EGR 110 Due Date: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Engineering Graphics

File: EGR 110 MATLAB Assignment B

# MATLAB Assignment B – Iterative (looping) Structures

**Reading Assignment:**

EGR 110 MATLAB Lecture B – Iterative (looping) Structures

Section 6.4 (Loops) in MATLAB – An Introduction with Applications, 5th Edition, by Gilat (freely available through Safari books on the TCC library website)

**General instructions for all MATLAB assignments.**

* **Warning**: Your assignments must be your own work. You can ask other students questions, but sharing files is cheating. If any evidence of copied files is discovered, all parties involved will receive grades of 0 and may be subject to further disciplinary action.
* For **all problems**, begin all MATLAB programs (scripts or .m files) with the following information:

 % John Doe (**your name**)

 % EGR 110

 % Homework Assignment #?, Problem ?

 % Filename: YourFileName.m

 % Instructions: (briefly summarize the instructions for the problem)

* Use descriptive variable names
* Use ***format compact*** to reduce extra lines in the output.
* Use the disp( ) function to display your name and assignment number.
* Print the program (script or .m file) and the results for each problem. If you post the results online, post both the program and the results.

**MATLAB Assignment:**

1. (25 points) Write a MATLAB program using a **for loop** to determine the number of values that are positive, the number of values that are negative, and the number of values that equal zero in a vector containing N elements. Prompt the user to enter N and the vector of values and then display the number of positive, negative, and zero values. Example:

Enter the number of elements in the vector: 8

Enter the vector: [1,-3,0,6,7,-1,-2,55]

Results:

Number of positive values: 4

Number of negative values: 3

Number of zero values: 1

Test the program for cases with 1, 8, and 25 elements.

1. (25 points) Repeat the example above for a two dimensional matrix. Prompt the user to enter the number of rows, the number of columns, and the matrix. Test the program for matrices with dimensions (1x8), (8x1), and (3x4) and be sure to include an assortment of positive, negative, and zero values as the inputs.

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1. (25 points) Write a MATLAB program using a **while loop** to calculate cos(x) accurate to 6 digits after the decimal point using the following infinite series:



Prompt the user to enter an angle A in degrees and display cos(A). Test the program for -30°, 0°, 30°, 120°, 210°, and 300°.

1. (25 points) Write a MATLAB program to:
* Prompt the user to enter numeric grades (one at a time) within a **while loop**. Any number of grades can be entered. The user should enter a negative number to indicate that there are no more grades.
* Determine the number of grades in each grade range using a standard 10 point scale: A (90 or higher), B (80-90), C (70-80), D (60-70), and F (0-60).
* Determine the maximum, minimum, and average grade.
* Display the results including the number of grades, maximum grade, minimum grade, and the number of grades in each grade range.
* Test the program for cases including 4 grades, 10 grades, and 20 grades with the grades reasonably distributed between the grade ranges.