4.Arrays and iterations

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Overview

What is an array?

- A group of variables containing values that all have the same type.
- Arrays are fixed-length entities
- In Java, arrays are objects, so they are considered reference types
- But the elements of an array can be either primitive types or reference types

More on array

- We access the element of an array using the following syntax.
  –name[index]
  –“index” must be a nonnegative integer
  –“index” can be int/byte/short/char but not long
- In Java, every array knows its own length
- The length information is maintained in a public final int member variable called length

Declaring and Creating Arrays

- int c[ ] = new int [12]
  –Here, “c” is a reference to an integer array
  –“c” is now pointing to an array object holding 12 integers
  –Like other objects arrays are created using “new” and are created in the heap
  –“int c[ ]” represents both the data type and the variable name. Placing number here is a syntax error.
  –int c[12]; // compiler error

Example

Here is an example:

```
public class ArrayExamples {
    public static void main(String[] args) {
        int arr[] = new int[10];

        for (int idx = 0; idx < arr.length; idx++ ) {
            arr[idx] = idx * idx; // square
        }

        for (int idx = 0; idx < arr.length; idx++ ) {
            System.out.println(arr[idx]);
        }

    }
}
```

Using an Array Initializer

- We can also use an array initializer to create an array –int arr[ ] = 10, 20, 30, 40, 50
- The length of the above array is 5
- n[0] is initialized to 10, n[1] is initialized to 20, and so on
- The compiler automatically performs a “new” operation taking the count information from the list and initializes the elements properly

Multidimensional Arrays

- Can be termed as array of arrays.
- int b[ ][ ] = new int[3][4];
  - –Length of first dimension = 3
    - •b.length equals 3
  - –Length of second dimension = 4
    - •b[0].length equals 4
- int[ ][ ] b = new int[3][4];
  - –Here, the data type is more evident i.e. “int[ ][ ]”

For-each loop

For each loops are more comfy with arrays:

```
public class ArrayExamples {
    public static void main(String[] args) {

        int arr[] = new int[10];
        for (int idx = 0; idx < arr.length; idx++ ) {
            arr[idx] = idx * idx;
        }
        for (int ele : arr) {
            System.out.println(ele);
        }

    }
}
```

Array Exercise

For 20 students store their marks of 4 subjects. Then you'll be asked to show gpa of any students through input. Calculate and print the gpa of that student.

Take a break

You've learned enough already

THE END