**CSCI 130-001-22425 Homework #12  
(Due: 9:00 am, 11/30/2020)**

**BEFORE YOU BEGIN:**

Before doing anything else, use the File Explorer and create a **…\Documents\CSCI130\Homework #12** folder somewhere on your local computer. You’ll be saving/storing your homework scripts in this folder.

Before starting each MATLAB/Octave homework problem, create a new script file by clicking on the **New Script** icon on MATLAB’s toolbar. The Edit Window should appear, allowing you to enter your MATLAB statements into the script file. Enter these two lines (with your name and brief program description) immediately:

**% Programmer: . . .  
% Description: . . .**

Now click the “**Save**” icon and navigate to the **…\Documents\CSCI130\Homework #12** folder. Save your file with the name **Problem12\_1** (or **Problem 12\_2**, as appropriate), as MATLAB does NOT allow spaces, periods or dashes in file names. Only underscore characters can be used as a separator.

**Problem 12.1:**

Write a MATLAB script to do the following:

1. In the command window, prompt the user to enter a square matrix. Once entered, display "**The matrix entered =**", then display the matrix beginning on the next line.}
2. If the matrix is not square, display “**Matrix is not square!**” and stop the script without proceeding.
3. Use the matrix determinant value to check if the matrix entered is invertible.
4. If the matrix is invertible, display "**Inverse =** ", then display the inverse matrix beginning on the next line. Otherwise, display "**Matrix is NOT invertible**".  
     
   [**Note:** Do NOT attempt to invert the matrix if it's not invertible.]  
   **[Hint:** You're going to have to use an "if" statement.]

**Problem 12.2:**

You're given the following system of simultaneous linear equations:

**x + 2 \* y - 3 \* z + 4 \* w = 12;  
 2 \* x + 2 \* y - 2 \* z + 3 \* w = 10;  
 y + z = -1;  
 x - y + z - 2 \* w = -4;**Create a MATLAB script to accomplish the following:

1. Using MATLAB's matrix operations, find the values of the unknowns (x, y, z, w) which are simultaneous solutions of all four equations.
2. In the command window, display the values of the unknowns calculated above.
3. Using the solution values, compute the left-hand-side (LHS) of each equation and display the computed LHS values in the command window.

[**Note:** If your computed LHS values aren't equal (or very close) to the RHS values shown above, then your script is doing something incorrectly.]

**Problem 12.3:**

You're given the following system of simultaneous linear equations:

**3 \* x + 4 \* y - 5 \* z + 2 \* w = -6  
 7 \* x - 8 \* y + 9 \* z + 6 \* w = 96  
 11 \* x + 12 \* y + 13 \* z + 10 \* w = 312  
 15 \* x + 16 \* y + 17 \* z + 14 \* w = 416**Create a MATLAB script to accomplish the following:

1. Using MATLAB's matrix operations, find the values of the unknowns (x, y, z, w) which are simultaneous solutions of all four equations.
2. In the command window, display the values of the unknowns calculated above.
3. Using the solution values, compute the left-hand-side (LHS) of each equation and display the computed LHS values in the command window.

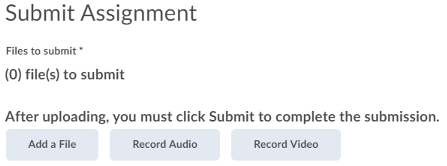
[**Note:** If your computed LHS values aren't equal (or very close) to the RHS values shown above, then your script is doing something incorrectly.]

**Submitting Your Work for Grading**

After you’ve completed this homework assignment, you should have these files stored in your **…\Documents\CSCI130\Homework #12** folder:

**Problem12\_1.m  
Problem12\_2.m  
Problem12\_3.m**

To submit these files, do the following:

1. Use your web browser to connect to and log into your **CMU MavZone** account. Launch D2L and then enter this course (**CSCI130-001-22425, Engineering Comp Sci**).
2. In D2L, navigate to the **Homework #12** assignment and scroll down to the **Submission** area. It will look something like this:  
     
   
3. Click on the **Add a File** button, click on **My Computer**, then click on the **Upload** button. On your local computer, navigate to your **…\Documents\CSCI130\Homework #12** folder and either select all your homework **.m** files as a group to upload, or upload them one at a time. When they’ve all been uploaded, don’t forget to click the **Submit** button.
4. You can enter an optional comment for me prior to clicking the **Submit** button. Make sure ALL your problem **.m** files are included in your submission, as you only get ONE submission attempt. If a problem **.m** file is missing, you will receive a zero score on that problem (if it’s the one chosen at random for grading). If you’re not confident everything is included in your submission, click **Cancel** (instead of **Submit**) and try the submission later (but before the assignment deadline).

**[End of Homework Assignment #12]**