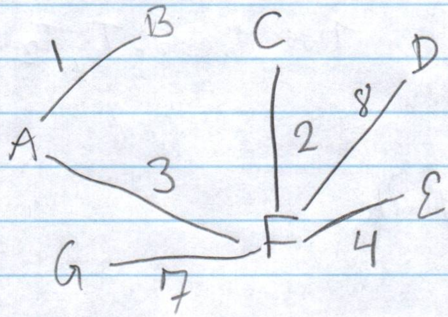
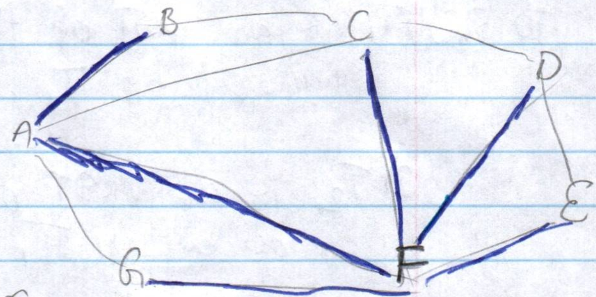
1)

vertex	A	B	C	D	E	F	G	MST
key	0	∞	∞	∞	∞	∞	∞	{A}
→	0	1	6	∞	∞	3	10	{A,B}
→	0	1	5	∞	∞	3	10	{A,B,F}
→	0	1	2	8	4	3	7	{A B F C}
→	0	1	2	8	4	3	7	{A,B,F,C,E}
→	0	1	2	8	4	3	7	{A B F C E G}
→	0	1	2	8	4	3	7	{A B F C E G D}





Edge	A,B	C,F	A,F	F,E	B,C	A,C	G,F	F,D	C,D	A,G	D,E
wt.	1	2	3	4	5	6	7	8	9	10	11

A	B	C	D	E	F	G
A	~~B~~	~~C~~	~~D~~	~~E~~	~~F~~	~~G~~
	A	A	A	A	~~C~~	A
					A	

$\boxed{\begin{array}{l} A,B \\ C,F \\ A,F \\ F,E \\ G,F \\ F,D \end{array}}$

2) Suboptimality property:

Problem: $G=(V, E, \omega)$

Solution a mst T of G

Subset problem

Graph induced by T_1 &

The graph induced by T_2

The graph induced by a spanning Tree = the original graph

Subset Solution

Remove an edge $\in T$ (u,v) from T ∴

Two trees: $T_1, T_2 \subseteq T$

To Show) T_1 is a MST of the graph induced by T_1

2) T_2 is a MST of the graph induced by T_1

$$w(T) = w(T_1) + w(T_2) + (u,v) \in T$$

Proof by contradiction

Assume T_1 is not a mst of the graph induced by T_1, Then $\exists$ T_1' that is a mst of the graph induced by T_1

$$w(T_1') < w(T_1)$$

then $T_1' \cup T_2 \cup \{(u,v)\}$ is a spanning tree of G & its weight $< W(T_1)$

$$W(T_1') + \omega(T_2) + w(u,v) < w(T_1) + w(T_2) + W(u,v)$$

Conclusion: T_1 is a MST of the graph induced by T_1

3) Prim's Algorithm for max Spanning Tree

vertex A B C

weight 0 $-\infty$ $-\infty$ init min Value

if weight > max weight

max weight = weight

4) All weights are the same @1 then any Spanning Tree is a minimum Spanning Tree.

Breadth First Search (Breadth First Traversal of a tree)

Then a node is only visited once $\therefore$ $O(E)$