

Assignment 1 Recursion - 100 pts Due 8/21 @ 11:59 pm

Note: Never hard-code test data in the test program, unless explicitly stated otherwise in the assignment. Always allow the user to enter the test data using a menu option

#### GENERAL SUBMISSION REQUIREMENTS

Upload all files individually as specified, not as zip files, to Assignments in D2L. Do not email files.

Make sure your program compiles, runs, and produces the correct output.

IF YOU NEED HELP – CONTACT ONE OF OUR GTA's (see contact info in D2L Content)

Ensure you have the correct file name(s), and author header, as specified in the Assignment.

Always use meaningful labels for prompts, inputs, and outputs.

**Well documented programs use comments, indentation and whitespace as shown in text.**

**HINT: complete Programming Practice Quiz 1 before starting this assignment**

#### Problem 1. Factorial

**Objective:** To reinforce the concept of thinking through your problem and developing the steps (algorithm) for solving the problem; then use the algorithm to implement the solution.

#### **Assignment:**

First, write out the logic / pseudo code / algorithm (note from here on we will refer to this as just algorithm) to compute the factorial of  $n$ , customarily denoted as  $n!$

It is important to use correct recursion terminology in your algorithmic solution.

Next, use your algorithm as the basis for writing a complete, well documented program solving the factorial problem using recursion. Your program should prompt the user to enter a nonnegative number and then display the factorial for that number. Your program must contain a function called *factorial*.

Function *factorial* calculates the factorial of a number. Sample output is included below.

---

Enter a nonnegative integer: 4 <enter>

Factorial of 4 is 24

---

Do not forget to include author header in your file as shown, no header, no points!

```
// Name: <your name>
// Class: CS 3305/ put your section number after the /
// Term: Fall YYYY
// Instructor: Sharon Perry
// Assignment: A1 Factorial
```

## DELIVERABLE INSTRUCTIONS

Capture a **READABLE** screenshot(s) of your program output and paste into a word/pdf document. Readable means readable! Screenshots ***should not be an entire desktop*** – use some type of snipping tool. After your output screenshots, copy and paste the source code for your program into the word/pdf doc. Save doc as a file named LastName-A1-P1-Factorial.docx or .pdf. word. Last step is to upload everything to D2L, word/pdf doc and source code file.

```
= =- = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
= = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = = =
```

### Problem 2 – Recursion

Write a complete, well documented program, that prompts the user for input and tests a recursive function. You will write one function that implements recursion and produces the following output:

```
// Sample output below is for input of 4
// Note: correct indentions are required for full credit.
```

```
    This was written by call number 1.
    This was written by call number 2.
    This was written by call number 3.
    This was written by call number 4.
    This was ALSO written by call number 4.
    This was ALSO written by call number 3.
    This was ALSO written by call number 2.
    This was ALSO written by call number 1.
```

In this example, the recursion stopped when it reached four levels deep (because 4 was input), but your program should be capable of continuing to any specified level.

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// Class: CS 3305/ put your section number after the /
```

// Term: Fall YYYY  
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1. word/pdf doc that contains output screenshot and copy/pasted source code; AND
2. your .java file that contains your source code.

Only your latest submission is kept so if you update a file and want to resubmit you must upload all files. Submit everything to the assignment submission folder in D2L by the due date posted in D2L.

**No zip file or email submissions are accepted. Late penalties of 10% per day are in effect.**

**Important Note:** Code must be correctly running and produce correct results before being uploaded.