**Purdue University northwest DEPARTMENTS OF ENGINEERING**

**ENGR15100: Software Tools for Engineers**

**Laboratory 1**

Follow the instructions carefully solve each problem in MATLAB.

**PURPOSE:** Practice with MATLAB editor and basic operations.

**Starting MATLAB**

Start MATLAB and change the “Current Folder” to your MATLAB directory.

MATLAB programs should be stored in files, called M-files, which end in the extension ".m" If your program is stored in the file program.m, then typing program at the MATLAB prompt ">>" will execute all the statements in the program. However, before doing so, be sure that your current directory is the one containing the file program.m. If not, click on the tab labeled Current Directory and change to that directory.

For each problem, create a MATLAB script file and name it FIRSTNAME\_LASTNAME\_LAB1\_ 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.

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%{

Class: ENGR15100: Software Tools for Engineers

Instructor: Xiaoli Yang

Author: [Student’s Name]

Assignment: Lab [No.]

File Name: LASTNAME\_LAB[No.]\_problem[No.].m

Date: [MM]/[DD]/[YY]

%}

%clear screen

clc

%clear workspace

clear

disp('Your Name Here');

disp('');

disp('starting code: ');

%Completing lab x

%your source code here%

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**Problem 1** (30 points)

Create a MATLAB script file and name it FIRSTNAME\_LASTNAME\_LAB1\_problem1.m.

Put 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 in the following steps.

Note the difference between the left and right divisors. Use help to learn more on commands: round, floor ceil (Hint: use **pi** for π, **exp** for e)

1. 2/2\*3
2. 8\*5\4
3. 8\*(5\4)
4. 6-2/5+7^2-1\*10/2\5-3+2\*4
5. 3^2/4
6. 3^2^3
7. 2+round(6/9+3\*2)/2
8. 2+floor(6/9+3\*2)/2
9. 2+ceil(6/9+3\*2)/2
10. 234
11. -34
12. -2-4/3
13. sin1
14. sin10
15. sin

**PROBLEM 2: Creating Vectors in MATLAB** (30 points)

Create a MATLAB script file and name it FIRSTNAME\_LASTNAME\_LAB1\_problem2.m. Put 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 in the following steps.

1. Create a vector variable
2. Create a vector variable
3. Create a vector variable by using the MATLAB ***colon (:) operator*** *(Hint: all the numbers from 5 to -5 in increments of -0.2).*
4. Create a vector variable . The first and last elements of should have the values 0 and 16, respectively. The number of elements of should be the same as that of . Accomplish this step with one line of code using a combination of two built-in functions ***linspace*** and ***length***.
5. Create variables *a*, *b*, and *c*. Assign the scalar values *5*, *−3.75*, and to variables *a*, *b*, and *c*, respectively.
6. Create a vector variable , based on the variables created in step (5) and their computations
7. Create a vector variable , based on the variables created in step (5) and their computations

**PROBLEM 3: Creating Vectors in MATLAB** (40 points)

Create a MATLAB script file and name it FIRSTNAME\_LASTNAME\_LAB1\_problem3.m. Put all the commands for the following steps in your script file. Separate and label different steps using comments. Unless otherwise specified, suppress MATLAB’s output in the following steps.

1. Create a matrix variable such that
2. Create a matrix variable such that

Utilize the MATLAB ***colon (:) operator*** and the built-in function ***linspace*** whenever possible.

1. Create a matrix variable , a 9 x 9 matrix full of 2’s, by using the built-in function ***ones***, such that
2. Create a matrix variable , a 9 x 9 matrix of all zeros, but with the values   
   [1 2 3 4 5 4 3 2 1] on the main diagonal, by using the built-in function ***diag***, such that

**SUBMITTING YOUR LAB:**

Submit your lab by uploading .m files using the Blackboard Assignment feature no later than the date specified.