



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][];
```

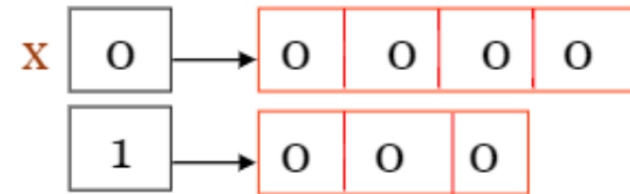
```
int[][] x = new int[][3]; //error
```

- 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];
```

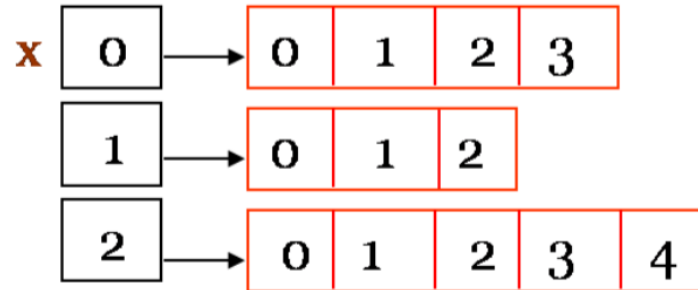
```
x[1] = new int[3];
```



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]);  
    }  
}
```



Summary

In this session, you were able to :

- Understand how to work with single and two dimensional arrays in Java



Thank You