By Java APP

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Introduction to Java language

what is Java?

- It is a general Purpose, high-level, Object Oriented Programming language.
- It was developed by James Gosling.
- It was developed at Sun Microsystems in 1995.
- The First name of Java language was Oak next goes to Green and finaly becomes Java.
- Java is the name of Coffee Seed

Features OF Java

- Platform Independent
- Object Oriented
- Security
- Portable
- Multithreading
- Simple language

Syntax OF Java

```
class Easy {
Public static void main (String [] args) {
  System.out.Println ("Hello world");}
}
```

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Class: It is a keyword used to declare a class.

Easy: It is an user defined class name.

public: It is a keyword which is called access specifier / modifier.

Static: It is a keyword and can be used with variable or function.

void: It is a keyword and it indicate that there is no value is returning by the function.

main(): It is the function which is called entry point of any program.

String [] args: It is an array of type String also called Command line argument.

System.out.Println: It is used to print data or information

System.out means Standard output object.

Println is a method / function

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User Input in Java

```
import java.. util. Scanner;
class Easy{
Public Static void main (String [] args){
    Scanner Sc = new Scanner (System.in);
    System out. println(" enter your name");
      String name = Sc.nextLine();
    System out. println(" enter your Rollno");
       int rollno = Sc nextInt();
System.out. println("Your name is=" + name);
System. out. println ("Your rollno is=" + rollno); }
                                                  }
```

output:

Your name is = Arslan

Your rollno is = 1161

IF in Java

```
import java. util. Scanner;
Class Easy{
Public Static Void main (String [] args) {
    Scanner Sc = new Scanner (System.in);
      int a = Sc. nextInt();
if (a>0){
  System. out. println(" a is greater"); }
if(a<0){
```

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```
System.out.println("a is Smaller");
}

if(a==0){
System.out.println("a is zero");
}
}
}
```

IF Else in Java

```
Class Easy {
Public Static void main(String []args){
    int a=5;
    int b=10;
if(a<b){
System.out.print("a is Smaller");
}

else {
System.out.println("a is greater");
}
}
}
```

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Nested IF in Java

```
import java.util.Scanner;
class Easy {
public static void main( String [] args ) {
    Scanner sc= new Scanner (System.in);
     int a = sc.nextInt();
     int b = sc.nextInt();
     int c = sc.nextInt();
  if (a>b) {
   if (a>c) {
    System out.println (" a is greater");
   }
  }

  if (b>a) {
   if (b>c) {
   System.out.println ("b is greater");
   }
  }
  if( c>a) {
   if (c>b) {
    System.out. Println ("c is greater");
   }}
  }}
```

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Switch Statement in Java

```
Class Easy {
Public Static void main (String [] args){
    int day = 2;
    Switch(day)
{
    case 1:
System.out.print("Monday");
    break;
    case 2:
System.out.println("Tuesday");
    break;
    case 3:
System.out.println("wednesday");
    break;
    default:
System.out.println("NO matching");
}
}
}
```

output:

Tuesday.

i) For lo

ii) whil

iii) Do u

iv) For

i) For lo

Class

Public

ii) whil

class

Publi

wh

Sys

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loops in Java

i) For loop

ii) while loop

iii) Do while loop

iv) For each loop

i) For loop in Java

```
Class Easy {
Public static void main(String []args){
    for(int i=0; i<=10; i++){
System.out.println(i);
}
}
}
```

ii) while loop in Java

```
class Easy{
Public Static void main(String[]args){
int x=1;
while(x<=10){
System.out.println(x);
x++;  }
}
}
```

DO-while loop

```
class Easy {
Public Static void main (String[] args) {
    int x=1;
do {
System.out.println(x);
    x++;
        }
while(x<=10);
    }
}
```

Foreach loop

Foreach loop is specially designed for array.

```
for(var name : Array name){
                    }
```

Examples-

```
class Easy {
public Static void main( String[] args) {
    int arr[] = new int { 10, 20, 30, 40}
    for ( int element : arr) {
System.out.println( element + " "); }
                    }
                }
```

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Break Statment

```
class Easy {
public Staic void main(String [] args) {
        for(int i=0; ik=10; i++) {
System.out.println (i);
if(i==5) {
  break;
        }
    }
}
```

ourput: 0,1,2,3,4,5

Every element will at next line

Continue Statment

```
class Easy {
Public Static void main(String []args) {
        for(int i=0; i<=5; i++) {
~~System.out.println(i);~~
if(i==3) {
  continue; }
else {
System.out.println (i);
        }
```

if(i!=3)

ourput:

(0,1,2,4,5) (every Element Print on next line)

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Single Dimension Array:-

```
class Easy {
public static void main(String[] args) {
    Scanner Sc = new Scanner(System.in);
    int Size = Sc.nextInt();
int marks[] = new int [Size];
for (int i=1; i<=Size; i++) {
    marks[i] = Sc.nextInt();
    System.out.println();
                }
for (int i=1; i<=Size; i++) {
System.out.println("Your numbers of
array are" marks[i]);
                }
        }
}
```

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```
class Easy{
public Static void main(String[] args){
Scanner SC = new Scanner (System.in);
int Size = SC.nextInt();
int marks[] = new int(size);
for(int i=1; i<=Size; i++){
marks(i] = Sc.nextInt();
System.out.println();
int x= Sc.nextInt();
for (int i = 1; i< marks.length; i++){
if(marks[i]==x){
System.out.println("x found at
index=" i);}}
}
}
```

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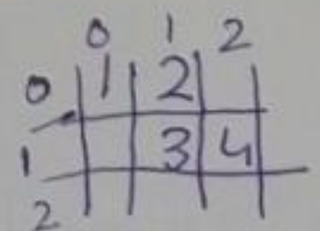
Double Dimension Array

```
class Easy {
Public Static Void main (String [] args ) {
    Scanner SC = now Scanner (System.in);
    int rows = SC.nextInt();
    int cols = SC.nextInt();
int numbers [][] = new int [rows] [cols];
    for (int i=0; i<rows ; i++){
    for (int j =0; j<cols ; j++) {
    numbers [i] [j] = SC.nextInt();
    System.out.Print (" ");
                }
    System.out.println();
                }
for(int i=0; i<rows; i++) {
for(int j=0; j<cols; j++) {
System.out.Print (numbers[i][j].+" ");
                }
System.out.println();
                }
        }
```



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```
Class Easy {
Public Static void main (String [] args) {
        Scanner Sc = new Scanner (System.in);
    int rows = Sc.nextInt();
    int cols = Sc.nextInt();
int numbers [][] = new int [rows] [cols];
  for (int i=0; i<rows; i++){
  for (int j=0; j<cols; j++) {
numbers [i][j] = Sc.nextInt();
System.out.Print (" ");
                    }
System.out.Println();
                    }
int x = Sc.nextInt();
for (int i=0; i<rows; i++){
for (int j=0; j<cols; j++){
if (numbers [i][j] == x) {
System.out.Println ("x found at index ("
    i+", "+j")");
                }
            }
        }
```

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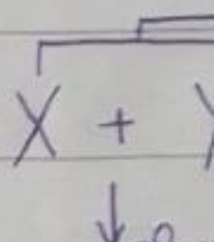
Function in Java

```
class Easy {
    Public void add() {
        int x, y=5; z=10;
        x= y+2;
        System.out.println("Addition is =" x);
                                    }
Public Static void main (String [] args){
    Easy obj = new Easy ();
    obj.add();
}
}
```

Operators



↓ Oper

TYPES of

i) Arithmetic

Symbol
+
-
*
/
%

ii) Relational

Symbol
==
!=
>
<
>=
<=

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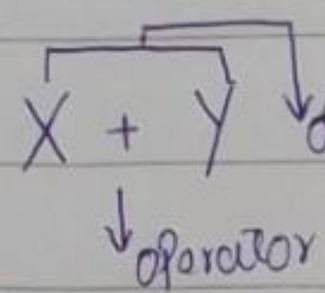
Operators in Java



TYpes of operator

i) Arethmatic Operator

Symbol	Operation
+	Addition
-	Subtraction
*	Multiplication
/	Division
%	Modulus

ii) Relational Operators

Symbol	Operation
==	equal to
!=	not equal to
>	greater than
<	less than
>=	greater than or equal to
<=	less than or equal to

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iii) Increment / Decrement Operators

Symbol	Operation
++	Increment
--	Decrement

Example

```
class Easy {
Public Static void main (String [] args) {
    int a=5, b=10;
    System.out.Println(++a);
    System.out.println(--b);
}
}
```

output: [6 (next line) 11]

iv) Assignment Operators

Symbol	Example
=	X=Y
+=	X+=Y ; X=X+Y
-=	X-=Y ; X=X-Y
*=	X*=Y ; X=X*Y
/=	X/=Y ; X=X/Y
%=	X%=Y ; X=X%Y

```
class Easy {
Public Static
    int x1=5
    x1+=y1;
    System.ou
    int x2=5;
    x2-=y2;
    System.ou
    int x3=5,
    x3*=y3;
    System.ou
    int x4=5,
    x4/=y4;
    System.ou.
    int x5=5,
    x5%=y5;
    System.ou.
}
```

OutPut

x1 = 8 ;

x2 = 2 ;

x3 = 15 ;

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```
class Easy {
Public Static void main (String [] args) {
   int x1= 5, y1 =3;
   x1+ = y1 ;
   System. out. Println( x1);
   int x2 =5; y2 =3;
   x2-= y2;
   System. out Println( x2);
   int x3 = 5, y3 =3;
   x3* = y3 ;
   System. out. Println( x3);
   int x4 =5, y4 =3;
   x4 /= y4;
   System. out. Println( x4);
   int x5 =5, y5 =3;
   x5% = y5 ;
   System. out. Println( x5);
}
}
```

OutPut

$x_1 = 8$; $x_4 = 1$

$x_2 = 2$; $x_5 = 2$

$x_3 = 15$;

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vi) Logical Operators

Symbol	Example
&&	if(x>y && x>z)
||	if (x>y || x>z)
!	if (!(x>y))

(x>y)&&(x>z)

It returns True if both conditions are true.

(x>y)||(x>z)

It returns True if any of conditions are true.

!(x>y)

It returns True if the condition is false and it returns false if condition is True.

vi) Conditio

condition

if cond

Part

Part

Part

Examp

class

public

int

ma

Syst

Outpu

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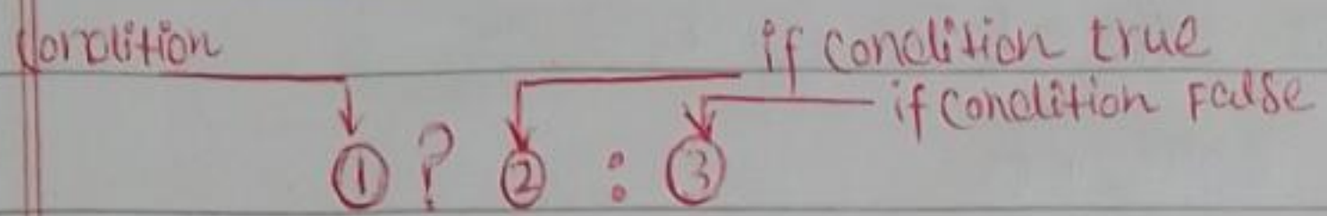
vi) Conditional Operators



if condition is true then Second part will execute otherwis third part will execute.

Example

```
class Easy {
public Static void main(String [] args) {
int a=5, b= 10; max;
max = a>b ? a : b;
System.out.println(max);
}
}
```

Output

10

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vii) Bitwise Operators

Bitwise operator works on
Binary concepts
Bitwise operator
Decimal number
&, |, ^, ~(→)

64	32	16	8	4	2	1
10			1	0	1	0
7			0	1	1	1

⇒ Table: (int a = 5(0101), b = 7(0111))

a	b	&	|	^	~a
0	0	0	0	0	0
1	1	1	1	0	1
0	1	0	1	1	1
1	1	1	1	0	0
		5	7	2	6

0101
+1
0110

Complement kissi ik variable k sath
krna hota hai.

program

```
class Bitwise{
    public static void main(){
        int a=5, b=7;
        Sout("AND" + (a&b));
        Sout("OR" + (a|b));
        Sout("XOR" + (a^b));
        Sout("complement" + (~a));
    }
}
```

By lectures

Pattern

i)

```
class A{
public
```

ii)

```
class A {
Public
int
int
for
for
```

BY lectures

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Patterns in Java

i) ★ ★ ★ ★ (4 x 4)
★ ★ ★ ★
★ ★ ★ ★
★ ★ ★ ★

```
class A{
Public Static void main (String[] args) {
    for (int i=1; i<=4; i++) {
     for (int j=1; j<=4; j++) {
     System.out.print("*");
                    }
     System.out.println();
                    }
                    }
```

ii) ★ ★ ★ ★ ★ (4 x 5)
★ ★
★ ★
★ ★ ★ ★ ★

```
class A {
Public Static void main (String [] args) {
    int n=4;
    int m=5;
    for (int i=1; i<=n; i++ {
     for (int j=1; j<=m; j++) {
```

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```
if (i==1 || j==1 || i==n || j==m){
System.out.Print("*");
}
else{
System.out.Print(" ");
}
}
System.out.println();
}
}
```

iii)

```
*
* *
* * *
* * * *
```

```
Class A{
Public Static void main (String []args){
    for (int i=1; i<=4; i++){
    for (int j=1; j<=i; j++){
System.out.Print("*");
}
System.out.println();
}
}
```

iv)

```
* * * *
* * *
* *
*
```

```
Class A{
Public st
```

v)

```
- - - *
- - * *
= * * *
* * * *
```

```
class A
Public S
in
for (in
for (
Syst
for (
Syst
Syst
```

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iv)

```
* * * *
* * *
* *
*
```

```
class A {
Public static void main(String [] args){
    for(int i=1; i<=4; i++) {
    for (int j=4; j>=i ; j--){
    System.out.Print("*");
                    }
    System.out.println ();
                    }
    }
```

v)

```
- - - *
- - * *
= * * *
* * * *
```

```
class A{
Public Static void main (String [] args){
    int n=4;
for (int i=1; i<=n; i++{
for (int j=1; j<=n-i; j++ {
System.out.Print (" ");
                    }
for (int j=1; j<=i; j++){
System.out.Print ("* ");
System.out.println();
    }
}
```

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vi)

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

```
class A{
Public Static Void main(String[]args){
    for(int i=1; i<=5; i++){
    for(int j=1; j<=i; j++){
     System.out.Print(j+" ");
                          }
System.out.Println();
                          }
                          }
```

vii)

```
1 2 3 4 5
1 2 3 4
1 2 3
1 2
1
```

i	Print	n-i+1
1	1 to 5	5-1+1 = 5
2	1 to 4	5-2+1 = 4
3	1 to 3	5-3+1 = 3
4	1 to 2	5-4+1 = 2
5	1 to 1	5-5+1 = 1

n=5

```
class A{
Public Static void main(String[] args){
    int n=5;
    for(int i=1; i<=n; i++){
    for(int j=1; j<=n-i+1; j++){
    System.out.print(j);      }
    System.out.println();
                          }
                          }
```

viii)

```
1
2 3
4 5 6
7 8 9
11 12 13
```

```
class
Public
```

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viii)

```
1
2 3
4 5 6
7 8 9 10
11 12 13 14 15
```

```
i        Increase numbers
1  1     by adding 1 on
2  2 3   every time. with
3  4 5 6 number of rows
4  7 8 9 10
5  11 12 13 14 15
```

```
class A {
Public Static void main (String [] args) {
    int n=5;
        int number=1;
for (int i=1; i<=n; i++){
for (int j=1; j<=i; j++){
System.out.print(number+" ");
    number++;
System.out.println();
}
}
}
```

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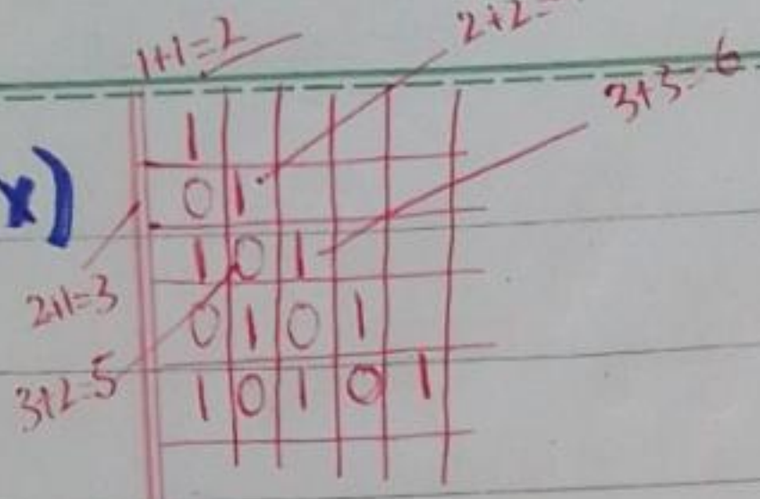
ix)



It requires a condition

if (i+j%==0){
even}

Else{
odd}

```
class A{
Public Static void main(String[] args){
  inf n=5;
  for (int i=1; i<=n; i++){
  for (int j=1; j<=i; j++){
    int Sum = i+j;
//even  if (Sum%2==0){
    System.out.Print("1");
                }
    Else{
    System.out.Print("0"); }
                }
    System.out.println();
  }
}
```

x)

Advanc

Butterfly

```
class A{
Public
upper Half fo
```

lower half

//

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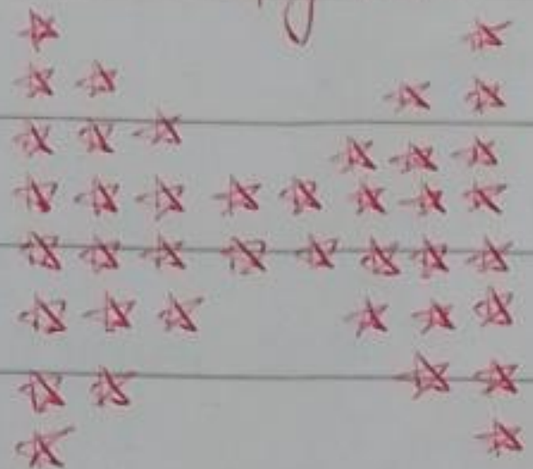
Advance Pattren in Java

n=4

x) Butterfly Pattren



i	Star	Spaces	Stars
1	1	6	1
2	2	4	2
3	3	2	3
4	4	0	4

~~2*(n-i)~~

2*3 (4-1) = 2*(n-i)

2*2 (4-2)

2*1 (4-3)

2*0 (4-4)

Spaces

```
class A{
  Public static void main(String []args){
    int n=4;
Upper Half  for(int i=1; i<=n; i++){
    for(int j=1; j<=i; j++){
    System.out.Print("* ");
        }
    //Spaces
    for(int j=1; j<=2*(n-i); j++){
    System.out.Print(" ");
    for(int j=1; j<=i; j++){
    System.out.Print("* ");
    System.out.println();
Lower Half
    for(int i=n; i>=1; i--){
    for(int j=1; j<=i; j++){
    System.out.Print("* ");
    // Spaces
```

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```
for (int j=1; j<=2*(n-i); j++){
    System.out.print(" ");  }
for (int j=1; j<=i; j++){
    System.out.print("*");  }
System.out.println();  }
}
```

xi)

Spaces				5 Stars				
1	2	3	4	★	★	★	★	★
					★	★	★	★
						★	★	★
							★	★
								★

n=5

for Printing Spaces (n-i)

Print Stars 5 times for every time.

```
class A {
Public Static Void main(String []args){
    int n=5;
for(int i=1; i<=n; i++){
//Spaces  for(int j=1; j<=n-i; j++){
        System.out.Print(" ");  }
    for(int j=1; j<=5; j++){
        System.out.Print("*");  }
    System.out.println();  }
}
```

(iii)

```
class A {
Public Sta
//Spaces
```

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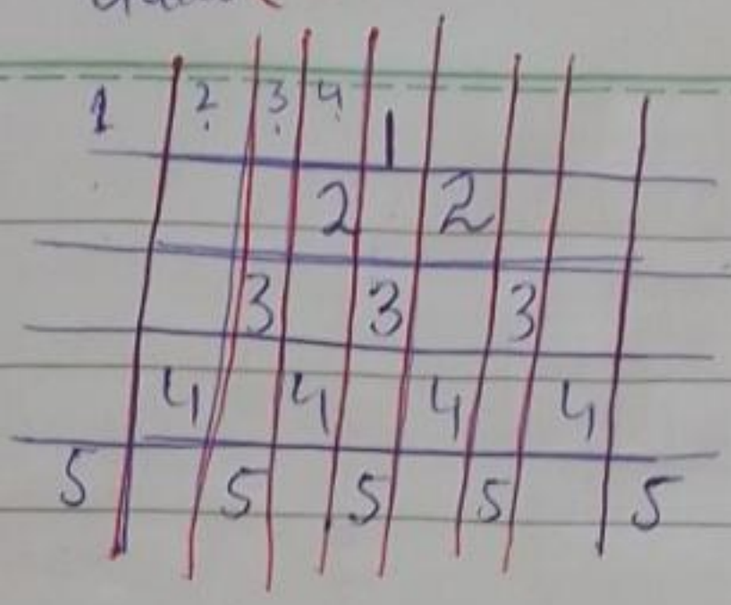
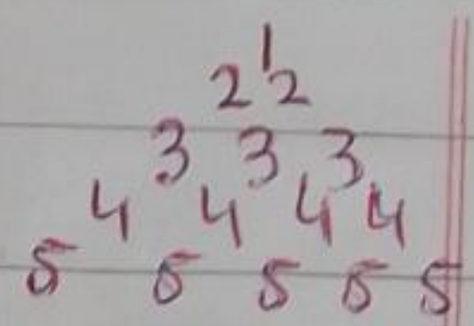
xii)

Spaces (n-i)






```
class A {
public static void main (String [] args) {
        int n=5;
    for (int i=1; i<=n; i++){
//Spaces  for (int j=1; j<=n-i; j++) {
            System.out.print (" ");  }
    for (int j=1; j<=i; j++){
        System.out.print (j+" ");  i++?
                                }
    System.out.println();  }
                                }
}
```

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xiii)

```
    1
   212
  32123
 4321234
543212345
```

Spaces (n-i)

i	Print
1	1
2	21
3	321
4	4321
5	54321

```
class A {
Public Static void main(String [] args){
        int n=5;
    for(int i=0; i<=n; i++){
// Spaces  for(int j=1; j<=n-i; j++){
            System.out.Print(" ");  }
First Half  for(int j=i; j>=1; j--){
            System.out.Print(j); }
Sec-Half    for(int j=2; j<=i; j++){
            System.out.Print(j);  }
            System.out.Println();  }
    }
}
```

xiv)

```
class A
Public
Upper Half
Lower Half
```

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xiv)

Spaces (n-i)

Stars = (2*i-1) 2*i-1

i	Stars = 2*i-1	
1		= 2-1 = 1
2	3	= 4-1 = 3
3	5	6-1 = 5
4	7	8-1 = 7
5	9	10-1 = 9

```
class A{
Public Static void main (String [] args){
                    int n=5;
Upper Half  for (int i=1; i<=n; i++){
~~System.out.Print~~(  for (int j=1; j<=n-i; j++){
System.out.Print(" ");  }
for (int j=1; j<=2*i-1; j++){
System.out.Print("*");  }
System.out.println();  }
lower Half  for (int i=n; i>=1; i--){
            for (int j=1; j<=n-i; j++){
System.out.Print(" ");  }
for (int j=1; j<=2*i-1; j++){
System.out.Print("*");  }
System.out.println();  }
}
}
```

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Functions in Java

Example 1

Print a given name in a Function

```
class Functions {
Public Static void PrintMyName(String name){
    System.out.Println(name); }
Public Static void main (String [] args){
    Scanner Sc= new Scanner (System.in);
    String name = Sc.next();
    PrintMyName (name);
}
}
```

Input= Arslan

Output= Arslan

Example

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Same

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Example 2

make a function to add two numbers and return the Sum.

```
class Functions {
Public Static int calculateSum (int a, int b) {
    int Sum = a+b;
    return Sum;                                    }
Public Static void main (String [] args) {
        Scanner Sc = new Scanner (System.in);
        int a = Sc.nextInt();
        int b = Sc.nextInt();
int Sum = calculateSum (a, b);
System.out.println(Sum);
                                                   }
}
```

input a=4 b=3 Sum=7

Same as multiply Question

```
class Functions {
        Public Static int calculateProduct (int a, int b) {
    return a*b; }
Public Static void main (String [] args) {
    Scanner Sc = new Scanner (System.in);
    int a = Sc.nextInt();
    int b = Sc.nextInt();
System.out.println("Product is: " calculateProduct(a,b);
                                                   }
}
```

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Examples 3

Find Factorial of a number by using Function.

```
class Functions{
Public Static int PrintFactorial (int n){
if(n<0){
System.out.Println("Invalid number");
return;                                    }
int factorial = 1;
for(int i=n; i>=1; i--){
factorial = factorial * i; }
System.out.Println(factorial);
return;                                    }
Public Static Void main(String[] args){
Scanner Sc = new Scanner (System.in);
int n= Sc.nextInt();
PrintFactorial (n);
                                           }
}
```

Input: 3

Output: 6

we call the functions directly and we call the methods by creating the object of a class.

By Jo... Lecture APP

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Object ...
System

⇒ **Class**

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