CS 1101 – Introduction to Computer Science

Spring 2022

Lab 8 - Recursion

Due Date: Monday, March 28, end of the day (11:59pm).

Objective: The goal of this assignment is to get familiar with **methods** and **recursion**.

Assignment:

You are to create a program that:

1) Takes an integer number *n* from the user.
2) Using a recursive method, prints the binary representation of *n.*
3) Using a recursive method, raises *n* to a power of 3 (i.e., n^3).
4) Using a recursive method, prints the numbers from *n* to 1, in descending order.
5) Using a recursive method, prints the sum of *n* numbers (from 1 to n): 1+ 2+ …+ *n*.

Example:

For a given number 5, the program should use recursion to show the following information:

- Number: 5
- Binary: 101
- 5 Raised to 3: 125
- Descending order: 5 4 3 2 1
- Sum: 15

Deliverables: You are expected to submit two files in Blackboard:

(i) Lab8_Lastname.doc--- contains the algorithm of your program and **tracing of your java program when n is 9**

(ii) Lab8_Lastname.java --- the java file of your program.

Grading Criteria:

- [10 points] Algorithm.
  - Sequential, executable, finite, and correct.
- [10 points] Tracing
  - Trace either the algorithm or the java program for *n*=9.
- [77 points] Java program that is similar to the algorithm.
  - [10 pts] Program compiles and runs.
  - [20 pts] The program uses methods, conditional statements, and recursion.
  - [10 pts] Correct types for each variable, correct naming conventions, and variables should have meaningful variable names.

- [25 pts] The program has correct logic and generates correct output.
- [5 pts] The program is indented properly.
- [5 pts] The program uses meaningful variable names.
- [2 pts] The program has proper documentation.

- [3 points] The deliverables follow the proper name Lab8_LastName

- Late submission: [**-10**] points for every 24 hours after the deadline.

If you need any clarification, please ask your TA for further details.