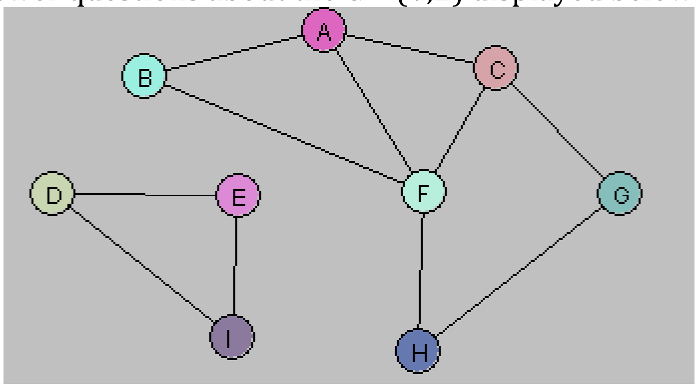
Lab 11 Graph Theory

Q1.
Answer questions about the G = (V,E) displayed below.

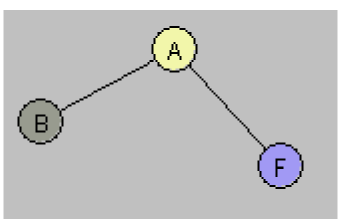


a. Let U = {A, B}. Draw G[U].

b. Let W = {A, C, G, F}. Draw G[W].

c. Let Y = {A, B, D, E}. Draw G[Y].

d. Consider the following subgraph H of G:



Is there a subset X of the vertex set V so that H = G[X]? Explain.

Q2.

Show that a graph has a unique minimum spanning tree if, for every cut of the graph, there is a unique light edge crossing the cut. Show that the converse is not true by giving a counterexample.

Q1. A.

Additional Lab 11 Question:
Study the discovery and finishing time and then solve the following problem.

22.3-2

Show how depth-first search works on the graph of Figure 22.6. Assume that the **for** loop of lines 5–7 of the DFS procedure considers the vertices in alphabetical order, and assume that each adjacency list is ordered alphabetically. Show the discovery and finishing times for each vertex, and show the classification of each edge.

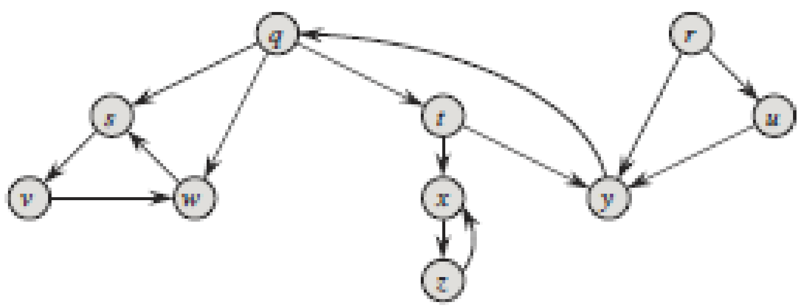
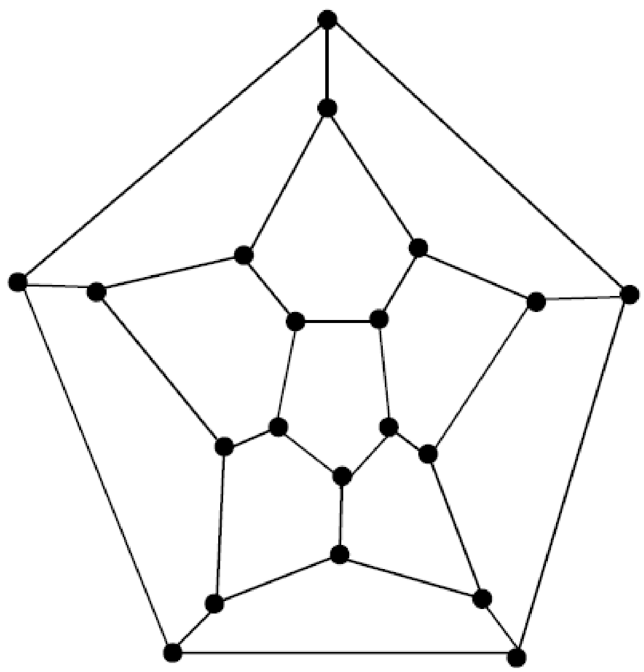


Figure 22.6 A directed graph for use in Exercises 22.3-2 and 22.5-2.

(Corman)

Q3.
The following graph has a Hamiltonian cycle. Find it.



Q4.

Consider the problem of computing a *maximum* spanning tree, namely the spanning tree that maximizes the sum of edge costs. Do Prim and Kruskal's algorithm work for this problem (assuming of course that we choose the crossing edge with maximum cost)?