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Basics Of Java :

```java
/*
In 1991 Java was created by Sun Microsystem, of USA. Initially Java was called as Oak,
by James Goslin(one of the inventors of the Java..!)

How Java works?
--> Java is compiled into the bytecode and then it is interprited to machine code.
Source code -->compiled to --> Bytecode -->interprited to --> Machine code
*/

public class A_BasicsOfJava{
    public static void main(String[] args){  // main is the entry point into application.
        System.out.println("Hello..!");  // println --> creat new line after printing a line.
        System.out.print("I'm here");  // print --> only print the string.
    }
}
```

Literals :

```java
public class B_Literals{

    public static void main(String[] args) {


// Literal --> A constant value which can be assigned to the variable is called as a literal.

        byte age = 18;

        short num = 1221;

        int num1 = 122333221;

        long num2 = 1223334444333221L; // Its neccessary to write l or L with long variable.

        char ch = 'A';

        String str = "Aman Verma";

        float f1 = 12.21f;  // Its neccessary to write f or F with float variable

        double d1 = 12.6666;  // By default d is there we don't need to write.


        System.out.println(age);

        System.out.println(num);

        System.out.println(num1);

        System.out.println(num2);

        System.out.println(ch);

        System.out.println(str);

        System.out.println(f1);

        System.out.println(d1);

    }
}
```

Input Output :

```java
import java.util.Scanner;

public class C_InputOutput{

    public static void main(String[] args){

        System.out.println("Taking input from the user");

        Scanner sc = new Scanner(System.in);

        System.out.print("Enter the first number here : ");

        byte a = sc.nextByte();

        System.out.print("Enter the second number here : ");

        float b = sc.nextFloat();

        float sum = a + b;

        System.out.print("The sum of the these number is : ");

        System.out.println(sum);

        /*

        boolean b1 = sc.hasNextByte(); // This will check whether user input a number or not

        System.out.println(b1); // if yes this will print true otherwise shows false

        */

        System.out.print("Enter a string here : ");

        String str = sc.next(); // --> This will print only first word.

        System.out.println(str);

        System.out.print("Enter next string here : ");

        Scanner sc1 = new Scanner(System.in);

        String str1 = sc1.nextLine(); // --> This will print whole sentence.

        System.out.println(str1);

        System.out.print("Enter a character here  :  ");

        char ch1 = sc.next().charAt(0); // For 'char' input.


        System.out.println("Entered character is :  " + ch1);

        System.out.print("Enter ch2 here :  ");

        char ch2 = sc.next().charAt(0);

        System.out.println("Entered ch2 is :  " + ch2);

        sc.close();

        sc1.close();

    }
}
```

Operators :

```java
public class D_Operators{

    public static void main(String[] args) {

        int a = 3;

        int b = 10 % a; // Modulo Operator

        float c = 1.1f;

        float d = 4.8f % c;

        System.out.println(b); // This will print the remainder part when 10 is divided by 3

        System.out.println(d); // Returns decimal operator.


        // Bitwise Operator

        System.out.println(2 & 3); // Here 'And' operation of 2 and 3 will be print.

        System.out.println(2|3);  // Here 'Or' operation of 2 and 3 will be printed.

        System.out.println(~3);  // This will print 'Nagation' of 3.

        int i = 8;

        int j = i<<2; // -> This is left shift.

        System.out.println(j);

        int k = 8;

        int l = k>>2; // -> This is right shift.

        System.out.println(l);

        /*

        2 in binary is =  10

        3 in binary is =  11

        'And' operation ------

        -->               10

        */

    }

}
```

Output :-

```
PS D:\11. Tutorial of Java> cd
1
0.4000001
2
3
-4
32
2
PS D:\11. Tutorial of Java>
```

Data Type Of Expression :

```java
public class E_DataTypeOfExpression{

    public static void main(String[] args) {

        /*

        Following table summarize the resulting data type after arithmetic operation on them

        R --> b + s = int                    b -> byte,  f -> float

        R --> s + i = int                    s -> short, d -> double

        R --> l + f = float                  i -> int,   c -> char

        R --> i + f = float                  l -> long

        R --> c + i = int

        R --> c + s = int

        R --> l + d = double

        R --> f + d = double

        */

        byte by = 8;

        short sh = 506;

        int it = 55066;

        long ln = 1221L;

        float ft = 2.3f;

        double du = 5.62646;

        char ch = 'A';

        System.out.println("Value must be in int when we add 'by' + 'sh' = " + (by + sh));

        System.out.println("Value must be in int when we add 'sh' + 'it' = " + (sh + it));

        System.out.println("Value must be in float when we add 'ln' + 'ft' = " + (ln + ft));

        System.out.println("Value must be in float when we add 'it' + 'ft' = " + (it + ft));

        System.out.println("Value must be in int when we add 'ch' + 'it' = " + (ch + it));

        System.out.println("Value must be in int when we add 'ch' + 'sh' = " + (ch + sh));

        System.out.println("Value must be in double when we add 'ln' + 'du' = " + (ln + du));

        System.out.println("Value must be in double when we add 'ft' + 'du' = " + (ft + du));

    }
}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial of Java\" ; if ($?)
Value must be in int when we add 'by' + 'sh' = 514
Value must be in int when we add 'sh' + 'it' = 55572
Value must be in float when we add 'ln' + 'ft' = 1223.3
Value must be in float when we add 'it' + 'ft' = 55068.3
Value must be in int when we add 'ch' + 'it' = 55131
Value must be in int when we add 'ch' + 'sh' = 571
Value must be in double when we add 'ln' + 'du' = 1226.62646
Value must be in double when we add 'ft' + 'du' = 7.926459952316284
PS D:\11. Tutorial of Java>
```

String :

```java
public class F_String{

    public static void main(String[] args) {

        /*

        In java string is a class but can be used like a data type also.

        Strings are immutable and cann't be changed.

        As string is a class also so it can be written as below

        */

        // String name = new String("Aman Verma");

        String name = "Aman Verma";

        System.out.println(name);

        /*

        String Methods :- String methods operate on java string. They can be used to find

        length of the string, convert to lowercase, etc.

        */

        int stLength = name.length();

        System.out.println(stLength);


        String lowerString = name.toLowerCase();

        System.out.println(lowerString);


        String upperString = name.toUpperCase();

        System.out.println(upperString);


        System.out.println(name.substring(2));


        System.out.println(name.substring(2, 7));


        System.out.println(name.replace('a', 'n'));

        System.out.println(name.replace("man", "mrit"));

        System.out.println(name.replace("m", "Hey"));


        System.out.println(name.startsWith("Ama"));

        System.out.println(name.startsWith("ama"));

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

```java
        System.out.println(name.charAt(3));


        System.out.println(name.indexOf('n'));
        System.out.println(name.indexOf('m', 3));
        System.out.println(name.lastIndexOf("rma"));


        System.out.println(name.equals("Aman Verma"));
        System.out.println(name.equalsIgnoreCase("aman verma"));


        System.out.println("This is \\ escape sequence");
        System.out.println("I'm \"escape\" sequence");


        int a = 65, b = 56;
        System.out.printf("The value of a is %d and the value of b is %d", a, b);
        System.out.format("\nThe value of a is %d and the value of b is %d", a, b);
        // Above two methods can also be used for printing in java.
    }
}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial of Java\"
Aman Verma
10
aman verma
AMAN VERMA
an Verma
an Ve
Amnn Vermn
Amrit Verma
AHeyan VerHeya
true
false
false
n
3
8
7
true
true
This is \ escape sequence
I'm "escape" sequence
The value of a is 65 and the value of b is 56
The value of a is 65 and the value of b is 56
PS D:\11. Tutorial of Java>
```

Conditionals :

```java
import java.util.Scanner;

public class G_Conditionals{

    public static void main(String[] args) {

    // Use of Switch Case

    System.out.print("Enter your age here : ");

    Scanner sc = new Scanner(System.in);

    int age = sc.nextInt();

    switch(age){

        case 12 :

        System.out.println("You cann't come to the party");

        break;

        case 18 :

        System.out.println("You can come to the party");

        break;

        case 56 :

        System.out.println("You are going to retair");

        break;

        default :

        System.out.println("Enjoy your life");

        break;

    }


    // We can use switch case as used below also. This is enhanced 'switch' case

    switch(age){

        case 12 -> System.out.println("You cann't come to the party");


        case 18 -> System.out.println("You can come to the party");


        case 56 -> System.out.println("You are going to retair");


        default -> System.out.println("Enjoy your life");

    }

    }
}
```

Array :

```java
public class H_Array{

    public static void main(String[] args) {

        int [] marks = new int[5];

        marks[0] = 10;

        marks[1] = 12;

        marks[2] = 22;

        marks[3] = 35;

        marks[4] = 46;

        // marks[5] = 56;  // --> This will throw error.

        System.out.println("Marks is as follow :-");

        for(int i = 0; i<5; i++){

            System.out.println(marks[i]);

        }

        // Another way to declair 'Array' is as follow :-

        int [] otherMarks = {100, 17, 70, 12, 21, 56};

        // In above method size of the array is automatically taken.

        System.out.println("otherMarks is as follow :-");

        for(int i = 0; i<otherMarks.length; i++){

            System.out.println("This is otherMarks[" + i + "] " + otherMarks[i]);

        }


        // Another way to print 'Array'

        // This is known as for each loop in which value will be taken from array one by one.

        System.out.println("Printing the elements of the array using for each loop :-");

        for(int element: marks){

            System.out.println(element);

        }


    }
}
```

Multi-dimensional Array :

```java
public class I_MultidimensionalArrays{

    public static void main(String[] args) {

        int [] marks = {5, 6, 8, 9, 3}; // --> This is 1-D Array

        int [] [] flats; // --> This is 2-D Array

        flats = new int [2] [3];

        flats [0] [0] = 101;

        flats [0] [1] = 102;

        flats [0] [2] = 103;

        flats [1] [0] = 201;

        flats [1] [1] = 202;

        flats [1] [2] = 203;

        System.out.println("Printing a 2-D(Matrix) array using nested for loop :-");

        for(int i = 0; i<flats.length; i++){

            for(int j = 0; j<flats[i].length; j++){

                System.out.print(flats[i][j] + "\t");

            }

            System.out.println();

        }


        // Below is the method to sum the elements of an 'Array'

        int sum = 0;

        float ln = marks.length;

        for(int element: marks){

            sum = sum + element;

        }

        System.out.println("The sum of the elements of the 'marks' array is : " + sum);

        System.out.println("Average of the elements of the array is : " + sum/ln);


        // Method to add the elements of the Matrix array

        int [] [] mat1 = {{1, 2, 3}, {4, 5, 6}};

        int [] [] mat2 = {{2, 6, 13}, {3, 7, 1}};

        int [] [] result = {{0, 0, 0}, {0, 0, 0}}; // Initiallise the values by Zero '0'

        for(int i=0; i<mat1.length; i++){ // Row number of times

            for(int j=0; j<mat1[i].length; j++){ // Column number of times
```

```
                System.out.println("Setting value for i = "+i+" and j = "+j);
                result[i][j] = mat1[i][j] + mat2[i][j];
            }
        }
        System.out.println("Printing the 'result' array :-\n");
        for(int i=0; i<mat1.length; i++){
            System.out.print("| ");
            for(int j=0; j<mat1[i].length; j++){
                System.out.print(result[i][j] + " ");
            }
            System.out.println("|");
        }

    }
}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial of Java\"
Printing a 2-D(Matrix) array using nested for loop :-
101     102     103
201     202     203
The sum of the elements of the 'marks' array is : 31
Average of the elements of the array is : 6.2
Setting value for i = 0 and j = 0
Setting value for i = 0 and j = 1
Setting value for i = 0 and j = 2
Setting value for i = 1 and j = 0
Setting value for i = 1 and j = 1
Setting value for i = 1 and j = 2
Printing the 'result' array :-

| 3 8 16 |
| 7 12 7 |
PS D:\11. Tutorial of Java>
```

Reversing The Array :

```java
public class J_ReversingTheArray{

    public static void main(String[] args) {

        int [] arr = {1, 2, 3, 4, 5, 6, 7, 8};

        System.out.println("Given arr is as follow :-");

        for(int i=0; i<arr.length; i++){

            System.out.print(arr[i] + "\t");

        }


        int l = arr.length; // --> This will gives the length of the arr

        int n = Math.floorDiv(l, 2);

        // Math.floorDiv is a class in java which gives the value = arr.length divided by 2

        for(int i=0; i<n; i++){

            // swap arr[i] and arr[l-1-i] --> This is formula to swap two numbers of an array

            arr[i] = arr[i] + arr[l-1-i];

            arr[l-1-i] = arr[i] - arr[l-1-i];

            arr[i] = arr[i] - arr[l-1-i];

        }

        System.out.println("\nReverse order of the given array is as follow :-");

        for(int elements: arr){

            System.out.print(elements + "\t");

        }


    }

}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial of Java\" ;
Given arr is as follow :-
1       2       3       4       5       6       7       8
Reverse order of the given array is as follow :-
8       7       6       5       4       3       2       1
PS D:\11. Tutorial of Java>
```

Methods :

```java
import java.util.Scanner;

public class K_Methods{

    static int logic(int a, int b){

        int c;

        if(a>b){

            c = a + b;

        }

        else

        c = (a + b) * 5;

        return c;

    }


    int logic2(int a, int b){ // Non static method and called by object of the class.

        int c;

        a = 5; b=3;

        if(a>b){

            c = a + b;

        }

        else

        c = (a + b) * 5;

        return c;

    }


    static void change(int [] arr){ // --> This will get reference of 'marks' so can

        arr[0] = 98;                // make changes in the value of marks.

    }


    public static void main(String[] args) {

        // A method is a function written inside a class, since Java is an object oriented

        // language, we need to write the method inside some class.

        System.out.println("Enter two numbers here :-");

        Scanner sc = new Scanner(System.in);

        int x = sc.nextInt();

        int y = sc.nextInt();
```

```
        System.out.println("After operation number will be : " + logic(x, y));

        sc.close();

        /*

        Calling a Method :- A method can be called by creating an object of the class in

        which the method exists followed by the method call.

        */

        System.out.println("Calling 'Non static method' by object of the class");

        K_Methods obj = new K_Methods();

        System.out.println("After operation number will be : " + obj.logic2(x, y));


        // Objects also pass the reference to the method thus we can make changes in it.

        int [] marks = {52, 73, 95, 56, 89, 90};

        System.out.println("The value of marks[0] before running change is : " + marks[0]);

        change(marks);

        System.out.println("The value of marks[0] after running change is : " + marks[0]);


    }
}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial of Java\"
Enter two numbers here :-
2
3
After operation number will be : 25
Calling 'Non static method' by object of the class
After operation number will be : 8
The value of marks[0] before running change is : 52
The value of marks[0] after running change is : 98
PS D:\11. Tutorial of Java>
```

Variable Arguments :

```java
public class L_VariableArguments{

    /* --> Here we have to write different methods for same work.

    static int sum(int a, int n){

        return (a + n);

    }

    static int sum(int a, int n, int v){

        return (a + n + v);

    }

    */

    static int sum(int ...arr){ // 'arr' is available here as int [] arr(in the form of array)

        int result = 0;

        for(int element : arr){

            result += element;

        }

        return result;

    }


    static void recursion(int n){

        if(n>0){

            recursion(n-1);

            for(int i=0; i<n; i++){

                System.out.print("*");

            }

            System.out.println();

        }

    }


    public static void main(String[] args) {

        System.out.println("Welcome to the Variable Arguments(varargs) :-");

        System.out.println("The sum of nothing is : " + sum());

        System.out.println("The sum of 4 and 5 is : " + sum(4, 5));

        System.out.println("The sum of 4, 5 and 6 is : " + sum(4, 5, 6));

        System.out.println("The sum of 4, 5, 6 and 7 is : " + sum(4, 5, 6, 7));
```

```java
        /*
        Promblem :- Print the following pattern.
        *
        **
        ***
        ****
        using recursion
        */
        int n = 5;
        System.out.println("The patter of stars of 5 row is as follow : ");
        recursion(n);
    }
}
```

Output :-

```
PS D:\11. Tutorial of Java> cd "d:\11. Tutorial
Welcome to the Variable Arguments(varargs) :-
The sum of nothing is : 0
The sum of 4 and 5 is : 9
The sum of 4, 5 and 6 is : 15
The sum of 4, 5, 6 and 7 is : 22
The patter of stars of 5 row is as follow :
*
**
***
****
*****
PS D:\11. Tutorial of Java>
```