Java Language Fundamentals - Arrays

OBJECTIVES

Arrays

LEARNING OBJECTIVES

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

- Understand one dimensional arrays
- Understand two dimensional arrays

Refer package **com.mgait.fundamentals** in the provided code base for demo programs on the topics covered in this presentation

CONCEPT

One Dimensional array

ARRAYS - OVERVIEW

- Is a group of like-typed variables that are referred to by a common name.
- Offer a convenient means of grouping related information
- May have one or more dimensions.
- A specific element is accessed by its index.
- The first element is always at index 0.

ARRAYS - OVERVIEW

- The size can be decided at the runtime
- Once initialized, the size cannot grow or shrink.
- All array elements are initialized to the respective default values
- Are initialized while the array is created

ONE DIMENSIONAL ARRAY

- Array declaration syntax

```
type var-name[];
```

- *type* determines the data type of each element of the array

```
Example:
String days[];          //days represents a String array
int [] num;             //num represents an integer array
```

- The declaration does not actually create an array.
- It declares a reference which can refer to an array object.

ONE DIMENSIONAL ARRAY

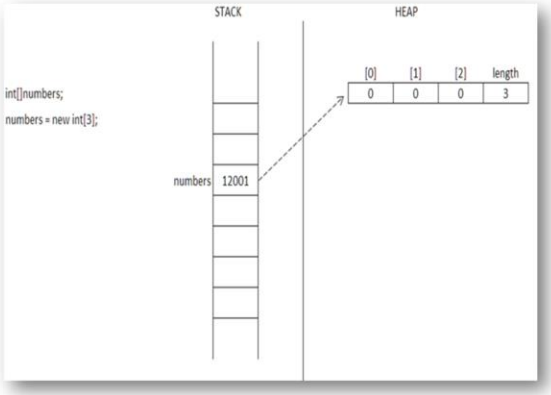
- Use 'new' keyword to allocate memory for the array elements:

  <var_name> = new < type> [<array size>];

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

- If the array size is negative, a

  NegativeArraySizeException is thrown.



ONE DIMENSIONAL ARRAY

- Throws ArrayIndexOutOfBoundsException when an index greater than the size of the array is specified

```
Example:
        int a[ ] = new int[5];
        a[10] = 10;                 // array index out of bounds
```

ONE DIMENSIONAL ARRAY

- Assigning an array initializer list to an array reference after declaration will result in an error.

```
int anArray;
anArray = {22, 33, 44}; // error
```

- You can use 'new' along with array initializer list to recreate the array.

```
anArray = new int[]{22, 33, 44};
```

ONE DIMENSIONAL ARRAY

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- Code snippet to find the biggest element in the given array;

```
int ar[]={23,3,45,67,89,34};
int max=ar[0];
for(int i=1;i<ar.length;i++){
        if (ar[i] > big)
                big = a[i];
}
```

CONCEPT

Two Dimensional array

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TWO DIMENSIONAL ARRAYS

- Is an array of arrays.
- To declare a two dimensional array variable, specify each index using another set of square brackets.
- This allocates a 4 by 5 array and assigns it to matrix.

```
The following declares a two dimensional array

int matrix[][] = new int[4][5];
```

- Internally this matrix is implemented as an *array* of *arrays* of **int**.

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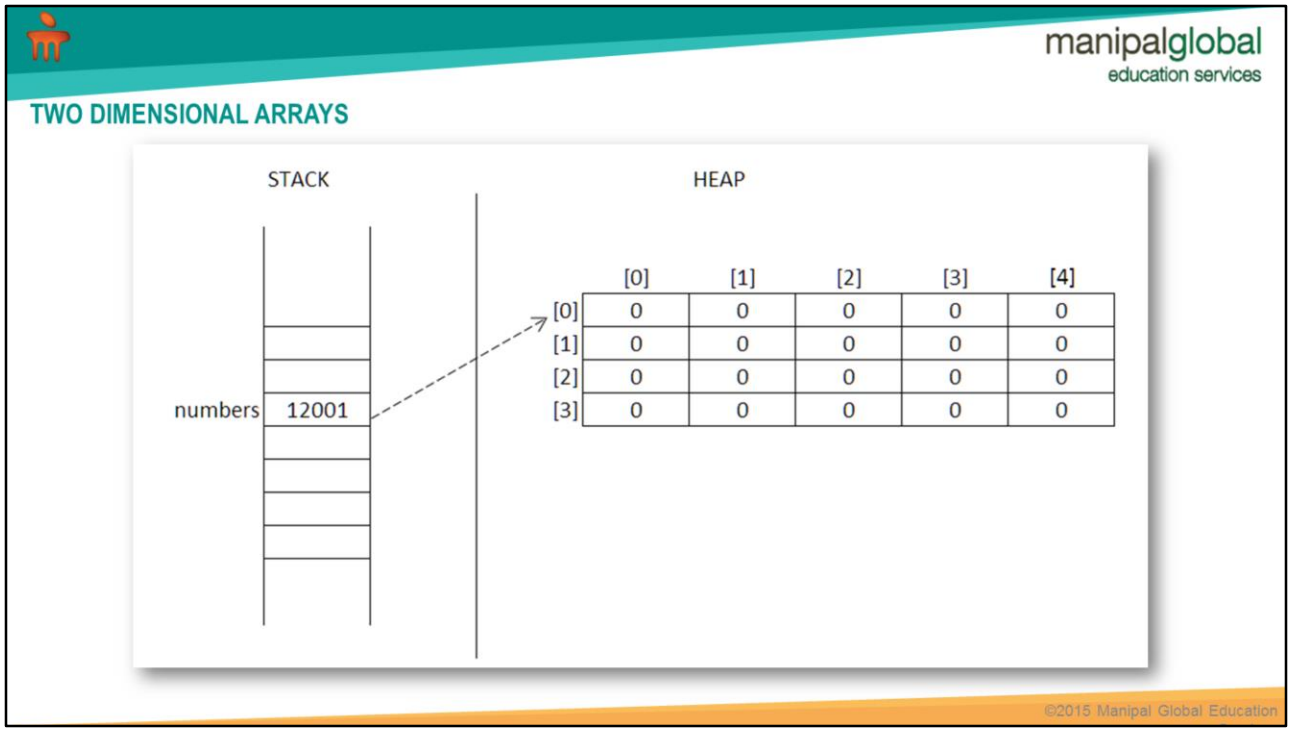
The following are valid declarations

```
<type>[][]<array name>;

<type> <array name>[][];

<type> []<array name>[];
```



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TWO DIMENSIONAL ARRAYS

TWO DIMENSIONAL ARRAYS

DEMO
Class

- Code snippet that prints the array elements in the form a matrix

```
int a[][] = {{1,2,3},{4,5,6}, {7,8,9}};
for (int i =0;i<a.length;i++){
    for (int j=0;j<a[i].length;j++){
        System.out.print(a[i][j]+"\t");
       }
    System.out.println();
}
```


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1. Which element is represented with a[10]?
10th
9th
11th
None
17
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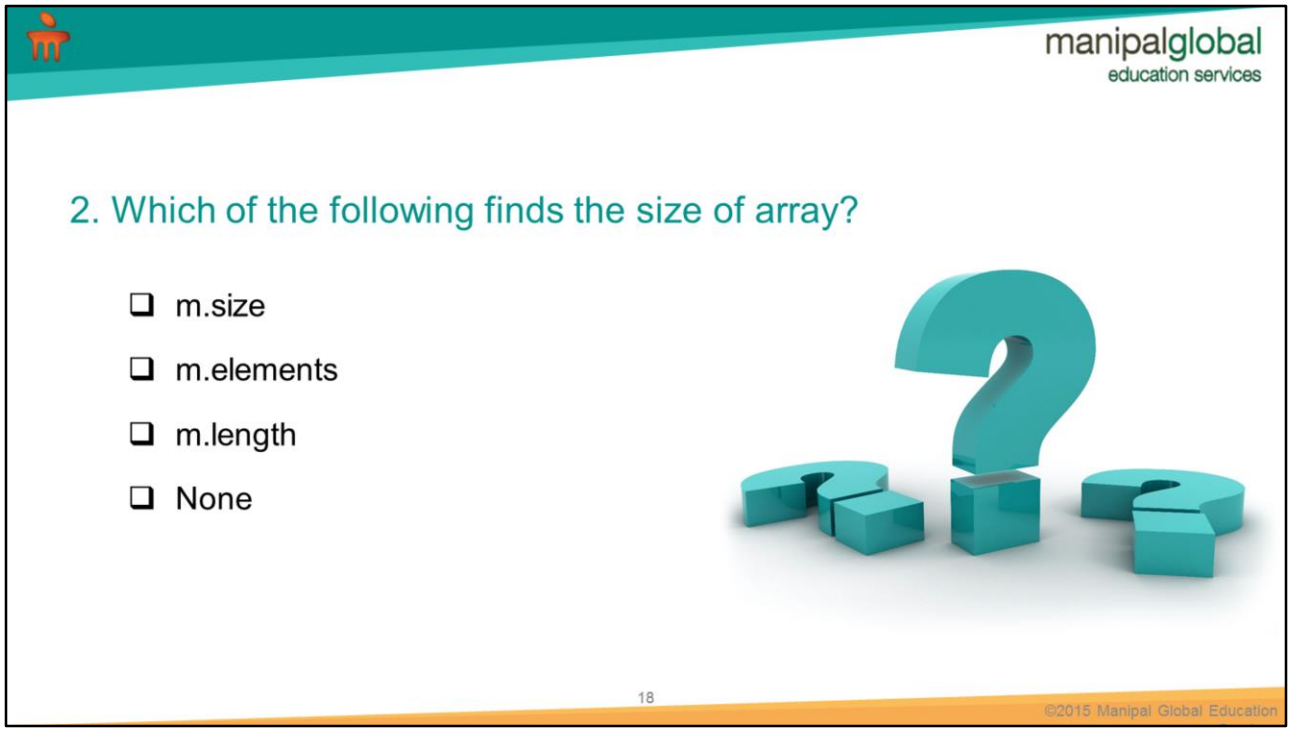
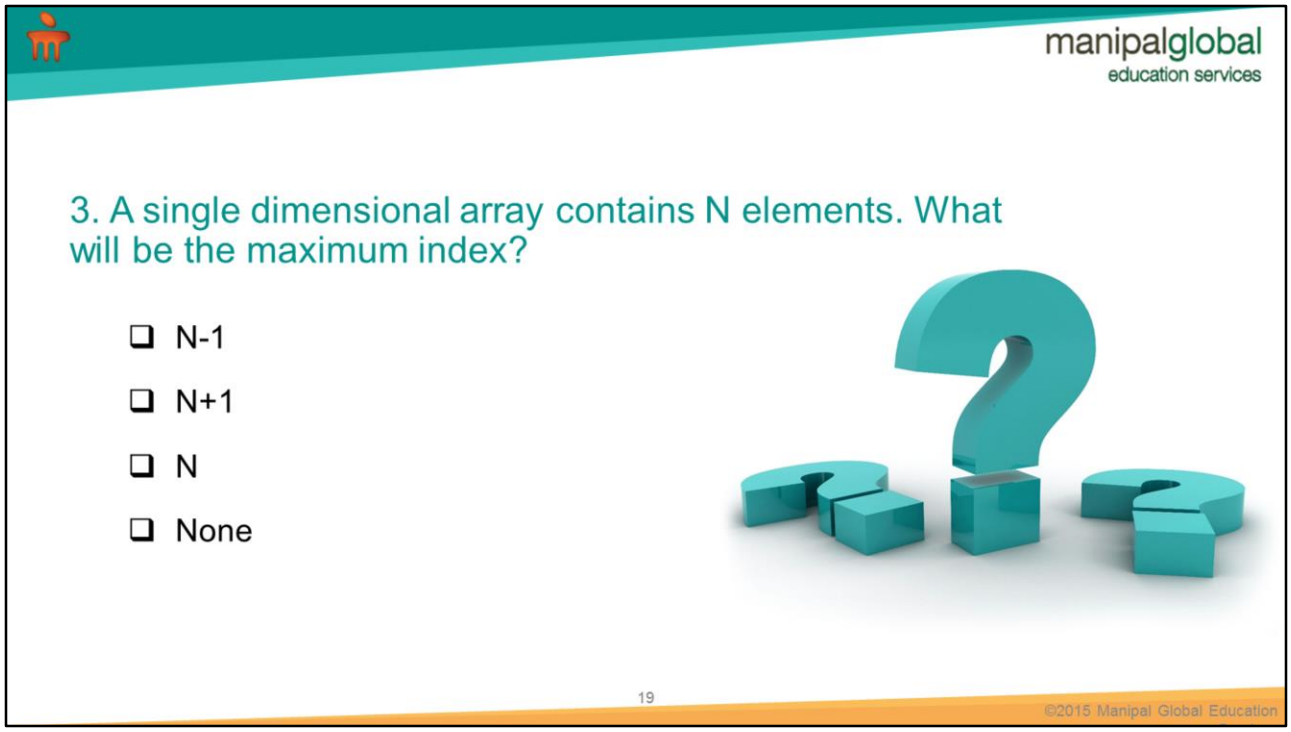
Answer: 11th



Answer: m.length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3. A single dimensional array contains N elements. What will be the maximum index?
N-1
N+1
N
None
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Answer: N-1

Answer: Index

References

- Refer following demo videos on EduNxt
  - M3L6L2_Single_dimension_arrays – Demo
  - M3L6L4_Demonstration_of_two_dimensional_arrays - Demo

SUMMARY

Arrays

SUMMARY

In this lesson, you've learned to:

- Use single dimensional arrays
- Use two dimensional arrays