Introduction to Engineering
MATLAB – 2
Introduction to MATLAB - 2

Agenda

- Defining Variables
- MATLAB Windows

THE ASSIGNMENT OPERATOR

In MATLAB, the = sign is called the ASSIGNMENT OPERATOR.

The ASSIGNMENT OPERATOR assigns a value to a variable.

For example, if you type:

```
>> x = 3
x =
   3
```

MATLAB assigns the value of 3 to x.

If then you type:

```
>> x = x + 5
x =
   8
```

MATLAB assigns a new value to x, which is the old value 3 plus 5.

(In mathematics this expression has no meaning since it implies: 0 = 5.)

THE ASSIGNMENT OPERATOR

Variable = A value, or a computable value

The left hand side can only be **one** variable.

The right hand side can be a specific value, or a computable expression (an expression that includes values and/or previously defined variables).

For example, the statement:

x + 4 = 30 is not valid. MATLAB does not solve for x,

but the statement:

x = 30 – 4 is valid (the number 26 is assigned to x.)

DEFINING VARIABLES

A variable is defined by typing a variable name followed by the assignment operator (equal sign) and then a value, or a mathematical expression.

```
>> a=8
a =
   8
```

← Type and press **Enter**

← Computer response

```
>> B=12
B =
   12
```

← Type and press **Enter**

← Computer response

Once a variable is defined, the computer remembers and stores its value. The variable can then be used in further calculations.

```
>> a+B
ans =
   20
```

```
>> a/B
ans =
   0.6667
```

```
>> B/a
ans =
   1.5000
```

```
>> B^a
ans =
   429981696
```

Variables can also be used to define new variables

```
>> d=a*B
d =
   96
```

Once in existence, variables can be used in functions

```
>> sqrt(d)
ans =
   9.7980
```

A previously defined variable can be redefined and reassigned a new value.

RULES ABOUT VARIABLES NAMES

- Variable names can be up to 21 characters long.
- Variable name can contain letters, numbers, and the underscore character.
- Variable name must begin with a letter.
- MATLAB is case sensitive; it distinguishes between uppercase and lowercase letters. For example, A and a are not the same variable.

PREDEFINED VARIABLES

MATLAB has several variables that are predefined.
These variables can be redefined to have any other value.
It is probably better not to use the predefined variables as variable names.

Some of the predefined variables are:

pi (π), eps (the smallest number) inf (infinity)

i (square root of –1) j (square root of –1)

ans (the value of the most recent calculation)

Typing these variables gives:

```
>> pi
ans =
   3.1416
```

```
>> sin(pi/4)
ans =
   0.7071
```

```
>> eps
ans =
   2.2204e-016
```

```
>> inf
ans =
   Inf
```

```
>> i
ans =
   0 + 1.0000i
```

AVOID USING NAMES OF FUNCTIONS FOR VARIABLES.

Once a function name is used to define a variable, the function can not be used.

This means that variables should not be called

sin, cos, exp, tan, sqrt, ……., etc.

OR:

max, min, sum, det, …., etc.

SOME USEFUL COMMANDS

When these commands are typed in the Command Window they either provide information, or perform a task.

; When a semicolon is typed at the end of a line, the computer does not displays the output.

```
>> abc=37
abc =
   37
```

```
>> def=23;
>>
```

clc Clears the command window.

clear Removes all variables from memory.

clear x y z Clears only variables x, y and z.

who Lists the variables currently in memory.

clf Clears the Figure Window.

% typing % at the beginning of a line designates the line as a comment, which is not executed.

Windows

- Today, we worked in the MATLAB command window.
- In future weeks, we will use other MATLAB windows
  - Figure window
  - Editor window

MATLAB windows:

Command window: Main window that opens when MATLAB is started. It has the command prompt ' » '. All commands can be typed in this window. Used for running programs written by user.

- **Figure window:** Contains graphs created by graphics commands. This window opens automatically.
- **Editor window:** Used for writing and editing programs. This window is opened from the File menu in the command window.
- **Help window:** Contains help information. This window is opened from the Help menu in any of the previous windows.

Command Window (The command window opens when MATLAB is started)

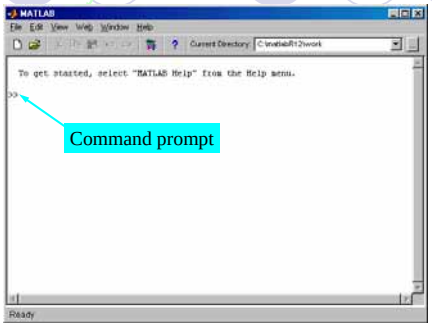
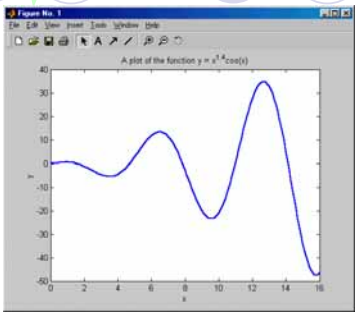
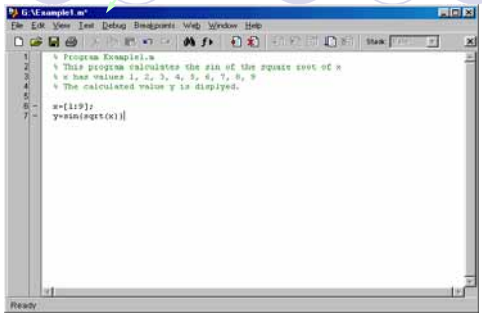


Figure Window (The Figure Window opens automatically by the plot command)



Editor Window (The Editor Window is opened from the file menu in the command window)



Assignment #2

- Do the problems below in the command window. Start each problem in a new (clear) window.
- The first two lines in each problem should be:
  - % First Last, CID
  - % MATLAB 2, Problem Number Page Number
- Submit the printout of the command window.
  - Problem 4 page 58 in the textbook.
  - Problem 5 page 58 in the textbook.
  - Problem 6 page 59 in the textbook.