Java means DURGA SOFT..

CORE JAVA

Material

Java™

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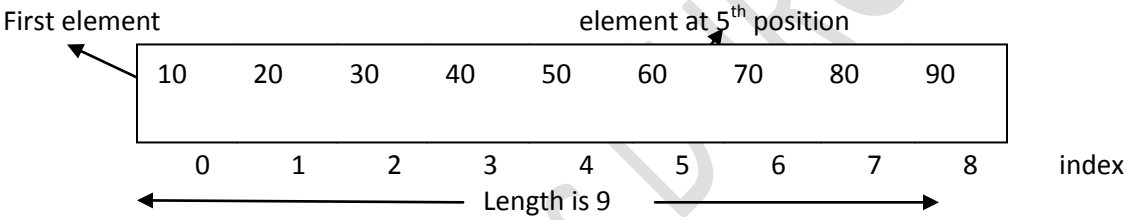
Arrays

- *Arrays are used to represent group of elements as a single entity but these elements are homogeneous &fixed size.*
- *The size of Array is fixed it means once we created Array it is not possible to increase and decrease the size.*
- ***Array in java is index based first element of the array stored at 0 index.***

Advantages of array:-

- ✓ Instead of declaring individual variables we can declare group of elements by using array it reduces length of the code.
- ✓ We can store the group of objects easily & we are able to retrieve the data easily.
- ✓ We can access the random elements present in the any location based on index.
- ✓ Array is able to hold reference variables of other types.



Different ways to declare a Array:-

int[] values;
int []values;
int values[];

declaration& instantiation & initialization :-

Approach 1:- inta[]={10,20,30,40}; ***//declaring, instantiation, intialization***

Approach 2:- int[] a=new int[100]; ***//declaring, instantiation***
a[0]=10; ***//initialization***
a[1]=20;
;;;;;;;;;;;;;;;;;;;;;;
a[99]=40;

```
// declares an array of integers
int[] anArray;
 // allocates memory for 10 integers
anArray = new int[10];
// initialize first element
anArray[0] = 10;
  // initialize second element
anArray[1] = 20;
```

// and so forth

```
anArray[2] = 30;    anArray[3] = 40;    anArray[4] = 50;    anArray[5] = 60;
anArray[6] = 70;    anArray[7] = 80;    anArray[8] = 90;    anArray[9] = 100;
```

Example :- taking array elements from dynamic input by using scanner class.

```
importjava.util.*;
class Test
{       public static void main(String[] args)
        {       int[] a=new int[5];
                Scanner s=new Scanner(System.in);
                System.out.println("enter values");
                for (int i=0;i<a.length;i++)
                {       System.out.println("enter "+i+" value");
                        a[i]=s.nextInt();
                }
                for (int a1:a)
                {       System.out.println(a1);
                }
        }
}
```


Example :- find the sum of the array elements.

```
class Test
{       public static void main(String[] args)
        {       int[] a={10,20,30,40};
                int sum=0;
                for (int a1:a)
                {       sum=sum+a1;
```

```
                }
                System.out.println("Array Element sum is="+sum);
        }
}
```

Method parameter is array & method return type is array:-

```
class Test
{       static void m1(int[] a)    //method parameter is array
        {       for (int a1:a)
                {       System.out.println(a1);
                }
        }
        staticint[] m2()  //method return type is array
        {       System.out.println("m1 method");
                return new int[]{100,200,300};
        }
        public static void main(String[] args)
        {       Test.m1(new int[]{10,20,30,40});
                int[] x  = Test.m2();
                for (int x1:x)
                {       System.out.println(x1);
                }
        }
}
```

Example:- adding the objects into Array and printing the objects.

```
class Test
{       public static void main(String[] args)
        {       int[] a = new int[5];
                a[0]=111;
                for (int a1:a)
                {       System.out.println(a1);
                }
                Emp e1 = new Emp(111,"ratan");
                Emp e2 = new Emp(222,"anu");
                Emp e3 = new Emp(333,"sravya");
                Emp[] e = new Emp[5];
                e[0]=e1;
                e[1]=e2;
                e[2]=e3;
                for (Empee:e)
                {       System.out.println(ee);          }
        }
}
```

Output:-

```
E:\>java Test
111     0       0       0       0
Emp@530daa  Emp@a62fc3   Emp@89ae9e   null      null
```

Example:- printing array elements with elements and default values.

```
class Test
{       public static void main(String[] args)
        {       Emp[] e = new Emp[5];
                e[0]=new Emp(111,"ratan");
                e[1]=new Emp(222,"anu");
                e[2]=new Emp(333,"sravya");
                for (Object ee:e)
                {       if (eeinstanceofEmp)
                        {       Empeee = (Emp)ee;
                                System.out.println(eee.eid+"----"+eee.ename);
                        }
                        if (ee==null)
                        {       System.out.println(ee);
                        }
                }
        }
}
```

Output:-

```
E:\>java Test
111----ratan
222----anu
333----sravya
null
null
```

Finding minimum & maximum element of the array:-

```
class Test
{       public static void main(String[] args)
        {       int[] a = new int[]{10,20,5,70,4};
                for (int a1:a)
                {       System.out.println(a1);
                }
                //minimum element of the Array
                int min=a[0];
                for (int i=1;i<a.length;i++)
                {       if (min>a[i])
                        {       min=a[i];
                        }
                }
                System.out.println("minimum value is ="+min);
                //maximum element of the Array
                int max=a[0];
                for (int i=1;i<a.length;i++)
                {       if (max<a[i])
                        {       max=a[i];
                        }
                }
```

```
                System.out.println("maximum value is ="+max);
        }
}
```

Example :- copy the data from one array to another array

```
class Test
{       public static void main(String[] args)
        {       int[] copyfrom={10,20,30,40,50,60,70,80};
                int[] copyto = new int[7];
                System.arraycopy(copyfrom,1,copyto,0,7);
                for (intcc:copyto)
                {       System.out.println(cc);
                }
        }
}
```

Example :- copy the data from one array to another array

```
class Test
{       public static void main(String[] args)
        {       int[] copyfrom={10,20,30,40,50,60,70,80};
                int[] newarray=java.util.Arrays.copyOfRange(copyfrom,1,4);
                for (intaa:newarray)
                {       System.out.println(aa);//20 30 40
                }
        }
}
```

Example:- finding null index values.

```
class Test
{       public static void main(String[] args)
        {       String[] str= new String[5];
                str[0]="ratan";
                str[1]="anu";
```

```
                str[2]=null;
                str[3]="sravya";
                str[4]=null;
                for (int i=0;i<str.length;i++)
                {       if ( str[i]==null)
                        {       System.out.println(i);
                        }
                }
        }
}
```

Root structure:-

```
java.lang.Object
   |
|--java.lang.reflect.Array
```

Array is a final class can't be extended.

To get the class name of the array:-

```
class Test
{       public static void main(String[] args)
        {       int[] a={10,20,30};
                System.out.println(a.getClass().getName());
        }
}
```

Example:-process of adding different types Objects in Object array

Test.java:-

```
class Test
{       public static void main(String[] args)
        {       Object[] a= new Object[6];
                a[0]=new Emp(111,"ratan");
                a[1]=new Integer(10);
                a[2]=new Student(1,"anu");
                for (Object a1:a)
                {       if (a1 instanceofEmp)
                        {       Emp e1 = (Emp)a1;
                                System.out.println(e1.eid+"---"+e1.ename);
                        }
                        if (a1 instanceof Student)
                        {       Student s1 = (Student)a1;
                                System.out.println(s1.sid+"---"+s1.sname);
                        }
                        if (a1 instanceof Integer)
                        {       System.out.println(a1);
                        }
                        if (a1==null)
                        {       System.out.println(a1);
                        }
                }
        }
}
```

Emp.java:

```
classEmp
{       inteid;
        String ename;
        Emp(inteid,Stringename)
        {       //conversion of local to instance
                this.eid=eid;
                this.ename=ename;
        }
}
```

Student.java:-

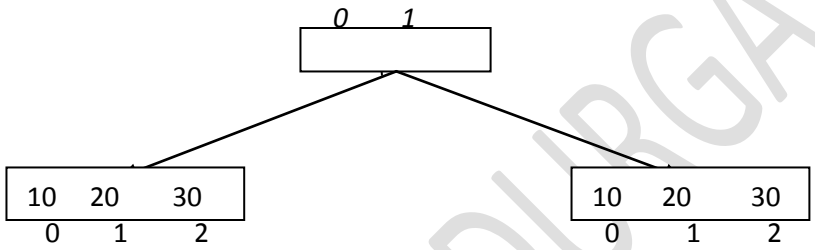
```
class Student
{       intsid;
        String sname;
        Student(intsid,Stringsname)
        {       //conversion of local to instance
                        this.sid=sid;
                        this.sname=sname;
        }
}
```

declaration of multi dimensional array:-

```
int[][]     a;
int         [][]a;
int         a[][];
int         []a[];
```

Example :-

```
class Test
{       public static void main(String[] args)
        {       int[][] a={{10,20,30},{40,50,60}};
                System.out.println(a[0][0]);//10
                System.out.println(a[1][0]);//40
                System.out.println(a[1][1]);//50
        }
}
```



a[0][0]------→10 a[0][1]------→20 a[0][2]-----→30 a[1][0]-----→40
a[1][1]-----→50 a[1][2]-----→60

Example:-

```
class Test
{       public static void main(String[] args)
        {       String[][] str={{"A.","B.","C."},{"ratan","ratan","ratan"}};
                System.out.println(str[0][0]+str[1][0]);
                System.out.println(str[0][1]+str[1][1]);
                System.out.println(str[0][2]+str[1][2]);
        }
}
```

Example :-febonacci series

```
importjava.util.Scanner;
class Test
{       public static void main(String[] args)
        {       System.out.println("enter start series of febonacci");
                int x = new Scanner(System.in).nextInt();
                int[] feb = new int[x];
                feb[0]=0;
                feb[1]=1;
                for (int i=2;i<x;i++)
                {       feb[i]=feb[i-1]+feb[i-2];
                }
                //print the data
```

```
                for (int feb1 : feb)
                {       System.out.print(" "+feb1);
                }
        }
}
```

Example :-febonacci series

```
importjava.util.Scanner;
class Test
{       public static void main(String[] args)
        {       System.out.println("enter the no required for febonacci");
                int a = new Scanner(System.in).nextInt();

                System.out.println("enter first no of  febonacci");
                int x = new Scanner(System.in).nextInt();
                System.out.println("enter second no of febonacci");
                int y = new Scanner(System.in).nextInt();

                int[] feb = new int[a];
                feb[0]=x;
                feb[1]=y;
                for (int i=2;i<a;i++)
                {       feb[i]=feb[i-1]+feb[i-2];
                }
                //print the data
                for (int feb1 : feb)
                {       System.out.print(" "+feb1);
                }
        }
}
```

Pre-increment & post increment :-

Pre-increment :- it increases the value by 1 then it will execute statement.

Post-increment :-it executes the statement then it will increase value by 1.

```
class Test
{       public static void main(String[] args)
        {       //post increment
                int a=10;
                System.out.println(a);          //10
                System.out.println(a++);        //10
                System.out.println(a);          //11
                //pre increment
                int b=20;
                System.out.println(b);          //20
                System.out.println(++b);        //21
                System.out.println(b);          //21
                System.out.println(a++ + ++a + a++ + ++a);
                                                //11   13   13   15
        }
}
```

Pre-decrement &postdencrement :-

Pre-decrement :- it decreases the value by 1 then it will execute statement.

Post-decrement :-it executes the statement then it will increase value by 1.

```
class Test
{       public static void main(String[] args)
        {       //post decrement
                int a=10;
                System.out.println(a);          //10
                System.out.println(a--);        //10
                System.out.println(a);          //9
                //post decrement
                int b=20;
                System.out.println(b);          //20
                System.out.println(--b);        //19
                System.out.println(b);          //19
                System.out.println(a-- + --a + a-- + --a);
                                                //9     7             7        5
        }
}
```