

Introduction to Programming 2016/2017

Tirgul 1: Basic MATLAB

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Administrations

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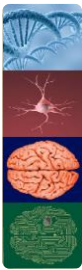
Course E-mail: matlab.brain@gmail.com

Administrations

- Course web-site:
<http://www.ibglab.org/matlab-2017>

Course name:
Scientific Programming using MATLAB

Password: matlab2017

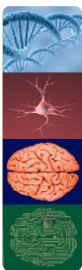


The course will include:

- Lectures
- Practices (Tirgulim)
 - Will include presentations, example files (Matlab files) and practice exercises - if we have time.


All files can be found at the website. I will try to post them before the lessons so you'll have time to print them and bring them to class.

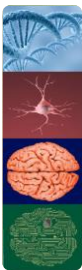
- 12 Home-Exercises
- Quizzes



Tips for success

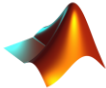
- Come to lessons and tirgulim.
 - and ask questions.
- Do the home exercises.
- Go over the presentations and example code-files
 - they are freely available to you.
- Use Matlab's help
- Practice, practice, practice...

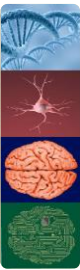




What is MATLAB

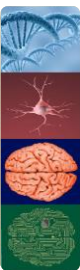
- MATLAB = MATrix LABoratory.
- Programming for scientific purposes.
- High level programming language:
 - Numerical calculations.
 - Data analysis.
 - Graphical presentation.
 - Simulations.
 - ...





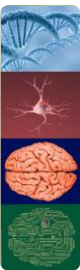
MATLAB Basics

- Start – Click the MATLAB icon.
- Exit –
 - X
 - ‘quit’ or ‘exit’ command




MATLAB Workspace

- Command Window.
- Workspace.
- Command History.
- Current directory.
- Toolbars.



Working in the Command Window


- Typing commands and <Enter> → the command is executed and the result is displayed.
- ↑ - Arrow up – **last command**.
- Cut & Paste.
- Syntax errors.



Working in the Command Window

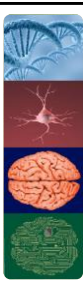
Variables:

- Variables appear in the workspace.
- Double click or type the variable name in the command window to view variable value.



Working in the Command Window

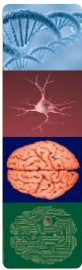
- clc – clear command window
- clear – clear variables



Error messages

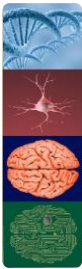
- MATLAB commands need to be written perfectly and are case-sensitive.
 - clc
(clear command window)
 - CLC

??? Undefined function or variable 'CLC'.



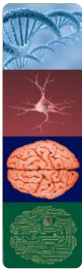
Current Directory

- Current Directory – the directory in the computer in which we are currently working.
- All **files** are saved in the current directory.
- Files are loaded and run from the current directory.
- Setting the current directory is the first thing to do when starting to work in MATLAB!



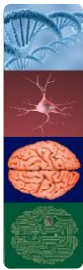
Directory-related commands

- `cd, pwd` – display the current directory.
- `cd dirName` – changes the current directory.
- `cd ..` – move up one level in the directories hierarchy.
- `mkdir dirName` – make a new directory.
- `rmdir dirName` – remove a directory.
- `dir, ls` – list of all files and directories in the current directory.



Matlab code files (scripts)

- computer program – commands written in a file, one after the other.
- Matlab program files (code files) - **.m files**.
- Matlab code files are also called **Scripts**.



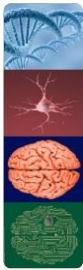
Scripts – Why?

- Instead of writing commands in the command window – we can write them as a script.
 - All the set of the commands is saved, no need to type commands again and again.
 - Some commands or variables values can be changed, and then the script can be run again in one-click.
 - Saving the program for future use.




Creating and Opening Scripts

- Creating a new script:
 - Toolbar: 'New Script' icon.
 - Toolbar : New → Script.
 - Shortcut: Ctrl+N
- Opening an existing script:
 - Toolbar : 'Open' icon.
 - Shortcut: Ctrl+O
- The script is displayed in the **Editor**.




File Editor

- Lines are numbered.
- Menu & Toolbar.
- Text options, such as: Find, copy & paste...
- Comments – Add %
 - Everything after the % in the same line is a comment → the line becomes green.
 - Toolbar: Edit → Comment / Uncomment icons.
 - Shortcuts: Ctrl+r / Ctrl+t.
- Print



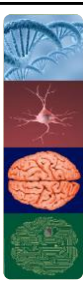
Saving and Running Scripts

- Saving - A script in MATLAB is saved as '.m' file.
 - Toolbar: 'save' icon (OR: save as).
 - Shortcut: Ctrl + S.
 - When naming a script: English letters, no special icons (space, %, !, >, ...).
- Running – 'Running a script' means executing the commands in it.
 - Editor toolbar (saves & runs).
 - F5 (saves & runs).
 - Typing the name of the script in the command window (runs latest version **saved!**).



Help !

- **help** [command] – details of the command syntax, usage and options.
 - *Example:* help clear
- **doc** – opens interactive help: includes all the details as in the "help" (in a nicer format) and also graphical displays, examples, contents, index, search, demos.
- *I strongly recommend using the helpdesk (doc) for commands names, usage and syntax.*



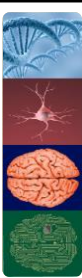
Help on the Web

- MathWorks web site:
<http://www.mathworks.com/>
- Google: type 'MATLAB' and keywords
- MATLAB tutorials on the web.



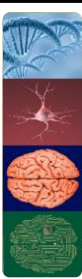
Exercises - Submission

- Exercise submission instructions at the course website – **read them carefully!**
- Hard copy (printed)
 - Submission at the beginning of the tirgul.
- Soft copy
 - Submission by email to: ex.matlab@gmail.com
 - Email subject line: exercise number- student name – id number (example: Exercise 2 – Israel Israeli– 123456789)
 - Submission by Saturday/Sunday – 24:00.
 - Make sure you submit ALL required files.
 - Only ONE e-mail per exercise.



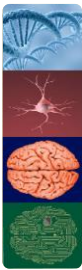
Exercises - Submission

- Submission time - no delays. Exceptions with a **doctor's note**, or **military reserve service note** (Milu'im) - contact me in advance to get a new submission date.
- Do the exercises on your own - don't work on the code together with other student/s.
- All programs must run. If it does not run – no points. Make sure that your code runs without errors, prior to submission.



Exercises - Submission

- Make sure that your files/functions/variables have exactly the required names as specified in the exercise, otherwise points will be reduced. No missing letters or spelling errors! This is because the exercises are checked by an automatic computer program.
- Use semicolons (;) to suppress output to the command window.
- Don't use 'clc' and 'clear' commands in the submitted code (again, because of the automated checking process).



Commands/Functions List

- quit, exit
- clc
- clear
- cd, pwd, mkdir, rmdir, ls, dir
- help, doc