Exercise – Arrays

Write the methods for following common operations on Arrays

1. Initialize the array with user input
2. Initialize the array with random values
3. Printing the content of array
4. Randomly shuffle elements of array
5. Reverse the contents of array
6. Shifting the elements of array
7. Find the largest element and its index
8. Summing all the elements
9. Linear Search
10. Binary Search
11. Insertion Sort
12. Bubble Sort

13. Write a program that reads in ten numbers and displays the number of distinct numbers and the distinct numbers separated by exactly one space (i.e., if a number appears multiple times, it is displayed only once). (Hint: Read a number and store it to an array if it is new. If the number is already in the array, ignore it.) After the input, the array contains the distinct numbers. Here is the sample run of the program:

    Enter ten numbers: 1 2 3 2 1 6 3 4 5 2
    The number of distinct number is 6
    The distinct numbers are: 1 2 3 6 4 5

14. Write a program that reads the integers between 1 and 100 and counts the occurrences of each. Assume the input ends with 0. Here is a sample run of the program:

    Enter the integers between 1 and 100: 2 5 6 5 4 3 23 43 2 0
    2 occurs 2 times
    3 occurs 1 time
    4 occurs 1 time
    5 occurs 2 times
    6 occurs 1 time
    23 occurs 1 time
    43 occurs 1 time

Note that if a number occurs more than one time, the plural word “times” is used in the output.

15. Write a program that reads an unspecified number of scores and determines how many scores are above or equal to the average and how many scores are below the average. Enter a negative number to signify the end of the input. Assume that the maximum number of scores is 100.

16. Write a method that finds the smallest element in an array of double values using the following header:

    public static double min(double[] array)

    Write a test program that prompts the user to enter ten numbers, invokes this method to return the minimum value, and displays the minimum value. Here is a sample run of the program:

    Enter ten numbers: 1.9 2.5 3.7 2 1.5 6 3 4 5 2
    The minimum number is: 1.5

17. Write a method that returns a new array by eliminating the duplicate values in the array using the following method header:

```
public static int[] eliminateDuplicates(int[] list)
```

Write a test program that reads in ten integers, invokes the method, and displays the result. Here is the sample run of the program:

```
Enter ten numbers: 1 2 3 2 1 6 3 4 5 2
The distinct numbers are: 1 2 3 6 4 5
```