

OOPS (Object oriented Programming System)

JAVA(1995)

Java is a high level, robust, object-oriented and secure Programming language.

Father of JAVA → James Gosling.

Java first name → OAK (since OAK is registered Co so they change name from OAK to JAVA).

① Why JAVA?

=> As James Gosling and his team were having a lot coffee while developing the language. And that coffee have been exported from the JAVA Island. So they named it as Java.

Symbol of JAVA → Coffee cup and saucer.

January 23rd 1996 (JDK v. 1.0) released.

② Pointer concept not on JAVA? Why?

⇒ It lead to confusion to both Programmer and compiler.
• It crashes the program easily, as while adding two pointers. Also happen when we forget to free the memory allotted and reallocate them to some other variable.

• It also break security: Using pointers, harmful programs like viruses and other hacking programs can be developed.

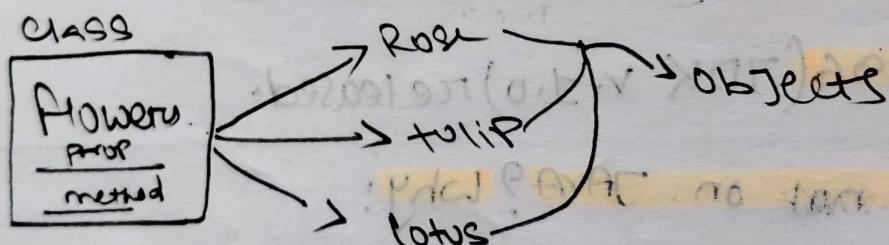
(not for examination) or Paradigm
 ③ Object-oriented is a methodology to design a program using classes and objects.

④ Object: An object is anything that really exist in the world and can be distinguished from others. everything we see physically come into this.
 eg: human being, a tree and so on.

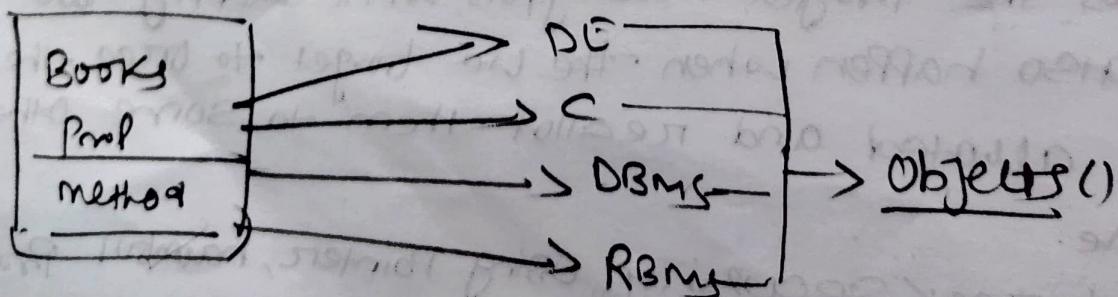
⑤ Properties: Properties are the variable that are used inside the object.
 eg: dog (name, height, color, age, etc).

⑥ Behaviour: Behaviour are the functions or methods that object posses.

eg: dog (barking, running, etc)



CLASS



⑤ CLASS :- A blueprint or Prototype that defines the variables and the methods (functions) common to all Java Programs.

It doesn't take any space on memory. Also called as Blueprint/ logical entity.

Class

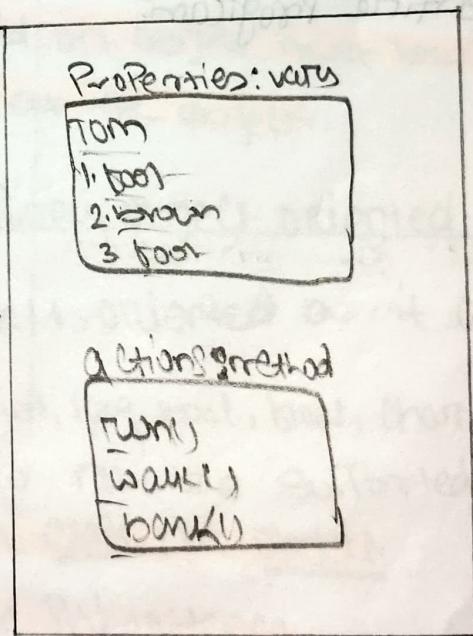
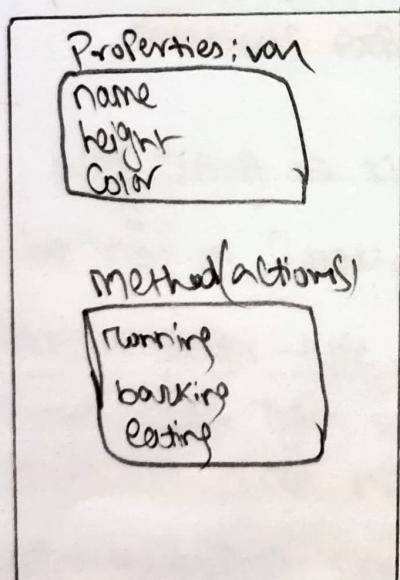
Pre-defined

(Library)

- ↳ Scanner
- ↳ Console
- ↳ System
- ↳ String

User-defined

- ↳ Dog
- ↳ Tom
- ↳ Demo



Class: Dog

[blueprint to create)
an object]

Object: TOM

[

⑥ Functions vs Methods: Functions are the group of reusable codes that can be used anywhere in the program.

Methods are the Procedure or function in OOPS concepts.

functions	methods
<ul style="list-style-type: none">• block of statement that takes specific input, does some computations.• it is defined independently. eg: main() in C++• by default function is Public• Can be accessed anywhere in the entire program.	<ul style="list-style-type: none">• does same as that of function• it is defined inside a class eg. main() in JAVA.• method can be Private, Public or Protected.• invoked by reference/Object only. eg. Obj.method();

⇒ Purely object-oriented language?

Purely object-oriented language are fully object oriented that support or have features that treats everything inside program as object.

There are seven qualities to be built-in for any programming language to be purely object-oriented.

They are:

- i) Encapsulation / Data hiding
- ii) Inheritance
- iii) Polymorphism
- iv) Abstraction
- v) All Predefined types are (object)
- vi) All user defined types are (object)
- vii) All op performed on object must be done through methods exposed at the object.

Why JAVA is not purely object oriented.

It is not a purely object oriented as it contains:

- i) Primitive data type e.g. int, long, bool, float, char, etc as object. These data type should not be supported as these int, char, etc are neither class nor object.
- ii) Doesn't support multiple inheritance.
- iii) It contains static variable and methods that can be accessed without using objects. It's against purely object oriented.

features of JAVA language:

- i) Distributed: It can handle the protocols like TCP/IP and UDP as it can capture ^{into} and distribute it to the Client.
- ii) Robust: They are strong unlike C++, etc - that can crash easily. as i) it contain excellent inbuilt exception handling features. exceptions are the error that occur at runtime. if exception occur will give rise to loss of data.
- iii) Memory Management: In C, C++ user need to allocate & deallocate the memory, but in JAVA, JDK will automatically allocate & deallocate the memory (Class loader subsystem) hence lowering the chance of Program Crash..
- iv) Secure: Security Problems can be eliminated and hence it is secure on Internet.
- v) System Independence: JAVA byte code is not machine dependent hence it can run on any machine with any Processor and any hardware.
- vi) Interpreted: JAVA program are compiled to generate the byte code. then interpreted by JVM.
- vii) High Performance: Interpreter is slow in JVM. to overcome this JAVA JIT (People) is created in Java Virtual Machine.

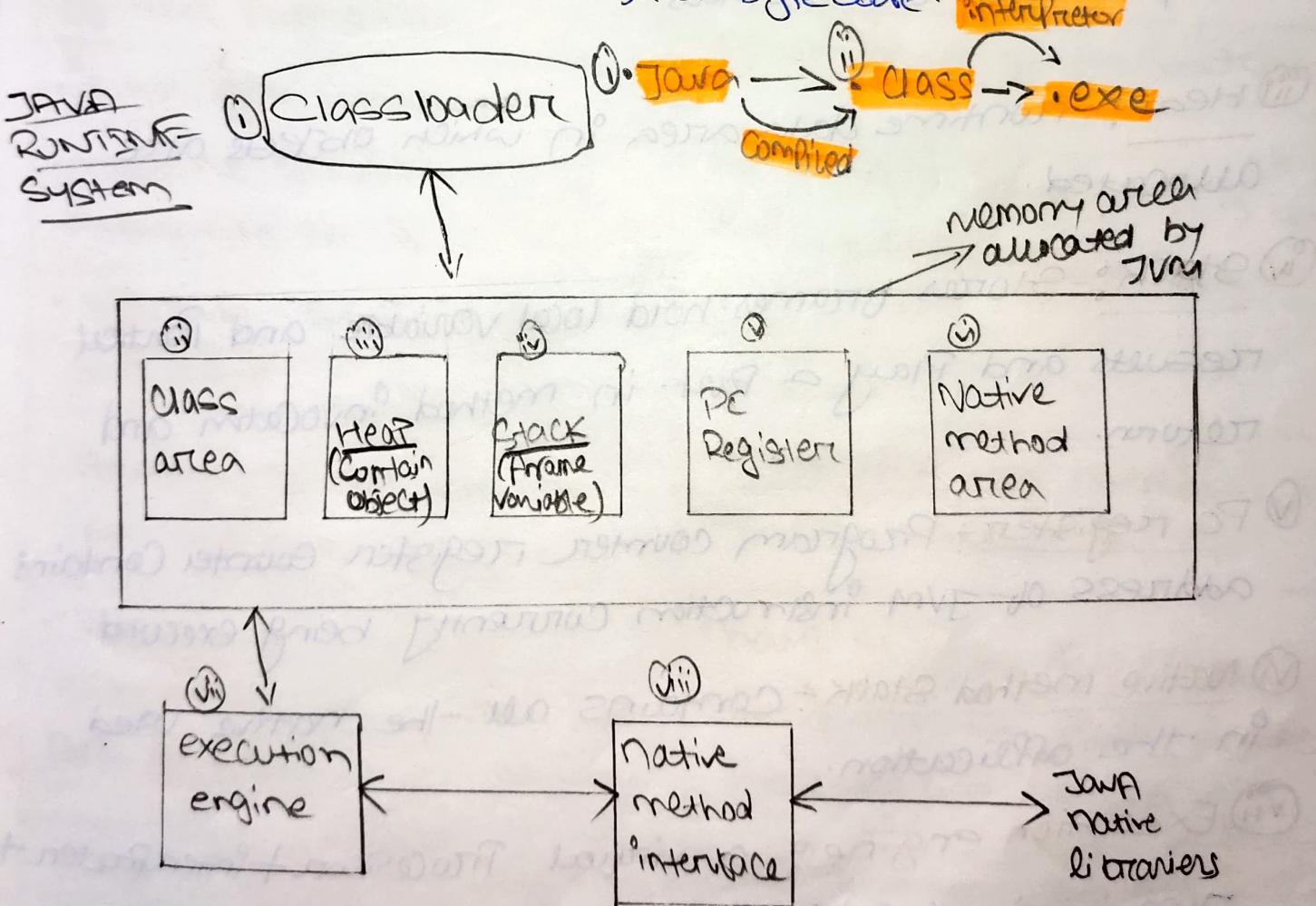
8) what is garbage collector?

⇒ it is the form of memory management that checks memory from time to time and marks the variable or object not used by the program.

- uses (mark and sweep) algorithm.

⑨ JAVA virtual Machine

JVM: also named as Java virtual machine is a virtual machine that enables a computer to run Java programs as well as programs written in other language that are also compiled to Java bytecode.



① Class loader :- It is a subsystem of JVM used to load class files. When we run any Java Program it first get loaded in the Classloader.

There are three built-in Classloaders in java.

- Bootstrap Classloader:-
- Extension Classloader:-
- System/Application Classloader:-

② Class(method) area :- It stores Pre-class structure such as the runtime constant pool, field and method data, the code for methods.

③ Heap :- Runtime data area in which objects are allocated.

④ Stack :- Stores frames. hold local variable and partial results and play a part in method invocation and return.

⑤ PC register :- Program counter register Counter containing address of JVM instruction currently being executed.

⑥ Native method stack :- Contains all the native used in the application.

⑦ Execution engine :- a virtual processor + interpreter + Just in time (JIT) compiler

⑧ Java native interface :- Produces an interface to language like, C, C++, etc. JNI, a framework that communicate with other

C++ and JAVA

C++

- It is not a purely object oriented Programming language, as it is possible to write C Program without class and objects.

- Pointers are available in C++.

- memory allocation and deallocation is responsibility of the programmer.

- it has goto statement

- multiple inheritance is available in it.

- operator overloading is available

- #define, typeid, etc are not available in C++.

- There are 3 access Specifiers i.e Private, Public and Protected.

- Public → can be accessed anywhere from the program.
- Private → can be only accessed from the class itself.
- Protected → is accessed within the package.
- can be used in child or inherited class.
- Default → by default it is used within the package.

Java

- It is Purely object oriented language, as it is not possible to write program

- We cannot create and use Pointers in Java.

- Allocation and deallocation of memory will be taken by JVM.

- Doesn't have go to statement.

- No multiple inheritance is available but, we can achieve it.

- not available.

- these are not available, but we can achieve it.

- have 4 types of access Specifiers i.e Public, Private, Protected and default.

Parts of JAVA

The Java has been divided into three Parts by Sun microsystem, inc.

- JAVA SE
 - JAVA EE
 - JAVA ME
- Java SE :- Java Standard edition that contains ^{basic} Core Java classes. Used to develop standard applets and applications.
- Java EE :- Java enterprise edition Contains classes that are beyond java se. Used mainly to provide business solution on a network.
- Java ME :- Java micro edition. used by developers who develop code for portable device such as PDA or cellular device. Code in small size and less memory.