Al-Mustaqbal University College
Department of Medical Instrumentation Techniques Engineering
Class: Third
Subject: Computer Applications
Lecturer: Dr.Feryal Althfery
Lecture: (1)

Introduction to MATLAB

1. What is MATLAB?

MATLAB is a high-performance language for technical computing. It integrates computation, visualization, and programming in an easy-to-use environment where problems and solutions are expressed in familiar mathematical notation.

It's name is derived from MATrix LABoratory.

2. High-level language

- Data types
- Functions
- Control flow statements
- Input/output
- Graphics
- Object-oriented programming capabilities

3. Typical Uses of MATLAB

- Math and computation
- Algorithm development
- Data acquisition
- Modeling, simulation, and prototyping
- Data analysis, exploration, and visualization
- Scientific and engineering graphics
- Application development including Graphical user interfaces (GUI) building.

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4. Why Use MATLAB?

Advantages:

- Handles vector and matrices very nice
- Quick plotting and analysis
- EXTENSIVE documentation (type 'help')
- Lots of nice functions: FFT, fuzzy logic, neural nets, numerical integration.

Drawbacks:

- Slow compared to C or Java.

5. Toolboxes

Collections of functions to solve problems from several application fields.

- DSP (Digital Signal Processing) Toolbox
- Image Toolbox
- Wavelet Toolbox
- Neural Network Toolbox
- Fuzzy Logic Toolbox
- Control Toolbox
- Multibody Simulation Toolbox
- And many others…

6. MATLAB Desktop Tools

When you start MATLAB, a special window called the MATLAB desktop appears. The desktop is a window that contains other windows. The major tools within or accessible from the desktop are:

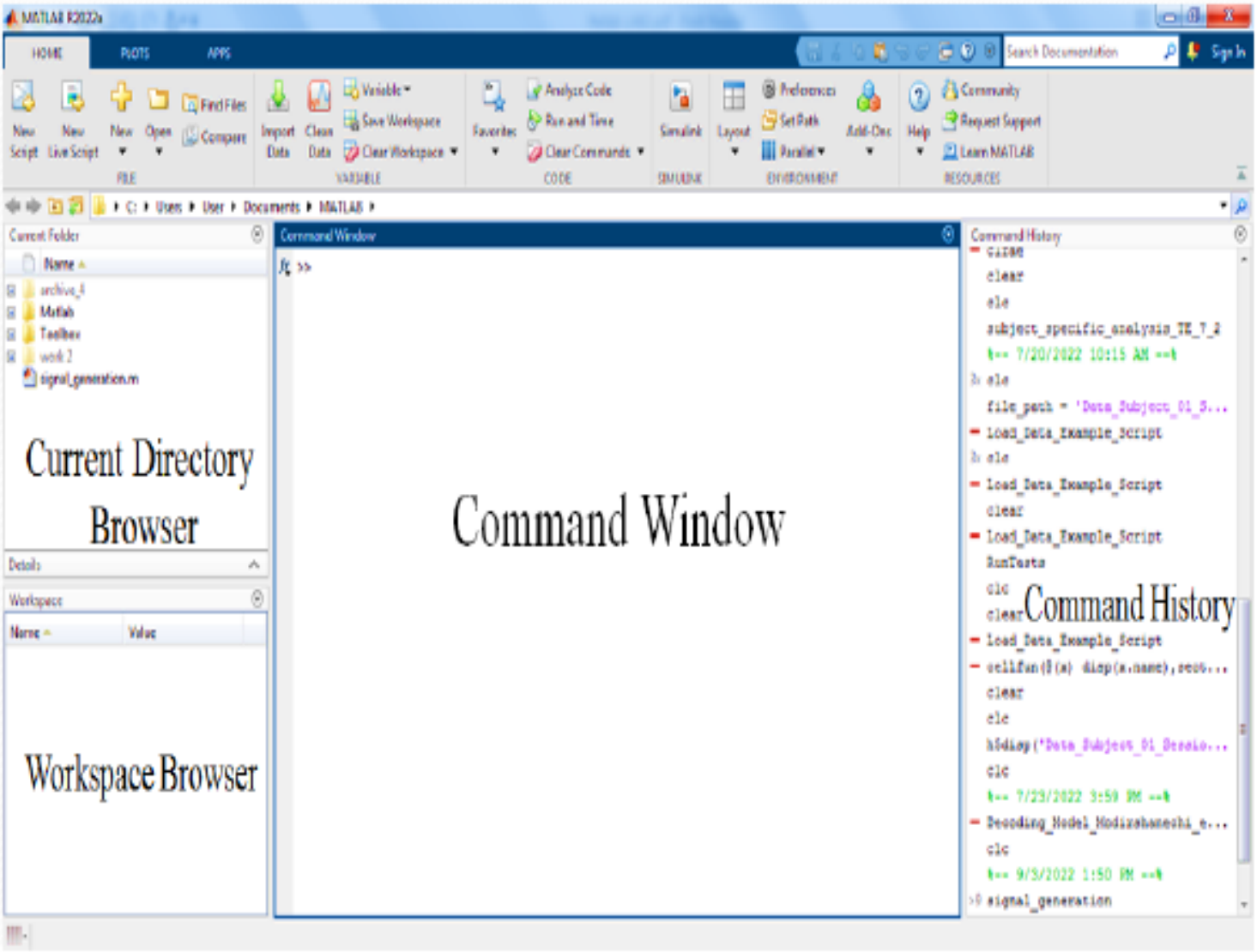
- Command Window
- Command History
- Current Directory Browser
- Workspace Browser
- Editor/Debugger
- Help Browser

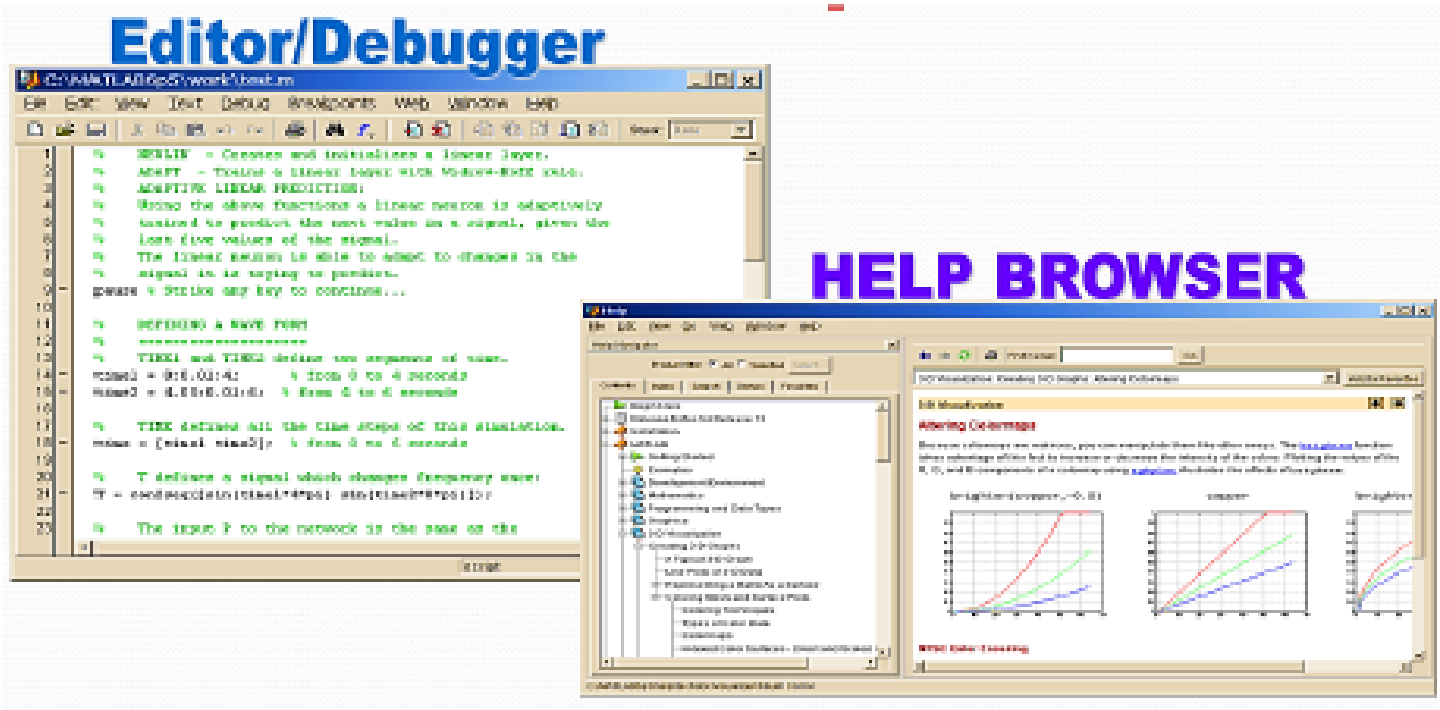
To select what you want to see, go under "Desktop" tab.

Desktop Tools

- **Command Window:** Use the Command Window to enter variables and run functions and M-files.
- **Command History:** Statements you enter in the Command Window are logged in the Command History. In the Command History, you can view previously run statements, and copy and execute selected statements.
- **Current Directory Browser:** MATLAB file operations use the current directory reference point. Any file you want to run must be in the current directory or on the search path.

- **Workspace:** The MATLAB workspace consists of the set of variables (named arrays) built up during a MATLAB session and stored in memory.





7. Using MATLAB as a calculator

For example, let's suppose you want to calculate the expression, 1 + 2 * 3. You type it at the prompt command (>>) as follows,

```
>> 1+2*3
    ans =
          7
```

Note that the variable ans is created (or overwritten, if it is already existed). To avoid this, you may assign a value to a variable or output argument name. For example,

```
>> x = 1+2*3
    x =
          7
```

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Notes:

1- A **semicolon** " ; " at the end of a MATLAB statement suppresses printing of results.

For example:

>> **x** = 3;

>> y = x + 5

When you click execute bottom, MATLAB executes it immediately and the result returned is:

>> y = 8

2- If a statement does not fit on one line, use " . . . ", followed by **Enter** to indicate that the statement continues on the next line.

For example:

>> S= sqrt (225)*30 /...
(20*sqrt (100))

3- Adding comments

The percent symbol (%), is used for indicating a comment line.

For example:

>> x = 9 % assign the value 9 to x

the statement will appear in green color.