Lab 8 (October 11 or October 12)

Instructions: Complete the steps below. Be sure to show your code to one of the lab TAs before you leave, so that you can receive credit for this lab. You must also upload a copy of all your source code (.java) files to the link on Blackboard by 11:59 PM on Thursday, October 12.

1. Define a Java method named `distribute()` that takes two arguments: an array of positive integer values and an integer value indicating a valid index within that array.

   ```
   public static void distribute (int [ ] values, int
   start_index)
   ```

   This method does the following:

   • Saves the value contained in the specified array index into a temporary variable (call it *count* for the purposes of this description)

   • Sets the value at index *count* to 0

   • Starting at the *next* index and wrapping around if necessary, adds 1 to each subsequent array value until *count* elements have been updated

   The `distribute()` method does not return any value; instead, it directly modifies its array parameter.

   For example, consider the initial array [3, 1, 6, 2, 4, 1, 5], which has a length of 7. Our starting index is 3, which holds the value 2. We will set the value of index 3 to 0, and add 1 to each of the next 2 array values, to get the final result [3, 1, 6, 0, 5, 2, 5].

   If we had a sufficiently large starting value, we would ``wrap around'' the end of the array to continue incrementing the array values. For example, if our starting index had been 2 (which holds the value 6) instead, we would have incremented indices 3, 4, 5, 6, 0, and 1, in that order, to get [4, 2, 0, 3, 5, 2, 6].

   Write a small Java program that uses `Math.random()` to generate an array of 15 random integers in the range 1–13. Your program should display the starting array, read in a starting index from the user, call `distribute()` with your array and the user input, and then print the modified array.

2. Define the following method, which returns the location of the largest element in a two-dimensional array of integers:

   ```
   public static int [ ] locateLargest(double [ ] [ ] a)
   ```

The method returns a one-dimensional array that contains exactly two integer elements, representing the row and column indices of the largest element in the two-dimensional array.

Write a test program that prompts the user to enter a two-dimensional array of double values and displays the location of the largest element in the array.

Sample execution:

Enter the number of rows: **3**

Enter the number of columns: **4**

Enter the array values, one row at a time:

23.5 35 2 10

4.5 3 45 3.5

35 44 5.5 9.6

The largest element is at (1,2)

Grading Guidelines: This lab is graded on a scale of 0-3 points, assigned as follows:

0 points: Student is absent or does not appear to have completed any work for the lab

1 point: Student has written one or both programs, but the code does not compile or run at all due to errors.

2 points: Student has written (or attempted to write) both programs, but only one compiles and runs without error.

3 points: Both programs compile and run correctly, without any apparent errors.