These exercises are intended to give you practice with the course material. If you have any questions, discuss them with your classmates! *Asking* and *answering* questions are both effective ways to learn and eventually master concepts. Of course, you can ask the course staff as well; they are there to help you learn.

When you have completed the exercise, show this sheet and any associated programs to a TA or Consultant, who will record that you have completed the work. If you do not finish this exercise during class, You have until *Tuesday*, 8/30, at 9pm to to get your exercise checked off during consulting hours or TA office hours (not professor office hours).

1 Getting situated with MATLAB

Here we will determine how you will be accessing MATLAB during the current discussion section. Go to the course website (https://www.cs.cornell.edu/courses/cs1112/2022fa/) and click on "Course info" then "Accessing MATLAB". Read the instructions on this page and decide how you would like to access Matlab. Note that the computers in your discussion room all already have MATLAB installed.

How will you be accessing MATLAB in this section? ____

Now that you have decided, follow the instructions and open up MATLAB.

2 Getting situated with file storage

If you haven't already, setup your file storage with folders and subfolders to organize all the files that you will use in this course. This will either be on your personal computer or on MATLAB Online. If you did not bring your personal computer to lab, you must do this in MATLAB Online. Steps:

- 1. Create a folder that is easily accessible that will store all of your files of this course. I would suggest calling it "CS1112", but you can call it whatever you like.
- 2. Within the folder created above, create at least 3 subfolders. They should be called "Exercises", "Projects", and "LectureCodes". You will want to create more folders like "ExamPractice" later on, but for now those three will be sufficient.
- 3. Download the MATLAB script spiral.m from the course website. Go to the course website, click on "Assignments" then "Exercises" in the navigation bar, then download "spiral.m". The easiest way to download the file is to *right*-click (Windows) or *ctrl-click* (Mac) on the file name, select *save link as* ..., and put it in the "Exercises" folder. Make sure that the file name remains spiral.m without any space and parentheses. If your machine has added any extra characters to the file name, e.g., spiral (1).m, after saving the file you must change the name to be without any space and parentheses before you open or run the file in MATLAB.
- 4. Create a subfolder in the "Exercises" folder called "ex01" and put the script spiral.m into this folder. We will use this MATLAB script in problem 4!

3 MATLAB built-in functions... fun with MATLAB

MATLAB provides numerous built-in variables and functions. For each line below, type the text in the *Command Window* and press < Enter > to see what happens. Where you see $%_{----}$, write the output produced by the code on the left.

- % This is a comment--no action is executed by the computer
- % From this point on, read but do not type the text after the % symbol in a line.
- % Variables, constants, and simple calculations: a= 100 % Look at the Workspace Pane: a VARIABLE called a has been created a= 101 % Look at the variable's value in the Workspace Pane

b= 99 format compact % _____ a/b ans y= ans % _____ format long V format short y p=(3*2)^2 $q=(3*2)^2$; % Did you type the semi-colon? Look at the Workspace Pane: q is % created but its value is not shown in the Command Window. $x = 2; y = x^x; z = y^y \%$ format loose % Built-in functions: sqrt(x)pi % a built-in variable % _____ cos(pi) abs(ans) % _____ abs(cos(pi)) exp(ans) % What does function rem do? If you're not sure, try a few more rem(5,2)% examples: rem(9,7), rem(10,6), ... _____ % Generate one random number in the range of (0,1)randhelp rand lookfor magic % MATLAB searches its documentation for the keyword 'magic' % Wait a few seconds. If this command takes too long to % complete, press <Ctrl><c> to make it stop.

4 Running and editing a MATLAB program

Now in MATLAB set the *Current Folder* to be the directory in which you have stored your file spiral.m. You should now see the file listed in the *Current Folder Pane*.

To run the program (script) spiral, in the *Command Window* type "spiral" and press *<Enter>*. What do you see on the screen?

To see the code inside the program, open the program file in the *Editor Window*: in the top menu click $File \rightarrow Open$ and then select or type the file name spiral.m. (Or in the *Current Directory Pane* double click on the file name.)

Now experiment with the program!

- 1. Change the value of turnAngle from 100 to 137. Save the program and run it to see what happens. Try other values for turnAngle. What does the *variable* turnAngle represent (or control) in the program?
- 2. Now change the value of numEdges and run the program again. Try again with another value. What does *variable* numEdges represent?
- 3. Which variable controls the color of the spiral? ______ Now change the color.

If you are using a lab computer, be sure to log off before you leave!