

Problem Set 1 – Understanding Matlab and Data Part I

Create ONE zipped folder file with all your m-files and supporting data and upload to course website by midnight Wed (1.23.2019). Late submissions are NOT accepted.

1. Create an M-file named PS1_1.m that can read in an excel file containing salary information (e.g. Column 1 = name, Column 2 = salary) and reports the following to the command screen: 1) Max salary, 2) Min salary, and Mean Salary rounded off to the nearest \$1000. Test with the Cleveland Cavaliers data set (create it as 'ClevelandCav.xlsx' using 2018-2019 data from Basketball Insiders)¹.
2. Create an M-file named PS1_2.m that asks for the meal price and calculates a 15% tip and rounds UP to the nearest whole dollar amount. (Test with \$134.56, should be \$21).
3. The displacement (Δx) of five Hookean springs is measured for a force F:

F, N	14	18	8	9	13
$\Delta x, m$	0.013	0.020	0.009	0.010	0.012

Given that $F = k\Delta x$ and $U = \frac{1}{2} k \Delta x^2$ for spring constant k (N/m) and potential energy U (J), write an m-file named PS1_3.m that solves for the spring constants and potential energies. Use MATLAB to determine the maximum potential energy. Suppress all output in the command window, except for the maximum potential energy.

4. Update your Slack profile with your picture (will help us remember names)
5. The density of freshwater can be computed as a function of temperature with the following cubic equation:

$$\rho = (5.5289 \times 10^{-8})T_c^3 - (8.5016 \times 10^{-6})T_c^2 + (6.5632 \times 10^{-5})T_c + 0.99985$$

where ρ is the density (g/cm³) and T_c the temperature (°C). Write an m-file function named PS1_5.m that uses input and output arguments to solve for density using this equation. Program it to take an input temperature **in FAHRENHEIT** and then output the density based on the cubic formula. Make your function work with both a scalar input (single temperature) or a vector (list of temperatures). In a separate script, name it PS1_5test.m, test your function by first creating a vector ranging from 32 °F to 93.2 °F using increments of 3.6 °F and calling your function to solve for all the densities. Terminate all commands such that all output is suppressed from the command window except for your answer.

GROUP CREDIT (2pts): Demonstrate use of SLACK. Post some of your code to your group's channel. Ask for help or for verification of form to your group members. Post a reply to at least one group member. We are looking for group interaction.

¹ <http://www.basketballinsiders.com/cleveland-cavaliers-team-salary/>