

Course Number	CSci 120
Descriptive Title	Object-oriented Programming
Programming Language	Java

Problem Set Number	5
Problem Number	1
Activity Title	Manipulate Arrays

Objective

In this exercise you will have hands-on experience in declaring, creating, and manipulating one- and two-dimensional arrays of primitive types.

Directions

Using Simple Arrays

1. Create an application class called `TestArrays`. In the `main()` method, declare two variables called `array1` and `array2`. They should be of type `int[]` (array of `int`).
2. Using the curly-brace notation `{}`, initialize `array1` to the first eight prime numbers: 2, 3, 5, 7, 11, 13, 17, and 19.
3. Display the contents of `array1`. You may want to use the `printArray` method at the bottom of this page to display these integer arrays in a nice fashion. Compile `TestArrays` and run it.
4. Assign the `array2` variable equal to the `array1`. Modify the even indexed element in `array2` to be equal to the index value (for example, `array2[0] = 0;` and `array2[2] = 2;` etc). Print out `array1`. Compile `TestArrays` and run it. What has happened to `array1`?

Using Multi-Dimensional Arrays

1. Declare a variable called `matrix` with the type of `int[][]` (an array of arrays of `int`). Initialize the `matrix` to an array of five arrays.
2. Populate each of the inner arrays in the following manner: Loop through the `matrix` from zero to its length; let's say that this index is `i`. On each iteration assign `matrix[i]` to a new array of integers the size of which is `i`. Then loop over each element in that array (of `ints`), with the index variable `j`. On each inner iteration assign `matrix[i][j]` to the value of `i * j`.
3. Print the `matrix` by iterating over the outer array and printing each inner array on a separate line. Compile the `TestArrays` class and run it. You should see an output similar to this:

```
matrix[0] is <>
matrix[1] is <0>
matrix[2] is <0, 2>
matrix[3] is <0, 3, 6>
matrix[4] is <0, 4, 8, 12>
```

The `printArray` Support Method

```
public static void printArray(int[] array) {
    System.out.print('<');
    for (int i = 0; i < array.length; i++) {
        // print an element
        System.out.print(array[i]);
        // print a comma delimiter if not the last element
        if ((i + 1) < array.length) {
            System.out.print(", ");
        }
    }
    System.out.print('>');
}
```