

CS1112 Discussion (Lab) 1

When you have completed the lab, show this sheet and any associated programs to your lab instructor, who will record that you have completed the lab. If you do not finish this exercise during the lab, show the instructor what you have done at the end of the lab and be sure to complete it in the next few days.

If you have any questions, **ask** your lab instructor or a consultant immediately! They are in the lab to help you learn the material.

1 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. Is the result what you expect? Fill in the blanks below with the screen output for that line.

```
% 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
b= 99  % Look at the Workspace Pane: a VARIABLE called  b  has been created
format compact
a/b                % -----
ans
y= ans             % -----
format long
y
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)
rem(5,2) % What does function rem do? If you're not sure, try a few more
         % examples: rem(9,7), rem(10,6), ... -----
rand     % Generate one random number in the range of (0,1)
help 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.
```

2 Running and editing a MATLAB program

From the course website (<http://www.cs.cornell.edu/courses/cs1112>), download the file `spiral.m` from the *Exercises* page to the *Desktop* of your computer. (You can use another directory/path, but be sure to write down the location of your file.)

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

To run the program (script) `spiral`, in the *Command Window* type the file name without the extension `.m`. What do you see on the screen?

To read the program, open the program file in the *Editor Window*: select menu options *File*→*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.
4. Now experiment with the print *format*. Look at Line 43 in the program. The `title(...)` command prints a string of text at the top of the figure window. The *substitution sequence* `%d` inside the quotation marks is replaced by the *value* of the variable `numEdges` when the command is executed. Notice that the value is printed as a whole number (no decimal part). Change the substitution sequence `%d` to `%f` and run the program. How has the format changed? _____
5. Now we try to control the number of decimal places that are printed. Change *one* of the substitution sequences from `%f` to `%.2f`. Run the program again and notice that the print format of only one of the two numbers printed has changed. What does the substitution sequence `%.2f` specify? _____
6. Say, you want to use 10 character spaces for printing the entire value (including the decimal point) with 2 decimal places shown. You will then use the substitution sequence `%10.2f`. Again, make this change and observe the print format.

3 Temperature conversion (from *Insight M1.1.3*)

A temperature can be converted from the Fahrenheit scale to Celsius using the formula $c = \frac{5}{9}(f - 32)$ where f is a temperature given in °F and c is the resulting temperature in °C. Write a script to prompt the user for a temperature in °F and convert and print the temperature in °C. Use the `fprintf` statement to print the result nicely, to one decimal place. Save the file as `convertF2C.m`.

4 CS1112 course web page <http://www.cs.cornell.edu/courses/cs1112/>

Answer the following questions:

1. Where are the reading assignments listed? _____
2. What does the CS1112 AI policy say about code found on the Internet? _____
3. Can you use the office hour of a TA who is *not* your section instructor? _____
4. Where do you find the consultants to get help? (Note: consulting begins on Sunday) _____
5. How do you indicate that you work with a partner on a project? (See CMS link) _____

5 CMS: Course Management System

You will use CMS to submit homework, find your scores, and view grading comments. If you *pre-enrolled* in CS1112, you can use CMS already. Try to log on CMS now. If CS1112 is *not* listed as one of your courses, ask your section instructor to add your information into CMS. Note that your *homework must be submitted through CMS*.

Please delete your files from the computer and sign in before leaving!