JDK

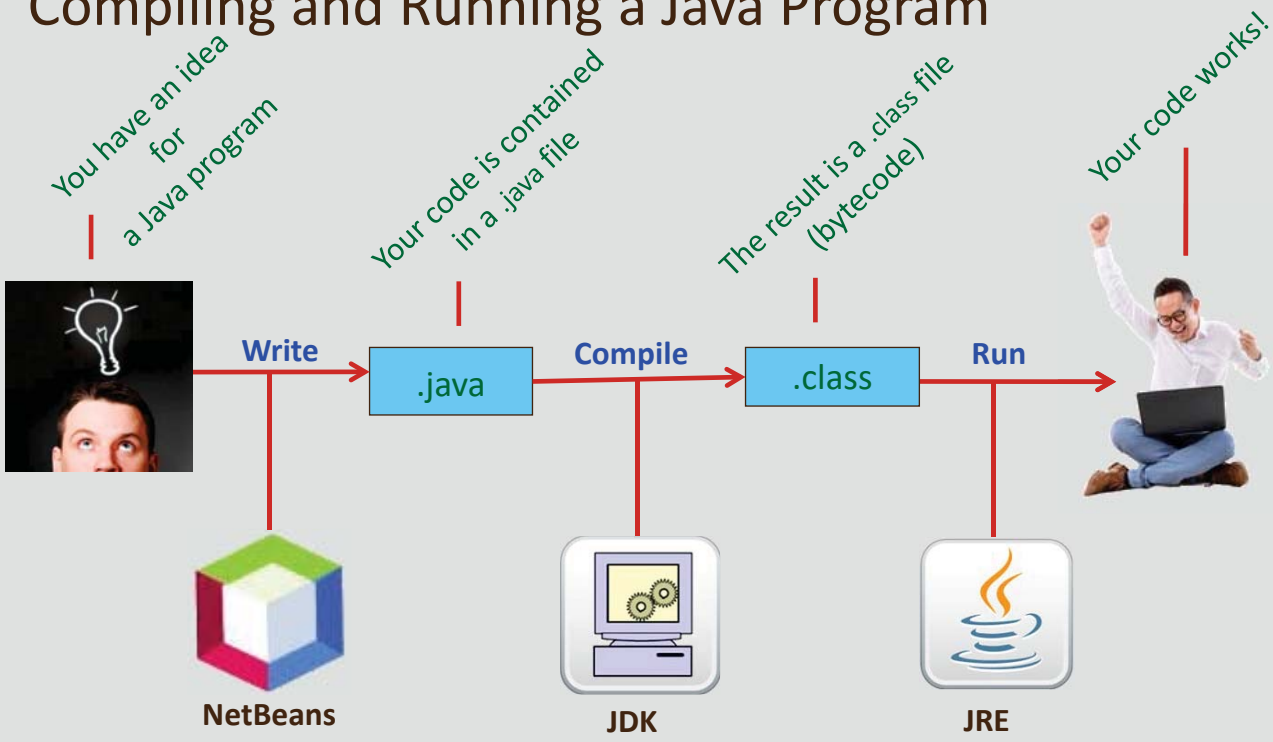
- Purpose:
  - Compile bytecode (.java → .class)

Integrated Development Environment (IDE)

- Purpose:
  - Provide a sophisticated text editor
  - Offer assistance debugging code
  - Manage projects
  - Write source code (.java)
- Examples:
  - NetBeans
  - Greenfoot and BlueJ
  - Alice

NetBeans IDE

Compiling and Running a Java Program



Time to Set Up!

JRE

JDK

NetBeans IDE

Downloading JDK 8 & NetBeans

1. Go to the Java SE Downloads page at https://www.oracle.com/technetwork/java/javase/downloads/jdk8-downloads-2133151.html
2. Locate latest Java SE Development Kit

Java SE Development Kit 8u191

You must accept the Oracle Binary Code License Agreement for Java SE to download this software.

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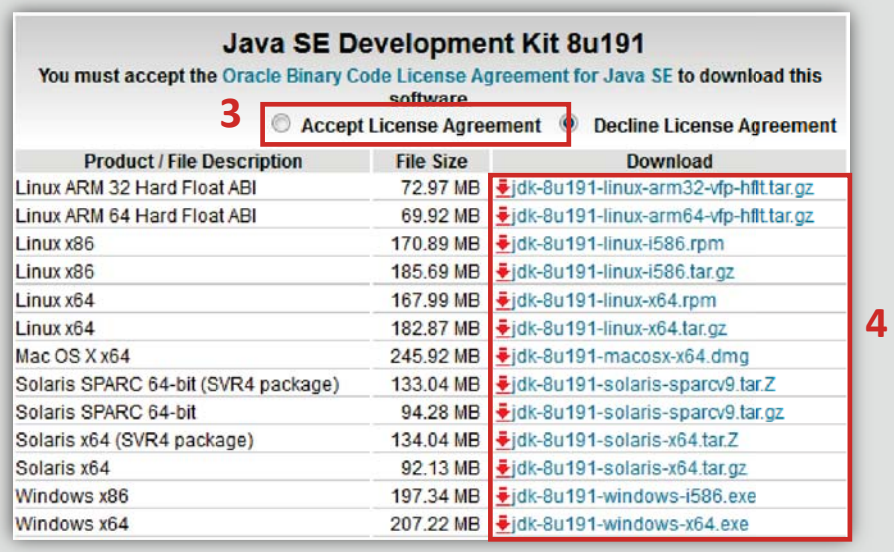
Product / File Description	File Size	Download
Linux ARM 32 Hard Float ABI	72.97 MB	jdk-8u191-linux-arm32-vfp-hflt.tar.gz
Linux ARM 64 Hard Float ABI	69.92 MB	jdk-8u191-linux-arm64-vfp-hflt.tar.gz
Linux x86	170.89 MB	jdk-8u191-linux-i586.rpm
Linux x86	185.69 MB	jdk-8u191-linux-i586.tar.gz
Linux x64	167.99 MB	jdk-8u191-linux-x64.rpm
Linux x64	182.87 MB	jdk-8u191-linux-x64.tar.gz
Mac OS X x64	245.92 MB	jdk-8u191-macosx-x64.dmg
Solaris SPARC 64-bit (SVR4 package)	133.04 MB	jdk-8u191-solaris-sparcv9.tar.Z
Solaris SPARC 64-bit	94.28 MB	jdk-8u191-solaris-sparcv9.tar.gz
Solaris x64 (SVR4 package)	134.04 MB	jdk-8u191-solaris-x64.tar.Z
Solaris x64	92.13 MB	jdk-8u191-solaris-x64.tar.gz
Windows x86	197.34 MB	jdk-8u191-windows-i586.exe
Windows x64	207.22 MB	jdk-8u191-windows-x64.exe

Downloading JDK 8 & NetBeans

3. Accept the license agreement
4. Select the correct download for your system

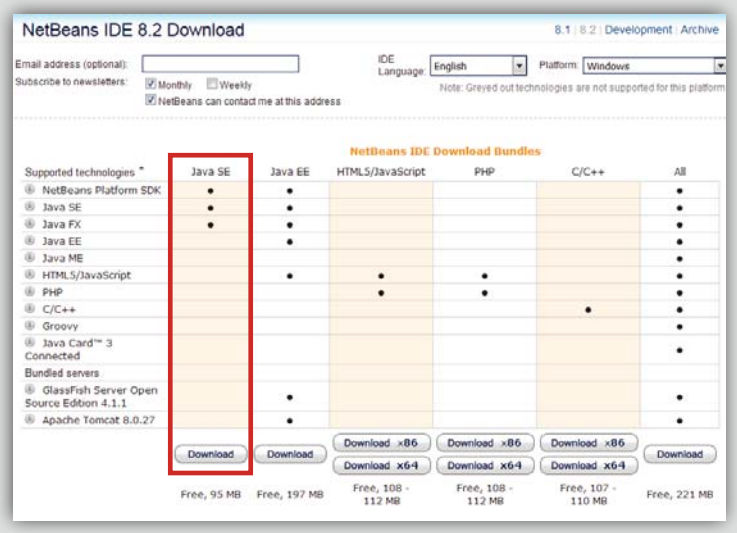


Downloading JDK 8 & NetBeans

5. Save the .exe file to your computer, noting the location

Downloading JDK 8 & NetBeans

1. . Go to the Netbeans Downloads page at https://netbeans.org/downloads/8.2/
2. Download Java SE



Downloading JDK 8 & NetBeans

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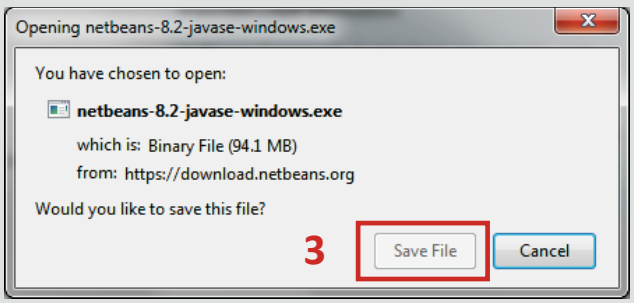
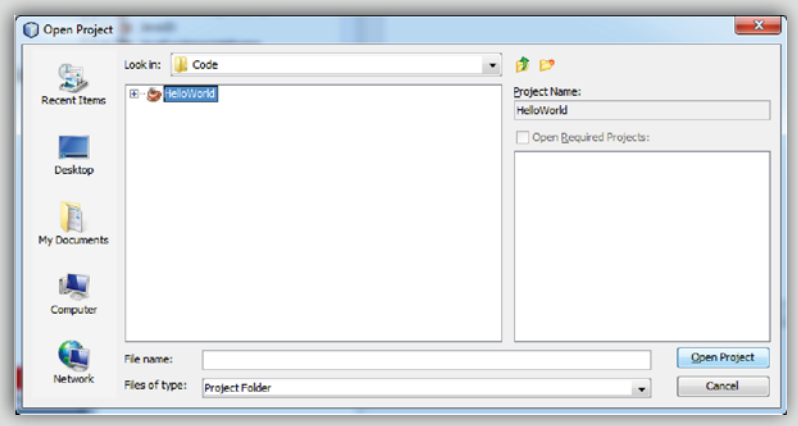


Installing JDK 8 & NetBeans

1. Locate and run the JDK installer file on your computer to start the installer
2. Follow on-screen instructions to complete the installation
3. Locate and run the NetBeans installer file on your computer to start the installer
4. Follow on-screen instructions to complete the installation

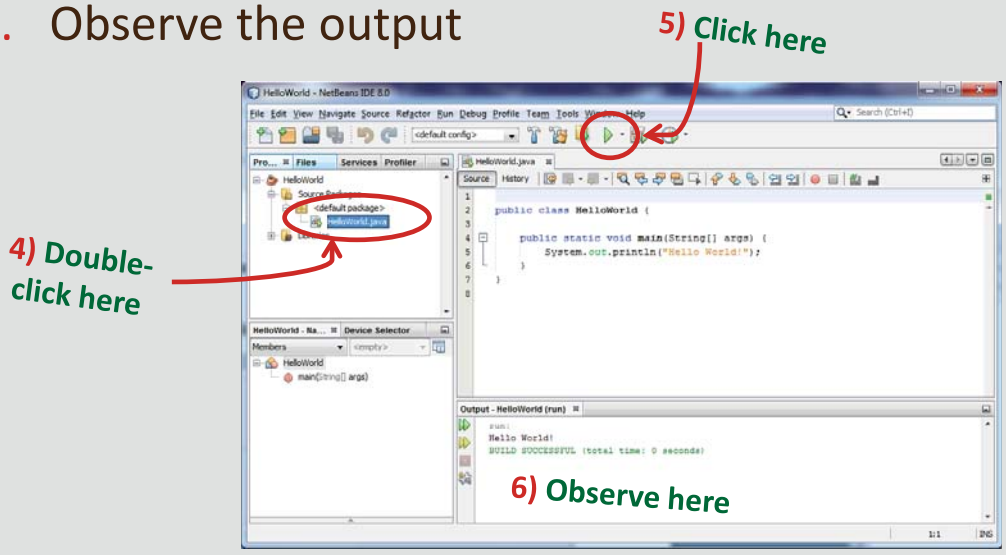
Testing NetBeans

1. Download and unzip the HelloWorld project
2. Launch NetBeans
3. Select File > Open Project, and then select HelloWorld



Testing NetBeans

4. Expand the project and open HelloWorld.java
5. Compile and run the project
6. Observe the output



Exercise

- Edit the code so that it prints a message other than "**Hello World!**"
  - Compile and run your code to verify that your changes work
- Change the '**S**' in "System" to lowercase and try to compile it
  - Is Java syntax case-sensitive?
- Remove the semicolon (;) and try to compile
  - Is the semicolon important to Java syntax?

Summary

- A computer program is written in a high-level language, but must be compiled into machine code
- Most programming languages compile a separate executable for each platform
- Java is platform-independent

An IDE like NetBeans is used to **write** source code (`.java`)

The JDK **compiles** bytecode (`.java` → `.class`)

Bytecode **runs** in a JVM, which is part of the JRE

Summary

- In this lesson, you should have learned how to:
  - Understand the difference between the JDK and JRE
  - Understand the difference between .java and .class files
  - Describe the purpose of an IDE
  - Download and install the JDK, JRE, and NetBeans IDE
  - Import a project into NetBeans