CIEG 675
INCLASS #3 Due **Wednesday February 1, 2021 by 1159p**

Please submit your solution as a published pdf. Include the MATLAB code and figures generated. Include comments if relevant. When working with a script separate sections using (%%).

1) Download the file called "*BM_dem_ascii.txt*" from Canvas and do the following:

    a. Open the file and Load the first 5 lines from the file into MATLAB using `fgetl`. Close the file.
    b. Using the metadata from the 1st five lines you've loaded into a cell array, and the description of each line given below, create x and y vectors to plot the elevation data. You'll have to parse out the numbers from the strings loaded in from part (a), and convert them to numeric values.

ncols:	number of columns in elevation matrix, these are x values
nrows:	number of rows in the elevation matrix, these are y values
xllcorner:	x-location (in meters) of the lower-left corner of the 1st data point [i.e. data(1,1)]
yllcorner:	y-location (in meters) of the lower-left corner of the 1st data point [i.e. data(1,1)]
cellsize:	spacing (in meters) between grid points (*dx & dy*)

    c. Now, open the file again and use `textscan` to load the elevation data from the file, skipping the 6 header lines. Convert the loaded data from a "cell" to a "regular" matrix with `cell2mat`, and call the variable `BM`. (HINT: the function `repmat` will be useful here!) Then, verify that you've made your x, y vectors and `BM` grid properly by plotting them using the following commands (advanced plotting we have learned):

    ```
    s(1) = subplot(1,2,1);
      pcolor(x - x(1), y - y(1), BM); shading flat;
        colorbar; caxis([-3 2.5])
        xlabel('x (m)'); ylabel('y (m)'); title('\bf Original Data')
    ```

    d. Next, create a new variable called `BM_mod` that is a copy of the elevation data in `BM`. We only want to see the data above zero elevation now, so find and "NaN-out" (assign a value of `NaN`) all the values in `BM_mod` that are less than or equal to zero.
    e. To check the results, plot the modified elevation data in a 2nd subplot using the following commands:

```
limits = [get(s(1), 'xlim') get(s(1), 'ylim')];
s(2) = subplot(1,2,2);
  pcolor(x - x(1), y - y(1), BM_mod); shading flat
    colorbar; caxis([-3 2.5]); axis(limits)
    xlabel('x (m)'); ylabel('y (m)'); title('\bf Elevations > 0 Only')
```

f. Finally, add a line of code that resizes the figure to be a bit larger, so that data are displayed in a way that is interpretable. Include the figure in your inclass submission

HINT: if it doesn't look like the figure below, something is not right...