Page No.
Date

* Array

① Array is a continuous block of memory which is used to store homogeneous type of data.
② Array is fixed in size And It is a non-static member.
③ If we want to access elements of the Array we have to go for index where index starts with 0 to n-1
④ If we cross the Range of Index It will get a Runtime error known as "Array Index Out Bond Exception"
⑤ In array we can also store default values.

* 2 ways to create array in Java.

① Using array literal (When we have the values).
datatype [] variable = {values,.....}

② Using new keyword (when input from user).
datatype [] variable = new datatype [size];

e.g.

```
class Driver{

    public static void main(String[] args)
    {
        int[] arr = {10,20,30,40,50,60};

        for (int i=0; i<arr.length; i++)
        {
            Sy.O.P.(a[i]);
        }
    }
}
```

```
import java.util.Scanner;
class Driver
{
    public static void main (String [] args)
    {
        Scanner sc = new Scanner (System.in);

        int size = sc.nextInt();
        int [] arr = new int[size];

        for (int i=0; i<arr.length; i++)
        {
            a[i] = sc.nextInt();
        }

        for (int i=0; i<a.length; i++)
        {
            S.O.P.(a[i]);
        }
    }
}
```

~~2D Arrays~~.

TYPES OF ARRAYS:

1. One / ~~Di~~ Single Dimensional Arrays.
2. Multi Dimensional Arrays.

1. one / single dimensional arrays

A single dimensional array is a group of element having the same data type which are stored in a linear arrangement under a single variable name.

Syntax : `int [] arr = {};` or

`int [] arr = new int[3];`

Page No.
Date

2. Multi Dimensional Arrays.

In multi-dimensional array, data is stored in row and column based index. (also known as matrix form).

A multidimensional array is an arrays of array.

2D Arrays. (Two-Dimensional Arrays.)

2D Array is the simplest form of a multidimensional array.

A 2D array can be seen as an array of 1D array for easier understanding.

Syntax: data_type [][] variable_name = new datatype [x] [y]

↑ size.

int [][] arr = new int[10][20];

x is outer size.

y is inner size.

OR

int [][] arr = {{1,2},{3,4}}

e.g.

```
class P{

    public static void main(String[] args)
    {
        int[][] arr = {{1,2},{3,4},{5,6}};

        for (int i=0; i<arr.length; i++)
        {
            for (int j=0; j<arr[i].length; j++)
            {
                S.O.P.(arr[i][j]
            }
        }
```

3D Array.

Three-dimensional array is a complex form of a multidimensional array.
A 3D array array can be seen as an array of two-dimensional array for easier understanding.

Syntax:

datatype[][][] variable = new datatype[x][y][z];

int[][][] arr = new int[10][20][30];

x Outer size 3D array
y outer size of 2D array
z inner size of 2D arry.
inner size of 3D

size:

e.g.

```
class P
{
  public static void main(String[] args)
  {
    int[][][] arr = {{{1,2},{3,4}},
                     {{5,6},{7,8}}};

    for(int i=0; i<arr.length; i++)
    {
      for(int j=0;j<arr[i].length; j++)
      {
        for(int k=0; k<arr.[i][j].length; k++)
        {
          S.O.P.(arr[i][j][k]);
        }
      }
      S.O.P.();
    }
  }
}
```

Date

ADVANTAGES

- Code optimization : It makes the code optimized, we can retrieve or sort the data efficiently
- Random access : We can get any data located at an index position.

Disadvantages

- Size limit : We can store only the fixed size of elements in the array. It doesn't grow its size at runtime. To solve this problem, collection framework is used in java.

* Anonymous Arrays.

Java supports the feature of an anonymous array, so you don't need to declare the array while passing an array to the method.

Syntax : methodName(new int[]{ 1, 2, 3 });

* ArrayIndexOutOfBoundsException:

The Java Virtual Machine (JVM) throws an ArrayIndexOutOfBoundsException if length of the array in negative equal to the array size or greater than the array size while traversing the array.

* What is the class name of Java array?

In java, an array is an object. For any array object, a proxy class is created whose name can be obtained by getClass().getName() method on the object.

Element Type	Encoding
boolean	Z
byte	B
char	C

class or interface	Lclassname;
double	D
float	F
int	I
long	J
short	S

* Copying a java array.

We can copy an array to another by the arraycopy() method of System class.

Syntax: arraycopy(Object src, int srcPos, object dest, int destPos, int length);

System.arraycopy(arr1, 2, arr2, 0, arr1.length);

printing

S.O.P.(String.valueOf(arr2));

* Cloning an array.

- Since, Java array implements the Cloneable interface, we can create the clone of the java array.
- If we create the clone of a single-dimensional array, it creates the deep copy of the Java array. It means, it will copy the actual value.
- If we create the clone of a multidimensional array, it creates the shallow copy of the Java array which means it copies the references.

Syntax: int[] OgArr = {3, 4, 5, 6};

int[] cloneArr = OgArr.clone();