

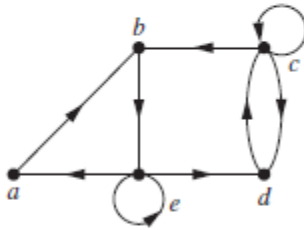
DM ASSIGNMENT NO.9

CHAPTER 10 (GRAPH)

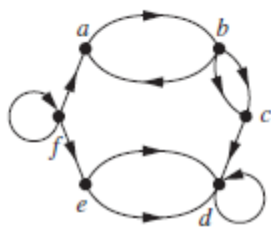
EXERCISE 10.1

For Exercises 7–9, determine whether the graph shown has directed or undirected edges, whether it has multiple edges, and whether it has one or more loops. Use your answers to determine the type of graph in Table 1 this graph is.

7.



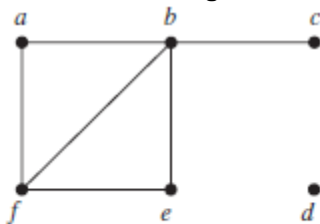
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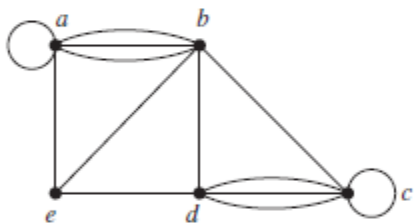
EXERCISE 10.2

In Exercises 1–3 find the number of vertices, the number of edges, and the degree of each vertex in the given undirected graph.

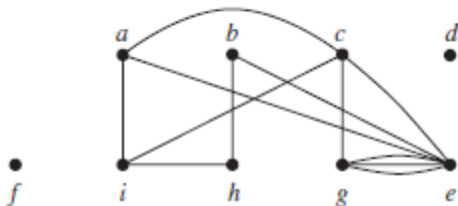
1.



2.



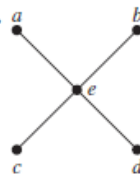
3.



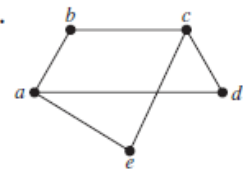
4. Find the sum of the degrees of the vertices of each graph in Exercises 1–3 and verify that it equals twice the number of edges in the graph.

In Exercises 21–22 determine whether the graph is bipartite. You may find it useful to apply Theorem 4 and answer the question by determining whether it is possible to assign either red or blue to each vertex so that no two adjacent vertices are assigned the same color.

21.



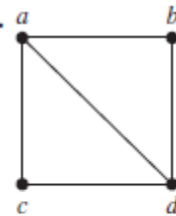
22.



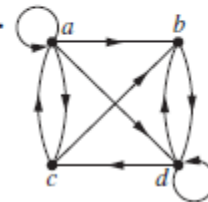
EXERCISE 10.3

In Exercises 1–4 use an adjacency list to represent the given graph.

1.



3.



7. Represent the graph in Exercise 3 with an adjacency matrix.

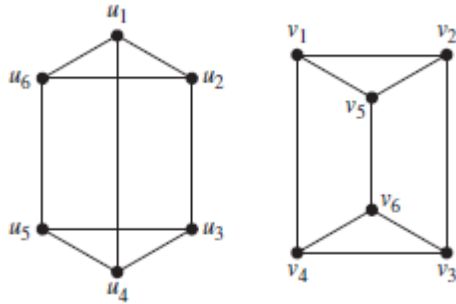
11.

$$\begin{bmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 0 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{bmatrix}$$

Draw a graph with the given adjacency matrix.

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39.

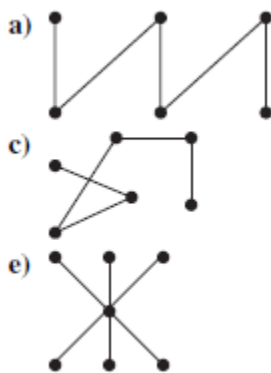


In Exercise 39 determine whether the given pair of graphs is isomorphic. Exhibit an isomorphism or provide a rigorous argument that none exists.

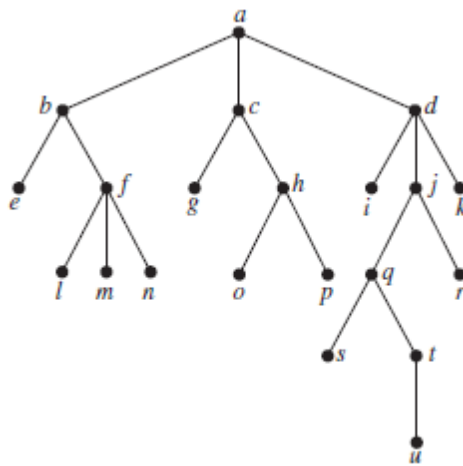
CHAPTER 11(TREES)

EXERCISE 11.1

1. Which of these graphs are trees?



- 3.** Answer these questions about the rooted tree illustrated.



- 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 ?

- 5.** Is the rooted tree in Exercise 3 a full m -ary tree for some positive integer m ?

EXERCISE 11.2

1. Build a binary search tree for the words *banana*, *peach*, *apple*, *pear*, *coconut*, *mango*, and *papaya* using alphabetical order.
3. How many comparisons are needed to locate or to add each of these words in the search tree for Exercise 1, starting fresh each time?

- a) pear b) banana c) kumquat d) orange**

19. Which of these codes are prefix codes?

- c)** $a: 101, e: 11, t: 001, s: 011, n: 010$

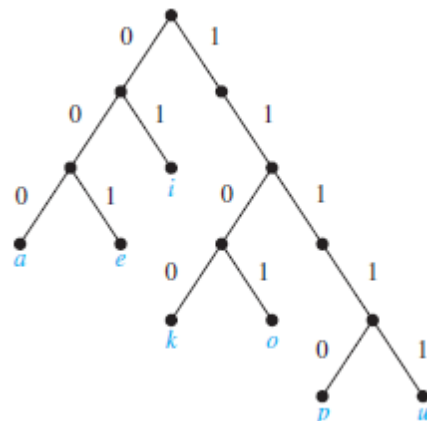
- d)** $\alpha: 010, e: 11, t: 011, s: 1011, n: 1001, i: 10101$

- 20.** Construct the binary tree with prefix codes representing these coding schemes.

- b)** $a: 1, e: 01, t: 001, s: 0001, n: 00001$

- c) $a: 1010, e: 0, t: 11, s: 1011, n: 1001, i: 10001$

- 21.** What are the codes for *a*, *e*, *i*, *k*, *o*, *p*, and *u* if the coding scheme is represented by this tree?



- 23.** Use Huffman coding to encode these symbols with given frequencies: $a: 0.20, b: 0.10, c: 0.15, d: 0.25, e: 0.30$. What is the average number of bits required to encode a character?