



### Exercise 1. Basics

What elements does the array **numbers** contain after the following code is executed? (Write the elements in the format: {0, 1, 2, ...})

```
int[] numbers = new int[10];
numbers[2] = 4;
numbers[5] = 55;
numbers[7] = 1;
int x = numbers[2];
numbers[x] = 88;
numbers[numbers[7]] = 11;
```

### Exercise 2. Basics

Which of the following choices is the correct syntax for quickly declaring/initializing an array of six integers to store a particular list of values?

- a. `int[] a = new [6] {100,90,80, -30, 24, 51};`
- b. `int a[6] = {100, 90, 80, -30, 24, 51};`
- c. `int [] a;`  
`a = {100,90,80, -30, 24, 51}`
- d. `int [] a = {100,90,80, -30, 24, 51}`

### Exercise 3. Reference

The following program produces 4 lines of output. Write each line of output below as it would appear on the console.

```
public class ReferenceMystery {
    public static void main(String[] args) {
        int x = 0;
        int[] a = new int[4];
        x++;
        mystery(x, a);
        System.out.println(x + " " + Arrays.toString(a));
        x++;
        mystery(x, a);
        System.out.println(x + " " + Arrays.toString(a));}

    public static void mystery(int x, int[] a) {
        x++;
        a[x]++;
        System.out.println(x + " " + Arrays.toString(a)); } }
```

#### Exercise 4. Maximum in an Array

Write a method called **getMax** that accepts an array of integers as a parameter and returns the maximum value in the array. For example, if the array passed stores {12, 7, -1, 25, 3, 9}, your method should return 25. You may assume that the array contains at least one element. Your method should not modify the elements of the array.

#### Exercise 5. Printing an Array

Write code that uses a for loop to print each element of an array of integers. For example, if the array contains the elements [-10, 4, 10002, 453, 24] then your code should produce the following output (Note that you can use printf to get the output as shown). Test your code on different arrays and different sizes:

```
Element [0] =    -10
Element [1] =      4
Element [2] =  10002
Element [3] =    453
Element [4] =     24
```

#### Exercise 6. Linear Search

Write a method **linearSearch** that takes an array of integers, and an integer value. It should then return the index of the value inside the array (by using a for loop to traverse the elements one by one in order). If the value is not found, -1 should be returned. If more than one value is found, the first occurrence should be returned. Write a program to test your method.

#### Exercise 7. Average Grades

- Write a method, **getAverage**, that takes an integer array and returns the average of the numbers in the array.
- Write a program that asks the user to enter the number of grades he/she has till now. Then it will take these grades as input as shown below, and store them in an integer array. The function **getAverage** will then be called to calculate the average of the entered grades as shown in the following sample run:

```
How many grades do you have by now? 4
```

```
Enter grade 1: 70
Enter grade 2: 90
Enter grade 3: 60
Enter grade 4: 72
```

```
Your grades: [70, 90, 60, 72]
Average: 73.0
```

### Exercise 8. Count Strings

Write a method **countStrings** that takes an array of Strings and a ***target*** String and returns the number of occurrences *target* appears in the array.

Implement a main method to test your work on different arrays.

### Exercise 9. All Less

Write a method called **allLess** that accepts two arrays of integers and returns true if each element in the first array is less than the element at the same index in the second array. If the arrays are not the same length, you should return false.