CMSC 113 – COMPUTER SCIENCE 1
Lab#4 1-Dimensional Arrays – Practice

In this lab you will practice instances where arrays are used to do some typical computations. Answer all questions in the space provided. If you need to confirm an answer, ask your instructor.

Task # 1: Review: The following table contains some typical examples of using arrays. Assume that the array **a[]** is an array of **n** double values. Please spend a few minutes, preferably with the person sitting next to you, to get a good understanding of arrays. Please, ask your instructor in case you need any clarification. Before you study the table below, declare and create the array **a[]** below:

_____

create an array with random values	```double[] a = new double[n];\nfor (int i = 0; i < n; i++)\n a[i] = Math.random();```
print the array values, one per line	```for (int i = 0; i < n; i++) {\n System.out.println(a[i]);```
find the maximum of the array values	```double max = a[0];\nfor (int i = 1; i < n; i++) {\n if (a[i] > max)\n max = a[i];\n}```
compute the average of the array values	```double sum = 0.0;\nfor (int i = 0; i < n; i++)\n sum = sum + a[i];\ndouble average = sum / n;```
Reverse the values within an array	```for (int i = 0; i < n/2; i++) {\n double temp = a[i];\n a[i] = a[n-1-i];\n a[n-1-i] = temp;\n}```

Task#2: Write and run a program that declares, creates, and initializes an array **a[]** of length 1000 with all zeros. Then, write a command following the initialization to print out the value in a[1000].

Does your program compile?

What happens when you run it?

Task#4: Hand trace the following code and show the contents of the array, **a[ ]** after the for-loop has terminated:

```
int n = 10;
int[] a = new int[n];
a[0] = 1;
a[1] = 1;
for (int i=2; i < n; i++)
    a[i] = a[i-1] + a[i-2];
```

Contents of a[ ] will be:

Task#3: Sampling without replacement

The program below takes two command line arguments **m** and **n** and produces a sample of **m** integers from 0..n-1. Enter, run, and test the output of the program for values (m, n) = (5, 10), (5, 1000).

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

              int m = Integer.parseInt(args[0]);
              int n = Integer.parseInt(args[1]);
              int[] a = new int[n];

              // Initialize a[]
              for (int j = 0; j < n; j++)
                    a[j] = j;

              // Shuffle the first m elements of the array
              for (int i = 0; i < m; i++) {
                    int r = i + (int) (Math.random() * (n - i));
                    int t = a[r];
                    a[r] = a[i];
                    a[i] = t;
              }

              // Print sample
              for (int i = 0; i < m; i++)
                    System.out.print(a[i]) + " ");
              System.out.println();
      } // main()
} // class Sample
```

Run the program for (10, 10) and (10, 5) and write down the output of the program below. Can you explain the results?