ENGR 11: Lesson 1, Part 1 Suggested Problems

Theoretic Problems: Discussed in notes

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1. **What's in a name?**

   A. What does MATLAB stand for? What is special about this name?

   B. What is the major purpose of MATLAB?

   C. What are some differences between MATLAB and more general-purpose programming languages like C, C++, or Java?

2. **Habits to minimize bugs in your code**

   A. In MATLAB, remember that parenthesis are expected to come in pairs: left parenthesis (and right parenthesis). What are the other symbols in MATLAB that should come in pairs?

   B. What is a good way to avoid unclosed parenthesis?

   C. Please start a list of useful debugging tricks that you plan to implement while you program. Put this list in a special place and refer back to it often, adding new ideas as you encounter them. Remember: an ounce of prevention is worth a pound of cure. I will encourage you to develop strategic programming habits now that help you avoid creating errors and flaws in your code. However, for these habits to become part of your workflow, you need to take ownership for yourself... Start the process of creating systems for yourself now! You'll thank yourself (in time saved) later in this course.

Problems Solved in Jeff's Notes

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3. Eg. 1: Use the MATLAB Command Window as a basic calculator to add the numbers 3 and 4 together.

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4. Eg. 2: Use the MATLAB Command Window as a basic calculator to multiply 64 and 32. Then assign the result of this operation to a variable m.

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5. Explain the difference between the mathematical equals sign (=) and MATLAB's use of the assignment operator (=). How are these two symbols (the equals sign and the assignment operator) similar? How are these symbols different?

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6. Eg. Use the assignment operator to take the value of variable m stored in memory from Eg. 2, subtract one from this value, and assign the result to variable m (thus overwriting the previous value stored in memory).

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7. Eg. 3: Create a new variable $x = \dfrac{m+1}{2}$ using the value of the variable m stored in memory.

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8. Eg. 4: Set variable $y = \dfrac{m+1}{1024}$ and suppress the output in the Command Window using the semicolon.

9. Eg. 5: Use the Command History window to execute any of the previous command from eg. 1 - eg. 4

   A. Activate the Command prompt >> and then use your mouse to double click on your chosen command from the Command History log

   B. Activate the Command prompt >> and then use the up and down arrows to scroll through your command history until you find the exact command you would like to execute again. Once you've found this command, press ⌈Enter⌋ .

10. Eg. Use the % symbol to type a comment in the Command Window. Explain some of the differences between an executable command and a comment in MATLAB.

11. Eg. Clear the command window using the `clc` command.

Suggested Problems

2. A. Set the MATLAB Desktop Window to it's default appearance (containing only the Command Window, the Workspace Window, and the Current Folder Window).

    B. Open the Command History Window as a Popup. Then, use dock the Command History window in MATLAB's main Desktop window.

    C. Undock each of the following windows individually: Command Window, Workspace Window, Current Folder Window. Then, dock each of these windows

    D. Rearrange the format of MATLAB's Desktop Window by clicking and dragging each of the windows mentioned above.

3. Calculate a numerical value for each of the following expressions by writing commands in the Command Window.

   A. $\left(\dfrac{5}{\sqrt{300}} + \dfrac{6.4^6}{91} \right)^{1/3} + 0.25 \times 120$ B. $\sqrt[5]{-789 + \dfrac{456.789}{123}} + 13.2^4$ C. $11^{10/7} - \dfrac{\sqrt{12} \times 10}{71}$

4. Write a MATLAB command in the Command Window to calculate a numerical approximation of the fraction with $-41.8 + \sqrt{17}$ in the numerator and $2^{21} + 26.891$ in the denominator.

5. Use the Command Window to define the variables

$$\alpha = -2.3, \qquad \beta = \sqrt[5]{25}, \qquad \gamma = \alpha^2 \cdot \beta, \qquad \text{and} \qquad \delta = \frac{\alpha + \gamma}{\beta - \alpha}.$$

Be sure to suppress the output of these variable assignments. (Hint: what do you recall about the effect of typing the semicolon ; at the end of a command?). Then evaluate the following expressions:

$$\text{A.} \quad (\gamma \cdot \delta)^\alpha + \qquad\qquad \text{B.} \quad \sqrt[4]{\gamma + \beta} - \frac{\delta}{\alpha}$$