

ARRAY

Array:-An array is an indexed collection of a fixed number of homogeneous data elements.

Advantage of arrays:-

The main advantage of arrays is we can represent multiple values with the same name so that the readability of the code will be improved.

The disadvantage of arrays:-

Fixed in size that is once we created an array there is no chance of increasing or decreasing the size of the array based on our requirement, so before using an array, we must know the size of the array in advance.

We can resolve this problem by using collections.

Array declarations:

Single dimensional array declaration:-

Example:-

```
int[] x
int []x;
int x[];
```

Single dimension Array creation:-

Every array in java is an object hence we can create by using new operator.

Example:

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

Rule 1:-At the time of array creation compulsory we should specify the size as at least zero otherwise we will get compile time error.

Example:

```
int[] a=new int[3];
int[] a=new int[]; //C.E:array dimension missing
```

Rule 3:-If we are taking array size with -ve int value then we will get runtime exception saying `NegativeArraySizeException`.

Example:

```
int[] a=new int[-3]; //R.E:NegativeArraySizeException
```

Rule 4:-The allowed data types to specify array size are byte, short, char, int. By mistake if we are using any other type we will get compile time error.

Example:

```
int[] a=new int['a'];//(valid)
byte b=10;
int[] a=new int[b];//(valid)
short s=20;
int[] a=new int[s];//(valid)
int[] a=new int[101];//C.E:possible loss of precision//(invalid)
int[] a=new int[10.5];//C.E:possible loss of precision//(invalid)
```

Rule 5:-The maximum allowed array size in java is maximum value of int size [2147483647].

Example:

```
int[] a1=new int[2147483647];(valid)
int[] a2=new int[2147483648];
//C.E:integer number too large: 2147483648(invalid)
In the first case we may get RE : OutOfMemoryError.
```

declaration & instantiation & initialization :-

Approach 1:- int a[]={10,20,30,40}; //declaring, instantiation

Approach 2:- int[] a=new int[100]; //declaring

a[0]=10; //initialization

a[1]=20;

a[99]=40;

Two-Dimensional or multi-dimension array creation:-

In java two-dimension or multi-dimension array we do not represent in matrix form, java follows array of arrays approaches for Two-Dimension or multi-dimension array creation.

The main advantage of this approach is memory utilization will improve.

Two dimensional array declaration:

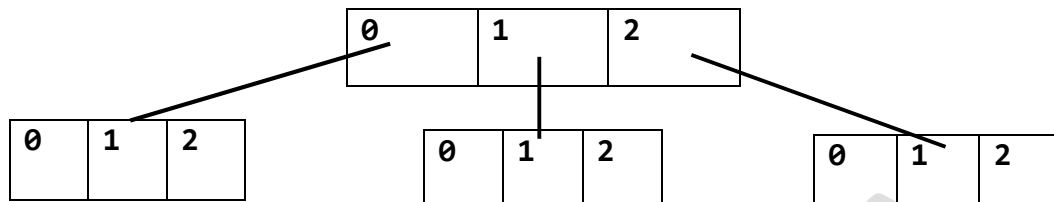
Example:-

```
int[][] x;
int [][]x;
int x[][];
int[] []x;
int[] x[];
int []x[];
```

Example:-1 This matrix form representation of array.

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

Memory representation:-



Example:-2 This is array of arrays form of array representation.

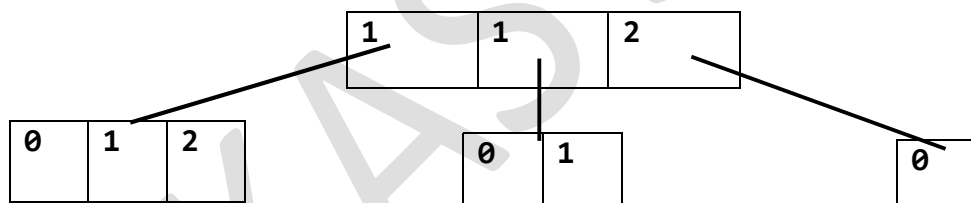
```
int[][] x=new int[3][];
```

```
x[0]=new int[3];
```

```
x[1]=new int[2];
```

```
x[2]=new int[1];
```

Memory representation:-



Example:-3

```
int[][][] a=new int[2][][];
```

```
a[0]=new int[3][];
```

```
a[0][0]=new int[1];
```

```
a[0][1]=new int[2];
```

```
a[0][2]=new int[3];
```

```
a[1]=new int[2][2];
```

