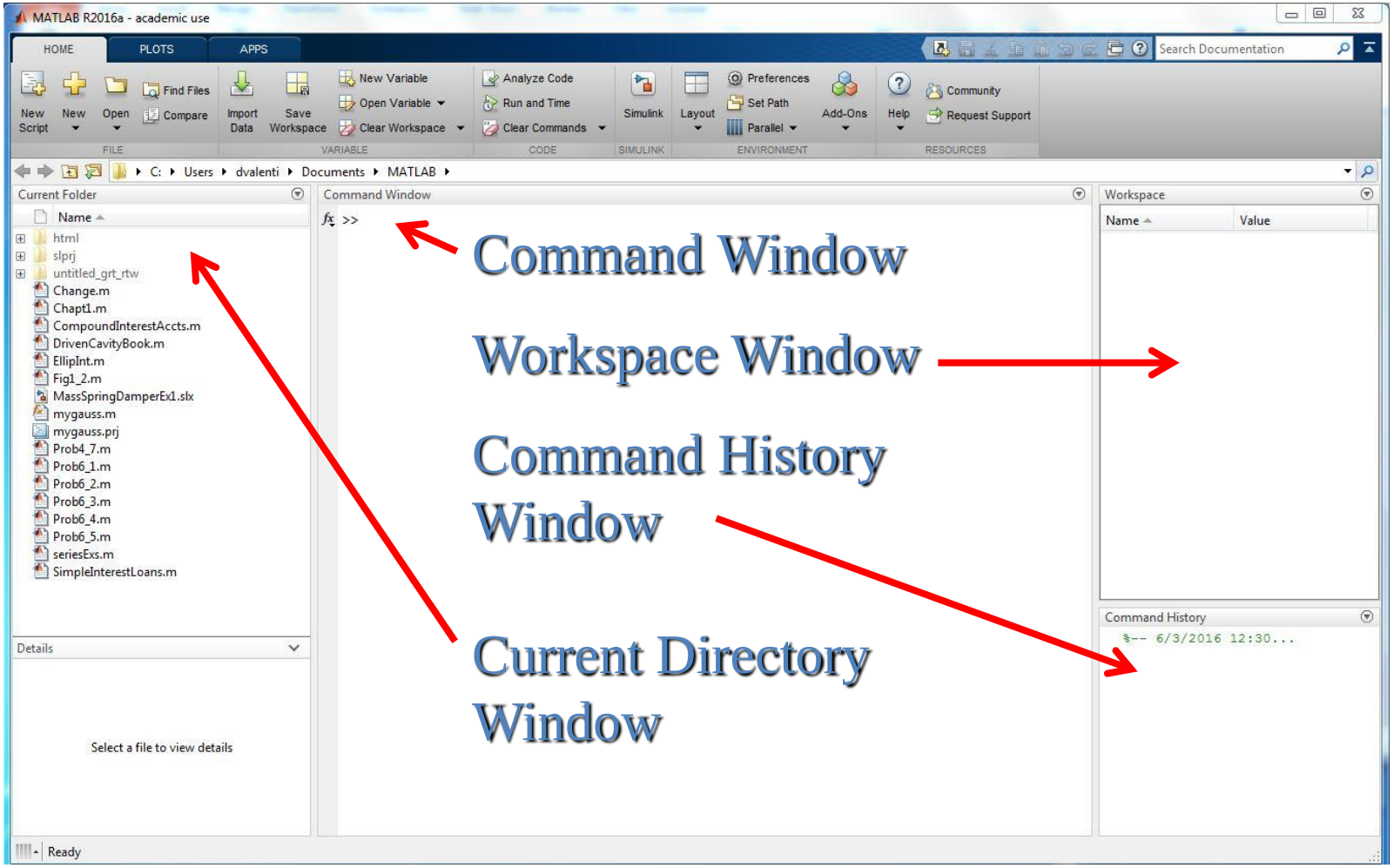
WESTERN SYDNEY
UNIVERSITY

Module 1

First Look at MATLAB

MATLAB desktop



Command Window

- The Command Window in the center is the main panel where you interact with MATLAB.
- You key (or type) and <Enter> commands after the prompt >>; MATLAB executes the commands and displays results (if requested).
- Some commonly used tools and commands:
  - ↑ (up arrow) returns last command input, can be repeated
  - clc – clears the screen
  - whos – shows list of variables
  - clear – clears variables

Command History Window

- The Command History Window logs all of the commands you enter in MATLAB.
- It should have logged **2+3**.

  Use the Command History Window to reenter **2+3** in the command window (use copy-and- paste or double click on 2+3).
- This is useful to retrieve past commands.
- Use “Shift” key to select multiple lines.

Evaluation of MATLAB

- HANDS-ON with MATLAB
  - Type

```
>> 2+3  <Enter>
```

    into the Command Window

```
>> clc  <Enter>
>> whos <Enter>
```

Arithmetic with MATLAB

- Let us explore by doing exercises:

```
>> 3-2      <Enter>
>> 3*2      <Enter>
>> 3/2      <Enter>
>> 3\2      <Enter>
>> 3^2     <Enter>
>> 2/0      <Enter>
>> 0/2      <Enter>
>> 3*Inf    <Enter>
```

Algebraic-numeric computations

- Let us explore by doing exercises:

```
>> a = 3    <Enter>
>> b = 2    <Enter>
>> a - b    <Enter>
>> a / b    <Enter>
>> a^2      <Enter>
>> c = a * b      <Enter>
>> d = c^(b+1)    <Enter>
```

Variables and Arrays

- What are variables?
  - Variables are arrays of numbers.
  - You name the variables (as the programmer) and assign them numerical values.
  - You execute the assignment command to place the variable in the workspace memory (memory is part of hardware used for storing information).
  - You are allowed to use the variable in algebraic expressions, etc. once it is assigned.

Variable Naming Rules

- Must begin with a LETTER
- May only contain letters, numbers and underscores (_)
- No spaces or punctuation marks allowed!
- Only the first 63 characters are significant; beyond that the names are truncated.
- Case sensitive (e.g. the variables **a** and **A** are *not the same*)

Which variable names are valid?

- 12oclockRock
- tertiarySector
- blue cows
- Eiffel65
- red_bananas
- This_Variable_Name_Is_Quite_Possibly_Too_Long_To_Be_Considered_Good_Practice_However_It_Will_Work % (the green part is not part of the recognized name)

Variable Naming Conventions

- There are different ways to name variables. The following illustrate some of the conventions used:
  - **`lowerCamelCase`**
  - **`UpperCamelCase`**
  - **`underscore_convention`**
- If a variable is a constant, some programmers use all caps:
  - **CONSTANT**
- It does not matter which convention you choose to work with; it is up to you.

Hierarchy of Operations

Just like in mathematics the operations are done in the following order: *Left to right* doing what is in

Parentheses & Exponents first, followed by

Division & Multiplication, and then

Addition & Subtraction last.

"PEDMAS" or "BODMAS"

An example:

`c = 2+3^2+1/(1+2)`	1st	`c = 2+3^2+1/3`
`c = 2+3^2+1/(1+2)`	2nd	`c = 2+9+1/3`
`c = 2+3^2+1/(1+2)`	3rd	`c = 2+9+0.33333`
`c = 2+3^2+1/(1+2)`	4th	`c = 11+0.33333`
`c = 2+3^2+1/(1+2)`	5th	`c = 11.33333`

The equal sign assigns

- Consider the command lines:

```
>> ax = 5;
>> bx = [1 2];
>> by = [3 4];
>> b = bx + by;
```

- The equal sign (=) commands that the number computed on the right of it is input to the variable named on the left; thus, it is an assignment operation.

Complex numbers

- Complex numbers take the form of a+b*i:
  - a is the real part
  - b is the imaginary part

  where i = sqrt(-1).
- Complex numbers can be assigned in MATLAB on command lines as follows:

```
>> a = 2; b = 3; % Must assign a & b
  before
>> c = a+b*i  %  assigning c as shown
>> c=2+3j  % is a valid statement
```

Plot *y* versus *x*

- Introduction to plotting & displaying data:

```
>> clear; clc          <Enter>
>> x = 0:0.1:1;     <Enter>
>> y = x.^2;          <Enter>
>> whos                  <Enter>
>> % x and y are 1-by-11 arrays of
  numbers!
```

```
Name      Size            Bytes  Class     Attributes

x         1x11               88  double
y         1x11               88  double
```