Exercises for Day 9

Exercise 1. Type the nested `for` loop program from the lecture into a script. Use the debugger to complete the table below. (Just turn in this paper, not the script.)

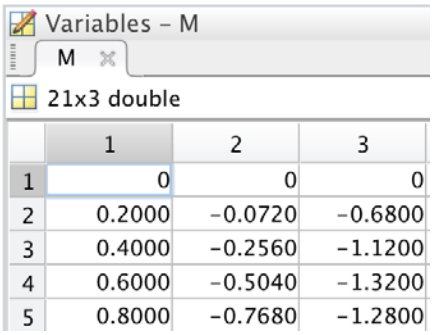
When `row` is …	And `column` is …	`C` is …
1	1	$[2]$
1	2	$[2 \quad 3]$
1	3	$[2 \quad 3 \quad 4]$
2	1	$\begin{bmatrix} 2 & 3 & 4 \\ 3 & 0 & 0 \end{bmatrix}$
2	2	
2	3	
3	1	
3	2	
3	3	
4	1	
4	2	
4	3	

Exercise 2. Start with your code from Day 8 Exercise 1. Instead of creating 3 different vectors with 21 entries each, make a 21×3 matrix using a single `for` loop:

- in the first ***column***, put the x values: 0, 0.2, 0.4, …, 4
- in the second ***column***, put the value of y at each x for the given function $y(x) = x^3 - 2x^2$
- in the third ***column***, put the value of the slope $\frac{\mathrm{d}y(x)}{\mathrm{d}x} = 3x^2 - 4x$ at each x

(over)

Make certain that your matrix has 21 rows and 3 columns by inspecting it:



	1	2	3
1	0	0	0
2	0.2000	-0.0720	-0.6800
3	0.4000	-0.2560	-1.1200
4	0.6000	-0.5040	-1.3200
5	0.8000	-0.7680	-1.2800

AFTER the loop, print the entire matrix to a text file as a three-column table, using a single `fprintf` command. Your table should begin as follows:

```
     x          y(x)         dy(x)/dx
 -------    ----------    ----------
   0.0          0.000         0.000
   0.2         -0.072        -0.680
   0.4         -0.256        -1.120
   0.6         -0.504        -1.320
```

Exercise 3. Create a script to do the following:

a. Read the thermocouple data file (available on course web page) and assign it to a matrix. (The data has voltages in the first column and temperatures in °F in the second column.)

b. Add a new third column to that existing matrix. The third column should contain the temperature readings converted to degrees Celsius:

$$T(^{\circ}\mathrm{C}) = \frac{T(^{\circ}\mathrm{F}) - 32}{1.8}$$

c. Print to a text file a table containing some of the values. Write out rows 10, 20, 30, … until the end of the matrix is reached. The start of your table should look like the following:

```
  Potential    Temperature    Temperature
  (Volts)       (deg. F)       (deg. C)
-----------------------------------------
  0.101477      44.53120        6.96178
  0.203406      58.45507       14.69726
  0.305251      71.84717       22.13731
  0.406071      82.81577       28.23098
```