Outils de programmation pour les mathématiques

Programming tools for mathematics

MATLAB Desktop

Introduction

- MATLAB is a software package ,
- developed by MathWorks.
- It provides a high-level programming language
- and an interactive environment
- designed for numerical computation, visualization and programming.

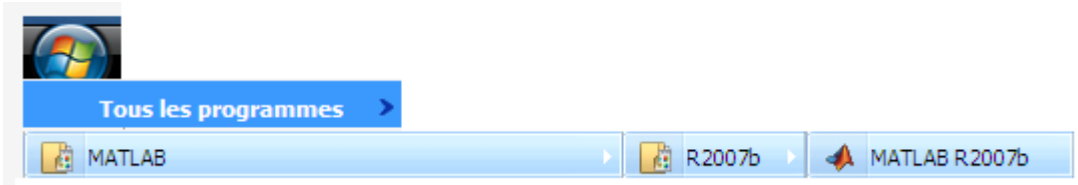
Introduction

- MATLAB is widely used as a computational tool in science and engineering (encompassing the fields of physics, chemistry, math and all engineering streams).
- It is used in a range of applications including :
  - signal processing and communications
  - image and video Processing
  - control systems
  - test and measurement
  - computational finance
  - computational biology

Introduction

- MATLAB name is derived from MATrix LABoratory allows:
- matrix manipulations;
- plotting of functions and data;
- implementation of algorithms;
- creation of user interfaces;
- interfacing with programs written in other languages, including C, C++, Java, and FORTRAN;
- analyzing data; developing algorithms; and creating models and applications (for AI).

A MATLAB session

- *A minimum* session consists in *starting* and *exiting* MATLAB.
- To launch MATLAB under Microsoft Windows 7 or XP in the computing laboratories :
  - double-click on the MATLAB shortcut *icon*  on the Window's desktop.
  - *Or follow MATLAB installation path: C:\Program Files\ R2021a \R2021a\bin, and* double-click on the MATLAB *.exe file*)
  - 

- To end the MATLAB session,
  - select **File**in the desktop main menu→ **Exit MATLAB**.
  - Or simply click on close icon like any other application.

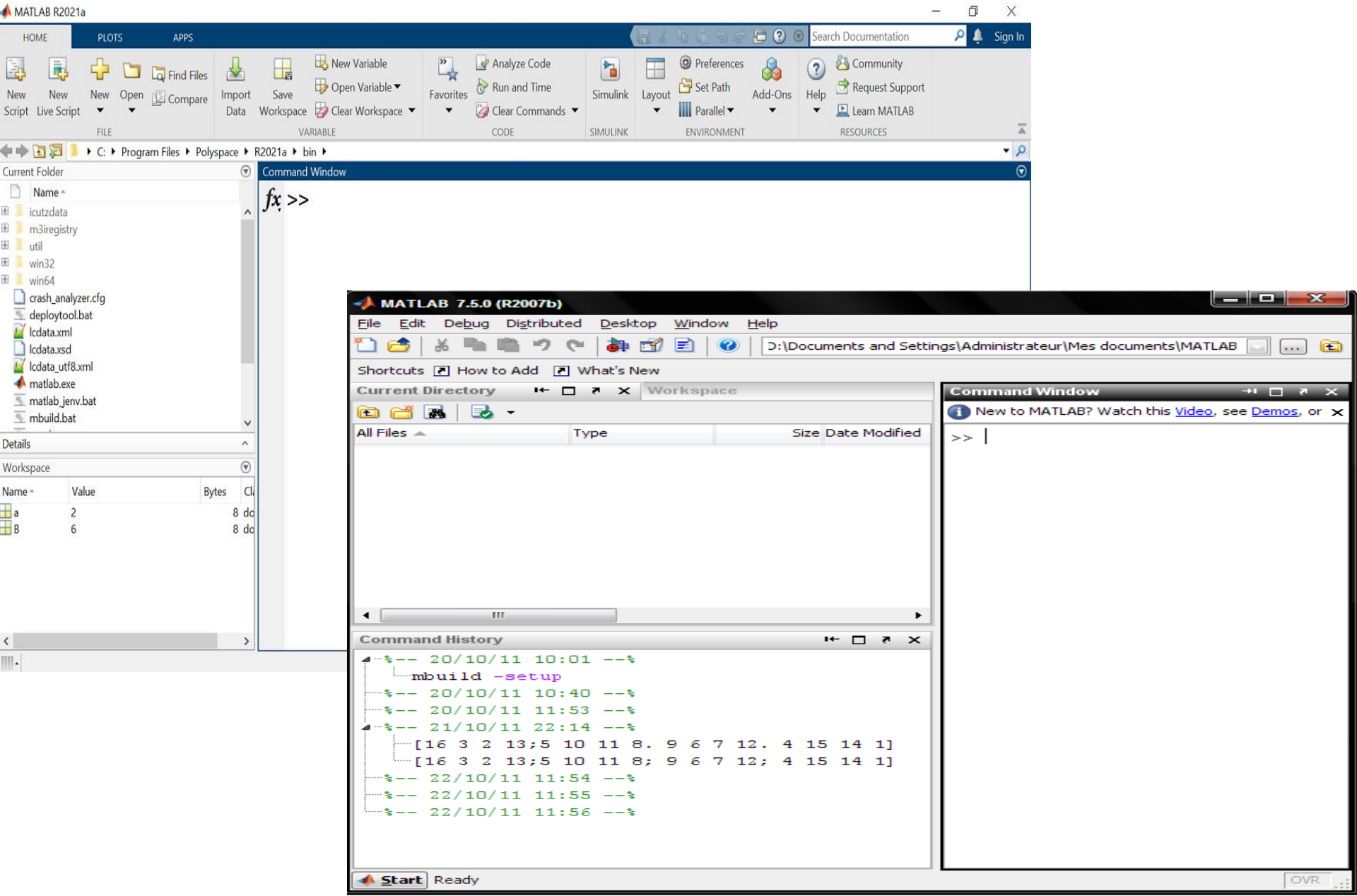
Principal Desktop components

- When MATLAB starts, a special screen appears :

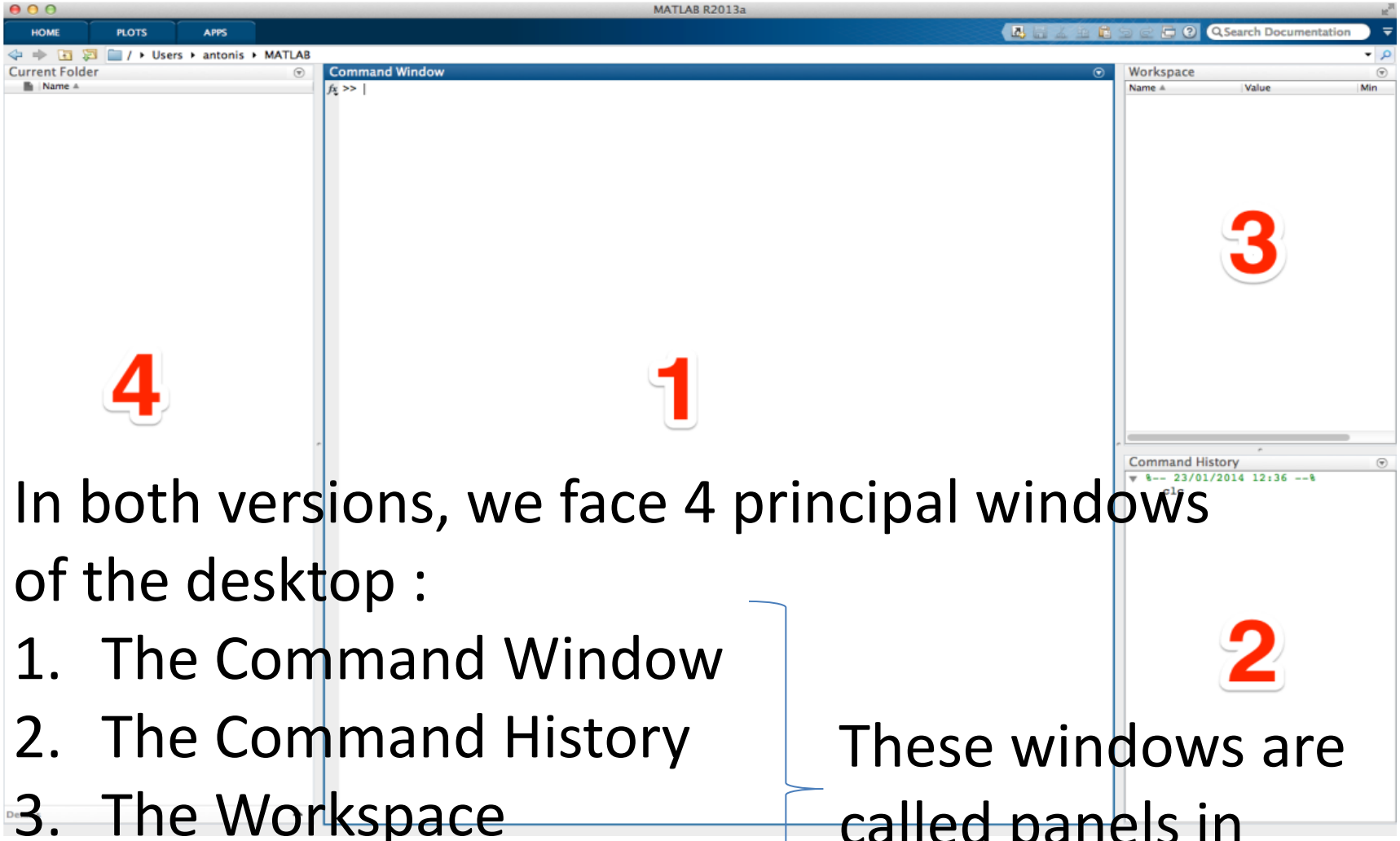
  it is called the **MATLAB desktop.**

- The desktop is a window that contains *other* windows.
- Working on a MATLAB session is equivalent to working on one of these windows or more.

Principal Desktop components



Principal Desktop components



In both versions, we face 4 principal windows of the desktop :

1. The Command Window
2. The Command History
3. The Workspace
4. The Current Directory

These windows are called panels in latest versions

Command Window

- This window (panel) is the main window in MATLAB
- It works by command line indicated by

  the command prompt (>>)
- It provides an interactive environment :
  - It is used to type lines of commands and expressions behind the command prompt.
  - Also, it displays MATLAB answers or commands result.

Command Window

→ MATLAB creates a default variable

ans

- (shortness of answer)
- ans stores the results of the current calculation.
- if the variable ans already exists from previous computations, it will be overwritten,
- To avoid this, you may assign the expression value to a variable or an output argument name.

Command Window

- In the assignment statements

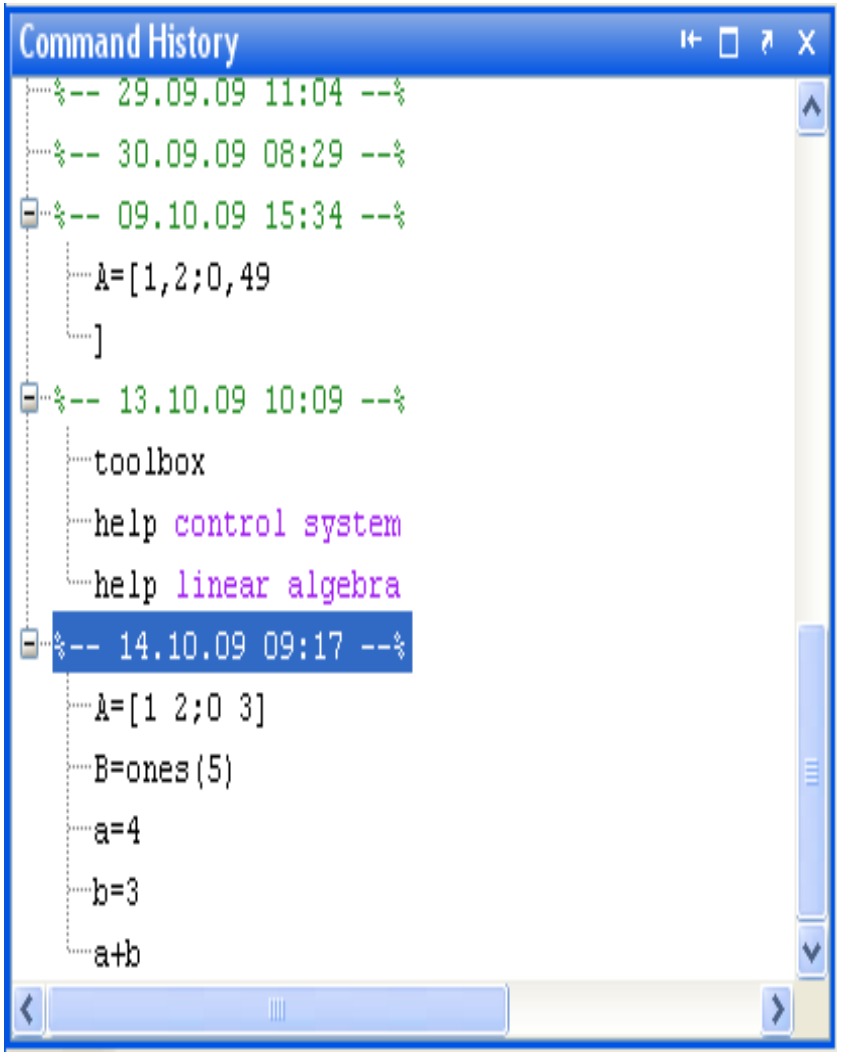
>> x = expression, expression is a combination of numerical values, mathematical operators, variables, and function calls.

- Type the clc command to clean the command window.

Command History

- This window is directly related with command window :

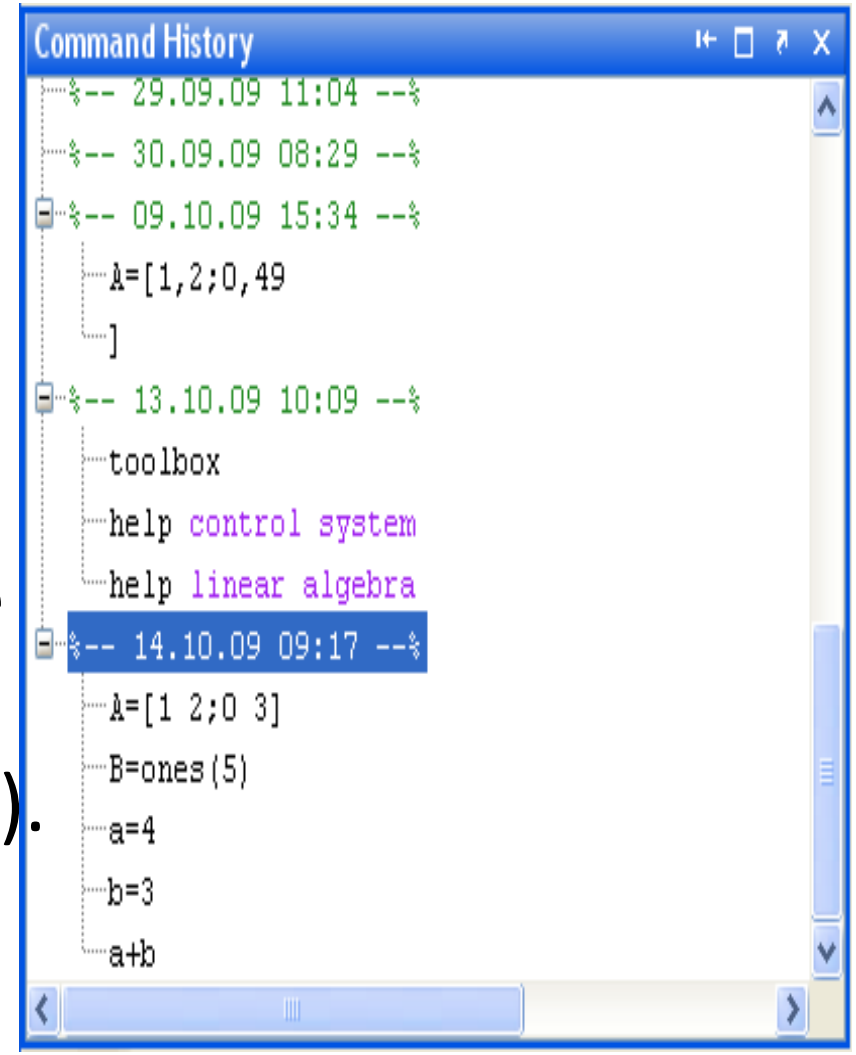
  it saves and shows a list of previously typed commands.



Command History

- The command history persists across multiple sessions :

each command typed during a session is saved under a title indicating the date and starting time of the session (the green line).

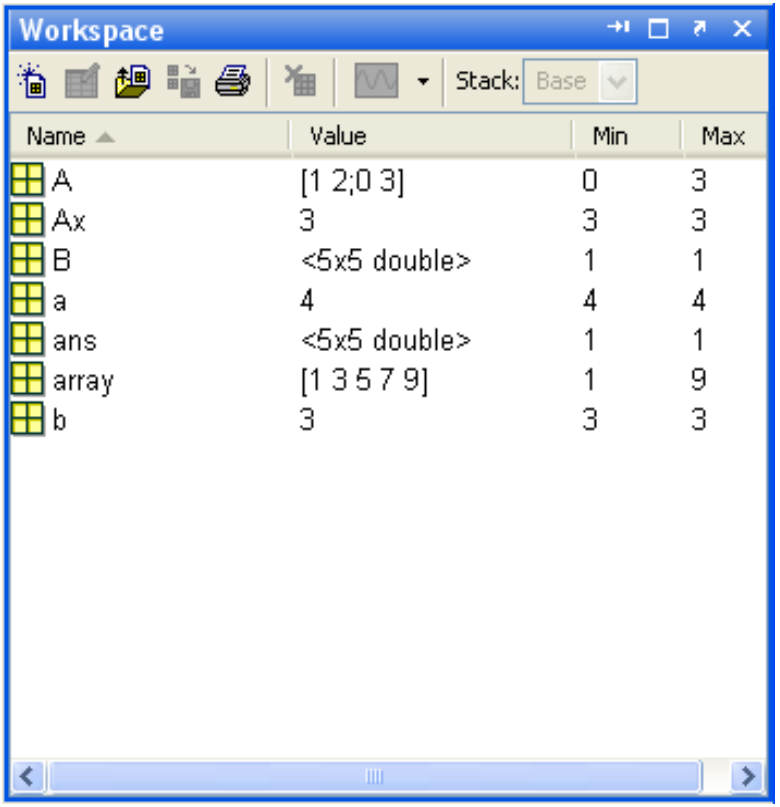


Command History

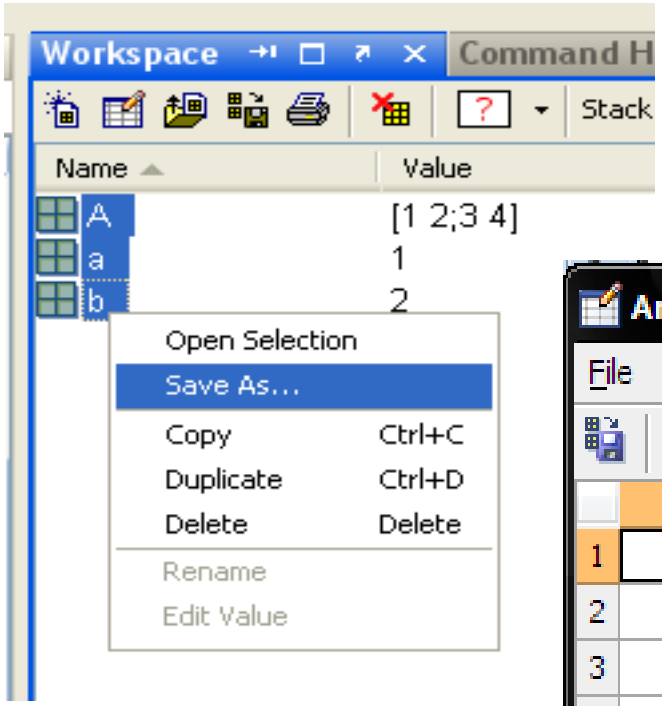
- Displayed commands on the Command History can be:
  - copied/paste on Command window
  - or dragged into the Command Window (and edited),
  - or simply double-clicked to run them again.
- On command window, we can view and search for statements previously run by using up ↑ and down ↓ keys.

Workspace

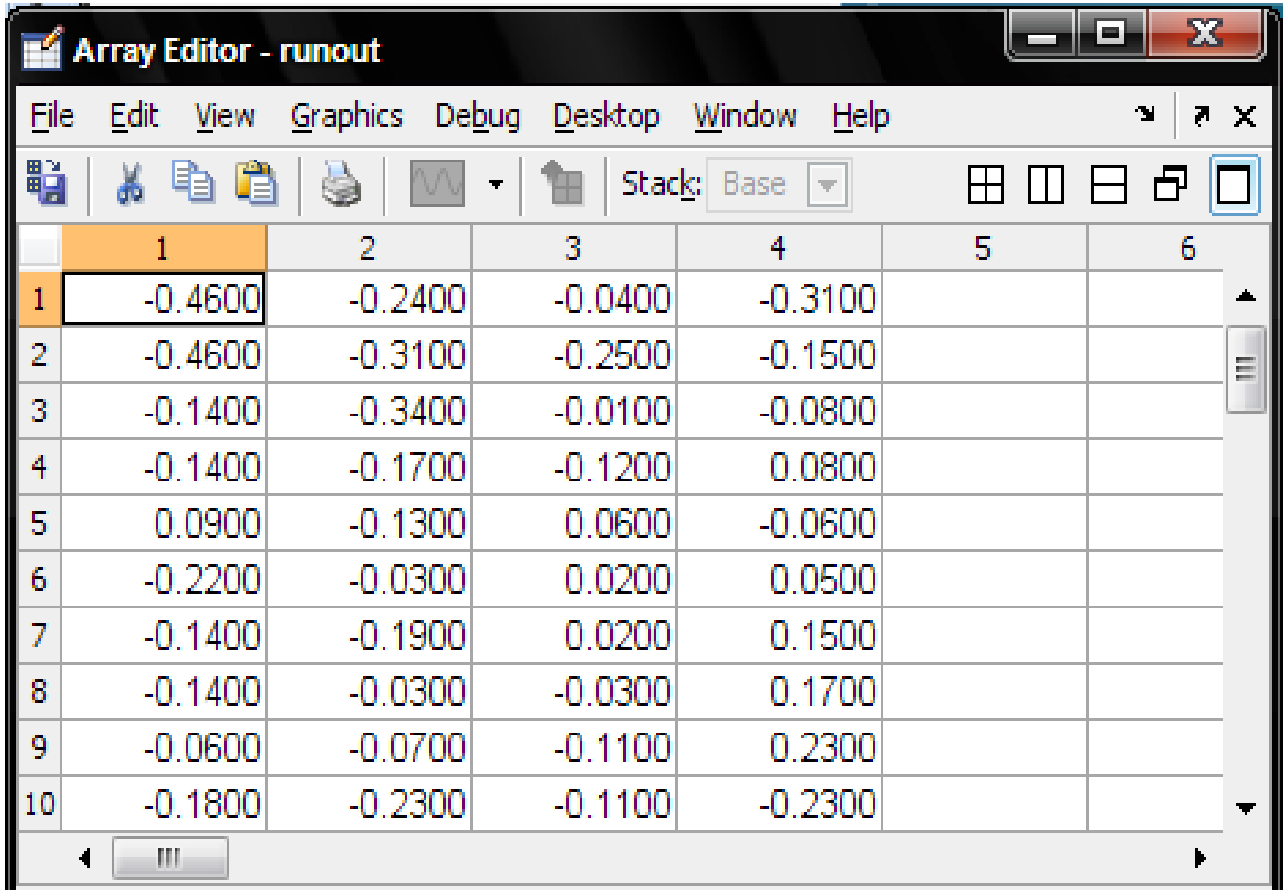
- Lists all the variables generated in the current session i.e : variables used since MATLAB have been opened last time.
- It shows the value, type and size of variables,
- it can be used to quickly plot, or inspect the values of these indicated variables.



Workspace



Variables values and content can be shown and modified using another window named Array Editor



	1	2	3	4	5	6
1	-0.4600	-0.2400	-0.0400	-0.3100		
2	-0.4600	-0.3100	-0.2500	-0.1500		
3	-0.1400	-0.3400	-0.0100	-0.0800		
4	-0.1400	-0.1700	-0.1200	0.0800		
5	0.0900	-0.1300	0.0600	-0.0600		
6	-0.2200	-0.0300	0.0200	0.0500		
7	-0.1400	-0.1900	0.0200	0.1500		
8	-0.1400	-0.0300	-0.0300	0.1700		
9	-0.0600	-0.0700	-0.1100	0.2300		
10	-0.1800	-0.2300	-0.1100	-0.2300		

Workspace

- In addition to the graphical interface, MATLAB offers some textual commands to handle the workspace too :
- The command clear, will clear all the variables in your workspace.

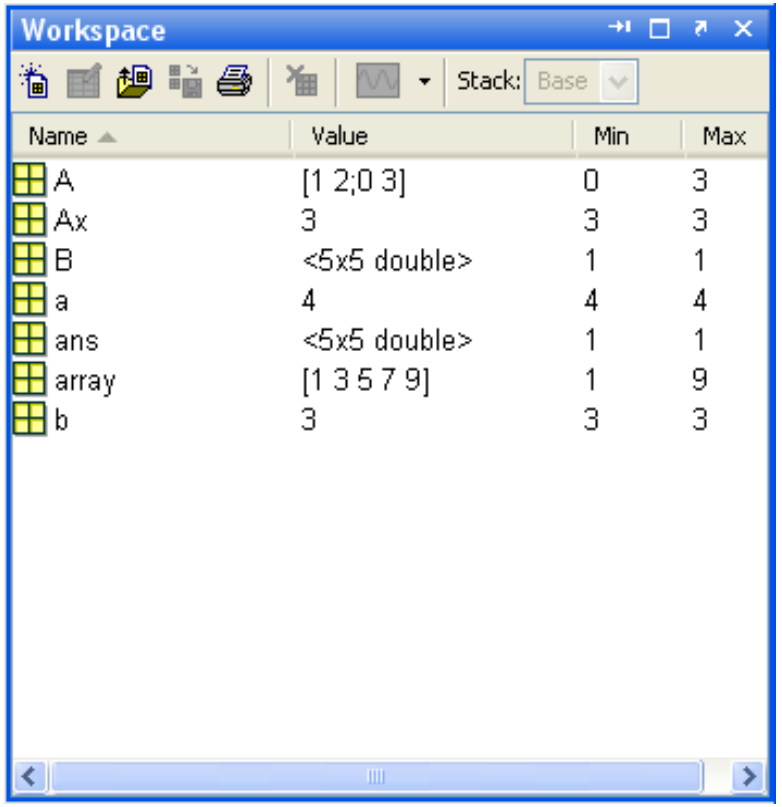
  >>clear
- The Who command lists all the variables used

  >>who
- The whos command lists all the variables with the current values, dimensions, and other informations

  >>whos
- **save** ,**load** and **diary** are useful commands to save data and use it later.

Workspace

- As seen before in command window, MATLAB variables are created by an assignment statement,
- However, MATLAB allows variable creation by importing them from files :
- In fact, one may save some/all workspace variables to a text file (**.mat** file), using icons on workspace bar

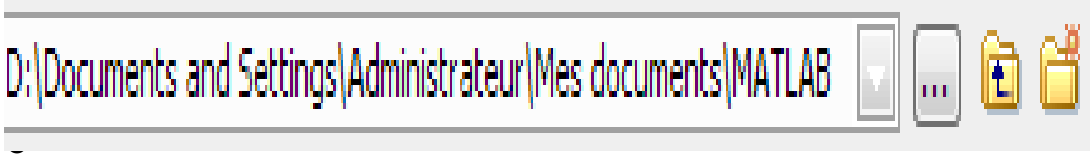


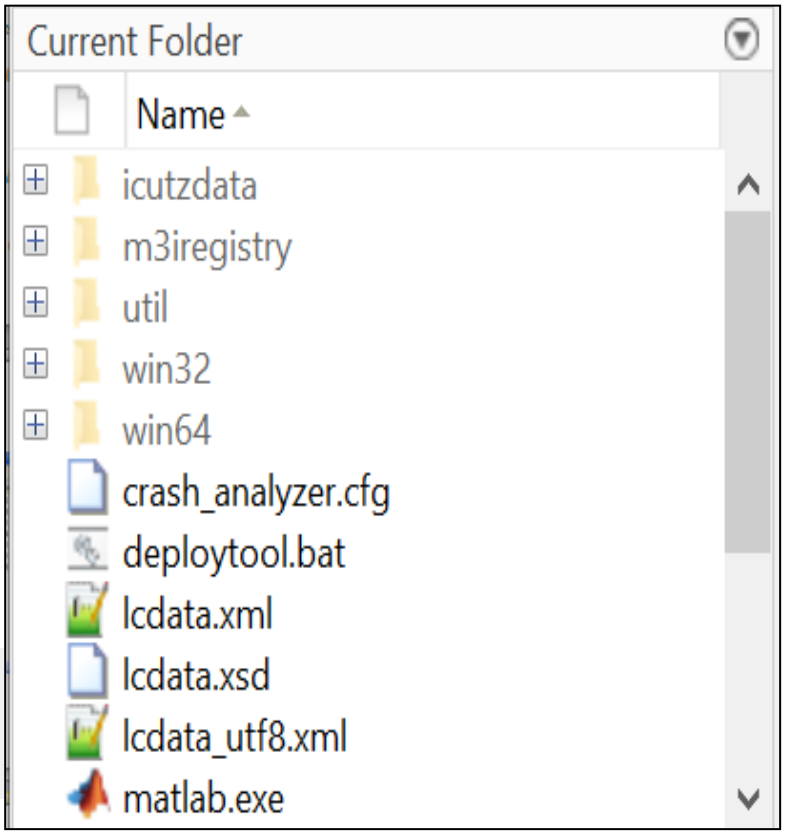
Current Folder

- This window →shows the files and directories available in the current folder.

  But, What is current folder?

- By default, it is a directory created by MATLAB in your documents folder,

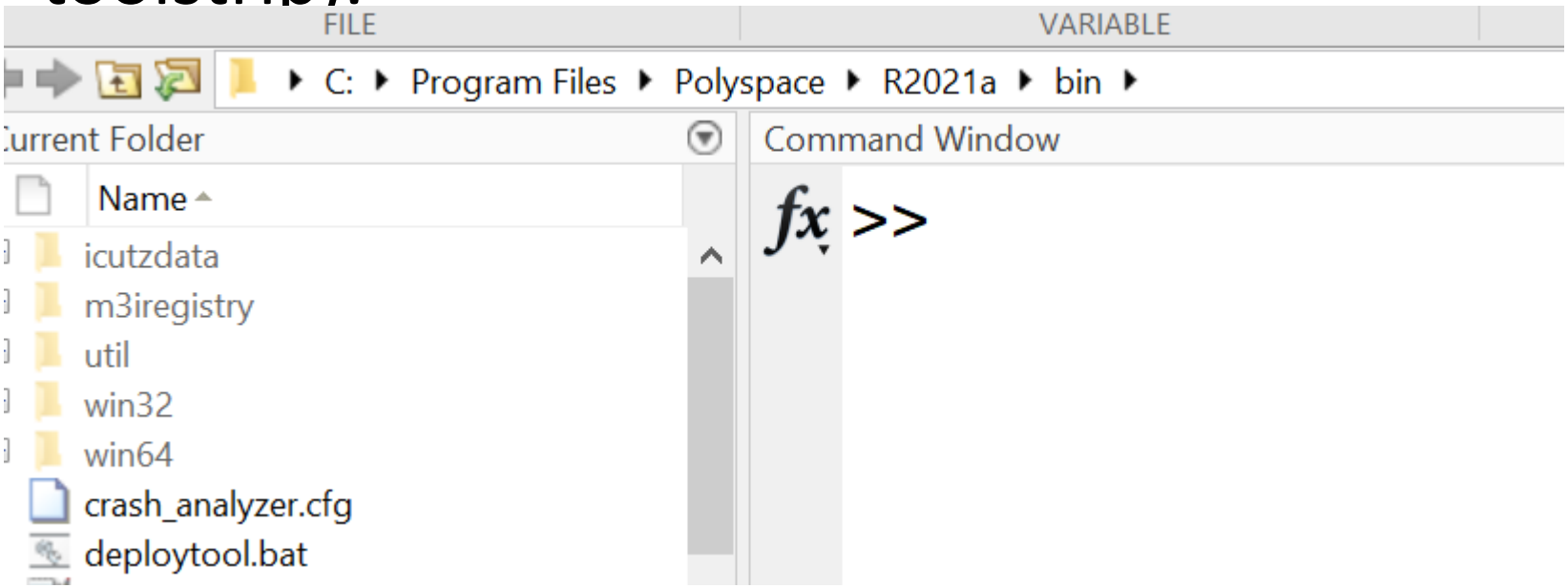




- and this is where you should save your work (saved as files!).

Current Folder

- The path to the current directory is listed/shown on the top of the MATLAB desktop. (on the address bar or in the toolstrip).

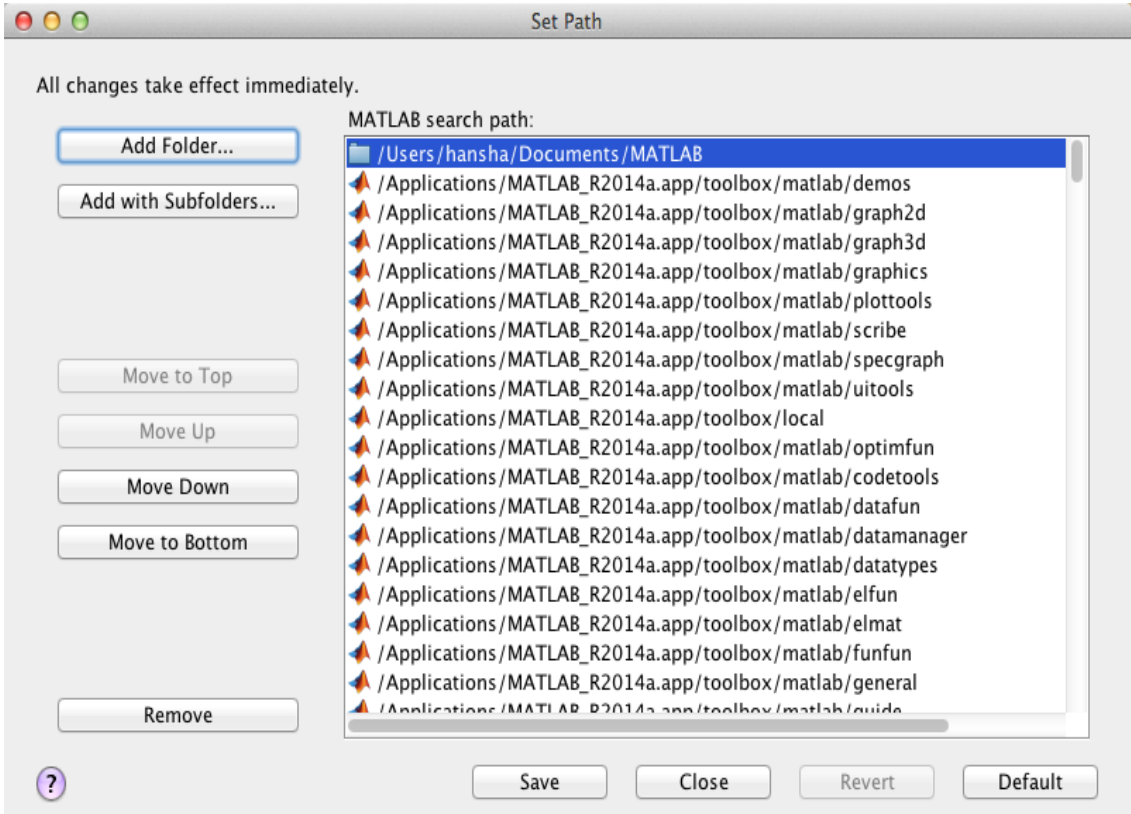


Current Folder

- You should set your working folder as the Current Directory

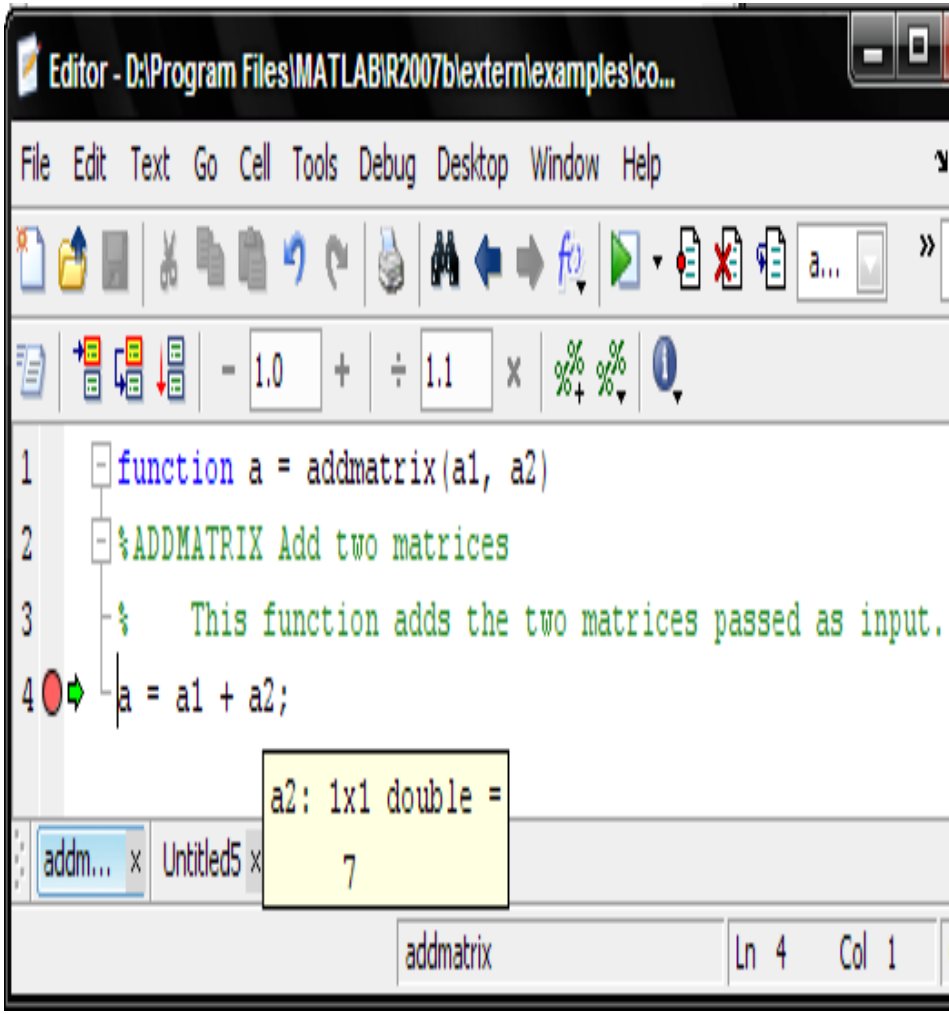
Or

- set your working folder as part of the search path,



Editor

- The **Editor** is used to create scripts and m-files.
- Click the “New Script” icon/button in the Toolbar



Illustrations above show the default configuration of the MATLAB desktop.

We can customize the arrangement of the windows to suit our needs or preferences.

We can return back to the default layout by following :

Desktop menu →

desktop layout →

default