Week 5 MATLAB Activities

Contents


No AI use

Time required: 60 minutes

1. Create a MATLAB script named **Wk05Lastname.m**
2. Save all programs in this script.
3. Include your name and date at the top of the script file as comments.
4. Put a Section Break between each program.

Reading

Matlab A Practical Introduction to Programming and Problem Solving (Stormy Attaway)

Sections 3.1, 3.2, 3.3, 3.4

Tutorial 1: Rounding

Add the tutorial code to your MATLAB program.

MATLAB has functions developed to round integer or array values. The following functions are useful for rounding with standard rounding conventions, rounding to the floor, and rounding to the ceiling. These functions operate by modifying a variable and creating a new rounded variable.

The following example shows how to round some variable a conventionally, to the floor, and to the ceiling and create a variable, b.

b = round(a)

- Rounds a number to the nearest integer.
- Handles decimal values and rounds towards the nearest even integer in case of a tie.

b = floor(a)

- Rounds a number towards negative infinity, always producing the next integer less than or equal to the input.

b = ceiling(a)

- Rounds a number towards positive infinity, always producing the next integer greater than or equal to the input.

```
%% Round, floor and ceiling
a = 7.890;
b = round(a);
c = floor(a);
d = ceil(a);
disp("Rounded: " + b)
disp("Floor: " + c)
disp("Ceil: " + d)

raw_data = [2.5, 3.8, 6.2, 9.4];
rounded_data = round(raw_data);
disp(rounded_data);
```

Example run:

```
Rounded: 8
Floor: 7
Ceil: 8
     3     4     6     9
```

Tutorial 2: Column Vectors

Add the tutorial code to your MATLAB program.

Column vectors have the same operators as row vectors. The difference between them is how they are created.

```
% Manually create a column vector
% The ; indicate when to move to the next row
vec = [1; 2; 3; 4; 5];
disp(vec)

% Create a column vector from 1 to 10 with a step of 1
% The ' symbol is used to transpose a row vector to a column vector
columnVector = (1:10)';
disp(columnVector);

% Accessing elements
thirdElement = vec(3);
disp(thirdElement)

% Modifying elements
vec(2) = 10;
disp(vec(2))

% Appending elements
vec = [vec; 6];
disp(vec)

% Deleting elements
vec(4) = [];
disp(vec)

% Transpose a column vector to a row vector
vecTransposed = vec';
disp(vecTransposed)

% Saving and loading vectors
save('myVector.mat', 'vec');
load('myVector.mat');
```

Tutorial 3: num2str

Add the tutorial code to your MATLAB program.

The MATLAB **num2str** function converts a numeric value into a string representation. The resulting string can be used for display, concatenation, or any other operation involving strings.

The function syntax.

str = num2str(number)

number The numerical value that you want to convert to a string.

Notice that num2str does not display anything. It converts the number to a string, which can then be displayed.

```
% Basic useage
% This converts the number 42 to the string '42'.
num = 42;
str = num2str(num);
disp(str);
```

Example run:

```
42
```

Controlling Precision: To control the precision of floating-point numbers, you can specify the number of decimal places. Example:

```
floatNum = 3.14159;
precision = 2;
str = num2str(floatNum, precision);
disp(str);
```

Example run:

```
3.1
```

sprintf: For more complex formatting, use the **sprintf** function. Example:

```
% sprintf return a formatted string
% fprintf prints and formats a string
value = 123.456;
formattedStr = sprintf("The value is %.2f", value);
fprintf(formattedStr);
```

Example run:

```
The value is 123.46
```

As you move forward, you will use **disp**, **fprintf**, or **sprintf** depending on the needs of the assignment.

- **disp** – simple display to the console where formatting is not involved.

- **fprintf** - is for writing formatted data to the command window.
- **sprintf** - is for creating and returning formatted strings to be stored in variables.

Assignment Submission

1. Submit properly named and commented script file.
2. Attach a screenshot of the Command Window showing the successful execution of the script.
3. Attach all to the assignment in Blackboard.