CS1109: Lab 1

June 25th 2013

In this lab, you will be introduced to MATLAB (short for MATrix Laboratory). You will also learn about two of the most fundamental building blocks of computer programs -- variables and assignment statements.

General Lab Instructions

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

1

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 .

% 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 are not sure, try a few more examples
                          % 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/cs1109/2012su/,* download the
spiral.m file 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.m*, 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   CMS: Course Management System

Please delete your files from the computer!