CSE 1570 Interacting with MATLAB

Instructor: Aijun An Department of Computer Science and Engineering York University <u>aan@cse.yorku.ca</u>

http://www.cse.yorku.ca/course/1570

Outline

- Starting MATLABMATLAB Windows
- Using the Command Window
 Some useful commands
- Using MATLAB as a calculator
- Arithmetic operations with scalars
- Order of precedence
- Elementary math built-in functions

Outline

- Defining scalar variables
 - The assignment operator
 - Rules for variable names
 - Predefined variables
 - · Useful commands for managing variables

Starting MATLAB

On a campus machine, launch MATLAB through the "start" menu (clicking on the "start" button on the bottom left corner of the screen):

Start → All Programs →MATLAB →R2010a → MATLAB R2010a

At home, launch MATLAB through WebFAS:

- Log into WebFAS at <u>http://webfas.yorku.ca</u> with your FAS account
- Click on "Matlab R2011a"

MATLAB Windows (Cont'd)

- Workspace window
 - Lists the variables currently active
- Command History window
 - Lists the commands that you have entered in the Command window.
- You can close and re-open any window
 - Click on **x** at the top right corner of the window
 - Open by selecting the window name from the **Desktop** menu

Get back to default layout of the Desktop:

• Desktop \rightarrow Desktop Layout \rightarrow Default

MATLAB Windows (Cont'd)

Three other important windows:

- Help window
 - Provides help information
 - Can be opened from the **Help** menu or by typing the **doc** command in the Command window
- Editor window (will study later)
 - For writing and editing MATLAB programs and functions.Can be opened from the File menu or by typing edit on
- command window
- Figure window (will study later)
- Opens automatically when graphics commands are executed
- Contains graphs created by these commands

Using the Command Window

You can type MATLAB command after >> prompt Practice the following commands

- date ---- show the current date
- **calendar** ---- show a month's calendar (default: current month)
- **clc** ---- clear command window
- pwd ---- show the current folder name
- 1s ---- list the content of current folder
- up arrow (\uparrow) ---- brings back the last command
- **help** (also try **help** *command/function_name*)
- doc (also try doc *command/function_name*)

Using MATLAB as a Calculator

Type a math expression in the command line and press the **Enter** key

Practice the following math expressions:

- 3+6/3
- (3+6)/3
- 3+7/2+3
- (3+7)/(2+3)

Using MATLAB as a Calculator

Order of Precedence:

Р	recedence	Math Operations
F	ïrst	Parentheses. For nested parentheses, the innermost are executed first.
S	econd	Exponentiation (^)
Т	hird	Multiplication (*), division (/) (equal precedence)
F	ourth	Addition (+), subtraction (-) (equal precedence)
Practice the following: • 6*(8-6)/(2*3) vs 6*(8-6)/2*3 • 2*3^2 vs (2*3)^2 • 5^(5-4+1)/((2+3)*2)		

Exercise

Express the following using MATLAB:

$$28.5 \times 3^3 - \sqrt{1500}$$

Expression: 28.5*3^3-sqrt(1500)

Result: ans =

730.7702

Examples of Variables Type the following in the command line: x=5 which assigns value 5 to variable x. Output from MATLAB: x= 5 Can use x in expressions: y=x^2+x+3 which first calculates 5^2+5+3 and assigns the result to variable y.

Rules About Variable Names

- Must begin with a letter
- Can contain letters, digits and the underscore character. For example,
- Al, xy3, First_name, firstName, c23D
- Cannot contain special characters (\$, %, &, @)
 MATLAB is case sensitive, meaning
- A and a are names of different variables.
 No space is allowed between characters
- Use underscore where a space is desired.
- Avoid using the names of build-in functions (e.g., sqrt, exp, log, sin, cos, ...)
- Avoid using keywords reserved by MATLAB (for,
- if, else, while,....)

Predefined Variables in MATLAB

- **ans** hold the value of the last expression if it was not assigned to another variable.
- **pi** the number π (3.1416)
- **eps** a very small number. Equal to 2^{-52} .
- **inf** a very big number. Used for infinity.
- **NaN** stand for Not-a-Number. Used when MATLAB cannot determine a valid value, such as 0/0.
- **i** and **j** defined as $\sqrt{-1}$

If you assign a value to a pre-defined variable, the predefined value is overwritten.

Useful Commands for Managing Variables

who – Display a list of the variables currently in the memory.

whos – Display a list of the variables currently in the memory and their size and other related information.

clear – Removes all variables from the memory.

clear \mathbf{x} , \mathbf{y} , \mathbf{z} – Removes only variables \mathbf{x} , \mathbf{y} , and \mathbf{z} from the memory.

Exiting MATLAB

You can exit MATLAB in one of the following ways:

- Type one of the following commands in the Command window:
 - •exit
 - quit
- Choose "Exit MATLAB" from the File menu
- Click **x** at the top right corner of the MATLAB Desktop window.

Home Exercise

Express the following using MATLAB:

$$\frac{3^5 - \sqrt{125}}{6 + \log_{10} 256}$$

Assign 6 to variable n and calculate the factorial of n.

Assign 281 to N and 5 to a. Then calculate $log_a N$

Next Class

Creating vectors and matrices