1. Consider and plot a node 5 path and ring graphs with the following weights on the edges $\{1, 0.8, 0.6, 0.4\}$, $\{1, 0.8, 0.6, 0.8, 1\}$ respectively.

2. Compute all possible Laplacian matrices for the above graphs. Now plot with index of the eigenvalues (ordered eigenvalues) on the x-axis and number of zero crossings of the corresponding eigenvector on the y-axis.

   Note:

   Def: The set of zero crossings of a signal f on a graph $\boldsymbol{G}$ is defined as the set of edges connecting a vertex with a positive signal to a vertex with a negative signal,

   $$Z_G(f) := \{e = (i,j) \in E : f(i)f(j) < 0\}.$$

3. Repeat question 2 for the given weighted adjacency matrix ('$Data.mat$')

4. Plot the Minnesota city graph using the data (Minnesota.mat). Now plot a Graph signal 'x' (inputSignal.mat) on that graph. Calculate GFT coefficients of the signal.

5. Is it possible to generate your city graph? (Hint: Google map of your city)