Student tasks:

1. In the program laplace.m, change the indicated line within the loops to perform the relaxation method.
2. Call the program laplace.m to solve for the potential. First you will need to make an n-by-n matrix of all zeros to act as your initial guess. You will call the program as `laplace(n,guess,size,voltage,plateSeparation, plateLength, plateThickness);`
3. Try adjusting the number of iterations. Can you tell if your solution is converging? What happens to the runtime?
4. Now run the program multigrid.m, which calls laplace.m with increasingly finer grids, using the solution on the previous grid size as the new guess.
5. Edit the lines to calculate and plot the electric field strength. What do you notice that is different from the infinite plate approximation?
6. Edit the lines to calculate the total charge. What do you observe on the plot?
7. Edit the line to calculate the capacitance. What can you do to check your capacitance calculation?
8. You will use this as a comparison to your lab measurements. You will need to decide how many sizes to check, how much surrounding space to use, how many refinements to use, how many iterations to use at each step, etc.

Here are some MATLAB commands you may find useful:

Make an n-by-n matrix of all zeros: `my_Matrix = zeros(n);`

Gradient: `[x-component, y-component] = gradient(scalar_matrix, grid_spacing);`

Laplacian: `scalar_matrix = del2(scalar_matrix, grid_spacing);`

Div: `scalar_matrix = divergence(Xgrid,Ygrid, vector_fieldX, vector_fieldY);`