ENGR15100: SOFTWARE TOOLS FOR ENGINEERS

Laboratory 3

PURPOSE: Further practice of matrix and vector definition in MATLAB.

For each problem, create a MATLAB script file and name it FIRSTNAME_LASTNAME_LAB3_problemX.m. Put ALL the commands for the required steps in your script file:

- Be sure to clear the display and the memory.
- Display your name.
- Separate and label different steps using comments.

You can use following template for each of the Problem.

```
%{
Class        : ENGR15100: Software Tools for Engineers
Instructor   : Xiaoli Yang
Author       : [Student's Name]
Assignment   : Lab [No.]
File Name    : Firstname_Lastname_LAB[No.]_Problem[No.].m
               (eg: Xiaoli_Yang_LAB1_Problem1.m)
Date         : [MM]/[DD]/[YY]
%}

%clear screen
clc

%clear workspace
clear

%display your name
disp('Your Full Name Here');
disp('Starting code: ');

%Start your source code here%

%End your code
disp('Completed');
```

SUBMITTING YOUR LAB:
Submit your lab by uploading .m file using the Brightspace Assignment feature no later than the date specified.

PROBLEM 1(20 points)
Use MATLAB addressing methods to get the values from a Matrix X, and then perform the following operations. Do NOT suppress MATLAB's output.

$$X = [41 \quad 81 \quad 68 \quad 22 \quad 57 \quad 26 \quad 66 \quad 41$$
$$32 \quad 33 \quad 83 \quad 4 \quad 36 \quad 5 \quad 2 \quad 72$$
$$70 \quad 55 \quad 12 \quad 44 \quad 3 \quad 25 \quad 72 \quad 93$$
$$90 \quad 39 \quad 28 \quad 94 \quad 51 \quad 67 \quad 40 \quad 99$$
$$50 \quad 90 \quad 77 \quad 27 \quad 83 \quad 33 \quad 4 \quad 99]$$

1) $X(2,3) * 3 - X(3,2) - 1$
2) $X(2,2)\text{^}2 + X(3,5) * 3$
3) $\sin(X(2,3)) + \cos(X(5,5))$

PROBLEM 2(20 points)
Save all the commands for the following steps in your script file. Separate and label different steps using comments. Unless otherwise specified, do NOT suppress MATLAB's output.

a=

5

b=

1	2	3

c=

4
5
6

e=

1	1	1
2	2	2
3	3	3

(1) Find $a * b$
(2) Find $a * c$
(3) Find $b * c$
(4) Find $d = c * b$
(5) Find $e + d$
(6) Find $d.* e$

PROBLEM 3(20 points)

Using what you have learned thus far:

- Create a script named of FIRSTNAME_LASTNAME_LAB3_problem3.m
- Set up the vector $\boldsymbol{t}$ from 0.4 (start value) to 5.0 (final value) by 0.01 (step increment).
- Calculate $\boldsymbol{v} = 2/\boldsymbol{t}$ (hint : division or element-wise division ?)
- Save the script. (Feel free to use Live Script in MATLAB)

PROBLEM 4(20 points)

- Create a script named of FIRSTNAME_LASTNAME_LAB3_problem4.m
- A food company manufactures five types of $8\ oz$ Trail mix packages using different mixtures of peanuts, almonds, walnuts, raisins, and M&Ms. The mixtures have the following compositions:

	Peanuts (oz)	Almonds (oz)	Walnuts (oz)	Raisins (oz)	M&Ms (oz)
Mix 1	3	1	1	2	1
Mix 2	1	2	1	3	1
Mix 3	1	1	0	3	3
Mix 4	2	0	3	1	2
Mix 5	1	2	3	0	2

- How many packages of each mix can be manufactured if 105 lb of peanuts, 74 lb of almonds, 102 lb of walnuts, 118 lb of raisins, and 121 lb of M&Ms are available? Write a system of linear equations and solve in MATLAB. (note:1 lb = 16 oz)

PROBLEM 5(20 points)

- Create a script named of FIRSTNAME_LASTNAME_LAB3_problem5.m
- Enter and solve the following system of linear algebraic equations:

$$5x - 4y + 6z = 37$$
$$11x + 3y + 3z = -5$$
$$5x + 6y + z = -3$$

- Solve it by hand first and then solve it using MATLAB. Display the values for x, y, and z. Make sure the values are clearly labeled.