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Java Day - 1

Assignment - 1

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1) History of Java

Birth : 1991

origin : sun microsystems

key members : James Gosling, Patrick Naughton, Mike Sheridan

old Name = Oak (Named by type)

updated Name = Java (a popular coffee)

Hot Java : Java team created their own browser  
Called Hot Java It was not only browser  
but also capable to run small programs  
Called applets directly in web pages

Release year of Java : 1996 (JDK 1.0)

Oracle Corporation : in 2010 Java class was  
acquired by Oracle Corporation

write once, Run anywhere :-

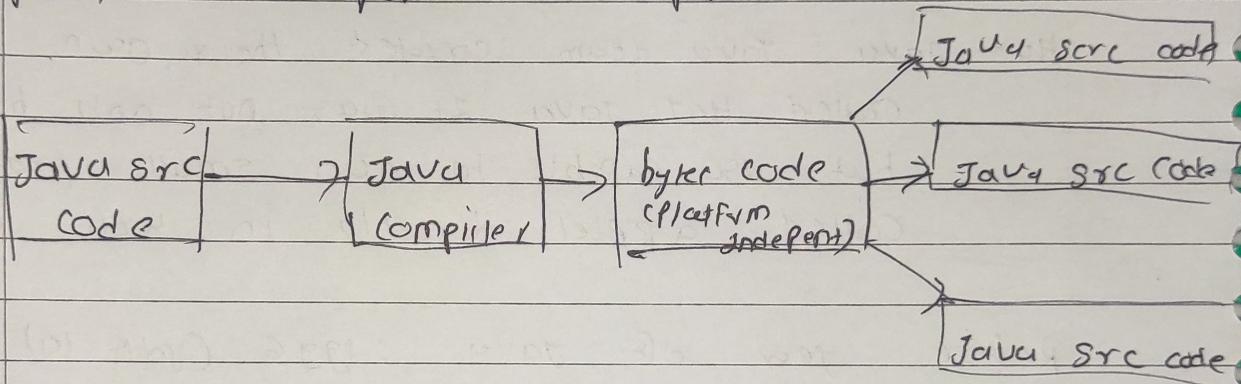
This slogan highlights Java's platform independence. It means Java can run on any device or as that has JVM installed

## 2) Features of Java

## 1) compiled &amp; interpreted

First Java compiler translates source code into bytecode instruction. bytecode are not machine instruction. therefore Java interpreter generates machine code that can be directly executed by machine that runs the Java program.

## 2) platform independent &amp; portable



## 3) object oriented language

- Java is truly object oriented language

- All program code & data reside within objects & classes

object : object are basic run time entity

class : class is a blueprint for an object

## 4) Robust &amp; Secure

It provides many protection to ensure reliable code

It has strict compile time & run time checking for data type

## 4) distributed

java is distributed language for creating application on different machine which has ability to share both data & programs

## 5) multithreaded

handling multiple task simultaneously

## \* JDK

JDK stands for Java development kit  
It is the collection of tools that are used for developing the running Java programs

Java SDK = Java development tools + API Docs  
supporting ib + Java execution environment

Java development tools - (to compile, build, test)

Java .c, .java, Javap - JS stack, Jdb

## API docs

Java stands for applets provides classes necessary to creation of applet & the classes of applets use to communicate with its applet

## Java .awt

contain classes for creating user interface & for painting graphics & images

## java. lang

provide classes that are fundamental to the design of the Java programming lang

Java.net

classes for implementing network  
classes

#### # Libraries

pre-written code which minimize  
developer efforts

mt.jar

#### # Execution environment

platform where we can deploy &  
test application

java virtual machine

Q] 3] which function of JDK should use  
longer feature release JDK 21

use for certain edge features & improvement  
intended for new projects or developers want  
the latest update

long term support JDK 17, JDK 11

Best for stability & long term support  
suitable for production & enterprise applications

older version JDK 8

It is extremely stable for vast ecosystem  
of libraries & frameworks that support  
- lots of new features security improvement  
& performance enhancement found in  
newer

## 4) @ JDK installation Director Structure

bin/

contains executable files & tools

Example: Java, Javac, Jav, Javadoc

conf/

Configuration File for the JDK

Ex. loggin.properties, security, policy file

include/

C header file for native code development

Jmod/

contain Jmod Files (Java Module files)

used for creating custom runtime image

legal/

legal notices & license information

lib/

Runtime libraries & support files

contain .jar & other resources

Release

A file containing version information

for JDK

## 5] About Java Technology:-

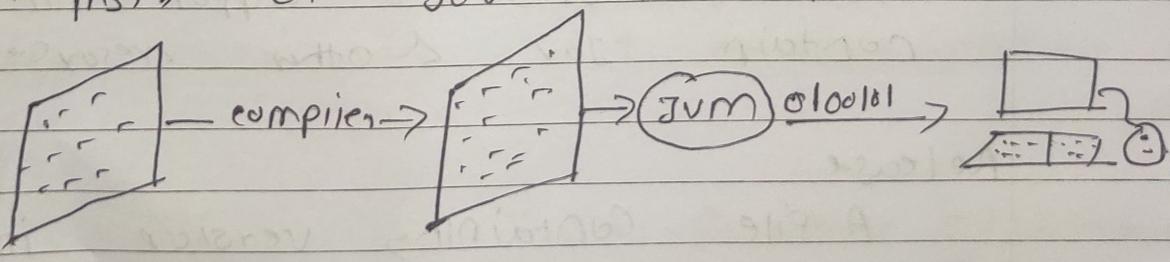
Java Technology is both programming language & a platform.

### Java programming language

It is a high-level language that can be characterized by all of following buzzword,

- 1) simple
- 2) Object oriented
- 3) distributed
- 4) multi-threaded
- 5) dynamic
- 6) architecture neutral
- 7) portable
- 8) high-performance
- 9) robust
- 10) secure

In Java programming all Java code is written in plain text files ending with Java extension then those source files compiled into class files by Java compiler. A class file contains bytecode machine language of JVM. Java launcher tool then runs Java application with or instead of Java virtual machine.



Demo.java

Demo.class

Demo  
(show output)

(An overview of the software development process)

- Java platform : A platform is the hardware or software environment in which program runs. most popular ones microsoft windows, linux, solaris os & mac os
- Java platform has 2 components
  - 1) Java virtual machine (JVM)
  - 2) Java Application programming interface (API)

Q) what can Java Technology do?

The general purpose, high-level Java programming language is a powerful software platform.

Even full implementation of Java platform gives you the following features

- 1) Development tools : compile Java code, Run program
- 2) API
- 3) deployment technologies
- 4) user interface Toolkit
- 5) Integration : libraries

### 1) Development Tools

javac - compiler Java code

java launcher - Run the application

Javadoc tool : generates documentation

### 2) API

Core functionality : Essential Java classes

Wide array - Basic to advanced Features

Java SE 8 documentation : API overview

## 3) deployment Technologies

Java Web Start = Application Deployment  
 Java Plug-in = Browser Integration

## a) user interface toolkits

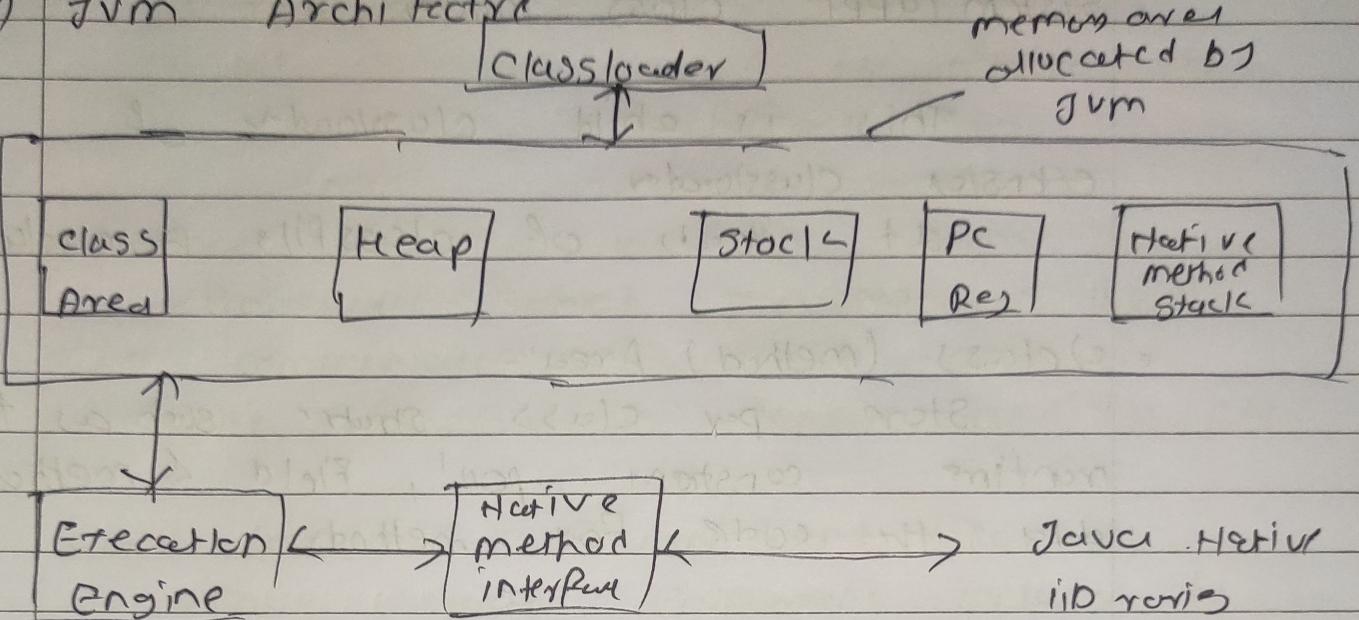
Java FX = modern UI toolkit  
 Swing = GUI commands  
 Java 2D = 2D graphical API

(3)

## 5) integration libraries

Java 2D API & CORBA integration  
 JDBC API = Database connectivity  
 JNDI API = Directory Services  
 JAVA RMI = Remote object manipulation  
 RMIS - DCOM = Distributed computing integration

## 7) JVM Architecture



It is a program that provides runtime environment necessary for JVM program to execute.

## 1) Class Loader

It is subsystem of JVM which is used to load class file.

Whenever we run the JVM Java program

It is loaded first by the class loader.

## 2) Bootstrap class loader

This is first class loader which is the super class of extension class loader.

It loads the jar file which contains all class file of Java SDC like java.lang package classes, java.net package classes.

## 3) Extension class loader

This is the child class loader of bootstrap and parent class loader.

It is loaded the jar file located inside Java home / jre / lib / ext library.

## System (app) Class Loader

This is child classloader of extension classloader  
It loads .class files from classpath

### c) class (method) Area:-

store per class strucr such as the runtime constant pool, field & method data & code for methods

### 3) Heap

It is runtime area in which object are allocated

### 4) Stack

Java stack store frames

It holds local variable & partial result & plays a part in method invocation & return

### 5) program counter register

Contains the address of the Java virtual machine instruction currently being executed

### 6) Native Method Stack

It contains all native methods use in app

### 7) Execution Engine

It contains

A virtual processor

2) Interpreter

3) JIT compiler : used to improve the performance

8) Java Native Interface

Framework which provides an interface to communicate with another application written in another language like C, C++

8) Java Language Environment (contents)

Java Language Environment includes the following components

1) Java Virtual Machine (JVM)

Executes Java programs

2) Java Runtime Environment (JRE)

provides resources for Java programs to run on any operating system

3) Java Development Kit (JDK)

used to develop Java software

4) Java Syntax & Semantics

includes the basic vocabulary & rules for writing algorithms

5) API

Important software components bundled with the Java platform

The Java language environment also includes:

- 1) byte codes
- 2) memory allocation & layout.
- 3) security checks in program class loader.
- 4) the byte code verification process
- 5) Java base system and libraries
- 6) input output package
- 7) utility package
- 8) Abstract window toolkit