Beginners Book: Java Basics

Lesson 2: Java Virtual Machine (JVM) Basics

- **Java Virtual Machine (JVM):** JVM is a virtual machine that resides in your computer executes the bytecode produced by the javac compiler.
- The JVM is responsible for making Java platform independent.
- Each operating system has different JVM, however the output they produce after execution of byte code is same across all operating systems.

How The JVM Works

Class Loader:

The class loader reads the .class file and save the byte code in the method area.

Method Area:

There is only one method area in a JVM which is shared among all the classes. This holds the class level information of each .class file.

Heap:

Heap is a part of JVM memory where objects are allocated. JVM creates a Class object for each .class file.

Stack:

Stack is also a part of JVM memory but unlike Heap, it is used for storing temporary variables.

PC Registers:

This keeps track of which instruction has been executed and which one is going to be executed. Since instructions are executed by threads, each thread has a separate PC register.

Native Method stack:

A native method can access the runtime data areas of the virtual machine.

Native Method Interface:

It enables java code to call or be called by native applications. Native applications are programs that are specific to the hardware and OS of a system.

Garbage collection:

A class instance is explicitly created by the java code and after use it is automatically destroyed by the garbage collection for memory management.

JVM vs JRE vs JDK

JRE:

JRE is the environment within which the java virtual machine runs. JRE contains the Java Virtual Machine(JVM), class libraries, and other files excluding development tools such as compiler and debugger. Which means you can run the code in JRE but you can't develop and compile the code in JRE.

JVM:

As we discussed above, JVM runs the program by using class, libraries and files provided by JRE.

JDK:

JDK is a superset of the JRE, it contains everything that JRE has along with development tools such as compiler, debugger etc.