Saturday Session Date 21/04/24 Page no. 01

Cloud Computing

It's a tech-nology Remote Servers that uses remote servers on the internet to store Cloud Computing provide on demand services

1) What is Cloud Computing?

⇒ Cloud Computing is a virtualization-based-technology that allow us to create, configure and customize application via an internet connection. The Cloud technology includes a development platform, hard disk, Software application & database.

2) What is server?

⇒ Server are basically C.P.U without monitor.

3) Cloud Service models :-

⇒ There are the following three type of Cloud Service models-

i) Infrastructure as a Services (IaaS)

ii) Platform as a Services (PaaS)

iii) Softwarl as a services (Saas)

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1) IAAS

IAAS is also known as Hardware as a Services (HaaS). It is a computing infrastructure managed over the internet. The main advantage of using IAAS is that it helps users to avoid the cost and complexity of purchasing & managing the physical servers.

Characteristics of IAAS

i) Resources are available as a Service

ii) Services are highly Scalable

iii) Dynamic & flexible

iv) GUI & API based access

v) Automated Administrative task

2) Platform as a Service (PaaS)

PaaS cloud computing platform is created for the programmer to develope, test, run and manage the application.

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iii) SaaS

SaaS is also known as On-demand Software. It's a Software in which the application are hosted by a Cloud services provider. User can access this application with the help of internet connection & web services.

Interview question

What is the value of 5 * 2 saving by bitwise operator

n << 2

$2^2 * 5$

= 4 * 5

= 20

Interview question 15-05-24

1) Is it possible to call static member with object ?

⇒ Yes.

2) Why main method is static ?

⇒ JVM call the main method by class name

3) If static method called by object why we can't ?

⇒ JVM is always look for memory saving if JVM create the object it's waste of the memory.

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Top level class always public

```
Class A{
    Class B{
    }
}
Class C{
}
```

Top level class not be private or protected but inner class will be private or protected must be inner class.

If we are making any class public then we want to define same name and same application name of java.

In a java application only one class be public not two class public

12-06-24

Static block

Q is that any code who is executed first from the main method?

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⇒ Yes Static block is the code which is executed first from the main method.

```
Public class Hello{
    Static{
        S.o.p(main-block);
    }
    p.s.v.m(String[] args){

    }
```

The execution order of the static block is the executer order return.

String Interview Question

1) What is the String?
2) What do you understand by immutability?
3) What are the difference between
4) String & String buffer
5) What you can understand by (==) & :equal(); method?

and more String method.

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Collection framework & OOPS

Use word very carefully in the interview. (scribble)

website → hackerrank.io,
Coding question ask from leetCode, ChatGPT
GFG FreeCodeCamp, daily Solve one question.

How the Hashmap internally work?
Input: Stream = { 5, 2, 2, 10, 10, 5 }

don't change the structure when interviewer ~~pass~~ ask they don't want to change the structure

Stream prepared.

Q1) Question practices from = i) leet code, ii) GeekForGeeks.

preperation of programming is to read code of different people.

Optimization technique. Should learn.

System design question also ask in the interview.

It help us to prepare System design → alex hU in linkedin

messaging services

e -22-06-24

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& OOPS

scribble
interview.

de, ChatGPT
question.

s]

interviewer
Change

Code, ii)

is to
.

the

inkedin

Stream, Multithreading

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L1, L2, HR
Interview Question ?
i) Coding question ii) System designing question.
iii) Database Query iv)

for Shifting the user from A to B Server, use Gateway.

~~don't~~ give Communicate Cristal Clear.

L1, L2, HR → prepare Separate intro

Try to Create a SpringBoot project & deploy on AWS

15-06-2024

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Data ~~member~~ power

Source of data ?

E-paper, website, Blogs, inventory data.

Type of data?

Structured data → properly organised in rows & column.

Varbinary (max) → This data store 2gb data in the only single column

Unstructural data → (big data) Qualitive data

In Structural database we didn't store images, video etc.

Semi Structured data → JSON, XML, Image

XML

In XML we can define by according to our choice.

<suitcase>
<medicine> Paracetamol </medicine>
</suitcase>

R programming

Data engineering → Learn, we have more knowledge

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If the data in that structure is called marked up language.

Data landline

Structured	UNstructured
MS-excel	• MarkLogic
My-Sql	• Mongo DB
Sql-Server	
Oracle	

Why data is so powerful

Gain greater insigt into target market

Enhance decision-making capabilities

Improve operational inefficiencies & minimize risk.

Data Analysis Tools

Tableau
Power BI

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Instance Variable

i) The variable that are declared inside the class but outside the scope of any Method are called instance Variables in java.

ii) The instance Variable is initialized at that the time of the class todt loading or when an object of the class is created.

iii) An instance variable can be declared using different access modifires avinable in java like default, public, private & protected

ared inside
Scope of
tance Variables

d at that the
n when an
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declared
ariable in
& protected.

iable

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2) What is JAVA?

JAVA is a Object oriented high level programming language.

We can decide ~~a~~ programming is any language is low level, middle level or high level is base on feature & understanding.

ii) What is Function ?

Function is a block of Code to perform a specific task.

For Example :-

```
pubic void run() {

}
```

iii) What is Object ?

⇒ Object is a real world entity & also Object is a Collection of different type of function & parameter.

For Example :-

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That's Class

```
public class Human {

    public void eat() {

    }
    public void talk() {

    }
}
```

That's a Object

Call function → `public class (anybody name){`

```
}
```

ii) What is Class?

Class is a template / blue print.

For Example :

```
public class Hello {

}
```

How many types of programming language?

There are three types of programming language :-

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Programming language

ii) Low level programming language

Low level programming language is called when we get to feed data in binary form. In low level language we get to give operator too in binary number.

iii) Middle level language

Middle level language is called Assembly language, Assembly language is low level programming language intended to communicate directly with a Computer's hardware.

Example of A.L.
MOV
MVI
LDA
STA etc.

In the Assembly language we use Assembler for converting our A.L code to Binary / machine code.

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In the A.L. languag we use Operator ~~from~~ that type.

ADD
SUB
DIV
MUL etc

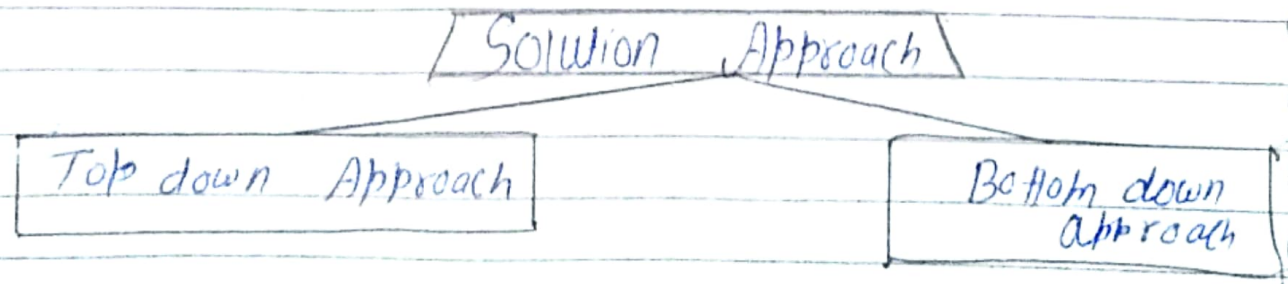
that type of Operator is Called Nemonics.

iii) High level programming language.-

There are two types of High level programming language

1) ii) Function / procedure oriented programming language

Dividing the module is called Solution Approach



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...e use Operator

...Operator is

...language.-

...es of High

...ted progra-

...ue is called

...Bottom down approach

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i) Top down approach :-

When we start from scratch be follow top down approach.

ii) Bottom down Approach :-

When we have some exstinging data, some detail, Analaysis we follow bottom down approach.

Object

→ Object based :-

The Object based language is used to describe any programming language that uses the idea of encapsulating state and operations inside objects. Object-based language doesn't support inheritance or subtyping. Simple defination Object based programming language not supported all type of OOPS Concept.

2) Object Oriented :-

Object oriented programming is divided into two parts

i) partially Object oriented
ii) pure/fully object oriented

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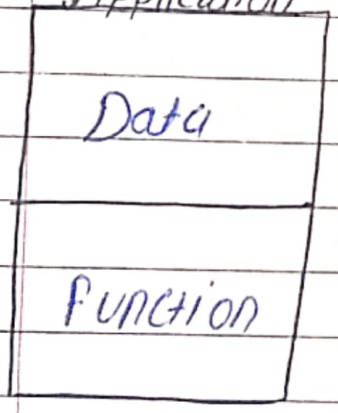
Simula67 talk firstly for object Oriented programming.

~~What is Object Oriented ?~~

C is High level language.
C is means procedure Oriented programming language.

System Software developing, by ~~one~~ using ['C' but data security is weak in C language.]



To bind a data & function in a single entity.

"Robert Raboza"

What is OO ?

Object Oriented is a Style of programming.

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object

ge.
Oriented

developing,
Security
J

data
in a

obert Rapoza"

Style

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Object Oriented programming

Concept of OOPS

- Inheritence
- Encapsulation
- Abstraction
- polymorphism
- Class
- Object

What is Object?

a) Object is a real world entity.

b) Object may have contains certain number number of property preperties or may have certain or no. of behaviour or many both.

c) If a thing is a Object then it must be in existence.

d) Object belong to factory / class.

a) Object is real time entity.
Each & every object have some properties.
The object which you want to manipulate, first think about that. then identify the properties of the object then identify the behaviour of the object then finally create a factory to represent the object.

What is class?

a) Class is a user define type.

b) Class is a collection of similar type of object.

c) Class is a blue print.

d) Once we define a class then we can create 'n' number of object.

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Encapsulation

The wrapping of data and function into the Singe unit. is a encapsulation.

With the help of Class we achieve the encapsulation.

Encapsulation provide extra layer of Data Security.

Abstraction

Hiding the unneccery info from the user and Showing only esencial thing.

Use the things without knowing the background detail.

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Polymorphism

Poly + Morphism

Poly → Many

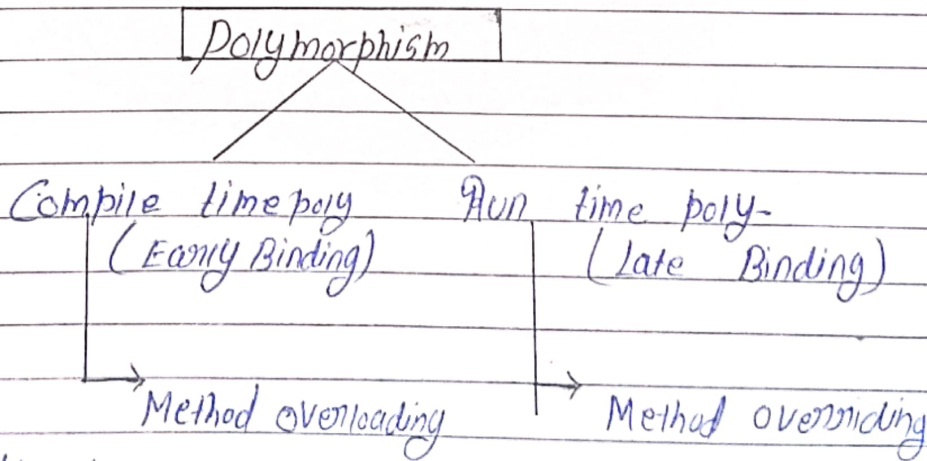
Morphism → Form

Defination :-

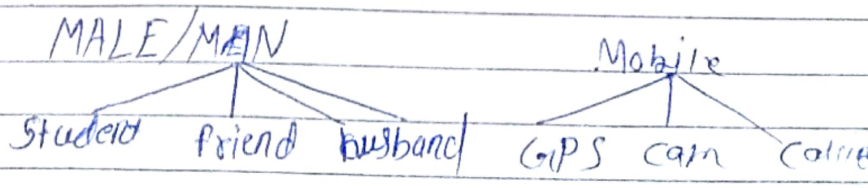
One thing has a different implementation.

General difination :-

To achieve more than one thing from a single thing.



Example :-



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Inheritance

By using existing thing to develope something new but there shouldn't be any changes in the existing thing.

i.e.

```
Class J5 {
    receive() {
    }
    reject() {
    }
}
```

We access built in class in the inheritance we not define both class.

Inheritance increase code reusability.

```
Class J7 extends J5 {
    Camera() {
    }
}
```

Class J7 is A J5 → It's true

Relationship

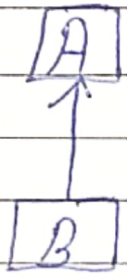
ISA HAS A

Note :- Java Only Support Date: / / Page no:
Single parent Concept.

Type of Inheritance :-

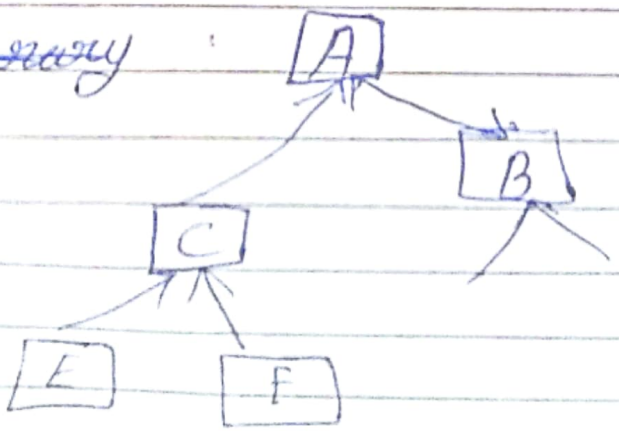
There are three type of Inheritance in JAVA :-

i) Single level inheritance
ii) Multilevel Inheritance
iii) Hierarchical inheritance

i) 

parent / Base / ~~Stub~~ Super class
Child / derivied / Sub class

ii) 

iii) ~~Literary~~ 

Inheritance

class

class

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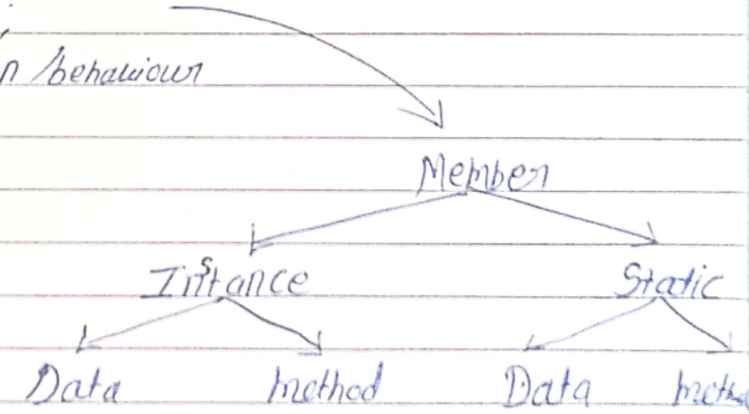
paradigm

A method or style of programming that define a set of principal, technique, & pattern for structuring code to solve problem on a computer.

Java is more Object oriented then C++.

```
Class A{
    Colour;
    Value;
    Function/behaviour
}
```



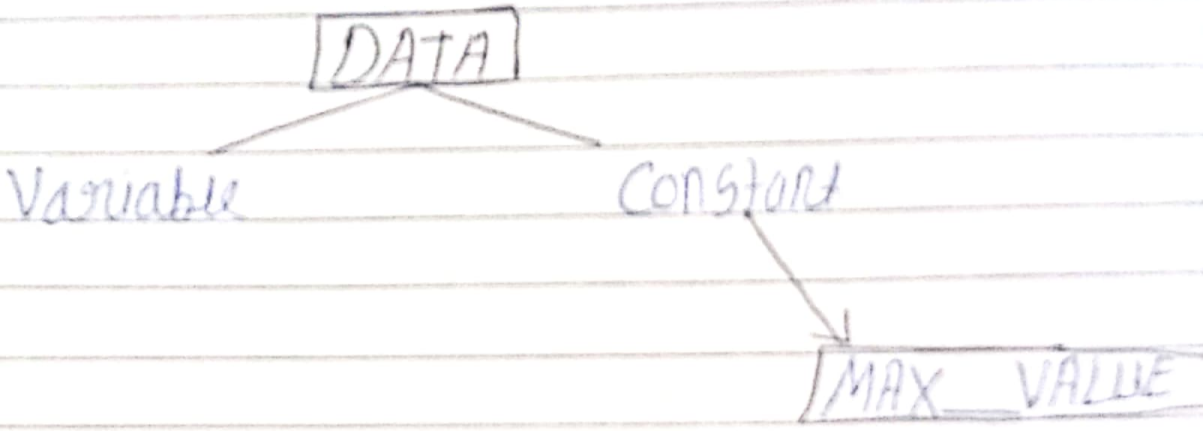
Naming Convencen

Class name

Class name should be ~~start~~ first letter is capital.

Method Name

First letter should be small than Changing the letter is capital.



Package name every letter is small.

Identifire

A to Z
a to z
0 - 9
_ , $

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Feature of JAVA

Object Oriented Object Oriented

Simple [Who knowing C & C++]

Naming Convienceen

Platform independent

Robust

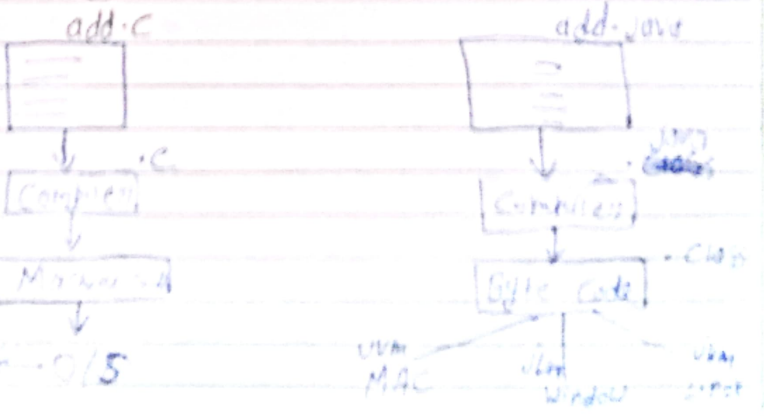
Multithread

Architecture Neutral

~~add.C~~

What is the difference between C & Java Compilation process :-

C



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WORA [Write one run anywhere]

Java achieve platform independence by .class file (Byte code). Not by JVM.

JVM (Java virtual machine) is a interpreter.

Robust

i) Strong memory management
ii) Reliable
iiV) Garbage Collector

i) Java has a ~~Sc~~ Strong memory manage-ment, because Java provide garbage Collection who ~~Collect~~ Collect automatically garbage value.

iii) ~~ii) Reliable~~ : Garbage Collector

IN C we be use malloc & calloc to create a memory & use Realloc to Recreate the memory and use free function to free the memory. when our work is done

IN case of Java, Java have a garbage collector who collect garbage value automatically.

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ii) Reliable :

In C When our code is compile and ~~When~~ ~~at~~ ~~in~~ our code have any exception is here in the middle of the code, So our ~~below~~ exception code below code cann't run. ~~below the~~

In case of Java, Java provide exception handling concept So due control the exception before. but C cann't provide any type of exception handling concept.

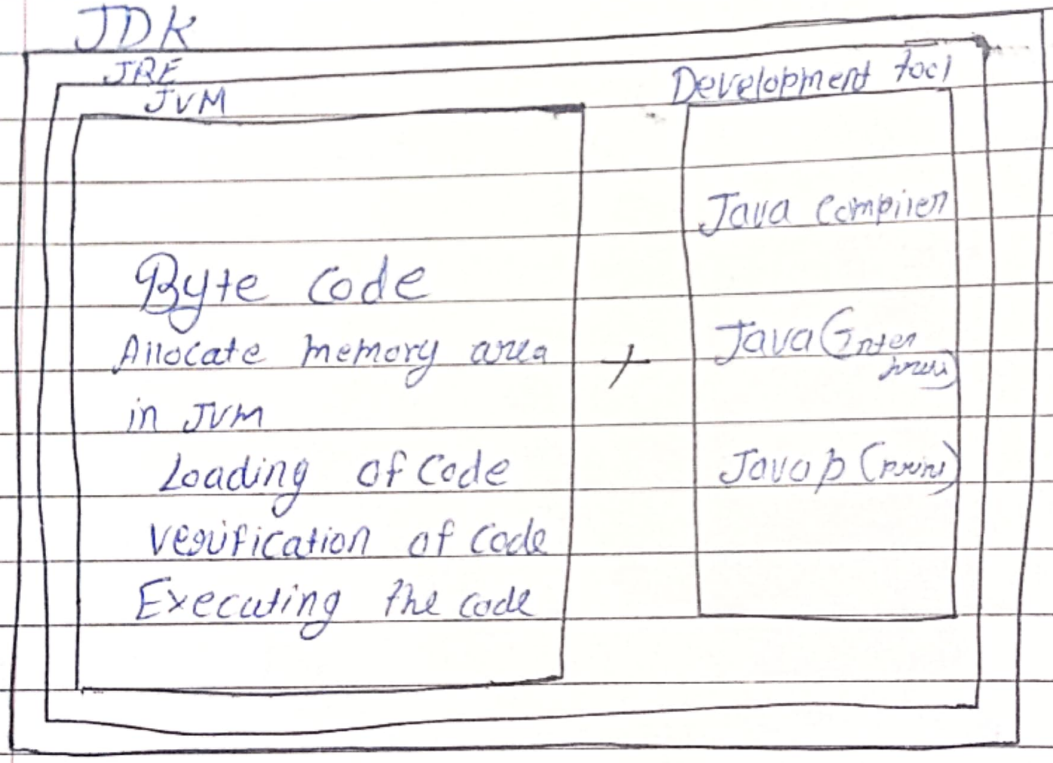
7) Architecture Neutral

Run in any hardware

Java 8

is Java avilable in our system how to check ?

=> C drive → programe file → Java
JRE JDK



Java Name

green talk → Oak → Java

- talk
- Java

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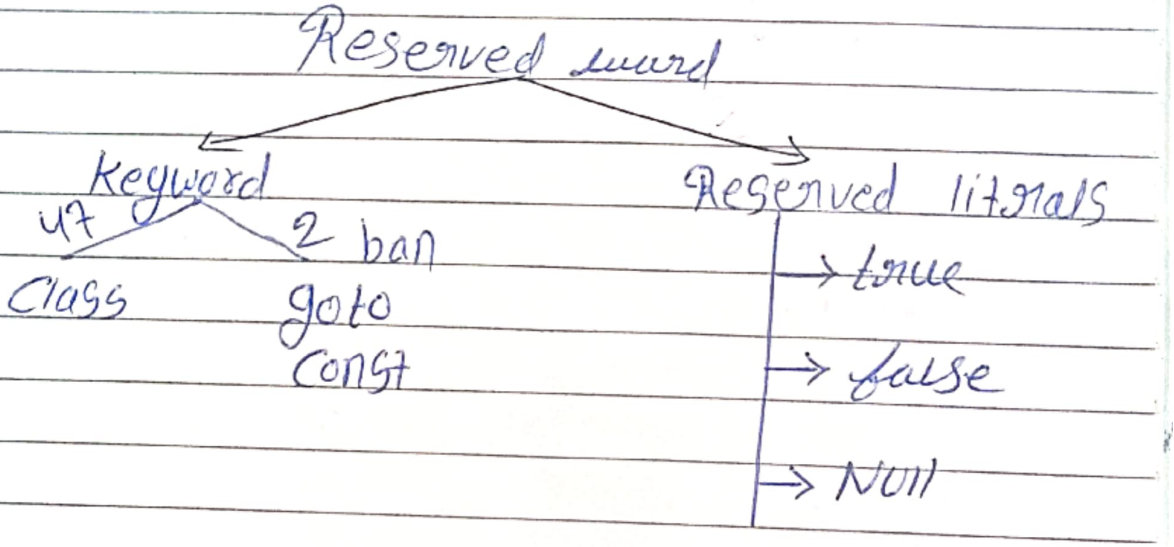
Keyword

Java have some reserved words that's called keyword



Instance

Instance method are the behaviour of the object.

Instance Method is a member of the Class.

When we want to call any type of instance method so we make a object to call them.

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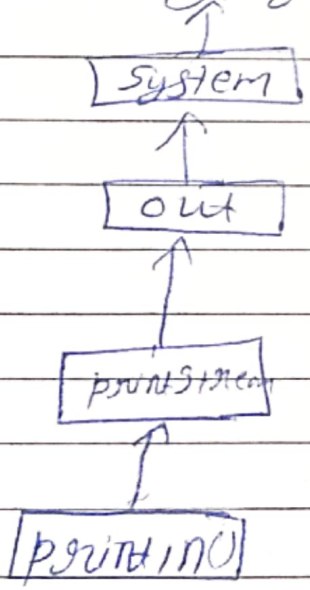
System.out.println();

println is a method who is inside the ~~Object~~ PrintStream class, When we want to use println method so we want to create a object because it's a instance but PrintStream class already provide us a inbuilt object that's ~~called~~ called "out" out is a object of PrintStream class and a Memeber of System class, also out is a static variable so we can call with name of System class System.out.println();



All of the variable who is called without static keyword is a instance variable.

It's a instance variable ← int x = 10;

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1) What is lang?

=> lang is a default package of java, we donn't need to ~~use~~ import the lang package, it's automatically imported.
Example, System Class, String Class.

System is a built in java Class avilable in the lang package.

```
Class Test {
    public static void main (String args[]);
        System.out.println("welcom");
}
```

Class

Class

It's built in java Class avilable in lang package

It's Object of PrintStream class and It is Static member of System class

println is a instance method of printStream class.

We can access Static member by dot(.)
Example, Classname.member name
System.out

The tool is requirment for run java- is inside the bin folder-:

C:/program file/java/JDK/bin > javac Test

It's a Compilation process

It's a Interpreted process

C ---//---> java Test

↘ Test.main();

How many Type of error in java

There are three types of error in java-:

i) Syntax error
ii) Runtime error
iii) logical error.

i) Syntax error :

When we don't follow rules of java, we face syntax error. In the java, Compiler detect syntax error.

Java Compiler generate seperate ~~inner~~ classes for every inner Corresponding of every inner class, Anonymous & interface

ent for run
bin folder:-

/JDK/bin > javac Test.java

process

process
st
↘ Test.main();

in java

error in java:-

follow rules
error. In
ntax error.

nate seperate
ance Corresponding
y mous & interface

What is Class loader?

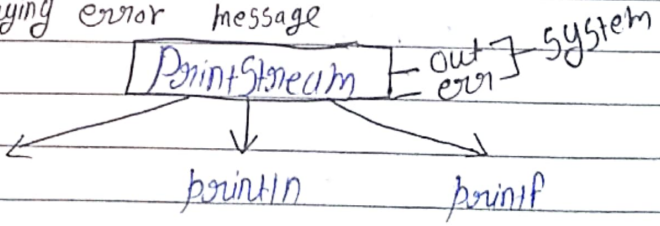
What is the work of Compiler?

Compiler is only responsible for convert our source code ~~into~~ into Byte Code.

~~p.s.v.main~~

There are for type of print method:-

S.O.println(" ");
S.O.print(" ");
S.O.printf(" ");
~~S.O.S.err.print(" ");~~
↳ that displaying error message



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Escape Sequence Character :-

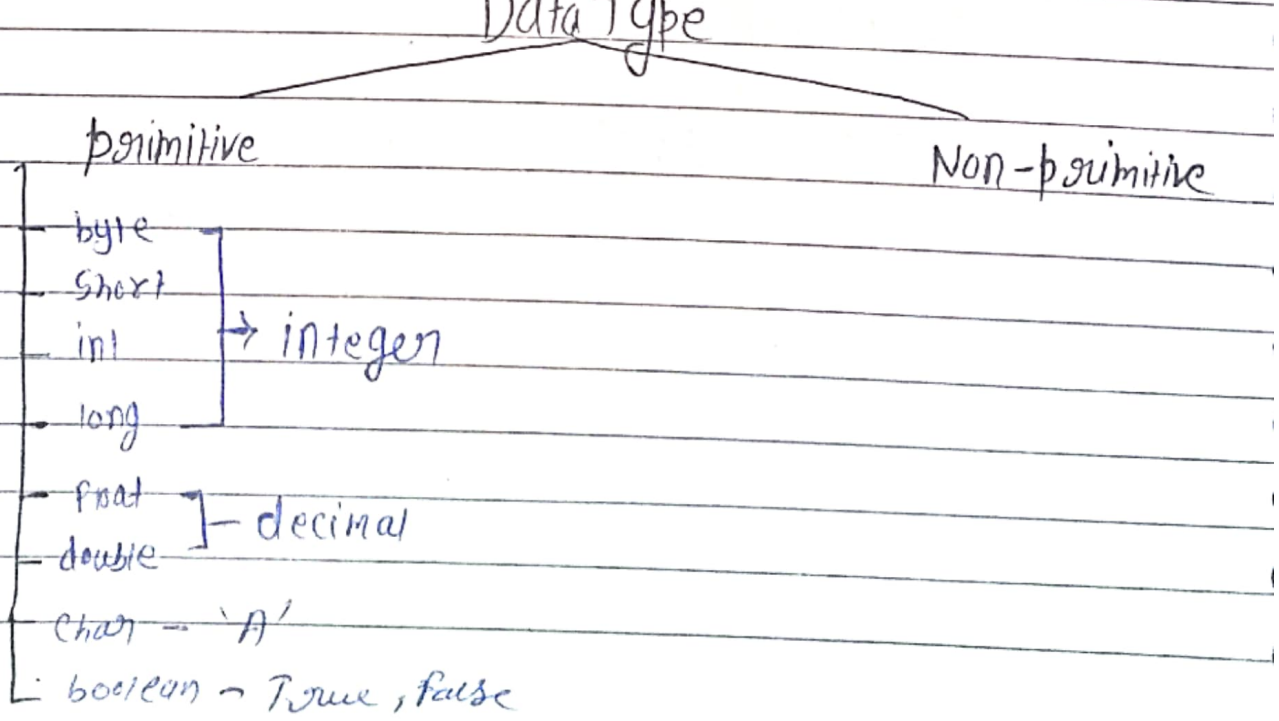
\n New line
\t tab Space → For creating 8 Space
\r Cursor move into Start
\b back Space
\a For hearing bip Sound

```
S.O.p("ABCD \r EF");
Output → EFCD
```

Variable

JS, py is a dynamically typed programming language.

Java is a Statically typed programming language.



ng & Space

ted programming

ed programming

ion-primitive

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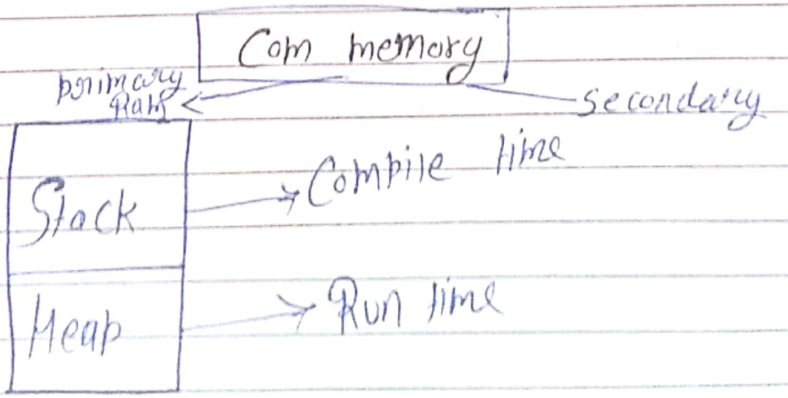
When we declare a variable think about that :-

i) default name
ii) Scope
iii) life

byte x ⟶ Memory Allocation
x = 20;
S.o.println(x) Compile time Runtime

Compile time :-
If the compiler able to resolve, how much memory a variable take it's compile time memory allocation.

Run Time :-
Memory always come in existence during run time it's runtime but memory allocation



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In the lang package

```
PrintStream {
  println();
}
```

```
System {
Static PrintStream .out = new
        PrintStream();
System.out.println();
```

-2^7 to 2^7-1 $\quad -128$ to 127

20

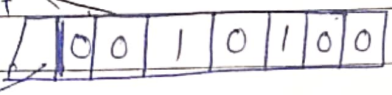
Binary format: $2^4\ 2^3\ 2^2\ 2^1\ 2^0$

16 8 4 2 0 1

1 0 1 0 0

1 Byte

8 Bit



0 - positive data

1 - Negative data

1 - Voltage High

0 - V. low

byte x;

x = 20;

In java we can access data by name.

1) Errors →

Incompitable type: possible lossy conversion from int to byte.

```
byte a,b,c;
a=10
b=20
c = a+b;
```

seeing that error.

= 30

c = (byte)(a+b);

(Loss conversion error)

The process of converting one type of value into the another is called type casting.

There are two types of typecasting in java :-

i) Implicit (Widening)
ii) Explicit (Narrowing)

i) Implicit type casting which is automatically done by the compiler or system.

ii) Explicit type casting forcefully done by the programmer. is it

```
byte x=125;
x = 125;
x= (byte) (x+1);
S.o.p(x);
```

In the java numeric value treat as an integer. (x+1)

```
byte x = 125;
x = (byte) (x+5);
S.o.P(x);
x=126
```

Date: / /

-2^{31} to 2^{31}

int x = 2147483648
Error [Integer No. is to large]

long x = 2147483648L
We want to tell java it's not a integer number, it's long

* / - +
b+b = int
b+s = int
s+s = int
s+i = int
b+i = int
s+i = int
i+i = int
i+l = Long

Default Value of any Static Variable ⇒
outside the method & inside the class

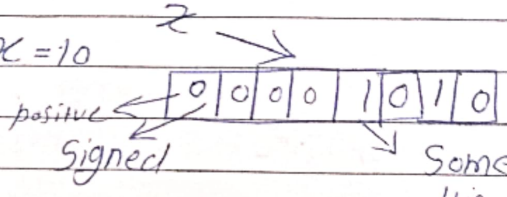
```
public class Variable {
Static int a;
pubic Static Vaid main(String [] args){
        S.O.P(a)
    }
}
```

That's print default Value of Variable.

Why Java don't support ^ pointer -

Java doesn't allow access of memory area (that's pointer) directly which make it secure & keeps it safe from many source of Bugs.

byte ~~int~~ x = 10



but in Java we can't data Access by the address. that's the pointer concept.

What is Variable

⇒ A Variable is a Container used to hold data, each Variable should be given a unique name.

Mainly There are three types of Variable in Java -

i) Local Variable
ii) Static Variable
iii) Instance Variable

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i) Local Variable :-

Local Variable is inside the method, The Scope of the local Variable is only ~~is~~ inside the method.

```
public Static Void main(String[]args){

    int a =10;
Not initi⇐ int b;
}
```

When we not initilized a local variable we saw a error -

Variable is not initilized.

ii) Static Variable :-

Static Variable is define by the Static key-word. & We don't want to initilized the Static variable, the Scope of Static variable is inside the class.

```
public class Hello {

Static byte a;

p.s.v.m(){

}
```

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iii) Instance Variable :-

Instance variable is always making in the class and we access this variable creating a object inside the method.

```
Instance Variable ^ <-- public class Hello {
                        int a = 10;
                        p.s.v.main(String[] args){

                        Hello obj = new Hello();
                        obj.a
                    }
}
```

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Different between Single precision & double precision in java :-

Single precision :-

Single precision is a format proposed by IEEE for representation of floating point numbers. It occupies 32 bits in computer memory. (Simple words take In Single precision we set 6 decimal value)

Double precision :-

Double precision is also a format given by IEEE for the representation of the floating-point number. It occupie 64 bits in computer memory. (Simple words In double precision we take 12 decimal place value.)

Char Data type

Language C Char	Java Char
1 byte	2 byte
256	65536
ASCII	Unicode (16 bit hexadecimal)

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Char Ch = 'A'

65 (Converting decimal to binary)

64 32 16 8 4 2 1 (~~Mat~~ adding every number who come 65 write 1 other wise 0)

0 1 0 0 0 0 0 1

4 2 1 | 8 4 2 1

4 | 1

→ (Converting decimal to hexa)

Unicode → /U0041

Char Ch = 65535;

S.o.p (Ch);

Boolean value size is 1bit / 0bit

True & false both are the reserved literal in java.

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Operator

There are three type of Operator in Java :-

i) Unary (++a)

ii) Binary (+, -, %, *, /)

iii) Ternary (conditional)

operator

int a = 10 + 20 Binary Operator

operands

1) Airthematic (+, -, *, /, %, +=, -=, *=, /= %=)

2) Relational (>, <, >=, <=, ==, !=)

3) Logical (&&, ||, !)

4) Assignment (=)

5) Incr/Decr (++, --)

6) Bitwise (&, |, ^, <<, >>, ~)

7) Conditional (if et ? :)

8) Instance of ( )

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of Operator

-=, *=, /=

)

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```
int x;
x = 5/2
S.o.p(x)
↳ 2
```

int / int = int
int / float = float
float / float = float

Airethematic Exception

1.of/2

```
result = 1/0 * b * h;
S.o.p(result);
```

(due face airthematic exception)

Infinity
-Infinity
NaN

```
double a = 0.0/0;   → NAN
       a = 2.of/0;  → Infinity
       a = -2.of/0; → -Infinity
```

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Boolean data type only compare with boolean otherwise we take a error Incompitable type.

$(a == b) == (c == d)$

Unary Operator

pre Increment

```
y = ++x
(x = x+1;)
y = x
```

post Increment

```
y = x+1;
y = x
x = x+1
```

x = 10

type caste manual

```
x = x+1
x = (byte)(x+1)
```

Increment & decrement operator will auto type cast.

```
++x
```

(auto type (c++))

```
(x = (byte)(x+1))
```

;)

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Logical (&&, ||)

Short Circuit

Java logical operator always return boolean value.

A	B	A && B	A || B
T	F	F	T
F	T	F	T
T	T	T	T
F	F	F	F

Short Circuit

&& → If the first condition is false the result is also false.

(a > b) && (++c / d)

= 10 > 20

= F

Single & Check both condition.

|| → In logical or case if first cadition is true, result is true

i.e) a = 10
b = 20
c = 30
d = 40
x

(a > b) && (++c < d) || (++a < d)

= F || (++a < d)

= F || T

= T

8 4 2 1
1 0 0 1
& 1 0 1 0
1 0 0 0

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! = to reverse the result.

x = !(20 && 0);
= !true
= false

Bitwise Operator

x = 19 & 10
x = 2

10011
& 01010
00010

x = 12 | 10
x = 14

1100
| 1010
1110

x = 20 ^ 14
x = 26

10100
^ 01110
11010

int x = 20<<3
x = 160

Condition
$2^3 * 20$
= 8 * 20
= 160

int x = 20>>3
20/2 = 10
10/2 = 5
5-1 = 4/2
= 2

If n is even then n/2
if n is odd then (n-1)/2

2 1
1 0
1 0

result.

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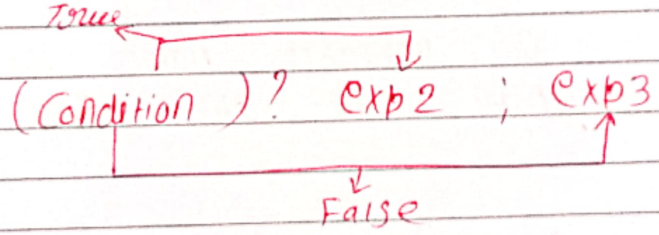
Interview Question

What is the value of 5 << 1

$= 2^1 * 5^1$
$= 10$

$5 << 1 \quad 2^2 * 5$
$= 4 * 5$
$= 20$

Conditional Operator




```
a = 10;
b = 20;
c = 30;

x = (a>b) ? a : b;
x = (x>c) ? x : c;
x =
```

n/2
(n-1)/2

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Some of the interview question asked in the starting of the Notes day -:

(String [] args) is the command line argument.

JVM already do a configration for p.s.v.m

JVM is signature specific

args is a variable name we can give anyname in the place of args

JVM Configuration for main

```
public static void main(String [] args)
public static final void main(String [] args)
public static synchronized void main(String [] args
public static strictfp void main(String [] args
public static strictfp final synchronized void m
static public void main(String [] args)
public static void main(String... args)
```

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Reference Variable Scanner ← → Object

```
Scanner sc = new Scanner (System.in);
```

In java Scanner is a built in class in the util package, when we want to use the Scanner class firstly we want to import it.

sc →

sc is a reference variable of Scanner class, when we want to use object multiple time we create a reference variable.

There are two type of String in Scanner class :-

Input String :- Input String is use for data reading.

Output String :- Output String is use for data writing.

System.in

in is a object of input String class also in is a static member of System class.

Anonmuos Object

Anonmuos Object will Create when we know, we need the object only one time.

Control Statement / Conditional Statement

1) If Statement
2) If else Statement
3) Nested if else Statement

i) if Statement :-

if Statement will be anything like :- if (a=b);

Now this Statement first will associated with the condition, means the execution of the first Statement is depend on if condition.

True / false

```
boolean IsGreater = a>10;
        S.o.p ("IsGreater");

if (Money > 10,000) {
   S.o.p ("Go to the party");

}else {
      S.o.p ("Go to the Home");
      }
```

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learning ~~point~~

Don't apply the condition directly first try to find out the possibility.

- java.util.inputMismatchException occur
  - When we give floting input in the integer type variable we face that exception.

String Comparision

For Comparision the String we use ~~eq~~ .equal()

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Switch Statement point

We can apply multiple switch case for a particular statement.

i.e.

```
String ch = Sc.next();
    Switch (ch) {
    Case "a":
    Case "b":
    Case "c":
    Case "d":
    Case "e":
        System.out.println("it's a statement");
        break;
    }
```

2) Learning thing about if else

=> We can use if else statement without curly bracket.

How to input a Char

```
Char ch = SC.next().charAt(0);
```

if we give 1 at the place of 0 then we ~~face~~ place two input

case

Otherwise we occur a error String index out of bound.

Remember point

In the switch case as a expression we pass byte, short, integer, String, Char value other type of value in the place of this we face a error.

When was default run in switch ?

⇒ i) default run in two case, when case is not matched.
ii) default find in the continue case.

Note :-

In a switch case only one default will use.

case 2+1: is a valid expression.

If we give a = 1
b = 2
case a+b; it's a invalid case.

in that case compiler genrating a error level must be constant type.

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When we use the Switch case :-
When we have multiple Choice at the same time we use switch case.

Note :-
We can't pass the long value in the Switch Cause the range of the Swith only given to the integer.

~~Whi~~ Which version support ~~Switch~~ String in the Switch :-

from java 1.7.

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Arrays :-

i) Why we use array ?

⇒ ~~We~~ When we want to Store similar type of data, we use array.

Type :-

1. One - dimension.
2. Multi - dimension.
3. Jagged - dimension.

"When data quentity is fixed, we know already, we use the concept of array."

1D Array :-

Syntax :-

```
datatype arrayName [ ] = new arrayName
                         [size];
```

"Array is basically an object" because of new keyword.

primitive data type have no reference variable.

How the check the name of reference variable?

⇒ Obj.getClass().getName();

int arr[] = new int[10]; → Dimention

arr.getClass(); getName();

default value applicable only localVariable.

arr.length → It's a properti not a method.

Garbage Collector applicable only heap memory

int arr[] = new int[10]

array size depend on JVM is capable to allocate memory or not.

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(System.in)
↳ In is a object of inputStream class.

int x = new int [-5];
↳ Ignore the sign.

Compilation Successful

Exception. Negative - array Size exception at run time

2 Dimension array

int arr [ ][ ] = new int [3] [4];
row Column

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Method

Instance :- The personal properties of object.

Access Modifire :-

public
private
protected
default

→ Only applicable on class member.

default → Void add() → If we not define any access modifire by default already define default.

Access Modifire :- Access modifire local Variable are not applicable for local Variable.

```
Void add(){
public int a = 10;
}
```

It's wrong

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When we create an object then the corresponding of object, Instance variable are allocate seprate memory.

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this & getter / setter

this keyword always refers current Obj.

```
Class Addition {
    private int a;
    private int b;

public void SetData(int a , int b){
        this.a = a;
        this.b = b;
```

this.a → Instance variable of current Obj

this.b = b; → local variable

If we are putting 200 data by SetData and by mistake provide one data wrong so we are creating a particular set method for changing the value.

```
public void SetA (int a ){

public int getA (){
    return a;
}

S.o.p (Obj.getA());
```

Combination of getter & setter is called Accessor.

Instance initiiized by it's default value.

Constructor

When we want to define a data after the initiization of the object we use Constructor.

What is Constructor?

Key point :-

Constructor is a special member of the class.

i) The name of the constructor is same of the class.
ii) There is no return type of the Constructor.
iii) Constructor called automatically when object is created.
iv) Constructor can't be static

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Why Constructor?

Constructor is use to initilized the obj at the time of obj creation.

Type of Constructor.

i) Default Constructor → Constructor without argument & parmeter.

ii) Parameteries Constructor → Constructor with parameter

How Constructor

In a class how many type of Constructor we have, that many ways to create an object.

When we are creating a class & not creating a Constructor Java compiler create default Constructor, Java compiler create default Constructor only that time when we are not define a any type of constructor.

Note → this keyword always use with instance Variable)

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Constructor overloading

Number difference

Sequence difference

type differences.

Note :- writing a default constructor is a good programming practice

this keyword

this keyword point the current obj of the class.

this.a = a;

Let's take an example of an current obj, we created.

Test obj = new ~~Obj~~ Test();

obj.setA();

Here if we want to point object we use this keyword.

new

New keyword create new memory in the heap

this keyword is use for call the constructor in the same class.
& the super keyword is use for call the parent class constructor from the child class.

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Constructor Chaning

What is actual & formal ?

Error: No suitable constructor found for A1(int, int, int)
(actual and formal argument lists differ in length)

actual = parameter passed.
formal = parameter define.

this keyword is used to call one constructor from another.

```
public Test(int x) {
    this();
}
public Test() {

}
```

- this() should be first statement in constructor.
- Recursion - function calling itself repetadly.
- Name of class & method can be same.
- In case of formal argument any changes doesn't reflect in actual argumen is called call-by-value.

POJO
(plain old java Object)

Getter is called accessors.
Setter is called mutators.

Where a properties are private, proper Constructor difined, setter & getter corresponding to every properties.

- if we made any class public we have to save file by it's public class name.

What is Instance

Instance are the features of the object

Instance member belong to Obj & Static member belongs to Class

Static modifires

- Static data member Create only one copy corresponding to class. Static is also called class Variable.

- Object can use Static properties but cannot claim it as it's personal properties.

Static for method

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- to count no of Object created we have to create static count in in Constructor and increment it.

Static method

- In Java we can call Static method, by Class Name & also called by Obj. Called by ~~reference~~ Class Name is the best option to call the Static method on variable as a further requirment

```
Class Test{
    Static void m1(){
        S.o.pln(" that's a Static method call
                by class name ");
    }
}

public Class Static_Method{
    p.s.v.m (String [] args)
        Test.M1();
    }
}
```

- In Static method we can only access Static member non Static member can't be access. otherwise Compiler Generate & error.

Error - non Static member can not be reference from a Static context.

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- In instance method due use Static member or non Static member.
- In Static method due can only use Static method.
- local member cannot be Static.

Example :-

```
Static void m1(){
    Static int a = 10;
}
```

It's a local member & It cann't be static

- We can create multiple Static method in the single class & invoke a Static method ~~from~~ inside the another Static method.

```
Static void m2(){
}
Static void m1(){
    m2()
}
```

It's given

- A Static method only call a Static method.

Static method only call by Static method

```
Class Test{
    Static void wish(){
        m1();
        S.o.p("WISH");
    }
    public void m1(){
    }
}
```

(wish generate error)

(It's Instance method)

- Class loader is responsible for load the .class file in the JVM.
- If we are creating a object JVM think we use the that class,
- Static variable allocate the memory at the time of class loading, only one copy created by the static because the class load only once time.
- Static block → A ~~Code~~ Code that load at the time of Class loading is called static block.

Interview question ?

Q. is that any code who is execute first from the main method ?

⇒ Yes Static block is the code who execute first from the main method.

- We can define more than 1 Static block in a class.

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- The execution order of the static block is the execute order of return.

We can't do nesting in static block.

⇒
```
static{
    static{ → that's wrong.
    }
}
```

der of the Static
e order of

in Static block.

s wrong.

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Method Overloading

One thing has different implementation is called polymorphism.

Defination

When we define multiple method with the same name who's either number of parameter are difference & type of argument are ~~differee~~ difference. ~~and~~ that's called method overloading.

```
Class Test{
    p.s void add (int a , int b) {
            S.o.p( a+b);
    }
    p. Void add (int a, int b , int c){
            S.o.p( a+b+c);
    }
```

The above example of method overloading.

ambiguity / ambigious error

If the method name & the number of parameter was same in two method we face ambiguity / ambigious error.

Java compiler treat any number by default integer.

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public class Py { }

In case of method overloading compiler first goes for perfect matching, if the perfect matching was not found, It's goes for suitable method if it's also not found by the compiler, then compiler generate an error.

```
Class Test {
    public void m1(int a, int b){
        S.o.p(int version);
    }
    public void m1(long a, long b){
        S.o.p(long version);
    }
    {
    Test t1 = new Test();
    t1.m1(20:f, 20.d);
    }
```

we face ambious error.

Return type

In java method overloading is not possiable by changing the return type of the method only because of ambiguity.

Method overloading

Var args (Variable length argument)

```
public void add(int... x){
                ↑ var args
}
```

Var args means 0 or n number of variable arguments.

Interview question

I have to add multiple argument number without creating another method?

In this term we use ~~method~~ var args, with the help of var args we add 0 to n number of argument.

Var args can we used in the multiple method. So Var ~~args~~ must be-
If we are storing multiple arguments in the var args so var args must be the last argument.

We can also overload static & main method.

String is an Object. Date: / / Page no:

String

String Defination

String is a built in java class which is immutable,

Immutable → Immutable meaning that can't be Changed.

What is immutability ?

Whenever we try to make Chages in existing String Object then Changes are not going to take place in existing Object, java will create new String existing object.

What we know First for creating an Object ?
When we want to ~~know~~ create a Object of the Class first we Should know how many number of Constructor aVilable in Str Class.

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Java.lang.String
- String()
- String(String name)
- String(byte[])
- String(char[])

there are four number of object create in this String class

String s1 = new String();
String s2 = new String("hello");
byte b[] = {65,66,67};

String use for data transfer in java.

Types of String :-

i) String Object
ii) String literal

i) String Object →

In java every thing in the between double braces treat as String.

When we define String as an Object :-

String s1 = new String("Atul"); ← It's a string object

String s2 = "Atul"; ← String literal

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S1 = "hello";
S2 = "hello";
S3 = new String ("hello");

S.o.p (S1 == S2); //true

== operator not checking the String it's only checking the reference address, location

.equal → It's check content equal() do case sensitive comparision

S.o.p (S1 == S3); //false

S3 is creating a memory in heap.

In ← When we create String Object with new keyword, it create two Object one in SCP & one in heap, it's reference will point to the heap area object. (If our reference heap area object it's applicable for garbage collection (S=null);)

But SCP area object is already unused but it's not ready for garbage collection cause garbage collection concept only applicable on heap memory not scp

javap java.lang.String → To check all method everything

Check p2 file must in String object folder

- When our JVM is shutdown or application is terminate so all the object in SCP will destroy.

Operations

Compile time Operation is applicable for constant like 20+10; "a"+"b" etc. It's goes on SCP

Run time Run time operation is applicable on references. (S1+S2) ← It's goes on heap memory

String S5 = S1 + S2;

Heap → Heap always create new object in the memory.

Example

String S1 = new String ("Atul");

This method create two String Object

SCP	Heap by new keyword
Atul ← S2	Atul ← S1

If we want S1 point on String Obj then we want to use .Intern() method.

.Intern(); method Check first SCP if the Object is avilable in SCP So it will Not Create New object in the heap.

String S1 = New String ("hello").intern();

first it'll check hello Object in the intern method.

HashCode

If we want return any type of String in the OuterClass So we need to define toString method the to String method is avilable in the long package & & the Object Class who is parent of the all Classes

String builder & String buffer use for frequently updation if we use String then it will create always new object after the updation. it unnecessary create multiple object.

String	String ~~Builder~~ Buffer	String Builder
Immutable that cannot be change	mutable	mutable
litral allowed	Not allowed, it's only used by object creating the object	Not allowed It's only used by creating the object
	mutability + ~~Thread~~ Safety	mutability − ~~Thread~~ safety
	StringBuffer Performance is slow the reason is threadSafety	~~STG~~ → Opposite

ThreadSafety → At a time one object (refer) only access

NOthreadSafety → At a time multiple object can access.

Each an every Immutable class in java by default threadSafe.

```
String S1 = new String("ABC");
String S2 = new String("ABC");

S.O.p(S1.equals(S2)); // True
```

StringBuilder/Buffer It's have equal method but check only address comparision.

```
StringBuffer Sb1 = new StringBuffer ("ABC");
StringBuffer Sb2 = new StringBuffer ("ABC");
S.o.p(Sb1.equal(Sb2)); //false
```

By it was returning false in StringBuffer case

"Java have a class Object this class is a parent class of every class, It's inside the ~~mat~~ lang package."

```
Class Object{
    public boolean equal(Object o){
        == } -> Address Comparision Code
    }
```

inside the object class the code was written was ~~it's~~ ~~called~~ address comparision. that's why it's giving us false.

"Why it's not giving us false when we use equals method in the String?"

elk only

("ABC");

("ABC");

se

very

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The reason of not giving us. false when due use equal method in the String cause java has override the ~~String~~ Object method in the String class., & it's ~~java~~ write his own logic.

parent
Object class

Class String { }

public boolean equals (Object o){

= } Content Comparision

}

}

if we want to chelk the Comparision in the StringBuilder / Buffer we want to Convert our StringBuilder into the String.

If we want, to Convert using ~~String~~ toString method.

String convert = Sb1. toString( ),

---

if we want to Seperate or Split the String in ~~by~~ the dot place we use like this :-

String element [ ] = S. Split(" \\. ");

That's and RegEx

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Inheritance

"By using existing thing to develope sth new".

Defination → "When the Object of the one class require or ~~the~~ inherit the properties of another class that's called inheritance.

What is the advantage, Why Inheritance → Inheritance increase the code reusability.

Java only support three type of inheritance :-

* Single level
* multilevel
* Hierarchical

Access modifire

Default member

Use cannot access default member from another ~~class~~ package. default member only accessable only same package.

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(2) default member are accessable in all the classess of package, (public for the same package.

1) private → Member are accessable within the class only.

3) Protected → Protected member are accessable in all the classess of same package as well as Child class of another package.

```
p1
Class A{
    protected void m1(){
    }
}
Class B{
    p v m2(){
        new A().m1();
    }
}
```

```
package
p2
Class C extend A{
}
Class D{
}
```

If we don't want to ~~private~~ to make our property protected to place of private & not lossing the security of our data.

So we can access our private property this type

```
Class Area{
    private int l;
    private int w;

    public void SetData (int l, int w){
        this.l = l;
        this.w = w;
    }
    public int getArea( ){
        return l*w;
    }
}

Class Volume extends Area {
    private int h;
    public void SetData (int l, int w, int h){
        SetData (l, w);
        this.h = h;
    }
    public int getVolume (){
        return getArea()xh;
    }
}

class Density extends Volume {
    private int mass, m;
    public void setData ( int l, int w, int h, int m){
        Set Data (l, w, h);
        this.m = m;
    }
}
```

execution

parent class

child class

execution

```
public int getDensity(){
    return m/getVolume();
}

Density d = new Density();
d.setData(5, 2, 4, 6);
S.o.p(d.getDensity);
```

3) ~~protected~~ → ~~protected member are accessable~~ in all the.

4) public → public member are accessable anywhere..

weaker access

private
default
protected
public

↓ Higher access

The execution order of the constructor is the order of inheritance

Use super keyword to call the parameterized constructor.

if parent class doesn't have default constructor so we need to define super keyword in every child class for calling the suitable constructor

We can
method.

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Method Overriding

```
Class Area{
    private int l;
    private int w;
    public Area(int l, int w){
        this.l = l;
        this.w = w;
    }
    public int getArea(){
        return l*w;
    }
}
```

```
extends Area
Class Volume{
    private int h;
    public Volume(int
    l, int w, int h){
    super(l, w);
    this.h = h;
    }
    public int getVolume(){
    return getArea()*h
    }
}
```

Super keyword ~~function~~

Overriding :-

- ☆ While overriding method signature of method shouldn't be changed.
- ☆ While overriding if return-type is ~~Co-Variant~~ (primitive, void) we shouldn't change it.
- ☆ We can change the Co-Variant type.
- ☆ When we redifine parent class method into child class without changing it's signature for fulfilling own requirement that's called method overriding.

☆ A parent class reference variable can easily hold child class object.

```
Class A {
    Static {
        S.o.p("A-Block");
    }
}
Class B extends A {
    Static {
        S.o.p("B-Block");
    }
}
```

```
public A(){
    S.o.p("A-default");
}

public B(){
    S.o.p(B-default)
}
```

```
(initialization Block){
    S.o.p("A-init");
}

(initialization Block) {
    S.o.p("B-init");
}
```

~~Parent~~ method ~~child~~

A parent class reference variable can easily hold child class object.

☆ Parent reference उसकी method

What is reference?

Reference is a variable of class type

```
Class A {
    public void wish() {
        S.o.p ("G.M");
    }
}
Class B extends A {
    public void wish() {
        S.o.p ("G.E");
    }
}
```

```
A obj = new A();
obj.wish();
B obj = new B();
obj.wish();
A obj = new B();
obj.wish();
```

```
Class A {
    public void m1() {
        S.o.p ("A - m1");
    }
Class B extends A {
    public void m2() {
        S.o.p ("B - m2")
    }
}
Class C extends B {
    public void m3() {
        S.o.p ("B - m3");
    }
}
```

(4) `A obj = new B();` ← reference

`obj.m1()`

`obj.m2()` ✗

जिसका reference उसकी method

(1) `A obj = new A();`
→ `obj.m1();`

2) `B obj = new B();`
→ `obj.m1();`
→ `obj.m2();`

3) `C obj = new C();`
`obj.m1();`
`obj.m2();`
`obj.m3();`

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5) B obj = new C();
obj.m1();
obj.m2();
obj.m3(); ✗

6) A obj = new C();
obj.m1(); ✓
obj.m2(); ✗
obj.m3(); ✗

The reference of the class & the method too in the class (Whose reference is it's method)

The method aviable in the reference variable it's run successfully other wise it generate an error.

RegEX

RegEX is basically use for Spiit the String from the Special type of Symbol.

S.Spiit ("\\.")

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Question About Overriding

1) Can we changed the overrided method signature?

⇒ Yes we can changed the overrided method signature but only Access modifire/privileges or the return type (not primitive or void) only Co-Variant return type. & also change the argument.

2) Can we Changed the access overrided method access privileges?

⇒ Yes we can.

3) Can be inherit the Static member?

⇒ Yes we can inherit the Static method but can't be override.

For Cross Check Static method is override can not use A obj = new B(); we can only access higher access privileges not the weake other wise be buce a error attempting to access weaker access privelige.

weaker access privilege ↑ private <default> protected public ↓ going Higher access

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Most IMP

["If we don't know which type of data is come we use object"

Object can store anything cause it's a parent of all the classes.

Object can hold anything in the data.]

[If we are printing the object directly it give the hash code. Cause toString method is not define.]

Static method are the hidden but not the overridden.

Overridden method → parent class method
Overridding method → Child class method

It mean the static class method can be inherit & Avilable in the B class, but it's not a overridded method.

```
Class A{
    Static void m1(){
    System.out.println("A-m1");
    }
}
Class B extends A{
    protected void m1(){
        System.out.println("B-m1");
    }
}
public class P7{
    public static void main(String[] args){
        A Obj = new B();
        Obj.m1();
```

Error →

Overriden method is static