LAB 2

CS1109

27th June, 2013

1   Test the following and write the output :

(If A = [0 1 1 0 1] , then A(1) returns ans = 0; A(2) returns ans = 1 ….)

Fill the comments after typing in the commands.

1. if ((4 + 6 * 5 / 10) == (4 * 2 - 1)   % Check the value of (4 + 6 * 5 / 10) = _____
    disp("TRUE");   % Check the value of (4 * 2 - 1) =_____
    end   % Can you predict order of precedence of (+/-) vs (*/)?

2. A = [2 7 6];   % What is the output?
    B = [8 7 0];   % _____
    A = = B   % Note: There is no space between the two equal to signs

3. A = [0 1 1 0 1];   % A & B   ~A   A | B
    B = [1 1 0 0 1];   %_____   _____   _____

4. Create a file *cos_lab.m* on your Desktop. Write the following to the file –

         %This function returns the cos of the given angle
         %The angle should be in radians
         %angle in degrees = angle in radians * (180 / pi)

         function x = cos_lab(theta)
               x = cos(theta)

    Change the current working directory to Desktop. On the command window type -
    cos_lab(pi)   % _____
    cos_lab(45 * pi / 180) % _____
    cos_lab(3 / 4 * pi)   % _____
    help cos_lab   % Check the output

2   Quadratic Solver

Download the lab2.zip folder from the site location –
Unzip it to the Desktop. Change the current directory to Desktop or the folder where the
files are unzipped. Open the file *quadratic.m*. Search for **'TODO'** and follow the
instructions. As a user, you will input three values for **a**, **b** and **c** as in the equation,
ax^2 + bx + c. Calculate the Discriminant and print the roots as follows –

       if D is less than 0
           display '*Imaginary roots*'
       if D is equal to 0
           display '*Equal roots*'
           print the root
       if D is greater than 0
           display '*There are two roots*'
           print the two roots

NOTE: When a function returns two values, you can fetch both the values as –
[x y] = quadratic
x contains the first root, y contains the second

3   Temperature converter

Open the file *cf.m*. Search for 'TODO' and follow the instructions. The function converts ˚**C** to ˚**F** or vice versa based on user input as 1 or 2 resp. Complete the if conditions for the function *cf()*. Also, check how the function *seasonPredictor()* predicts the season.

4   Challenge

- **Beauty of Math**
  You have to complete the two functions mentioned in the file. Experiment with different sin and cos functions and admire the beauty of Mathematics. Follow the TODOs.
  The helper function returns two random values viz. frequency and amplitude you will use to create your functions.
  If the screen does not remove the previous graph, use **clf** command to clear. (*clear figure*)

- **Tell the Quadrant**
  Write two different programs to determine in which quadrant a user-input value of **A** degrees belongs. Assume that the user may enter any non-negative number. For example, 725˚ is the same, and should be treated, as 5˚ (Hint: the function **rem** that you saw last lab might be useful.) To avoid ambiguity, we use the following convention:

$$Quadrant\ is \begin{cases} 1 & if\ \ 0 \le A < 90 \\ 2 & if\ \ 90 \le A < 180 \\ 3 & if\ \ 180 \le A < 270 \\ 4 & if\ \ 270 \le A < 360 \end{cases}$$

  Print the result.
  In the first script use four separate if statements (4 separate if-end constructs, no else or elseif) and call the program angle1.m.
  In the second script, use a single if-elseif-...- else-end construction for the evaluation and call it angle2.m. Pay close attention to the differences among the two programs. Are the boolean expressions as concise as they can be?

Delete your files from the computer and log out