FEC II Spring 2018 MATLAB

Student Challenges

**Warming Up:**

1) Create the following vectors and matrices in MATLAB (a vector is a matrix with one row or column):

A = $\begin{matrix}1&2&3\\4&5&6\\7&8&9\end{matrix}$ B = $\begin{matrix}5&11&6\\1&3&8\\4&2&15\end{matrix}$ C = $\begin{matrix}121&5&17\end{matrix}$

2) Oops! There are mistakes in the above values. **Without starting over, modify the existing matrices/vectors** tochange the 9 in matrix A to a 0 and make the entire third row of matrix B the number 2. (Try to do the latter using the colon operator.)

3) Great now that those are fixed, we need to divide every value in matrix A by 2. Display A. Are the values ½ of what’s given above (remember we changed the 9 to a 0)? If not, you need to figure out why.

4) Display only rows two and three of matrix B (Hint: use the colon operator).

5) Multiply each value in column two of matrix B by 2.

**Plotting Challenge:**

Create a proper graph of multiple experimental data series for the following data. Height should be on the x-axis with units of meters and Power should be on the y-axis with units of hp. Data series should have different symbols (plots should be individual points, not solid lines) and a legend should be included. Include gridlines (you may have to search the help or Google to find the command for including gridlines).

H1 = [10, 15, 25, 35, 55]; H2 = [10, 30, 50, 70, 100];

P1 = [0.27, 0.41, 0.68, 0.95, 1.5]; P2 = [0.11, 0.33, 0.54, 0.76, 1.09];

**Looping Challenge:**

Suppose we have invested some money which draws 10 percent interest per year, compounded yearly. We would like to know how long it takes for the investment to double. More specifically, we want a statement of the account each year, until the balance has doubled.3 (think loops and you may have to look up the compound interest formula)

**More MATLAB Challenges:**

1. Given a circular pizza with radius *z* and thickness *a*, return the pizza’s volume.1 Set z = 10 and a = 2 to determine the volume.
2. Find the value of the expression2 y = e-asin(x) + 10$\sqrt{y}$, for a = 5, x = 2 and y =8
3. Determine the solution to the following equation in MATLAB2:

$$\frac{1}{2+3^{2}}+\frac{4}{5}×\frac{6}{7}$$

1. Given the following system of linear equations2 (requires knowledge of linear algebra):

x + 2y + 3z = 1

4x + 5y + 6z = 1

7x + 8y = 1

Solve for x

1. For questions A and B, determine the contents of the specified variable following execution **without** actually running the code in MATLAB.
2. What will be stored in A after running the following code?

 >>for i = 1:3

 A(i) = i\*2;

 End

1. What will be stored in B after running the following code?

>> for i = 1:3

 for j = 1:4

 B(i,j) = i^2 – j;

 end

 end