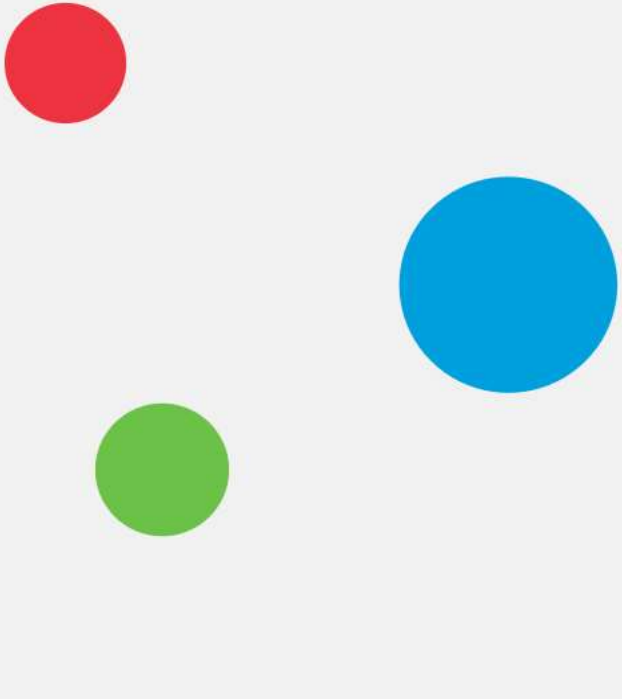
ARRAYS

Objectives

At the end of this module, you will be able to :

- Work with one dimensional and two dimensional arrays in Java

Arrays



Arrays

- An array is a container object that holds a fixed number of values of a single type.
- When an array is created, the length of the array is fixed.
- Array elements are automatically initialized with the default value of their type, when created.
- Array can be created using the new keyword.

Ex:

```
int[] x =  new int[5]; // defining an integer array for 5 blocks
```

Arrays (Contd..)

- Alternatively, we can create and initialize array using below format :

```
int[] x = {10, 20, 30};
int[] x = new int[]{10, 20, 30};
```

- Here the length of an array is determined by the number of values provided between { and }
- The built-in length property determines the size of the array.

Ex:

```
int[] x = new int[10];
int x_len = x.length;
```

Array - Example

```
public class ArrayDemo {
    public static void main(String[] args) {
        int[] x; // declares an array of integers
        x = new int[5]; // allocates memory for 5 integers
        x[0] = 11;
        X[4] = 22;
        System.out.println("Element at index 0: " + x[0]);
        System.out.println("Element at index 1: " + x[1]);
        System.out.println("Element at index 4: " + x[4]);
    }
}
```

Output:
Element at index 0: 11
Element at index 1: 0
Element at index 4: 22

Array Bounds, Array Resizing

- Array index starts with 0.
- We can't access an array element beyond the range.
- We can't resize an array but can use the same reference variable to refer a new array.

```
int x[] = new int [5];
x= new int [10];
```

Two-Dimensional Arrays

- Two-dimensional array is array of arrays.
- Initializing two-dimensional arrays:

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

The 1st dimension represent rows and the 2nd dimension represent columns.

The curly braces { } may also be used to initialize two dimensional arrays.

- **Ex:**

```
int[][] y = { {1,2,3}, {4,5,6}, {7,8,9} };
int[][] y = new int[][] { {1,2,3}, {4,5,6}, {7,8,9} };
```

Two-Dimensional Arrays (Contd.).

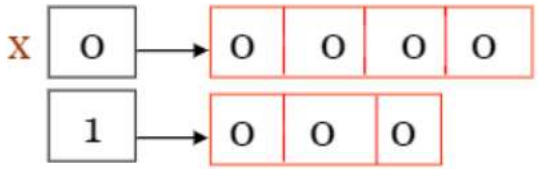
- You can initialize the row dimension without initializing the columns but not vice versa.

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

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

- The length of the columns can vary for each row.
- We can initialize number of columns for each row.
- **Ex 1:**

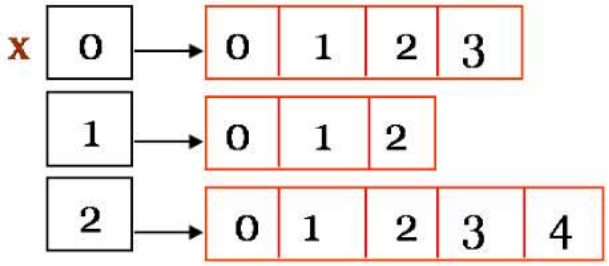
```
int [][]x = new int [2][];
x[0] = new int[5];
x[1] = new int[3];
```



Two-Dimensional Arrays (Contd.).

Ex 2:

```
int [][]x = new int [3][];
x[0] = new int[]{0,1,2,3};
x[1] = new int[]{0,1,2};
x[2] = new int[]{0,1,2,3,4};
```



Two-Dimensional Array - Example

```
/* Program to understand two-dimensional arrays */
class TwoDimDemo {
    public static void main(String[] args) {
     int [][] x = new int[3][];   // initialize number of rows
       x[0] = new int[3];  // define number of columns in each row
        x[1] = new int[2];
        x[2] = new int[5];
        for(int i=0;  i < x.length; i++) {   // print array elements
            for (int j=0;  j < x[i].length;  j++) {
                 x[i][j] = i;
               System.out.print(x[i][j]);
             }
             System.out.println();
         }
    }
}
```

Output:

```
000
11
22222
```

Quiz

Select which of the following are valid array definition :

1.
```
int[] a;
a = new int[5];
```
2.
```
int a[] = new int[5]
```
3.
```
int a[5] = new int[5];
```
4.
```
int a[] = {1,2,3};
```
5.
```
int[] a = new int[]{1,2,3};
```
6.
```
int[] a = new int[5]{1,2,3,4};
```

Quiz (Contd.).

What will be the result, if we try to compile and execute the following code :

```
class Sample {
    public static void main(String[] args) {
        int[] a = new int[5]{1,2,3};
        for(int i : a)
            System.out.println(i);
    }
}
```

Quiz (Contd.).

What will be the result, if we try to compile and execute the following code ?

```
class Test {
   public static void main(String [] args) {
      int [] x=new int[10];
      System.out.println(x[4]);
   }
}
```

Quiz (Contd.).

What will be the result, if we try to compile and execute the following code ?

```
class Test {
   public static void main(String [ ] args) {
      int x[ ][ ]=new int[10] [ ];
      System.out.println(x[4][0]);
   }
}
```


Thanking
You