Introduction to Java Section I

CS9053

Thursday 6:00 PM – 8:30 PM

Prof. Dean Christakos

Jan 31st, 2025

Due: Feb 7th, 2025 11:59 PM

**Assignment 2**

**Part I – Loops**

The alternating Harmonic Series is given by:

The alternating signs cause the partial sums to oscillate, but the equation does converge. Ultimately,

as ,

Write a method that executes this summation using a loop and figure out how many iterations of n it takes for the sum to estimate to within .00001 (

You should print out something like this:

ln(2) is estimated as <x> after <y> iterations

Where <x> is the estimation of to within .00001

Because the method estimateLn2() cannot return both the estimation and the number of iterations, this output should be printed from within the estimateLn2() method.

**Part II: Arrays**

1. In MaximumSubArray.java, you are going to take an integer array arr, and return an array output that is the maximum subarray sum within arr.

Input: arr = [−2,1,−3,4,−1,2,1,−5,4]

Output: output = [4,−1,2,1]

Maximum Sum: 6

Any array methods are allowed, such as Arrays.copyOfRange()

1. Rotate a 2-dimension matrix 90 degrees: in RotateMatrix.java, the method rotatedMatrix takes a 2 dimensional matrix of integers and returns a 2-dimensional matrix of integers that has been rotated 90 degrees clockwise.

Therefore, a 4x3 matrix becomes a 3x4 matrix:

**Part III: Strings**

1. **Generate a Pyramid of Letters**

You are going to generate a Pyramid of letters based on the number of rows you enter as an argument.

Example:

generatePyramid(5) **returns a String** that represents a pyramid with 5 rows:

A

ABA

ABCBA

ABCDCBA

ABCDEDCBA

You will need to keep track of the number of spaces for each row and the number of characters and the order.

Whether you choose to use arrays of characters, form the String step by step is up to you.

You can (if you need to… there’s no one right answer to this) create a String out of array of chars using

String str1 = new String(charArrray);

The generatePyramid method with return the String and you will print out that String in the maim method