



Al-Mustaqbal University

College of Engineering & Technology

Biomedical Engineering Department

Subject Name: Computer 2

2nd Class, Second Semester

Subject Code: [UOMU011046]

Academic Year: 2024-2025

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Lecture No.: 1

Lecture Title: [MATLAB Introduction]





Computer 2 (MATLAB)



حاسوب 1 (ماتلاب)
2025-2024

MATLAB Introduction

by

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Agenda

- What is MATLAB?
- Brief History of MATLAB
- Advantages of MATLAB
- Applications of MATLAB
- MATLAB Environments
- MATLAB Windows





What is MATLAB?

- MATLAB (Matrix Laboratory) is a high-level programming language and environment.
- Widely used for numerical computing, data analysis, simulations, and algorithm development.
- Essential tool in fields like engineering, data science, and applied mathematics.





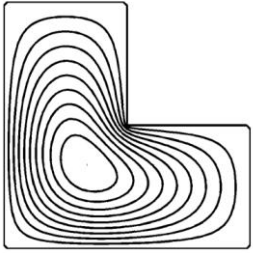
Brief History of MATLAB

- Developed by Cleve Moler in the late 1970s.
- Initially used for matrix calculations and linear algebra.
- Commercial release by MathWorks in 1984.
- Expanded to include graphics, toolboxes, and a broader range of applications over time.
- Continuous updates with features like machine learning, big data analytics, and cloud support.

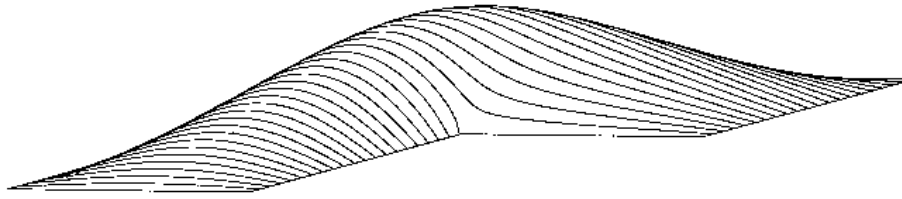




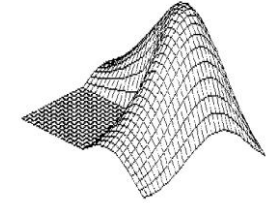
Brief History of MATLAB



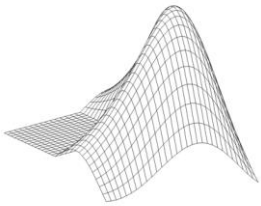
1964



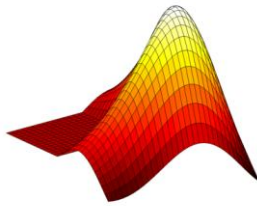
1968



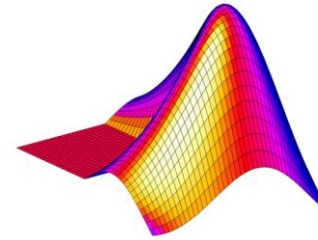
1985



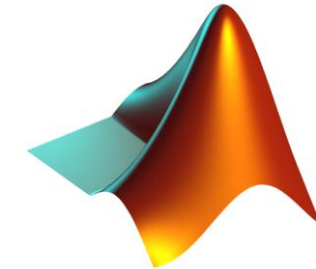
1987



1992



1994



1996





Advantages of MATLAB

- **Ease of Use:** Simple syntax and built-in functions for quick results.
- **Powerful Visualization:** Advanced plotting and data visualization tools.
- **Extensive Libraries:** Wide range of toolboxes for specialized tasks.
- **Interactivity:** Immediate execution of commands in the Command Window.
- **Cross-Platform Support:** Runs on Windows, macOS, and Linux.
- **Integration:** Easily interfaces with other languages like Python, C/C++, and Java.





Applications of MATLAB

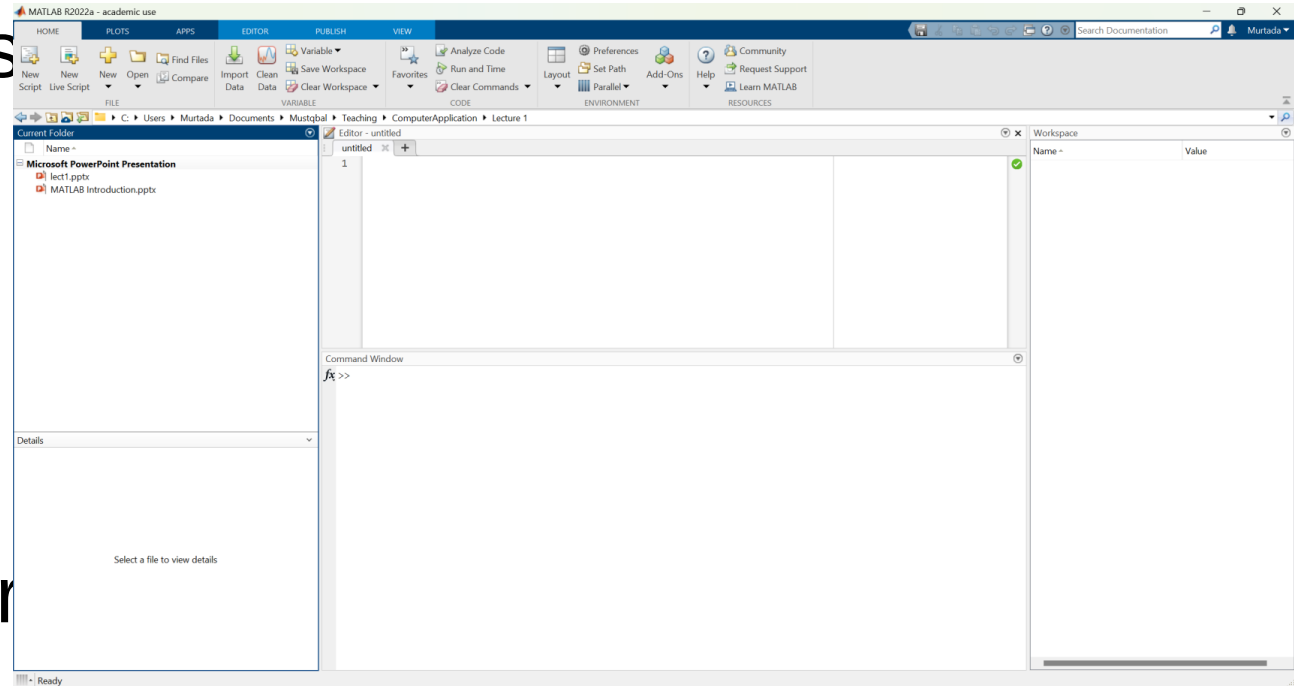
- **Engineering:** Simulations, control systems, and signal processing.
- **Data Science:** Data visualization, machine learning, and statistical analysis.
- **Research & Academia:** Numerical methods, algorithm development, and modelling.
- **Finance:** Risk management, optimization, and financial modelling.
- **Image and Signal Processing:** Manipulation and analysis of visual and audio data.





MATLAB Environment

- MATLAB consists of various tools that help perform computations and visualize data.
- Integrated Development Environment (IDE) features include multiple windows for code execution, data management, and debugging.



HOME

PLOTS

APPS

EDITOR

PUBLISH

VIEW

New Script

New Live Script

New

Open

Find Files

Compare

Import Data

Clean Data

Variable

Save Workspace

Clear Workspace

Favorites

Analyze Code

Run and Time

Clear Commands

Layout

Set Path

Parallel

Add-Ons

Help

Community

Request Support

Learn MATLAB

FILE

VARIABLE

CODE

ENVIRONMENT

RESOURCES

Search Documentation

Murtada

C: > Users > Murtada > Documents > Mustqbal > Teaching > ComputerApplication > Lecture 1

Current Folder

Microsoft PowerPoint Presentation

lect1.pptx

MATLAB Introduction.pptx

Editor - untitled

untitled

1

Command Window

```
fx >>
```

Workspace

Name	Value

Select a file to view details

Ready

Zoom: 110%

UTF-8

CRLF

script

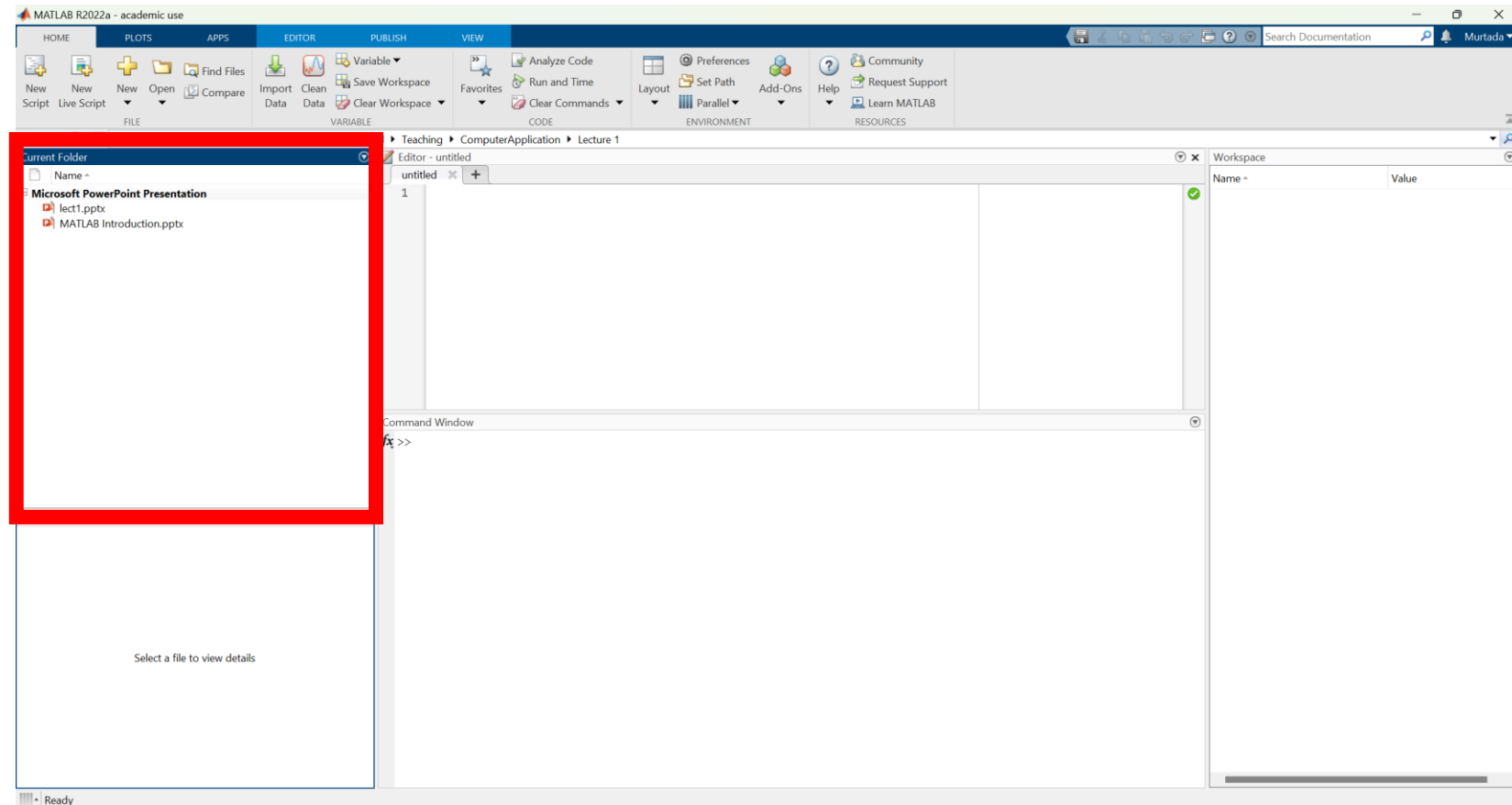
Ln 1

Col 1



MATLAB Windows: Current Folder

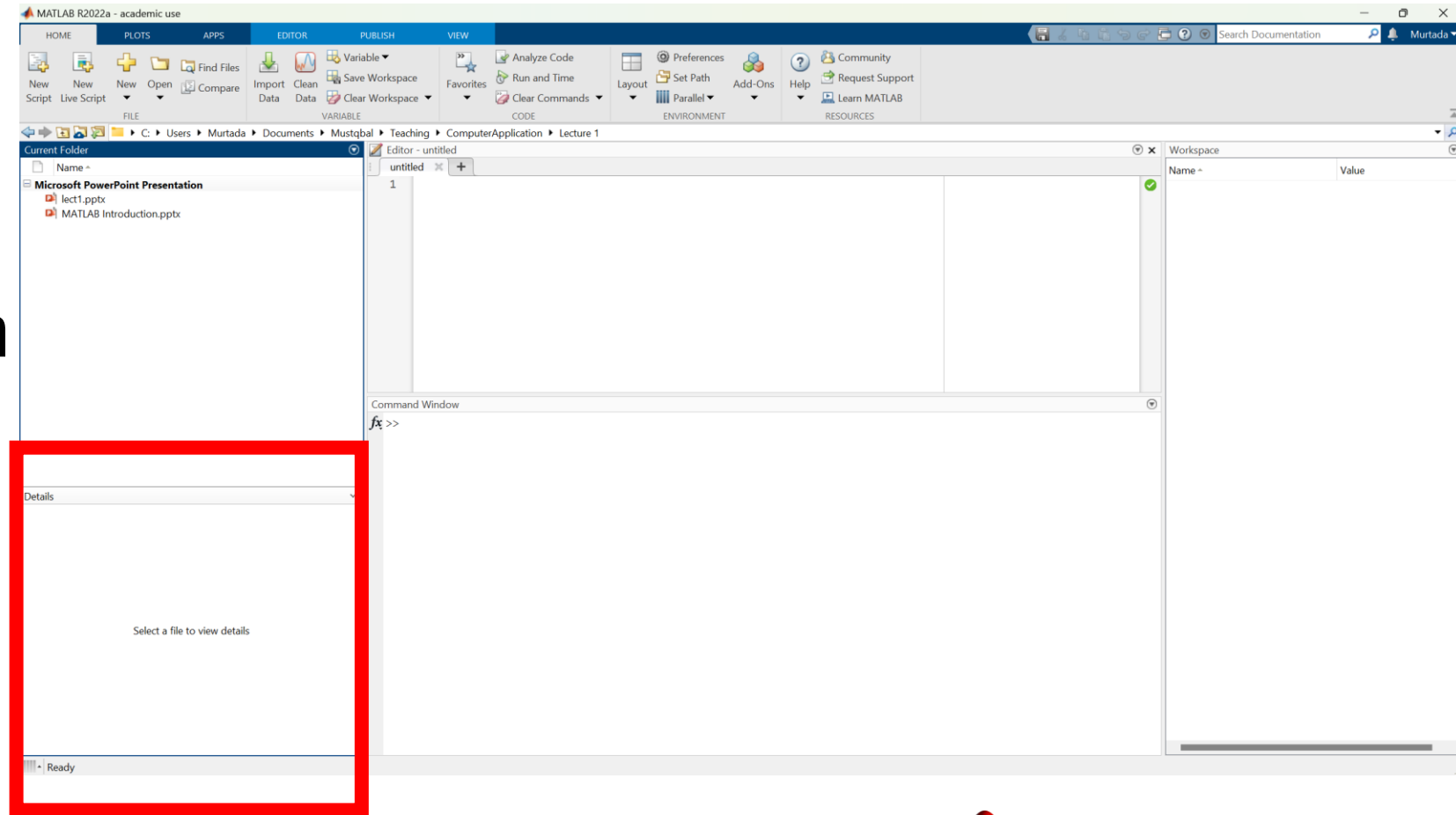
- Shows the current directory and allow to navigate to any folder in the hard drive





MATLAB Windows: Details

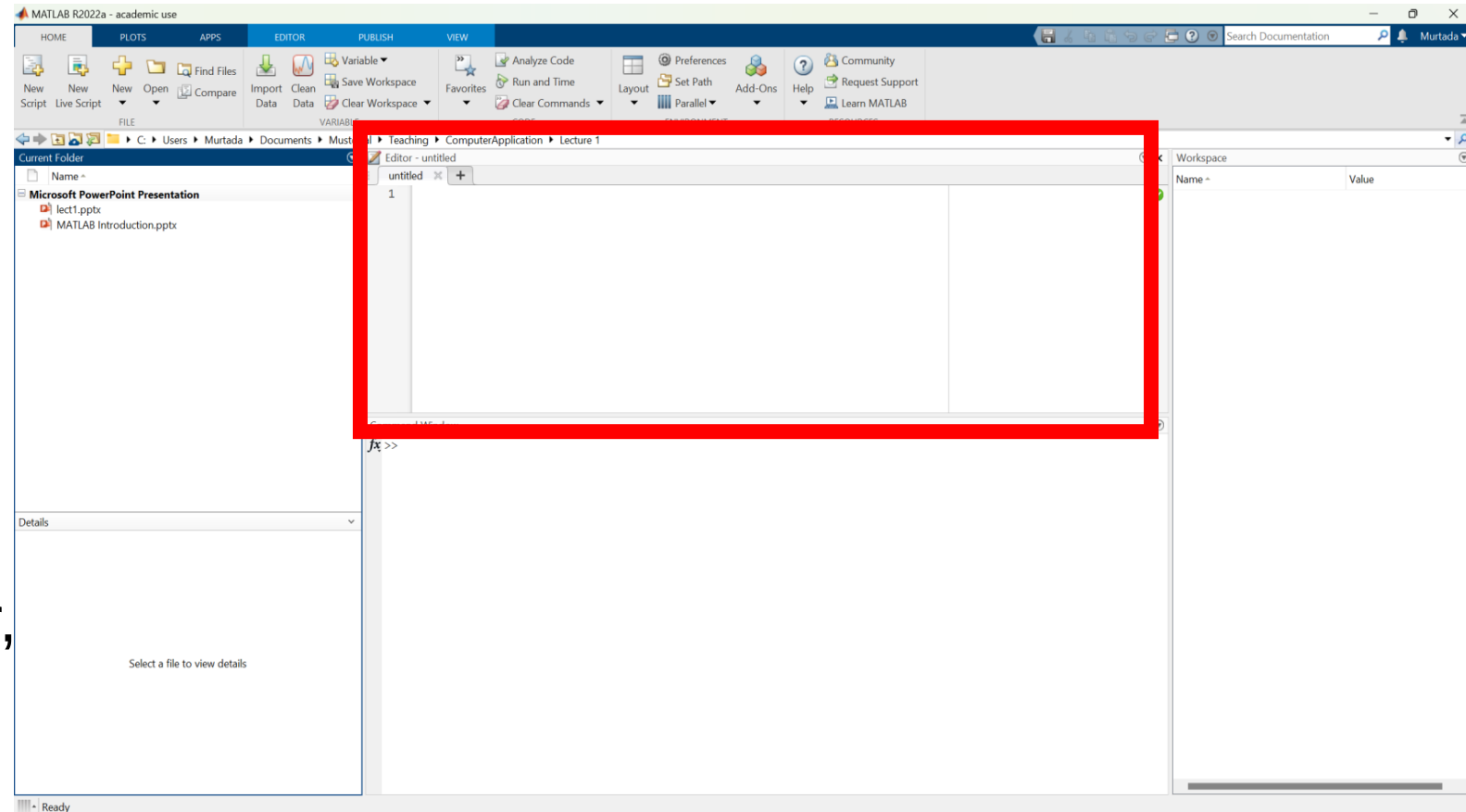
- Shows the content or information of any mat file from the directory





MATLAB Windows: Editor

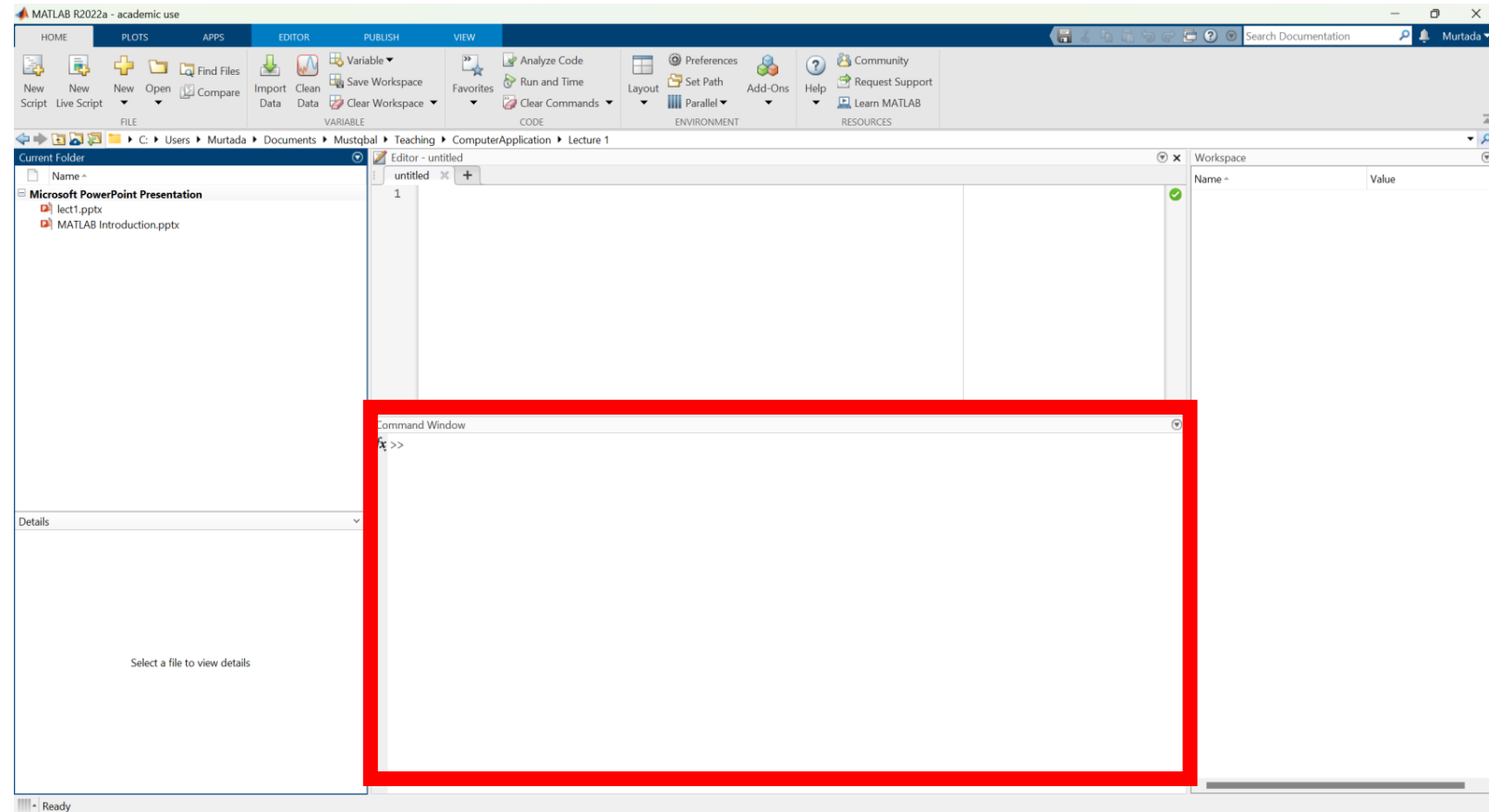
- Used to write, save, and debug MATLAB scripts and functions.
- Features syntax highlighting, code suggestions, and debugging tools.
- Ideal for developing larger, more complex programs.





MATLAB Windows: Command window

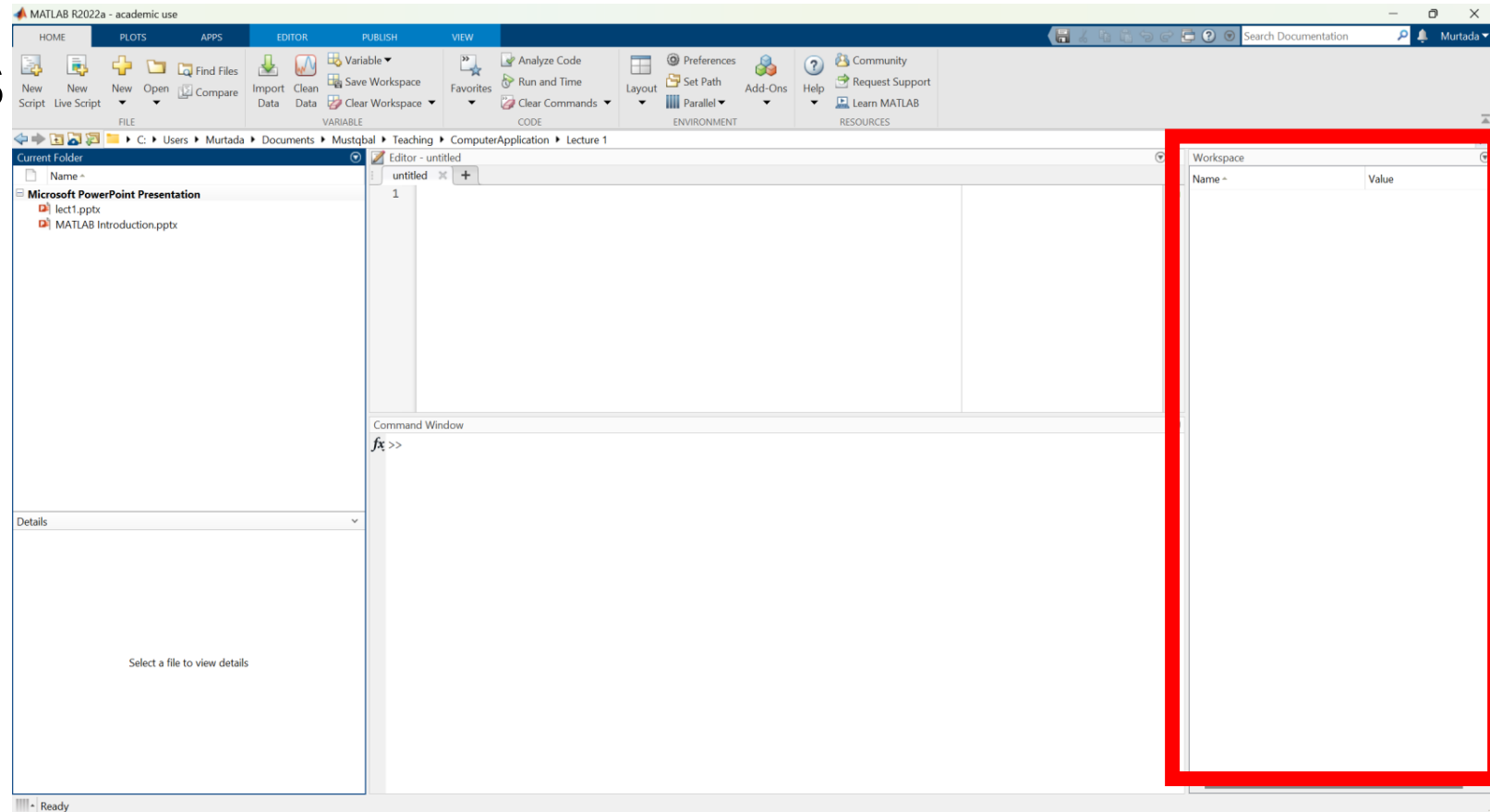
- The core window where you enter commands and run code.
- Executes commands immediately (interactive environment).
- Use it for quick calculations and testing small code snippets.





MATLAB Windows: Workspace

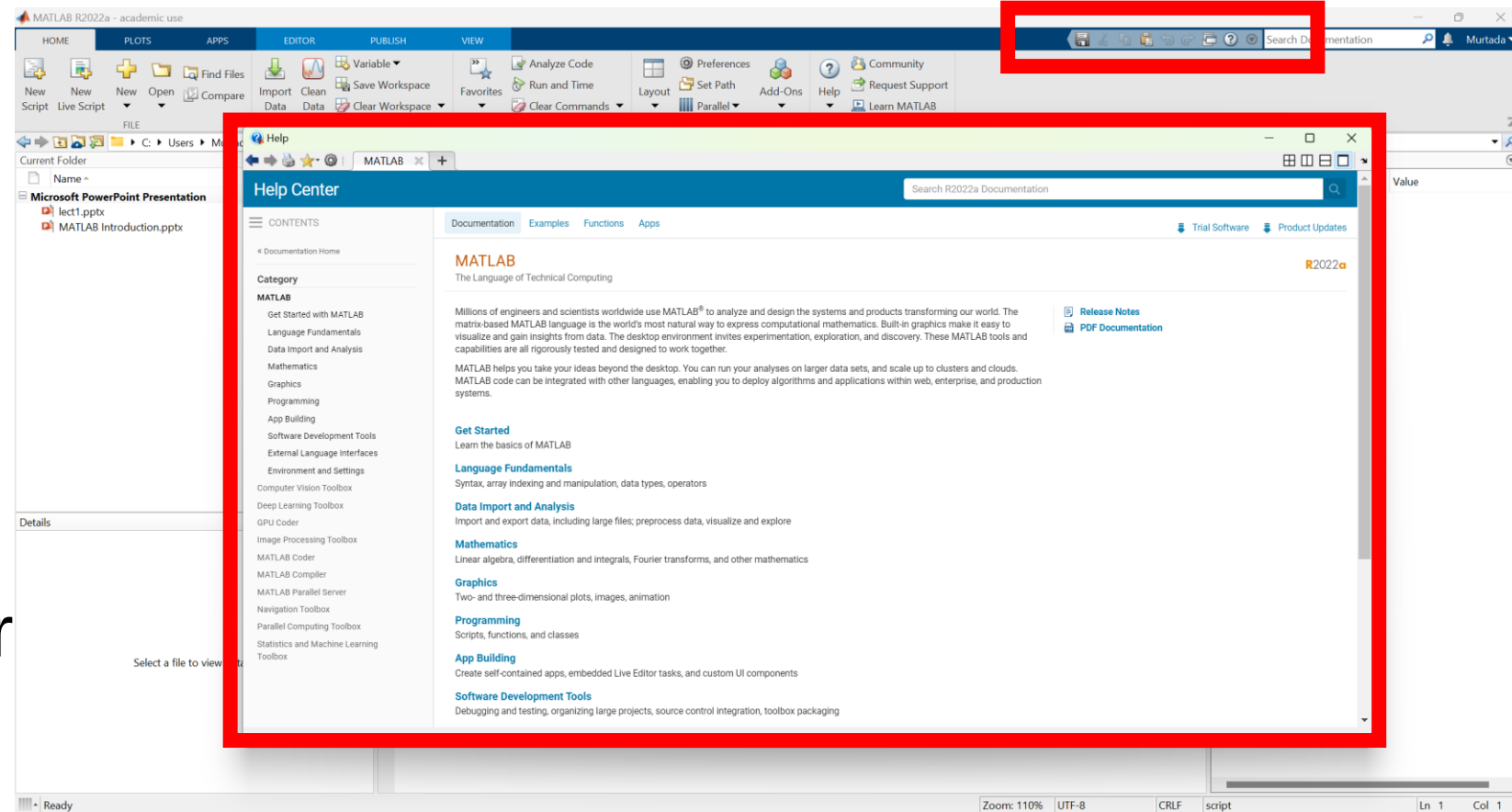
- Displays all variables currently in memory.
- Useful for tracking variable changes during a session.
- You can double-click a variable to view its details in the Variable Editor.





MATLAB Windows: Help Window

- Provides access to MATLAB's extensive documentation.
- Useful for finding information on functions, syntax, and toolboxes.
- You can type help function_name in the Command Window for function-specific help.





Files in MATLAB

- Script Files (.m):
 - MATLAB script files contain sequences of commands and code.
 - Useful for automating tasks and running multiple commands at once.
- Function Files (.m):
 - Function files define custom functions.
 - Begin with the function keyword and can accept inputs and outputs.
- MAT-Files (.mat):
 - Binary files used to store variables, arrays, and other data structures.
 - Saved using save command and loaded with load.
- Data Files:
 - MATLAB can read and write data from multiple formats such as:
 - CSV Files (.csv): Read with csvread and csvwrite.
 - Excel Files (.xls/.xlsx): Use xlsread and xlswrite.
 - Text Files (.txt): Use fopen, fwrite, fread, and fclose.
- Live Scripts (.mlx):
 - Interactive scripts that include text, equations, code, and output all in one document.
 - Useful for sharing results and documentation.





Let's try MATLAB

Install MATLAB and familiarise yourself with its interface.

