Object Oriented Programming System

LAB FILE

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EXPERIMENT - 1 : Introduction to Java Environment

Q.1 Explore and understand the role of JDK, JRE and JVM.

Java follows a "Write Once, Run Anywhere" approach, and its core components—JDK, JRE, and JVM—play a crucial role in Java application development and execution.

1. JDK (Java Development Kit)

The JDK is a complete software development kit required for developing Java applications. It provides the tools needed to write, compile, and debug Java programs.

Components of JDK

- JRE (Java Runtime Environment) – Provides the necessary libraries and environment to run Java applications.
- Java Compiler (javac) – Converts Java source code (.java files) into bytecode (.class files).
- Debugger and Monitoring Tools – Helps developers test and optimize Java programs.
- Java Libraries – Predefined classes and functions to aid development.

2. JRE (Java Runtime Environment)

The JRE is a subset of the JDK, designed to run Java programs but not develop them. It contains everything needed to execute Java applications.

Components of JRE

- JVM (Java Virtual Machine) – Converts bytecode into machine code.
- Core Java Libraries – Pre-written Java classes required for program execution.

3. JVM (Java Virtual Machine)

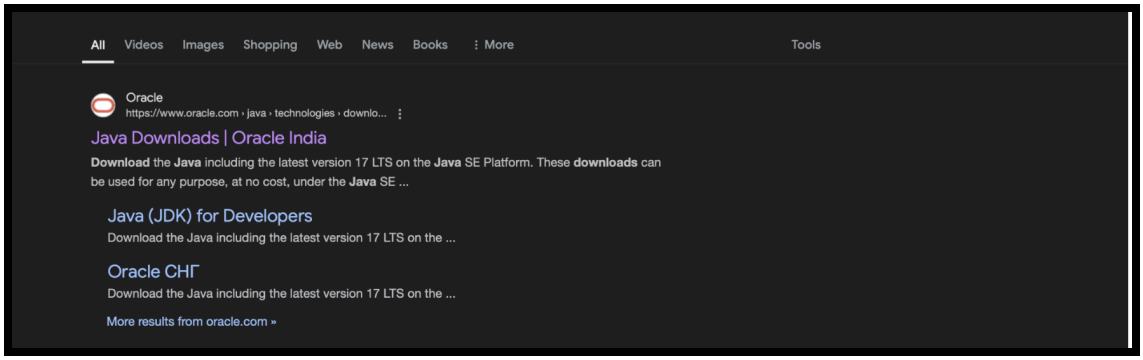
The JVM is an abstract machine responsible for executing Java bytecode, making Java platform-independent.

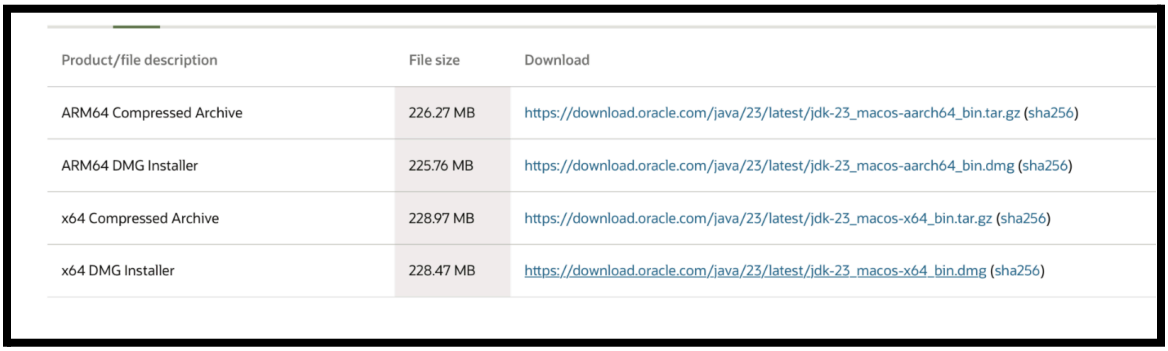
Key Functions of JVM

- Class Loader – Loads .class files into memory.
- Runtime Memory Areas – Includes Heap, Stack, Method Area, etc., for memory management.
- Execution Engine – Interprets or compiles bytecode into machine code for execution.

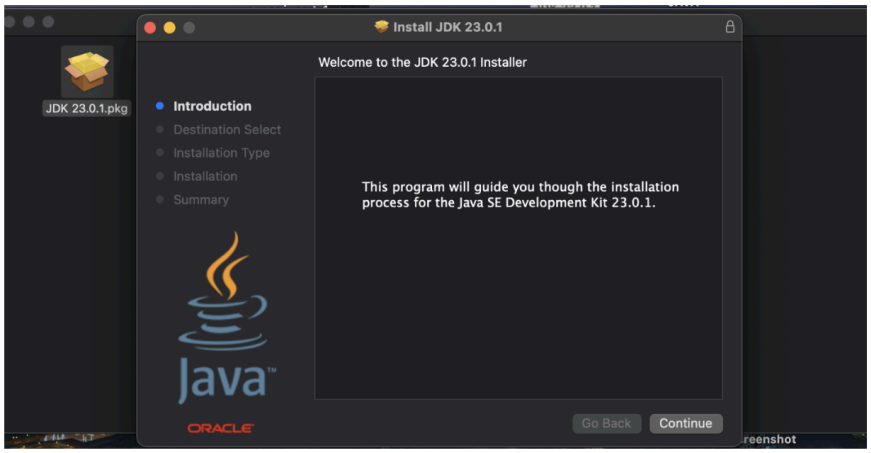
Q.2 **Install the latest available JDK and verify the Java Environment.**

- Search JDk in your web browser > Click on the x64 DMG installer



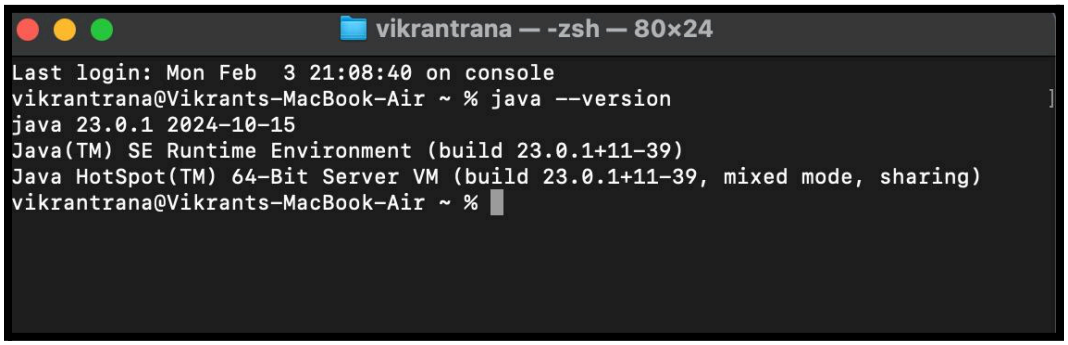


Product/file description	File size	Download
ARM64 Compressed Archive	226.27 MB	https://download.oracle.com/java/23/latest/jdk-23_macos-aarch64_bin.tar.gz (sha256)
ARM64 DMG Installer	225.76 MB	https://download.oracle.com/java/23/latest/jdk-23_macos-aarch64_bin.dmg (sha256)
x64 Compressed Archive	228.97 MB	https://download.oracle.com/java/23/latest/jdk-23_macos-x64_bin.tar.gz (sha256)
x64 DMG Installer	228.47 MB	https://download.oracle.com/java/23/latest/jdk-23_macos-x64_bin.dmg (sha256)



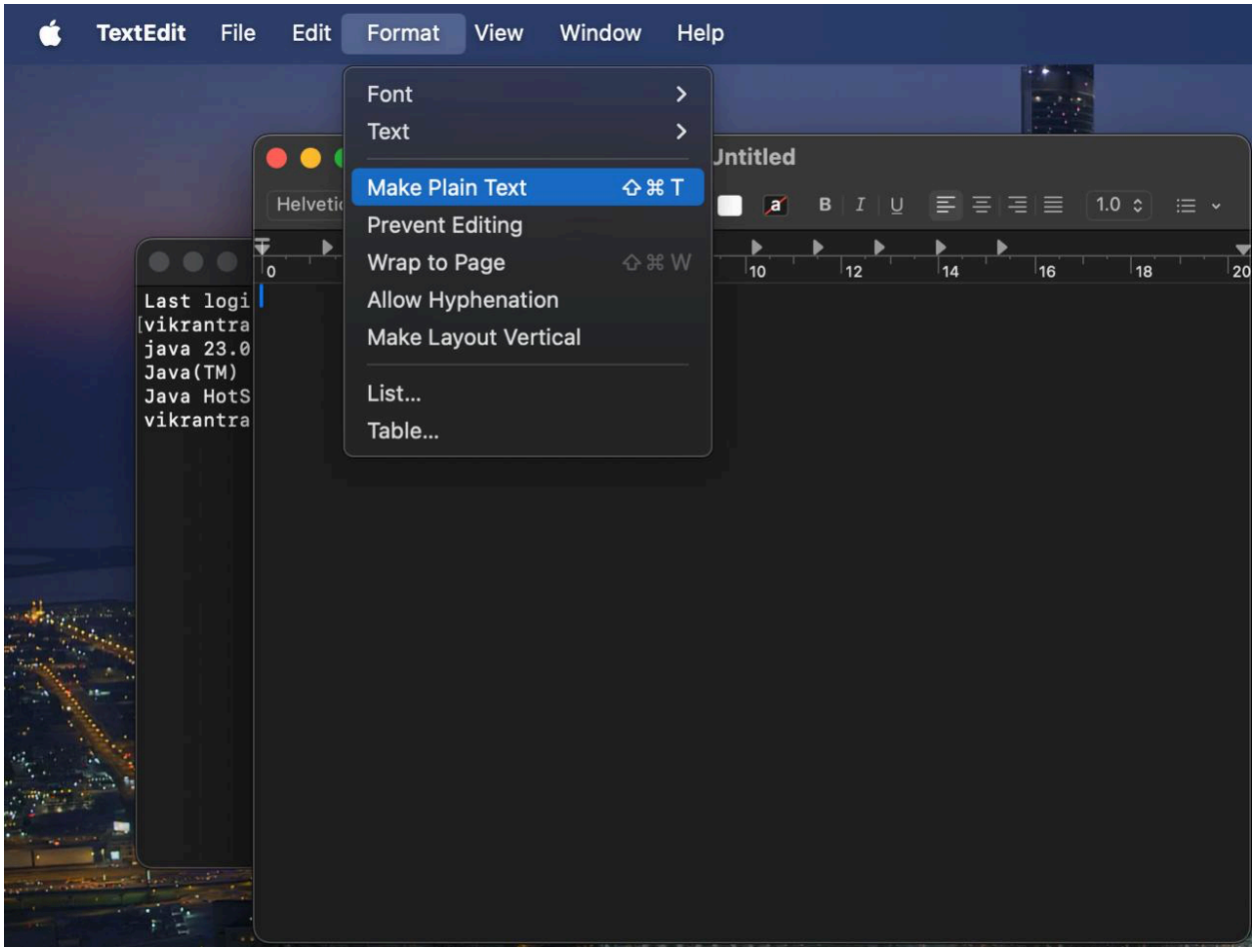
- After your JDK has been installed, open the terminal in your device

and type the following command: java --version, hence Java Runtime environment is verified.



Q.3. Create a Sample Hello World Program using a simple text editor
(e.g. Notepad) and show the steps to compile and execute the program using command prompt.

- Open text editor > click on format > make plain text
- Type a java program and save that file with the same class name
  ex. File name : HelloWorld and class name: HelloWorld
- Then open the terminal in your system to run the file.
- Commands :
  1.javac HelloWorld.java : here javac is the compiler which converts source code in bytecode(platform independent) and creates a .class file and HelloWorld.java is the source file containing Java code.
  2.java HelloWorld : it runs the java compiled program displaying our output Hello, World!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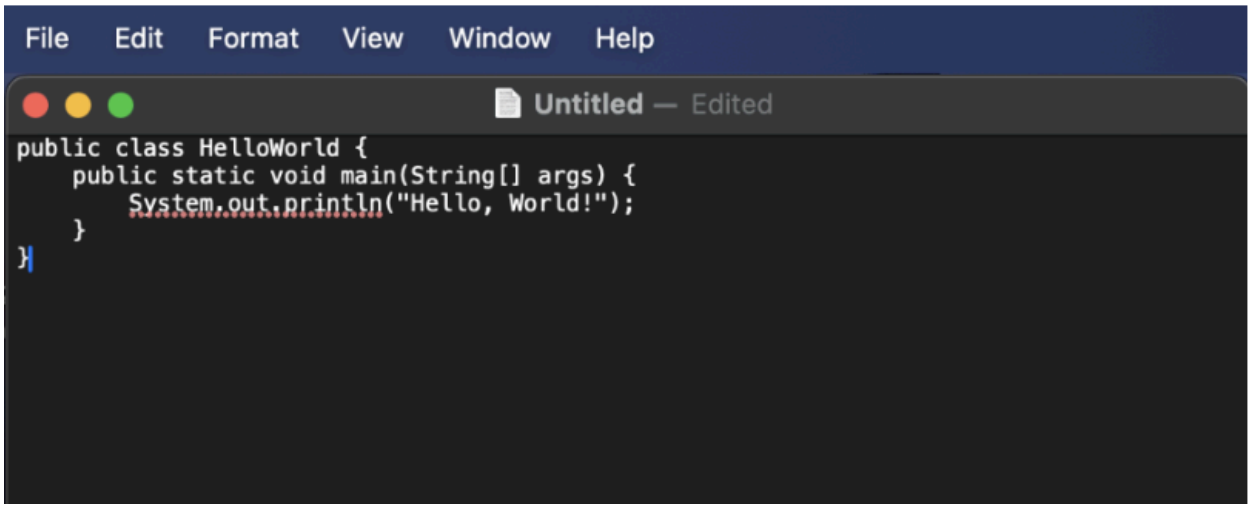
File
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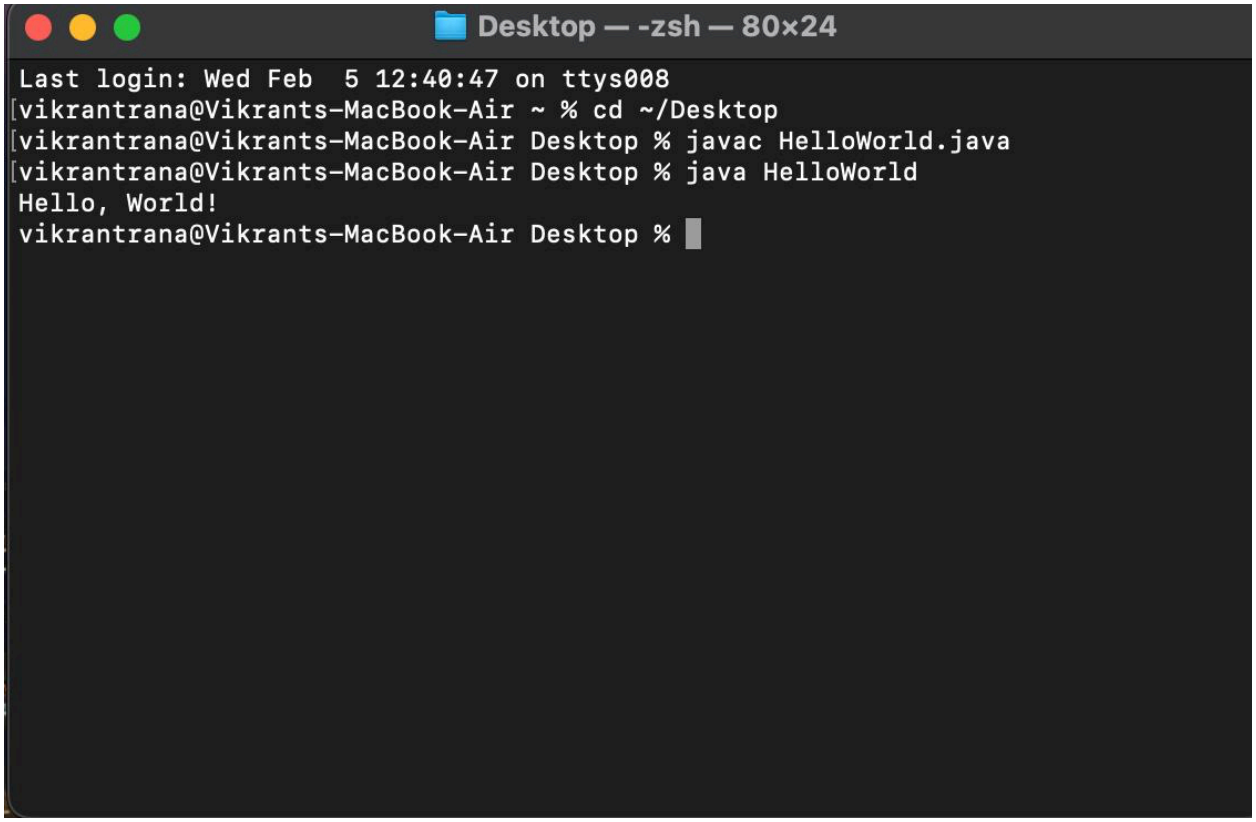
public class HelloWorld {
public static void main(String[] args) {
System.out.println("Hello, World!");
}
}



Q.4 **Display your name and complete address in different lines.**