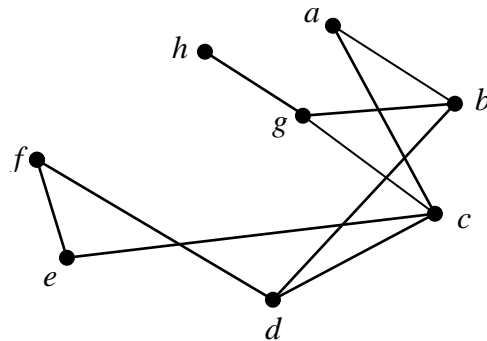


BMMS2633 Advanced Discrete Mathematics

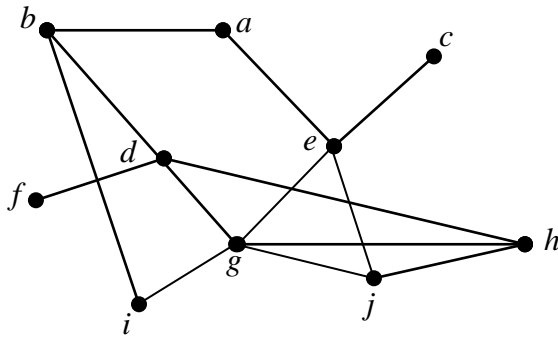
Tutorial 2

(1)

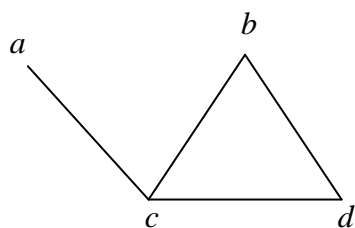


- (a) Use depth first search to produce a spanning tree for the graph above. Choose f as the root of the spanning tree.
- (b) Use depth first search to produce a spanning tree for the graph above. Choose e as the root of the spanning tree.
- (c) Use breadth first search to produce a spanning tree for the graph above. Choose g as the root of the spanning tree.
- (d) Use breadth first search to produce a spanning tree for the graph above. Choose f as the root of the spanning tree.

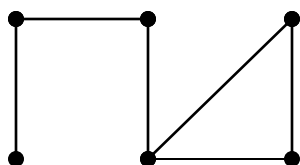
- (2) Construct the adjacency lists for the graph below by listing the adjacencies of each vertex in alphabetical order. Hence, use depth first search and breadth first search to produce a spanning tree by choosing b as the root of the spanning tree.



- (3) Draw all the possible undirected spanning trees for the graph given below.

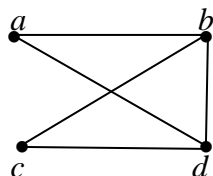


- (4) Find all undirected spanning trees for the graph below.



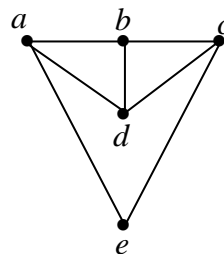
- (5) For each case, use Prim's algorithm to construct a spanning tree for the connected graph shown. Use the indicated vertex as the root of the tree and draw the digraph of the spanning tree produced.

(a)



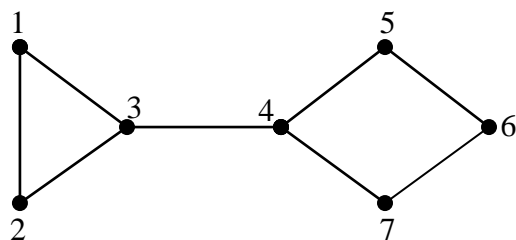
Use c as the root.

(b)



Use e as the root.

(c)



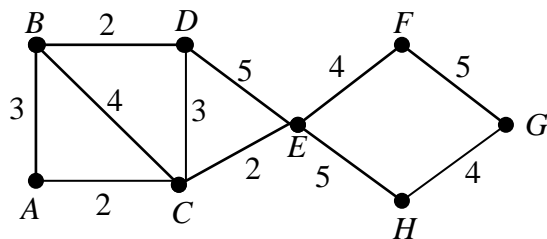
Use 4 as the root

- (6) The table below shows the weights of edges of a connected graph:

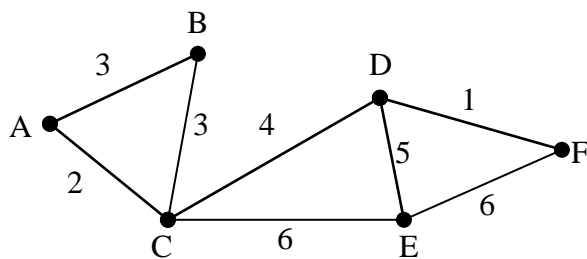
	A	B	C	D	E	F	G	H
A		9	5	6	12	11	8	6
B	9		10	11	13	10	9	8
C	5	10		6	10	12	6	2
D	6	11	6		14	13	10	4
E	12	13	10	14		14	7	11
F	11	10	12	13	14		15	12
G	8	9	6	10	7	15		7
H	6	8	2	4	11	12	7	

Use Prim's algorithm to obtain a minimal spanning tree and show your result in a diagram. What is the minimum total weight of the spanning tree?

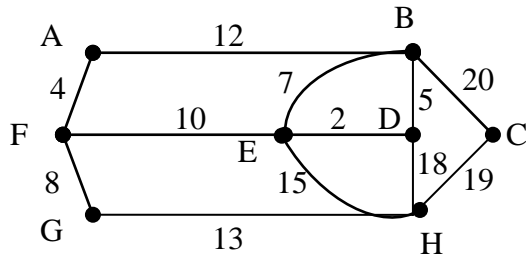
- (7) Use Prim's algorithm to find a minimal spanning tree for the connected graph below. Use vertex E as the initial vertex. What is the minimum total weight of the spanning tree?



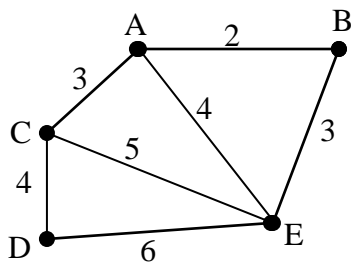
- (8) Find all the minimum spanning trees for the following graph by using Kruskal's algorithm.



- (9) Use Kruskal's algorithm to find a minimum spanning tree for the following graph.



- (10) The following diagram shows a weighted undirected graph.



Use Kruskal's algorithm to construct a minimal spanning tree.

Answers

(6) Minimum total weight = 42

(7) Minimum total weight = 22