Work in pairs to complete this assignment. Submit code to solve the following problem in a single .py file. Submit written explanations of your conclusions in a single pdf document. Be sure to include the names of all group members in both files.

1. Consider the following ten graphs.
   a. Calculate the Laplacian of each of the graphs.
   b. Calculate the eigenvalues of each of the graphs.
   c. Use Kirchhoff's matrix tree theorem to count the number of spanning trees in each of the graphs.
   d. Use the calculations you have completed to determine which of the graphs are connected. Of course, you can tell by looking but the purpose is to use the calculations to answer the question.
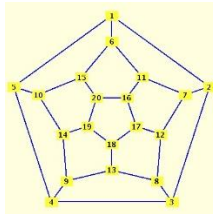
   (i) K_n, the complete graph on n vertices

   (ii) P_n, the path on n vertices

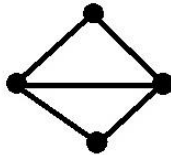   (iii) C_n, the cycle on n vertices

   (iv)   Petersen graph
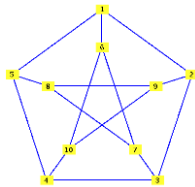
   (v)   Dodecahedron

   (vi) K_4 minus an edge
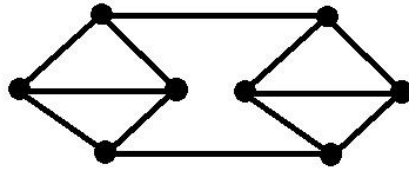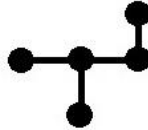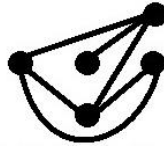
(vii)

(viii)   A tree on 5 vertices

(ix)   The complement of (viii)

(x)   The disjoint union of (viii) and (ix)