Object oriented programming

LAB FILE

NAME - ANANYA KARN

BATCH- B3

SAP_ID- 500125205

ROLL_NO - R2142231061

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

1. JVM (Java Virtual Machine)

Role: It is responsible for executing Java programs by converting Java bytecode into machine-specific code.

Key Features:

- Converts Java bytecode to native machine code (Interpreter & JIT Compiler).
  - Manages memory (Garbage Collection).
  - Provides runtime environment for Java applications.
- JVM alone cannot compile Java programs—it only runs them.

---

2. JRE (Java Runtime Environment)

Role: JRE provides the necessary libraries and environment to run Java applications but does not contain the compiler.

- JVM (to execute Java bytecode).
- Core libraries (e.g., java.lang, java.util).
- Support files for execution.

-> If you only need to run Java programs (not develop them), install JRE.

---

3. JDK (Java Development Kit)

Role: JDK is required for developing, compiling, and running Java applications. It includes everything in JRE plus development tools.

- JRE (to run Java programs).
- JVM (to execute Java bytecode).
- Java Compiler (`javac`) (to convert `.java` files to `.class` bytecode).
- Development tools (Debugger, Javadoc, Jar utility, etc.).

2. Install the latest available JDK and verify the Java environment.

Step 1: Download and Install the Latest Oracle JDK

- Visit the Official Oracle JDK Website:
a. **Go to the official website for Oracle JDK:** [Oracle JDK Downloads](#)
(Note: Ensure you're downloading the correct version suitable for your OS, e.g., JDK 17 or JDK 16).
b. **Download the JDK:**
c. **Select the appropriate platform (Windows, macOS, or Linux).**
d. **Accept the license agreement and download the installer for your system.**
e. **Install the JDK:**
f. **Run the downloaded installer.**
g. **Follow the installation steps and take note of the installation path (default is usually something like `C:\Program Files\Java\jdk-15` on Windows).**

Step 2: Set Up the Java Environment

1. Set JAVA_HOME Environment Variable:

○ **Windows:**
  ■ **Right-click on This PC → Properties → Advanced system settings → Environment Variables.**
  ■ **Under System Variables, click New and add:**
    ■ **Variable Name:** `JAVA_HOME`
    ■ **Variable Value: The JDK installation path, e.g.,** `C:\Program Files\Java\jdk-15`.

Set Path Variable:

● **Windows:**
  ○ In the **Environment Variables** window, find the **Path** variable under **System Variables** and add the following:
    Bash
  ○ `C:\Program Files\Java\jdk-15\bin`

Step 3: Install Visual Studio Code (VSCode)

Step 4: Install Java Extension Pack for VSCode
Step 6: Verify Java Environment in VSCode

3. **Create a sample hello world program using a simple text editor and show the steps to compile and execute the program using command prompt.**

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

```
OOPS_JAVA >  J Exp_one.java > Language Support for Java(TM) by Red Hat >  Exp_one >  main(String[])
  1
  2    public class Exp_one {
  3
          Run main | Debug main | Run | Debug
  4        public static void main(String[] args) {
  5            System.out.println(x:"Name - Ananya Karn");
  6            System.out.println(x:"Address: A-56, Ganga Vatika, Ganga sagar,\n Ganga Nagar, mawana road,\n Meerut- UP(250001)");
  7        }
  8    }
```