

# Experiment 1

1) Explore and understand the role of jdk, jvm and jre.

- **JDK (Java Development Kit):**

JDK is a software development kit that provides tools to develop, compile, and debug Java applications.

## **Components:**

- **JRE (Java Runtime Environment)** – Required to run Java applications.
- **Java Compiler (javac)** – Converts Java source code into bytecode.
- **Debugger (jdb)** – Helps in debugging Java programs.
- **JavaDoc** – Generates documentation for Java code.
- **Java Development Tools** – Includes additional utilities like jar, jconsole, etc.

- **JRE (Java Runtime Environment):**

The JRE provides the necessary environment to run Java applications.

## **Components:**

- **JVM (Java Virtual Machine)** – Runs the compiled Java bytecode.
  - **Core Libraries** – Essential Java class libraries (e.g., java.lang, java.util).
  - **Supporting Files** – Configuration and security settings.
- 
- **JVM (Java Virtual Machine):**  
 The JVM is a virtual machine that interprets Java bytecode and executes it. It provides platform independence by converting bytecode into machine-specific instructions.  
**Key Features:**
    - **Class Loader** – Loads Java classes into memory.
    - **Bytecode Verifier** – Ensures bytecode integrity and security.
    - **Interpreter & JIT Compiler** – Executes bytecode efficiently.
    - **Garbage Collector** – Manages memory by removing unused objects.

2) Install the latest JDK and verify java environment.

- Installing latest JDK:

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JDK 23 binaries are free to use in production and free to redistribute, at no cost, under the [Oracle No-Fee Terms and Conditions \(NFTC\)](#).

JDK 23 will receive updates under these terms, until March 2025, when it will be superseded by JDK 24.

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Product/file description	File size	Download
x64 Compressed Archive	228.77 MB	<a href="https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.zip">https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.zip</a> (sha256)
x64 Installer	205.27 MB	<a href="https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.exe">https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.exe</a> (sha256)
x64 MSI Installer	204.02 MB	<a href="https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.msi">https://download.oracle.com/java/23/latest/jdk-23_windows-x64_bin.msi</a> (sha256)

## Verifying java environment:

```
C:\Users\Mayank Thakur>javac -version
javac 22.0.1

C:\Users\Mayank Thakur>java -version
java version "22.0.1" 2024-04-16
Java(TM) SE Runtime Environment (build 22.0.1+8-16)
Java HotSpot(TM) 64-Bit Server VM (build 22.0.1+8-16, mixed mode, sharing)
```

3) Create a sample hello world program using simple text editor and show the step to compile and execute the program using cmd.

- Writing code in notepad:

```
test.java
File Edit View

class test {
public static void main(String[] args)
{
System.out.println("hello world");
}
}
```

```
C:\Users\Mayank Thakur> javac test.java
```

```
C:\Users\Mayank Thakur> java test  
hello world
```

4) Display your name and complete address in different line.

File Edit View

```
class nameaddress{  
public static void main(String[] args)  
{  
System.out.println("name= Mayank Thakur");  
System.out.println("address=Indira Nagar,Lucknow");  
}  
}
```

Command Prompt

```
C:\Users\Mayank Thakur> javac nameaddress.java
```

```
C:\Users\Mayank Thakur> java nameaddress  
name=Mayank Thakur  
address=Indira Nagar,Lucknow
```

```
C:\Users\Mayank Thakur>
```

