ENGR 1181 | MATLAB 10: While Loops

Preparation Material

Learning Objectives

1. Explain the proper application of while loops
2. Use external inputs (e.g., tic, toc) for real time programming

Topics

Students will read Chapter 6.4.2 of the MATLAB book before coming to class. This preparation material is provided to supplement this reading.

Students will learn a basic understanding of while loops and how to enter them into MATLAB. This material contains the following:

1. Key Definitions
2. While Loops

1. Key Definitions

Relational Operator – compares two numbers by determining whether a comparison statement is true or false. Operators include: ‘less than <’, ‘greater than >’, ‘less than or equal to <=’, ‘greater than or equal to >=’, ‘equal to ==’, ‘not equal to ~’.

Logical Operator – examines true/false statements and produces a result that is true (1) or false (0) according to the specific operator. Operators include ‘AND’ (&), ‘OR’ (|), ‘NOT’ (~).

Order of Precedence – computers and calculators follow a hierarchy for the order in which operations are executed. Higher-precedence operations are executed before lower-precedence operations; when they are equal, they are executed from left to right.

Conditional Statements – a command that allows a program to make a decision of whether to execute a set of commands or skip those commands.

Loop – a command, or group of commands, can be executed multiple times, consecutively.
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2. While Loops
A while-end loop is used when the number of passes is NOT known in advance.

The general structure of a while-end loop is:

```
while (conditional statement)
    .......
    .......
    .......
end
```

A while-end loop will continue as long as the conditional statement is true. The check of the conditional statement is done at the beginning of the pass, prior to executing any of the group of commands within the loop.

A while-end loop is used in every application that needs to be continuously monitored as the program can be either designed to continue until a specific condition occurs, or continue infinitely (which in practice means until the device is shut off). Examples include cell phones and computers.

```
while (1)  
    .......
    .......
    .......
end
```

While (1) = Always TRUE
What will this **while** loop display?

```matlab
x = 0;
while (x < 10)
    x = x + 1;
    disp (x)
end
```

Remember that the while loop will continue to run over and over again until its condition is no longer TRUE.

```matlab
x = 0;
while (x < 10)
    x = x + 1;
    disp (x)
end
```

The output then is:

```
1
2
3
4
5
6
7
8
9
10
```