

ENGR15100: SOFTWARE TOOLS FOR ENGINEERS**Laboratory 4**

PURPOSE: Further practice with MATLAB for array operation and handling functions.

For each problem, create a MATLAB script file and name it FIRSTNAME_LASTNAME_LAB4_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(30 points)

Use MATALB Random Number Generator Commands (rand, randn, randi) to generate the followings:

- (1) Use rand, randn, and randi commands to generate 3×6 , 5×3 , and 3×3 matrices, respectively.

(note:

rand: *Uniformly distributed random numbers between 0 and 1.*

rand(sz1,...,szN) returns an sz1-by-...-by-szN array of random numbers where sz1,...,szN indicate the size of each dimension. For example, rand(3,4) returns a 3-by-4 matrix;

randn: *normally distributed random numbers.* randn(sz1,...,szN) returns an sz1-by-...-by-szN array of random numbers where sz1,...,szN indicate the size of each dimension. For example, randn(3,4) returns a 3-by-4 matrix;

randi: *Uniformly distributed pseudorandom integers.*

randi([imin,imax],___) returns an array containing integers drawn from the discrete uniform distribution on the interval [imin,imax]. For example, randi([-5,5],10,1), Generate a 10-by-1 column vector of uniformly distributed random integers from the sample interval [-5,5].)

- (2) Use Array Operation functions, such as max(x), to conduct the maximum, minimum, median, summation, and standard deviation operations to the above three matrices in exercise (1).
- (3) Use rand function to return an array (any size) containing values drawn from the uniform distribution on the interval [10, 20]
- (4) Use randi function to return an array (any size) containing values drawn from the uniform distribution on the interval [50, 1000]
- (5) Use randn function to return normally-distributed array with the size of 2×3 , the mean of 10 and standard deviation of 3.

(hint: Create a vector of 1000 random values drawn from a normal distribution with a mean of 500 and a standard deviation of 5.

a = 5;

b = 500;

y = a.*randn(1000,1) + b;)

PROBLEM 2 (20 points)

Use MATLAB fprintf function to print the following message:

Hello again from ENGR 15100!

“-----”

Display

a

string

across

multiple lines

“-----”

This is September 23, 2020.

PROBLEM 3 (25 points)

Use MATLAB fprintf function to print the following message:

Time (s)	Velocity (m/s)
----------	----------------

23.00

10.05

45.00

24.23

48.00

30.50

PROBLEM 4(15 points)

- Use **Input** command to prompt users to enter 3 different numeral values. After each prompt, **pause** 5 seconds and then let users enter the next number.
- Compute Sum and Max operations on the three value that the user entered.
- Display the results of summation and maximum operations.

PROBLEM 5(10 points)

Write a matlab command according to the following sequence.

- (1) Create a random 5×5 matrix named “var”
- (2) Save the variable “var” in a mat file named “test_1.mat”
- (3) Clear all variables in MATLAB workspace, and then load the mat file “test_1.mat”