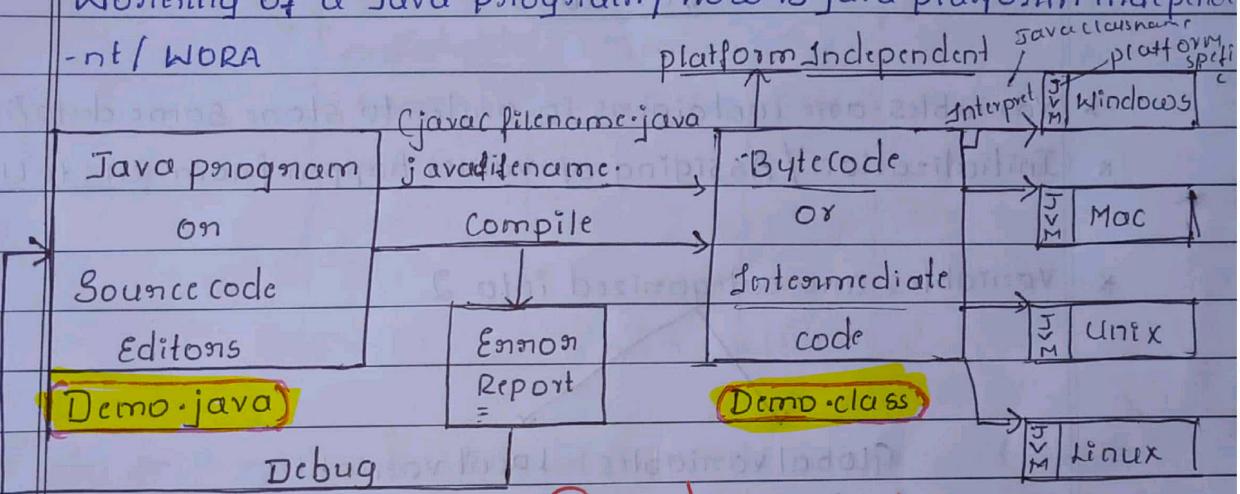


Java

- \* Java is a high level programming language.
- \* Programming language is a medium to interact with System.
- \* Highlevel language is a language in a normal English i.e. Human Understandable form.
- \* James Gosling was a person who introduced Java.
- \* The company which started java is SunMicrosystems (system).
- \* Currently Java is owned by oracle.

Working of a Java Program / How is java platform independent / WORA



@codees\_notes

**JVM** : Java virtual Machine (Platform independent)

**WORA** : Write Once Run Anywhere

Bytecode is an intermediate which is neither low-level nor high-level language so it uses jvm → ① convert to machine level  
② Execute line by line.

- \* Firstly we build the java program using editors and save it with the extension .java

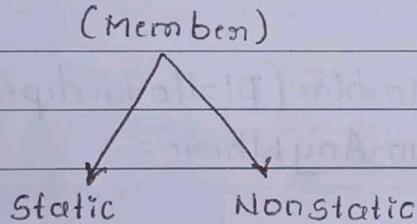
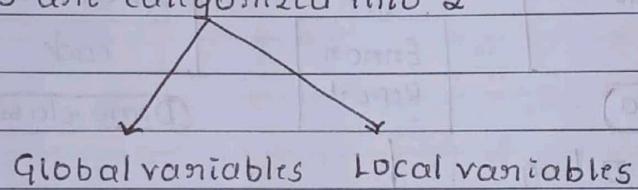
- \* Once we are done developing the program we need to compile it.

- \* compilation is a process in order to check if there are any errors in my java program or not.
- \* If compilation is unsuccessful we get error report based on error report we need to debug the program.
- \* If compilation is successful we generate bytecode which is intermediate code / platform independent code.
- \* Extension of all bytecode is **.class**
- \* This bytecode can be executed on all platform i.e all operating systems.

## **Variables**

- \* Variables are containers in order to store some data/information.
- \* Initialization / Assigning of values happen from RHS to LHS.

- \* Variables are categorized into 2



variable      variable

**@codees\_notes**

Example :  $\downarrow$  Age = 25

LHS	RHS	[25]
-----	-----	------

Age

Height = 5.5

5.5
-----

Height

V  $\Rightarrow$  LHS    RHS

## Datatypes

@codees\_notes

- \* Datatypes are used to indicate or specify the type of data stored into variables
- \* Datatypes are categorized into 2
  - > primitive Datatype
  - > Non primitive Datatype
- \* In order to store non decimal numeric values we have the following datatypes
- \* The difference between those datatypes is Memory size.

Data types	Memory Size	
	Bytes	Bits
byte	1	8
short	2	16
int	4	32
long	8	64

- \* In order to store decimal numeric values, we have the following datatypes

Data-T	Memory Size	
	Bytes	Bits
float	4	32
double	8	64

widely used and <sup>↑</sup> default datatype for decimal.

- \* In order to store true / false we have following datatype

Data-T	Memory Size	
	Bytes	Bits
Boolean	1	8

@codees\_notes

- \* In order to store a single character, we make use of char
- \* char data should be enclosed within 'Single quotes(' ' )'
- \* The Memory size of char is 2 bytes = 16 bits

Note : All the above mentioned 8 data types are together called as primitive data types.

String : It is a data type to store a sequence of characters.

\* String data has to be enclosed within "double quotes"

Note : Java is Case Sensitive where in lowercase letters are not equivalent to uppercase letters/values (a ≠ A)

22/01/2020

## Variable Declaration

Syntax:

```
datatype VariableName;  
int age;  
double salary;
```

@codees\_notes

## Variable Initialisation

Syntax:

```
VariableName = value;
```

age = 20;                  [20]  
          ↓                      Age

salary = 5000.69          [5000.69]  
          ↓                      Salary

## Variable Declaration & Initialization

Syntax:

Initialization

datatype VariableName = Value;

Declaration

```
boolean x = true;
```

false;

String subject = "java";  
 = "IjSP2020";  
 char gender = 'M';

(String can store number,  
character but it should  
be within "" quoted)

### Structure of a java program

- 1) Class
- 2) Main method
- 3) Print statement

@codees\_notes

① class : Class className

```

  {
    public static void main (String [] args)
    {
      System.out.println (---);
    }
  }
  
```

The filename should be same as classname during file

Saving className.java

Ex:1) class Firstprogram

```

  {
    public static void main (String [] args)
    {
      System.out.println ("Hello world");
    }
  }
  
```

@codees\_notes

Output: Open cmd

cd desktop

cd java programs

javac Firstprogram.java - (compile) + to enter to

java Firstprogram - (execute) the save files

HelloWorld!!!

|| cd: change

directory

+ to enter to

the save files

### Ex:2} Class Demo

```
{  
public static void main (String[] args)  
{  
System.out.println (10);  
System.out.println (45.67);  
System.out.println (true);  
System.out.println ('Z');  
System.out.println ("Ijsp@2020");  
}  
}
```

Output : javac Demo.java

```
java Demo
```

```
10
```

```
45.67
```

```
true
```

```
Z
```

```
Ijsp@2020
```

@codees\_notes

Ex 3) Write a java program to follow the below statement / Scenarios

- i) Create class called as Student
- ii) Define main method
- iii) Under main method initialize 2 variables called as name and age entering those respective values

→ Class Student

```
{
```

```
public static void main (String [] args)
```

```
{
```

```
String name= "Bhagya";
```

```
int age = 23;
```

```
System.out.println ("name");
```

```
System.out.println (age);
```

O/P

Bhagya

23

Notes: In java, in order to perform concatenation we make use of '+' operator.

Q) class Employee

{

public static void main (String [] args)

{

int id = 101;

String name = "Jerry";

double salary = 123.45;

System.out.println ("Employee Id: " + id);

System.out.println ("Employee Name is: " + name);

System.out.println ("Employee Salary = " + salary);

System.out.println (id + " " + name + " " + salary);

}

Output

@codees\_notes

javac Employee.java

java Employee

Employee Id=101

Employee Name is: Jerry

Employee Salary = 123.45

101 Jerry 123.45

23/11/2020

## Operators

- 1) Arithmetic Operators
- 2) Assignment Operators
- 3) Relational / Conditional / Comparison Operators
- 4) Logical Operators
- 5) Unary Operators

## 1) Arithmetic Operators

+	: Addition
-	: Subtraction
*	: Multiplication
/	: Division
%	: Modulus

$$\begin{array}{r} 5 \rightarrow \text{division} \\ 2 \sqrt{90} \\ \underline{-10} \\ 0 \rightarrow \text{modulus} \end{array}$$

Ex :  $10/2=5$        $10 \% 2=0$

Example :

```
Class ArithmeticOperators
{
    public static void main (String [] args)
    {
        int x=10;
        int y=20;
        int sum=x+y;
        int diff=x-y;
        System.out.println ("Sum = " + sum);
        System.out.println ("Difference is " + diff);
        System.out.println (y*5);
        System.out.println (30/3);
        System.out.println (30 % 3);
    }
}
```

Output :-

Sum = 30

Difference is = -10

100

10

0

@codees\_notes

## 2) Assignment Operators

=

+ =

- =

\* =

/ =

% =

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int  $\downarrow a = 5;$

$\begin{bmatrix} 5 \\ 15 \end{bmatrix}$

$a = a + 10$  or  $a += 10$

$a = 15$

a

int  $x = 30$

@codees\_notes

$x = 20$

$\downarrow x = x - 20$

$\begin{bmatrix} 30 \\ 10 \end{bmatrix}$

$x = 30 - 20$

$x = 10$

x

Ex: Class Assignment Operator

{

public static void main (String[] args)

{

int x = 10;

System.out.println ("value of x is :" + x);

x += 20;

System.out.println ("value of x is :" + x);

System.out.println ("== = = =");

int a = 6

System.out.println ("value of a is :" + a);

a \*= 5;

System.out.println ("value of a is :" + a);

3

O/P

Output

Value of x is 10

value of x is 30

=====

value of a is 6

value of a is 30

3) Relational/conditional/comparison Operators

&lt; : less than

&gt; : Greater than

&lt;= : less than or equal to

&gt;= : Greater than or equal to

== : Equals to

!= : not equal to

Note: Comparison Operations will always return boolean  
 Values i.e (true/false)

Ex: Class comparison operation

```

public static void main (String[] args)
{
    int x=10;
    int y=20;
}
  
```

@codees\_notes

boolean result1 = x &lt; y;

boolean result2 = y &gt; x;

System.out.println(result1 + "\t" + result2);

System.out.println (" == != &lt;= &gt;= ");

System.out.println (x &lt;= 10);

System.out.println (3 &gt;= 4);

System.out.println (" --- ");

System.out.println (x == 10);

System.out.println (y == 30);

System.out.println ("---");

System.out.println (x != 10);

System.out.println (y != 30);

O/P

true true

true

false

true

false

false

true

#### 4) Logical Operations

AND  $\Rightarrow \&&$   
 OR  $\Rightarrow ||$   
 NOT  $\Rightarrow !$

AND &&			OR			NOT !	
T	T	T	T	T	T	T	F
T	F	F	T	F	T	F	T
F	T	F	F	T	T		
F	F	F	F	F	F		

Ex: Class logical operations

```

public static void main (String[] args)
{
    int x=10;
    int y=20;
    boolean result1 = x<y && y>x;
    boolean result2 = x<y && x==1;
    System.out.println(result1);
    System.out.println(result2);
    System.out.println(" --- ");
    System.out.println(1<2||2>10); @codees_notes
    System.out.println(2<1||2==3);
    System.out.println(" --- ");
    System.out.println(!true);
    System.out.println(!false);
    System.out.println(" --- ");
    System.out.println(!(1<2));
}
    
```

O/P  
true

false

true

false

true

false

true

false

@codees\_notes

## 5) Unary Operators

$++$  (increment by 1)

$--$  (Decrement by 1)

$++$  → preincrement  
 $++$  → postincrement

$--$  → predecrement  
 $--$  → postdecrement

Ex : Class Unary

```
public static void main (String [] args)
```

```
    int x = 5;  
    System.out.println ("x:" + x);
```

```
    x++;  
    System.out.println ("x:" + x);
```

```
    ++x;  
    System.out.println ("x:" + x);
```

```
    x--;  
    System.out.println ("x:" + x);
```

```
    --x;  
    System.out.println ("x:" + x);
```

```
    System.out.println ("x:" + x);
```

3.

y

@codees\_notes

Output  $\Rightarrow$  x:5

x:6

x:7

x:6

x:5

① int x= 10;  
int y =  $x++$ ;

post increment

First assign, then increment

x [10]  
y [10]

② int a= 5  
int b =  $++a$ ;

pre-increment

First increment, then assign

a [6]  
b [6]

(3) `int i=2;`

`j=i--;`

postdecrement

First assign, then decrement

`i [ 1 ] j [ 2 ]`

(4) `int a=5;`

`int b=++a;`

preincrement

First increment, then assign

(5) `int p=50;`

`int q=--p;`

pre-decrement

First decrement, then assign

`p [ 50 ] q [ 49 ]`

@codees\_notes

Ex) class Unary

`s`

`prsm (String [] args)`

`int q=123;`

`int w=q++;`

`System.out.println(q + " " + w);`

`System.out.println("-----");`

`int o=444;`

`int p=--o;`

`System.out.println(o + " " + p);`

`y`

`y`

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## Decision / conditional statements

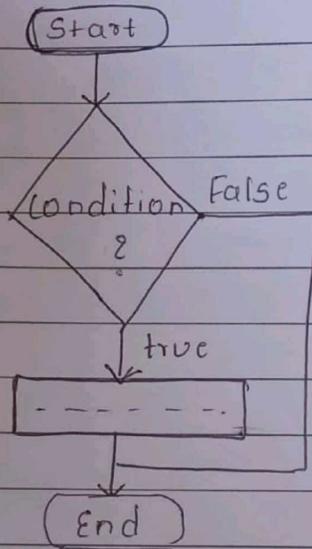
These statements are used to take some decision based on the condition specify. The different decision statements are as follows

- 1) Simple if
- 2) if else
- 3) if else if
- 4) Nested if
- 5) switch

### ① Simpleif

Simpleif is a decision making statements wherein we execute a set of instructions only if the condition is true

Ex :- Flowchart



Syntax :-

```

if (condition)
{
    Statement 1;
    - - - - -
    Statement n;
}
    
```

Ex :- class SimpleifDemo

@codees\_notes

```

{
    public static void main (String [] args)
    {
        System.out.println ("START");
        int a=10;
        int b=10;
    }
}
    
```

`if (a <= b)`

`{`

`System.out.println ("at " is less than or equal to " + b);`

`}`

`System.out.println ("End");`

`}`

`y`

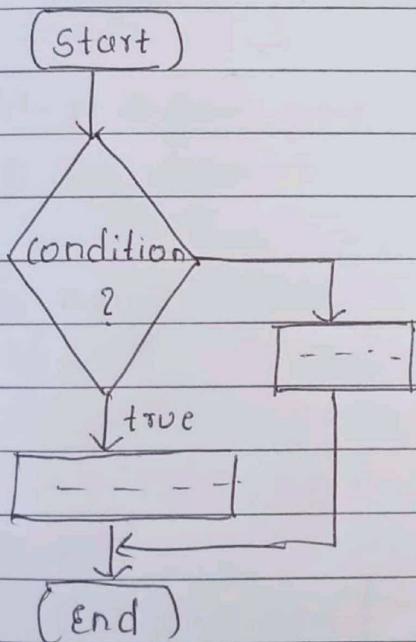
## ② if else:-

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`x if else` is a decision making statement wherein, if the condition is true we execute `if` block. Otherwise if the condition is false we execute `else` block:-

flow chart

Syntax:



`if (condition)`

`{`

`Statement 1;` } set of  
----- instructions  
`Statement n;`

`}`

`else`

`{`

`-----`

`}`

Ex class IfElseDemo

{

psvm(String[] args)

{

s.o.println("START");

int x=100

if (x<=10)

{

s.o.println(x + " is lesser than or equal to 10");

}

else

{

s.o.println(x + " is greater than 10");

}

s.o.println(" ---- ");

if(true)

{

s.o.println("HI");

}

else

{

@codees\_notes

s.o.println("BYE");

}

s.o.println(" ---- ")

if(false)

{

s.o.println("WELCOME");

}

```
else  
{  
    s.o.println("Thank you");
```

```
}  
s.o.println("END");
```

```
}  
}
```

Output: START

100 is greater than 10

```
-----  
Hi
```

```
-----  
Thank You
```

END

Q) Write a java program to find a number is +ve or -ve  
→ Class Number

```
s  
public (String[] args)
```

```
{
```

```
int x=5;
```

```
if (x>0)
```

```
{
```

```
s.o.println("x is a positive number");
```

```
}
```

```
else
```

@codees\_notes

```
{
```

```
s.o.println("x is a negative number");
```

```
}
```

```
}
```

Q) Write a java program to find a number is even or odd  
→ class Number1  
{

PSVM (String [] args)  
{

int num=4;

if (num % 2 == 0);  
{

System.out.println ("num + " is a even number");

}

else

{

System.out.println ("num + " is a odd number");

}

}

@codees\_notes

3) Write a java program to find maximum of 2 numbers

→ class Number2

{

PSVM (String [] args)

{

int x=5;

int y=10;

if (x > y)

{

System.out.println ("x + " is a larger than " + y);

}

else

{

System.out.println ("x + " is a less than " + y);

}

y

@codees\_notes

27/1/2020

classmate

Date \_\_\_\_\_  
Page \_\_\_\_\_

### if - else-if

- 3) if - else - if is a decision making statement where in we can check multiple conditions

Syntax: if (condition)

{

---

--

}

else if (condition)

{

----

3

else if (condition)

{

}

else

{

optional

3

Ex.: class IfElseIfDemo

{

PSVM (String [] args)

{

if num = 250;

if (num <= 10)

{

S.O.Pln (num + " is less than or equal to 10");

}

@codees\_notes

```
elseif (num <= 20)
```

```
{
```

```
s.o.println ("numt " is lesser than or equal to 20");
```

```
}
```

```
elseif (num <= 30)
```

```
{
```

```
s.o.println ("numt " is lesser than or equal to 30");
```

```
}
```

```
else
```

```
{
```

```
s.o.println ("Above conditions did not match");
```

```
}
```

```
y
```

@codees\_notes

O/P: Above Condition did not match.

0-34-F
35-59-F
60-100-F

Ex class IfElseIfDemo1

```
{
```

```
psvm (String[] args)
```

```
{
```

```
int marks = 25;
```

```
if (marks >= 0 && marks <= 34)
```

```
{
```

```
s.o.println ("fail");
```

```
}
```

```
else if (marks >= 35 && marks <= 59)
```

```
{
```

```
s.o.println ("First class");
```

```
}
```

```
else if (marks >= 60 && marks <= 100)
```

{

```
s.o.pn("FCD");
```

}

else

{

```
s.o.pn("Invalid Marks");
```

}

@codees\_notes

}

}

O/P : Fail

(4)

### Nested if:

Nested if is a decision making statement where in, one if is presented inside another if condition

Syntax: if (condition)

{

```
if (condition)
```

{

---

--

}

else

{

}

## Ex ① class Nested If Demo

```
public class NestedIfDemo {  
    public static void main(String[] args) {
```

```
        char id = 'b';  
        int password = 123;
```

```
        if (id == 'a') {
```

```
            System.out.println("User id is valid");  
            if (password == 123) {
```

```
                System.out.println("password is valid");  
                System.out.println("Login is successful");
```

```
            } else {
```

```
                System.out.println("password is invalid");  
                System.out.println("Login is unsuccessful");
```

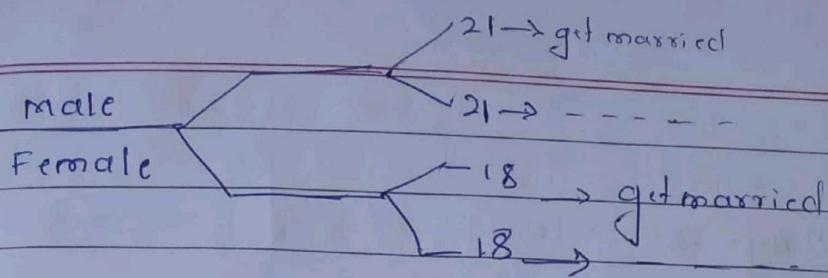
```
        } else {
```

```
            System.out.println("User id is Invalid");  
            System.out.println("Login is Unsuccessful");
```

```
}
```

Output :- ① User id is Invalid  
                  Login is Unsuccessful

② User id is valid  
                  Password is valid  
                  Login is Successful

Ex

class NestedIfDemo1

{

PSVM (String [] args)

{

char gender = 'M';  
int age = 24;

if (gender == 'M');

{

@codees\_notes

System.out.println ("Male");

if (age &gt;= 21)

{

System.out.println ("Age is : " + age);

System.out.println ("Get married &amp; hopefully stay happy");

}

else

{

System.out.println ("Age is : " + age);

System.out.println ("Have patience");

}

else if (gender == 'F')

{

System.out.println ("Female");

if (age &gt;= 18)

{

System.out.println ("Age is : " + age);

}

else

{

s.o.println("Age is :" + age);

( )

}

}

else

{

s.o.println("Gender is Invalid");

}

}

} ② Gender is Invalid

O/P :- Gender is Male

age : 21

Get married & hopefully stay happy

Stay happy

Q) Write a java program to find largest of 3 numbers.

→ class Largest of threeNumbers

{

psvm(String[] args)

{

int a = 10;

int b = 5;

int c = 3;

s.o.println("a :" + a + " b :" + b + " c :" + c);

if (a > b)

{

if (a > c)

{

@codees\_notes

s.o.println("a is largest");

}

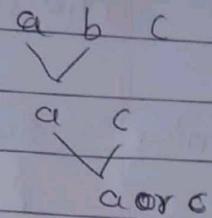
```
else
{
    s.o.pn("c is largest");
}
```

```
else if (b>c)
{
    s.o.pn("b is largest");
}
```

```
else if (c>b)
{
    s.o.pn("c is largest");
}
```

```
else
{
    s.o.pn("invalid");
}
```

```
s.o.pn("----");
```



@codees\_notes

```
if (a>b && a>c)
```

```
{
```

```
    s.o.pn("a is largest").
```

```
}
```

```
else if (b>a && b>c)
```

```
{
```

```
    s.o.pn("b is largest").
```

```
}
```

```
else if (c>a && c>b)
```

```
{
```

```
    s.o.pn("c is largest").
```

```
else
```

```
{
```

```
    s.o.pn("invalid").
```

```
}
```

```
y
```

```
y
```

```
y
```

28/1/2020

### ⑤ Switch Statement :-

Switch is a conditional statement generally used for character comparison

Syntax :- Switch (choice / input)  
{

Case 1 : - - - -  
break;

Case 2 : - - - -  
break;

- - -  
|

Case n : - - - -  
default;

@codees\_notes

Ex. class switchDemo

{  
public (String [] args)  
{

int choice = 3;  
switch (choice)

{

case 1 : System.out.println ("In case 1");  
break;

case 2 : System.out.println ("In case 2");  
break;

case 3 : System.out.println ("In case 3");  
break;

default : System.out.println ("Invalid choice");

}

y

O/p :- In case 3

**Break:** is a keyword which is used to transfer the control outside the currently executing block

Ex. class monthvalidation

```
public class monthvalidation {  
    public static void main(String[] args) {
```

```
        System.out.println("Start");
```

```
        char month = 'Z';
```

```
        switch(month) {
```

```
            case 'J': System.out.println("In January");
```

```
                break;
```

```
            case 'F': System.out.println("In February");
```

```
                break;
```

```
            case 'M': System.out.println("In March");
```

```
                break;
```

```
            default: System.out.println("Invalid month");
```

```
        }
```

```
        System.out.println("End");
```

```
}
```

```
}
```

@codees\_notes

Output: start

Invalid Month

End