

Name: _____

CS 210 – Fundamentals of Programming I

Fall 2019 – In-class Exercise 4 for 09/10/2019

(10 points) The following in-class exercise has two parts, a written part and a programming part. The purpose of this exercise is to work with loops. Write the answers to the written part in this assignment sheet. Hand in this sheet and submit the program electronically when you are done. An **empty** CodeBlocks project should be created for this exercise and the program file `patterns.c` should be downloaded from the course website to the project folder, then the file added to the project. **DO NOT CHANGE** the name of the file!

Problem Statement

Write a program that creates different patterns in an $n \times n$ grid, where n is the pattern grid size input by the user.

Analysis & Design

Main program analysis and design is given in the accompanying code. Each of the main program design steps will be implemented using a function. The analyses and designs of the functions will be covered during lecture as we build this program. The assignment assumes that two of the functions you write during class are named `script` and `draw_vertical_line`.

Assignment

0. (2 points) Complete the `script` function and the functions that draw the patterns covered in the lecture.
1. (1 point) What are the (formal) parameters of the `script` function when it is used in function `draw_vertical_line`, w ?
2. (1 points) With respect to its use in function `draw_vertical_line`, what are the (actual) arguments to the `script` function?
3. (2 points) Answer the following questions regarding the loop in function `draw_vertical_line`.
 - a. What is the loop control variable?
 - b. What is the loop condition?
 - c. What is the initialization statement of this loop?
 - d. What is the update statement of this loop?

(Note: Exercise 4 is on the back page and is a programming exercise.)

4. (4 points)

a. Add a function `draw_right_diagonal` that receives a pattern grid size and displays a right diagonal of asterisks across the $n \times n$ grid. E.g., if n is 5, then the output would be:

```
  *
 *
*
*
*
```

You should use a while-loop or a for-loop and the `script` function to draw this pattern in a similar manner to the previous ones designed in class. You are not required to comment in-class exercise code, but you can if you want to.

b. Add a call to this function where indicated in the main program.

When you have completed this exercise, zip up your `patterns.c` file and submit it electronically under assignment 05-IN4. **The submission system will compile, but NOT run your program**, so you should get a result of success unless you submit something other than a zipfile containing `patterns.c`. Turn in this exercise sheet with your answers to the questions. REMINDER: once you have finished this exercise, you are expected to work on Programming Project 2 and/or Homework 3 unless you have completed them.