Java Basics

- **JVM ->** A blueprint of how to provide a runtime environment in which Java bytecode can be executed.
- **JRE ->** Actual implementation of JVM. Provided by different companies eg:- Sun, Oracle, etc.
- **JDK ->** JRE + development tools(compiler, interpreter, archiver(jar),etc)

- **Java Classloader**
  - Is a part of the **JRE** that dynamically loads Java classes into the **JVM.**
  - Java classes aren't loaded into memory all at once, but when required by an application. At this point, the **Java ClassLoader** is called by the **JRE** and these ClassLoaders load classes into memory dynamically.
  - If any of these classes are not found then it returns a **NoClassDefFoundError** or **ClassNotFoundException**.
    - **BootStrap** or **Primodial ClassLoader ->** loads classes from the location *rt.jar*
    - **Extension ClassLoader ->** loads files from *jre/lib/ext* directory or any other directory pointed by the system property.
    - **System** or **Application ClassLoader ->** loads classes from **classpath**.
    - **Priority ->** BootStrap > Extension > Application

- **Bitwise Operator**
  - **Left Shift -> multiply**
    - $(10<<2) -> 10*2^2 -> 40$
    - $(5<<3) -> 5*2^3 -> 40$
  - **Right Shift -> Divide**
    - $(10>>2) -> 10/2^2 -> 2$
    - $(50>>5) -> 50/2^5 -> 1$