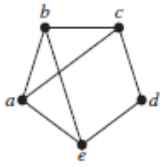
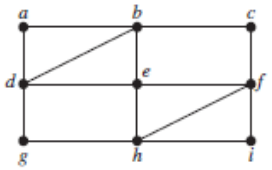
10.5

In Exercises 1–8 determine whether the given graph has an Euler circuit. Construct such a circuit when one exists. If no Euler circuit exists, determine whether the graph has an Euler path and construct such a path if one exists.

1.



2.

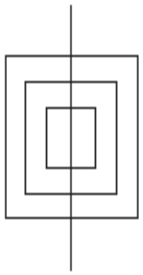


12. Devise a procedure, similar to Algorithm 1, for constructing Euler paths in multigraphs.

In Exercises 13–15 determine whether the picture shown can be drawn with a pencil in a continuous motion without lifting the pencil or retracing part of the picture.

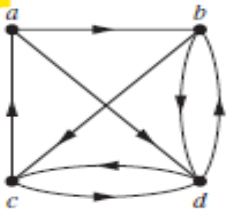
13.

14.

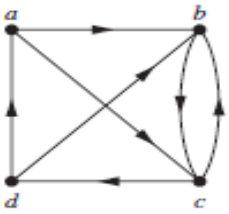


In Exercises 18–23 determine whether the directed graph shown has an Euler circuit. Construct an Euler circuit if one exists. If no Euler circuit exists, determine whether the directed graph has an Euler path. Construct an Euler path if one exists.

18.

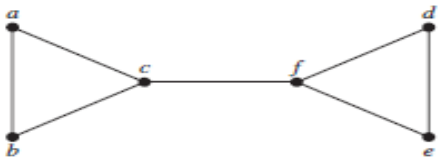


19.

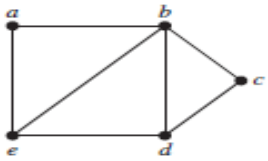


In Exercises 30–36 determine whether the given graph has a Hamilton circuit. If it does, find such a circuit. If it does not, give an argument to show why no such circuit exists.

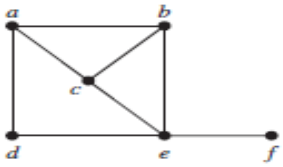
30.



31.



32.



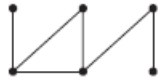
11.1

1. Which of these graphs are trees?

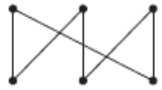
a) 

b) 

c) 

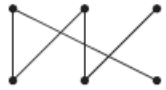
d) 

e) 

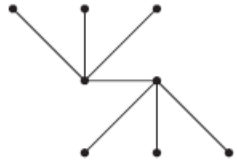
f) 

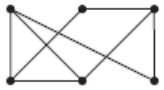
2. Which of these graphs are trees?

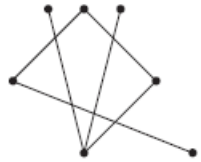
a) 

b) 

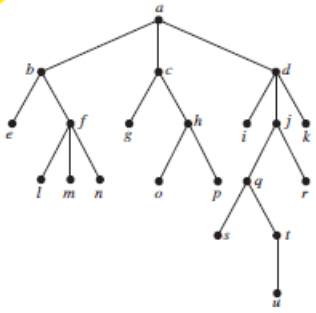
c) 

d) 

e) 

f) 

3. Answer these questions about the rooted tree illustrated.



a) Which vertex is the root?

b) Which vertices are internal?

c) Which vertices are leaves?

d) Which vertices are children of j?

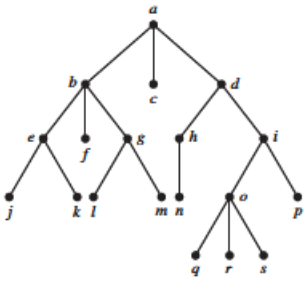
e) Which vertex is the parent of h?

f) Which vertices are siblings of o?

g) Which vertices are ancestors of m?

h) Which vertices are descendants of b?

4. Answer the same questions as listed in Exercise 3 for the rooted tree illustrated.

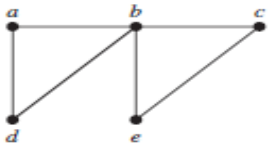


11.4

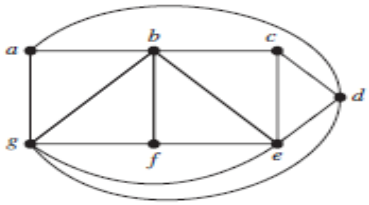
1. How many edges must be removed from a connected graph with n vertices and m edges to produce a spanning tree?

In Exercises 2–6 find a spanning tree for the graph shown by removing edges in simple circuits.

2.



3.



11.5

5. Use Kruskal's algorithm to design the communications network described at the beginning of the section.
6. Use Kruskal's algorithm to find a minimum spanning tree for the weighted graph in Exercise 2.
7. Use Kruskal's algorithm to find a minimum spanning tree for the weighted graph in Exercise 3.
8. Use Kruskal's algorithm to find a minimum spanning tree for the weighted graph in Exercise 4.