1.050: MATLAB Tutorial

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MATLAB ENVIRONMENT:

Two key components:

1. **Command window**: In here, you can type all MATLAB commands and operations. However, you might lose your script (the collection of all your computations) if you exit MATLAB.
2. **Editor**: In this window, you can also type all MATLAB commands and operations, but they will not be executed until you tell the program to 'run' the calculations (see next section how to create and run your script). The neat about creating a script file is that you can save it and 'run' it any other time.

Screenshot of the MATLAB environment showing editor and command window removed due to copyright restrictions.

How to run your script in MATLAB?

In recitation this week, Alberto walked you through some basic MATLAB commands used for vector and matrix operations.

In case you missed recitation or you want to learn about creating a MATLAB script, you can download the file **MATLABrecitation.m** from the class website (remember where you save it in your Athena account or personal computer). This file has all the exercises we did in class.

The goal of this section is to help you load this file, and run the calculation in MATLAB. Once you learn how this works, you will be ready to create your own **.m** scripts and perform a series of operations for your P-sets or other engineering problems you may have to solve using MATLAB.

1. In your MATLAB main window, go to **File / Open** and search for the **.m** of interest (in this case, **MATLABrecitation.m**).

2. The file will pop-up in the Editor window. As you can see, there are a lot of commands typed in there. Some commands at the beginning of the script are new, but they are there to keep things 'neat'.

    clear – clears all the variables stored in the memory of MATLAB, so results don't get mixed.
    close all – closes all figure windows, so that you have 'fresh' graphs every time.
    clc – clears all contents of your Command Window, so that only the results obtained from your current script are displayed.

3. The statements that have a **%** in front are just annotations. This helps you make notes of what you are doing, and in general is a good programming habit, just in case you have to share your script with other people.

4. All operations for vectors and matrices are included in the script. MATLAB has some intuitive labels:

    dot , transpose, cross, inv, rank

    Other commands, you can learn them:
    size(x) – displays the number of rows and columns of the vector x.
    acosd – calculates the *arccos* of a number in *degrees*.
    norm(x) – calculates the length of a vector

5. The last part of the script shows you how to make a plot in MATLAB for the relation between to quantities. The example used to illustrate this application is plotting the length dimension *x* (related to the travel path used by Alberto to save a friend drowning) as a function of time *t*.

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6. Finally, *how to run ALL these computations…?*

    Using your mouse pointer, click over the Editor window.

    In the main MATLAB window, you will see the menu options:
    File Edit Text Go Cell Tools Debug Desktop Window Help

    Go to **Debug / Run** (or alternatively just hit F5)

    Then, you will see that all the operations typed into the **.m** script are performed in the Command Window! And you can always make modifications to your **.m** script and re-run your calculations.
    IMPORTANT TO REMEMBER! If you make changes to your script, save them first (**File / Save**) and then hit **Run.**

Hope this MATLAB tutorial is helpful.