Introduction to Java Section I

CS9053

Thursday 6:00 PM – 8:30 PM

Prof. Dean Christakos

Sept. 11th, 2025

Due: Sept. 19th, 2025 11:59 PM

**Assignment 2**

**Part I – Loops**

The Leibniz Formula for πis given by:

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:

pi is estimated as <x> after <y> iterations

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

**Part II: Arrays**

1. In Java you can make a two dimensional array—an array of arrays. Each array contains a reference to another array. That array contains the values. In this way we can create a matrix.

In the main method of the class SpiralMatrix, I have a 5x4 matrix (5 rows, 4 columns) in the variable matrix.

1. Using nested loops, print out the contents of the matrix to the console , row by row
2. Return the “spiral matrix”, an array containing elements of the matrix in **spiral order traversal**, starting from the top-left corner and moving right, then down, then left, then up, and so on.

For example, the matrix has a spiral order of [1, 2, 3, 6, 9, 8, 7, 4, 5]

**Part III: Strings**

1. **Make an Acronym from a String**

Write a Java program that takes a sentence and returns its acronym.

Example:

Input: "As Soon As Possible"

Output: "ASAP"

Use split(" ") to separate words. split() returns an array of String objects. Then you will iterate through the array of Strings to access each word.

Use charAt(0) and toUpperCase() for the first letter of each word.

Concatenate letters using string operations (+= or concat).

Show the results for s1 and s2

1. **Mirror String Generator**

Write a Java program that takes a string and produces its “mirrored” version by appending the reverse of the string to itself.

**Examples:**

Input: "hello"

Output: "helloolleh"

Input: "java"

Output: "javaavaj"

Input: "a"

Output: "aa"

There are different ways of doing this. You could use charAt() to get each letter from end to beginning to form a reversed string and then concatenate it to the original string, for example.