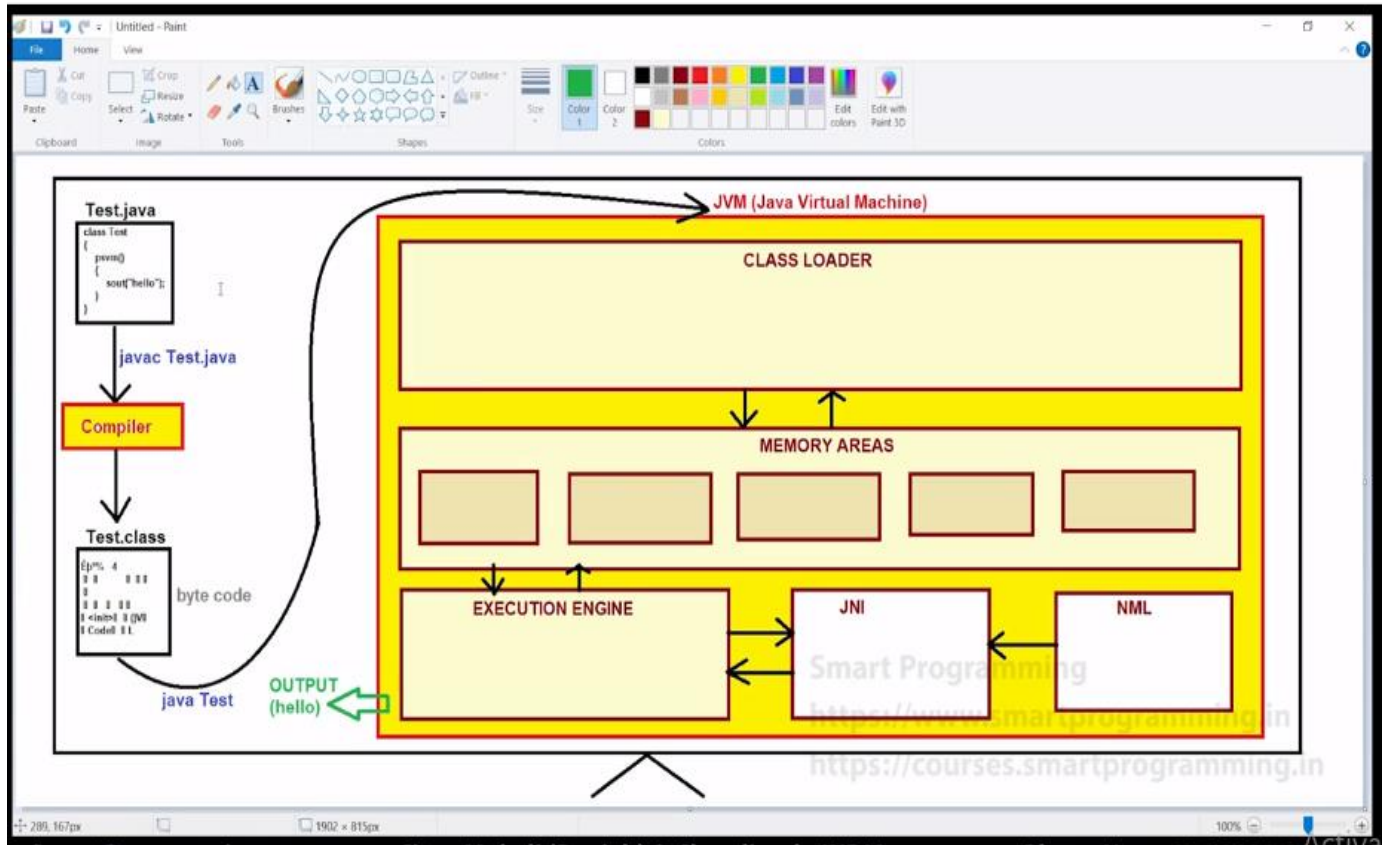


Deep Explanation of compilation & Execution of Java Programs:===



Interview Questions:--

- ⇒ What is the role of Compiler? OR,
- ⇒ what happens in java compilation phase.
 1. Compiler checks the syntax whether it is correct or not.
(whether the class,method,interfaces,variable declaration etc. is correct or not, java is case sensitive language thus it checks upper case and lowercase keywords names.)

2. Java is strongly typed language thus it checks whether the variables has stored correct value or not.

For example:--`int a="Abhishek";` //now here Abhishek is string and not allowed to assign into int type variable a.

3. Compiler ignores all typed of comments.

4. Compiler generates the byte code.

⇒ What is the role of JVM?

⇒ What happens in java execution phase?

1. Byte code is loaded in JVM.

2. Byte code verifier checks whether the byte coe is correct or not.

3. Memory allocation starts (variables,class,information etc.)

4. Interpreter and JIT compiler executes our program and provides the output.

⇒ What is virtual machine?

➔ It is software simulation of a machine performs operation similar to physical machine.

➔ Types of virtual machine---

○ Hardware based virtual machine or system based virtual machine.

○ Application based virtual machine or process based virtual machine .

➔ JVM is Application based or Process based VM.

⇒ What is JVM(Java Virtual Machine)?

➔ JVM is Java Virtual Machine which is used to execute java byte code .

➔ JVM is Application based or process based VM.

➔ Role of JVM.

- Architecture of JVM:-> figure is given below at very last.

=====

⇒ Explain deep architecture of Class loader

⇒ What data is stored in Method Area?

---.class file information

---static variables

⇒ How many memory areas are present in JVM?

➔ Five types i) Method Area ,ii)Heap Area
iii)Stack Area , iv) PC Register , v) Native Method Area

⇒ What data is stored in heap area?

---objects

----arrays

----instance variables

⇒ What data is stored in Stack Area?

```
--- current running method
```

---local variables

⇒ Explain the working of execution engine.

⇒ What is JIT compiler?

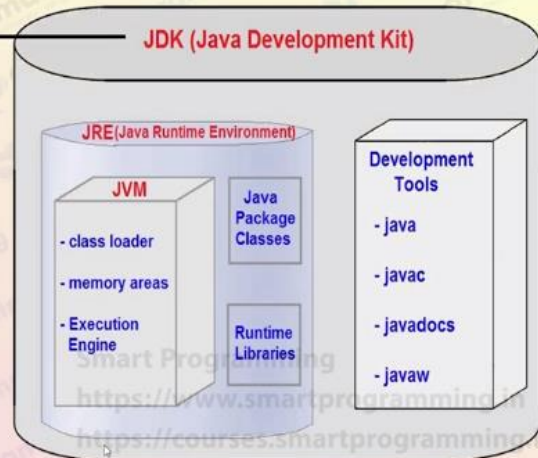
JDK (Java Development Kit)

Java Development Kit contains tools needed to develop the Java programs, and JRE to run the programs. The tools include compiler (javac.exe), Java application launcher (java.exe), Appletviewer, etc

JDK is mainly targeted for java development. i.e. You can create a Java file (with the help of Java packages), compile a Java file and run a java file.

JDK = JRE + Development Tools

Architecture Of JVM, JRE & JDK



JRE (Java Runtime Environment)

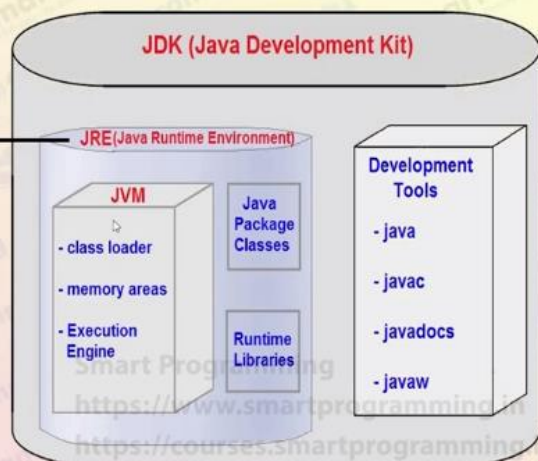
Java Runtime Environment contains JVM, class libraries, and other supporting files. It does not contain any development tools such as compiler, debugger, etc.

Actually JVM runs the program, and it uses the class libraries, and other supporting files provided in JRE.

If you want to run any java program, you need to have JRE installed in the system

JRE = JVM + Java Package Classes + Runtime Libraries

Architecture Of JVM, JRE & JDK



JVM (Java Virtual Machine)

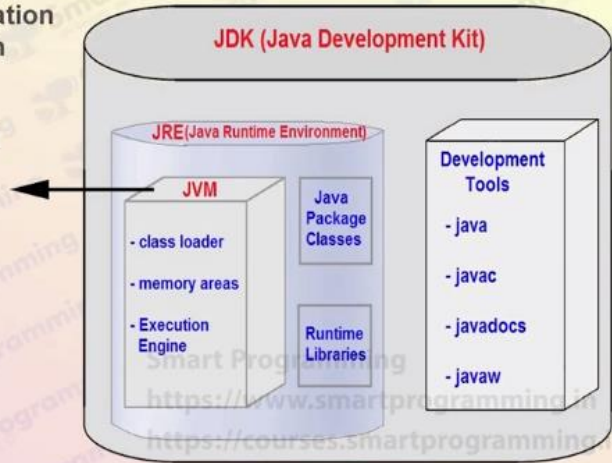
JVM is an abstract machine. It is a specification that provides runtime environment in which java bytecode can be executed.

JVM's are available for many hardware and software platforms. JVM is platform dependent because configuration of each OS differs and this makes java Platform Independent.

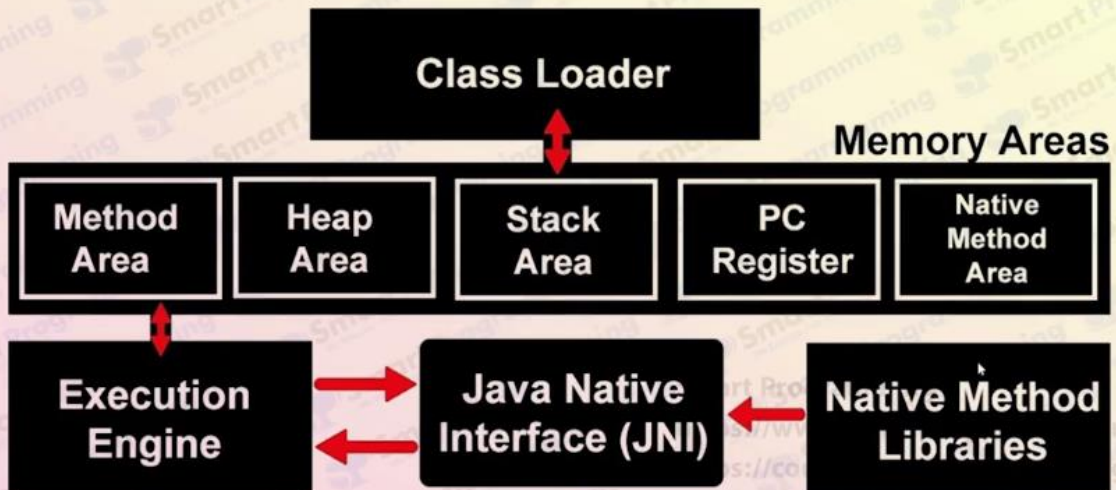
JVM performs following main tasks:

- Loads code
- Verifies code
- Executes code
- Provides runtime environment Libraries

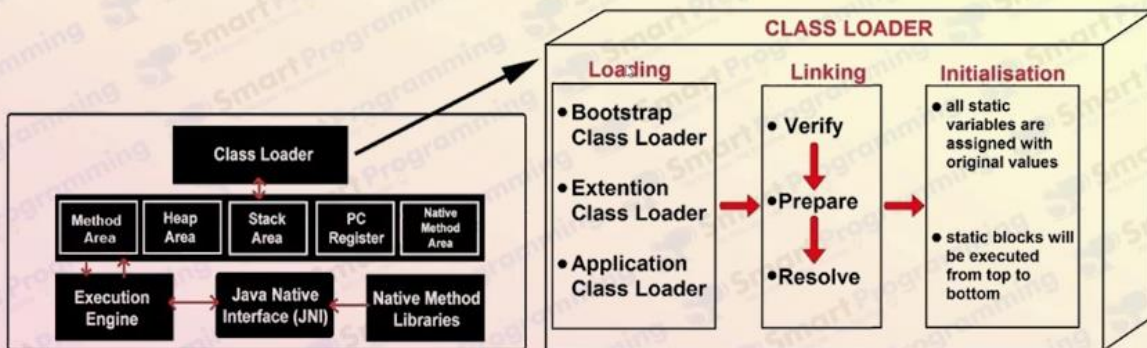
Architecture Of JVM, JRE & JDK



JVM Architecture



Class Loader SubSystem



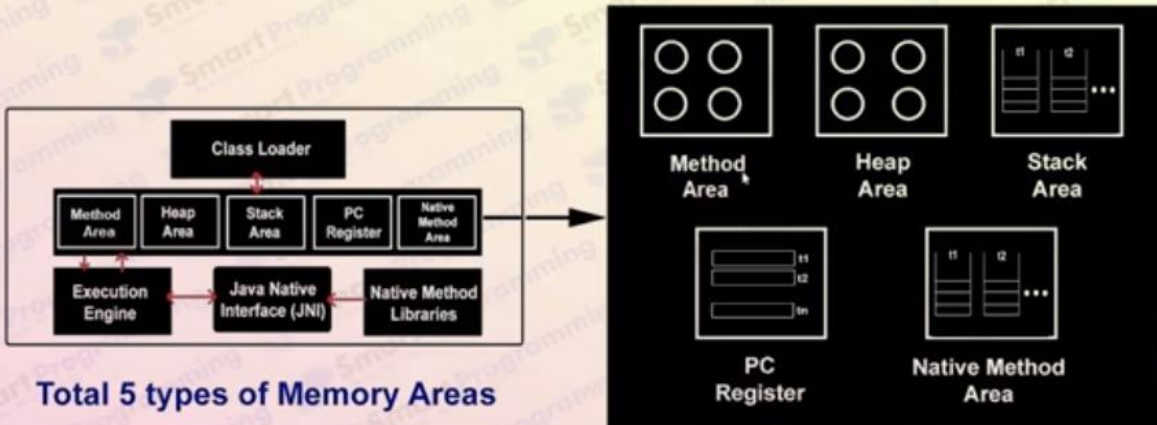
Class Loader : It is responsible for the following three tasks :

1. Loading
2. Linking
3. Initializing

<https://www.smartprogramming.in>

<https://courses.smartprogramming.in>

Memory Areas



Total 5 types of Memory Areas

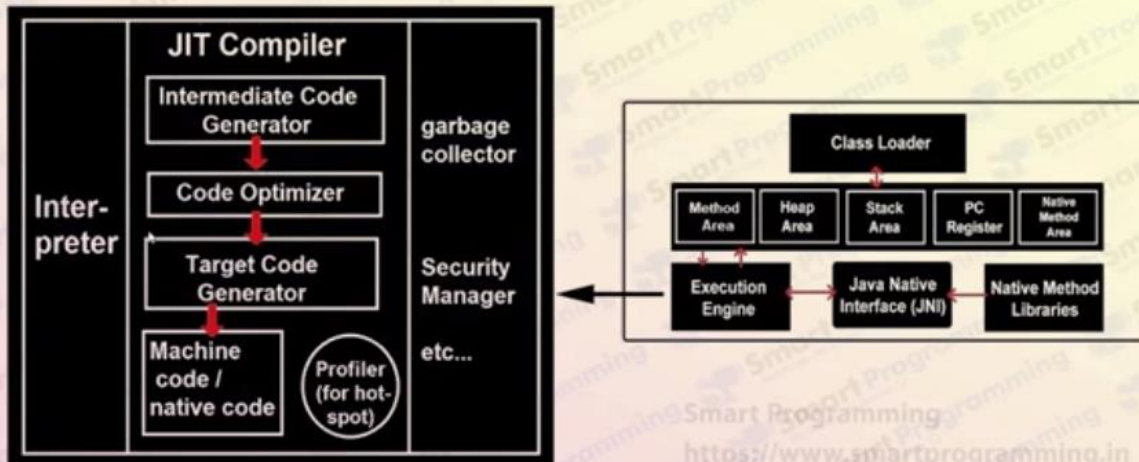
1. Method Area
2. Heap Area
3. Stack Area

4. PC Register
5. Native Method Area

<https://www.smartprogramming.in>

<https://courses.smartprogramming.in>

Execution Engine



Execution Engine (central component of JVM)

<https://www.smartprogramming.in>

<https://courses.smartprogramming.in>