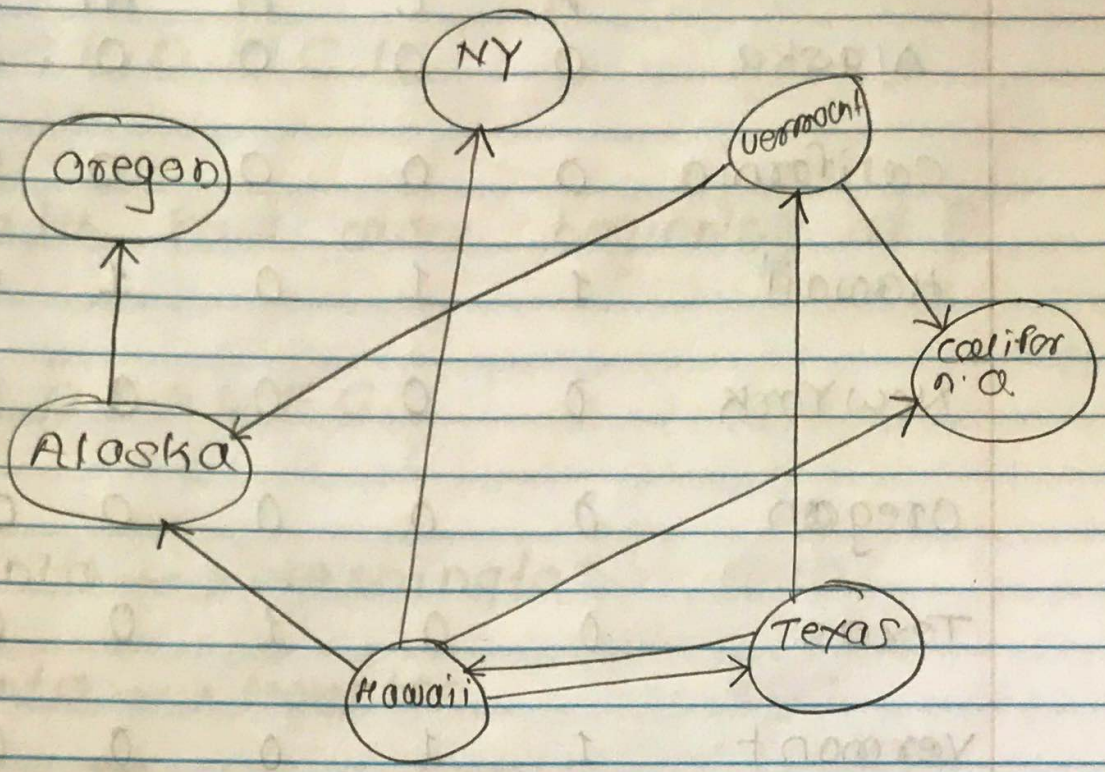
1) Draw the state graph



Formal graph notation

V(StateGraph) = { O, A, T, H, V, N, C }

E(StateGraph) = { (A, O), (H, A), (H, T), (T, H), (H, C)
(H, N), (T, V), (V, C), (V, A)

2.

a) There is no path between oregon to any other state in the graph.

b) Yes. There is a path from Hawaii to every other state in the graph.

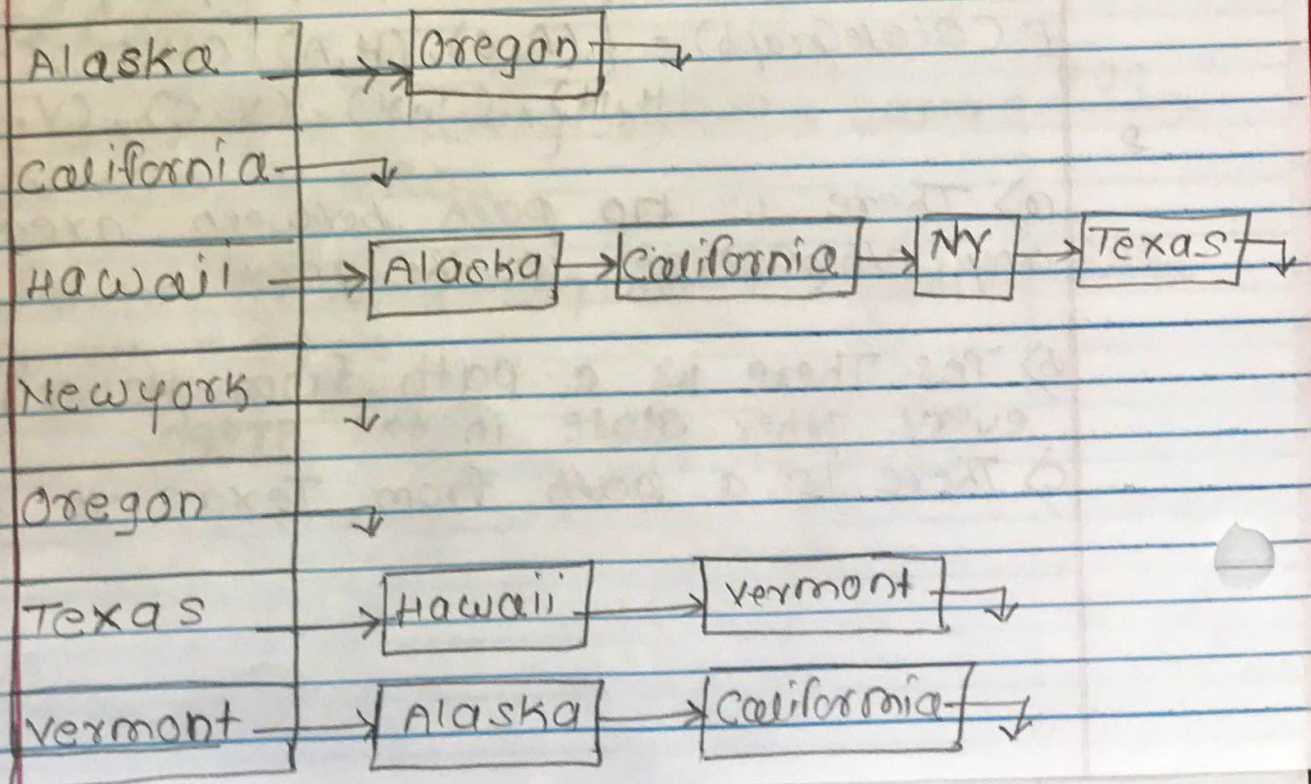
c) There is a path from Texas to Hawaii.

3. a)

adjacency matrix

	A	C	H	NY	O	T	V
Alaska	0	0	0	0	1	0	0
California	0	0	0	0	0	0	0
Hawaii	1	1	0	1	0	1	0
NewYork	0	0	0	0	0	0	0
Oregon	0	0	0	0	0	0	0
Texas	0	0	1	0	0	0	1
Vermont	1	1	0	0	0	0	0

3. b) adjacency lists



4.a) Depth first order beginning with E

⇒ E G A D F C B

4.b) Breadth first order beginning at F

⇒ F C D A B E G

5) Atlanta → Washington — 600

Atlanta → Houston — 800

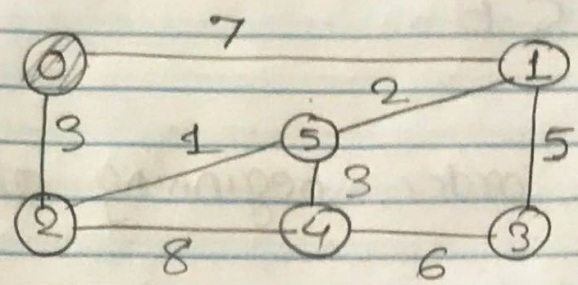
Atlanta $\xrightarrow{600}$ Washington $\xrightarrow{1300}$ Dallas — 1900

Atlanta $\xrightarrow{600}$ Washington $\xrightarrow{1300}$ Dallas $\xrightarrow{780}$ Denver
⇒ 2680

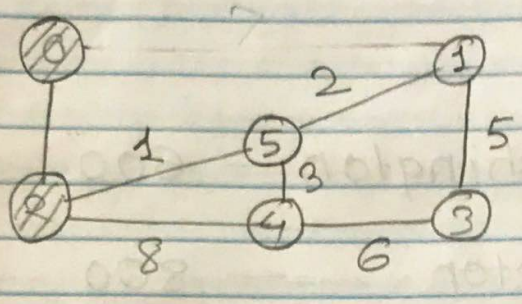
Atlanta $\xrightarrow{600}$ Washington $\xrightarrow{1300}$ Dallas $\xrightarrow{900}$
Chicago = 2800

Atlanta $\xrightarrow{600}$ Washington $\xrightarrow{1300}$ Dallas $\xrightarrow{200}$
Austin = 2100

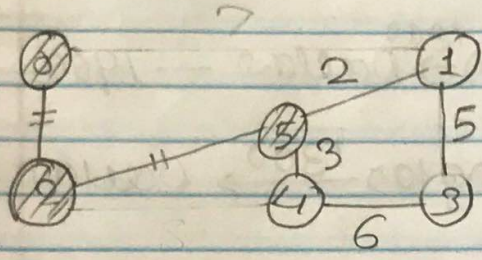
6) minimal spanning tree using prim's algorithm.



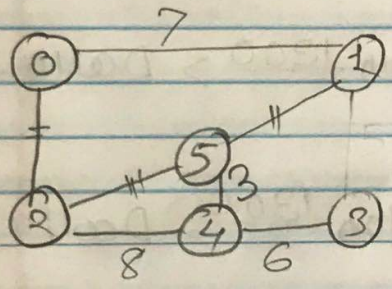
$V(T) = \{0\}$
$E(T) = \phi$
$N = \{1,2,3,4,5\}$



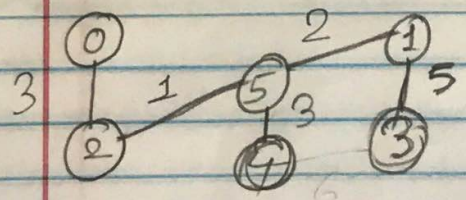
$V(T) = \{0,2\}$
$E(T) = \{(0,2)\}$
$N = \{1,3,4,5\}$



$V(T) = \{0,2,5\}$
$E(T) = \{(0,2),(2,5)\}$
$N = \{1,3,4\}$



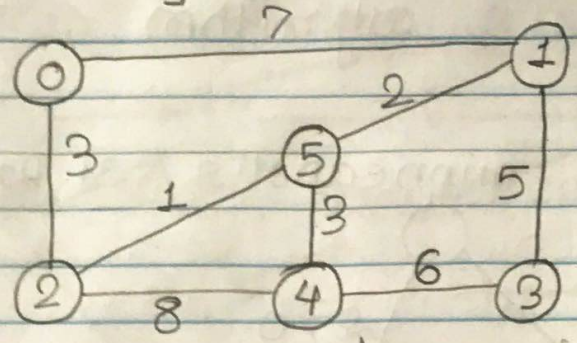
$V(T) = \{0,1,2,5\}$
$E(T) = \{(0,2),(2,5),(5,1)\}$
$N = \{3,4\}$



$V(T) = \{0,1,2,3,5\}$
$E(T) = \{(0,2),(2,5),(5,1),(5,3)\}$
$N = \{4\}$

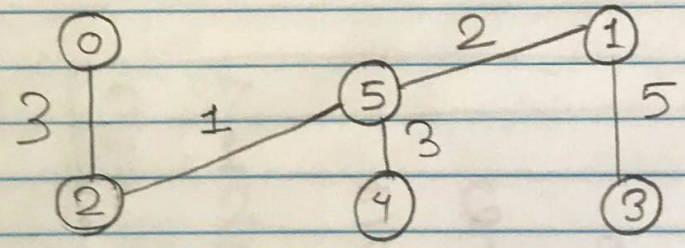
$V(T) = \{0,1,2,3,4,5\}$
$E(T) = \{(0,2),(2,5),(5,1),(5,3),(3,4)\}$

7) MST using kruskal's algorithm



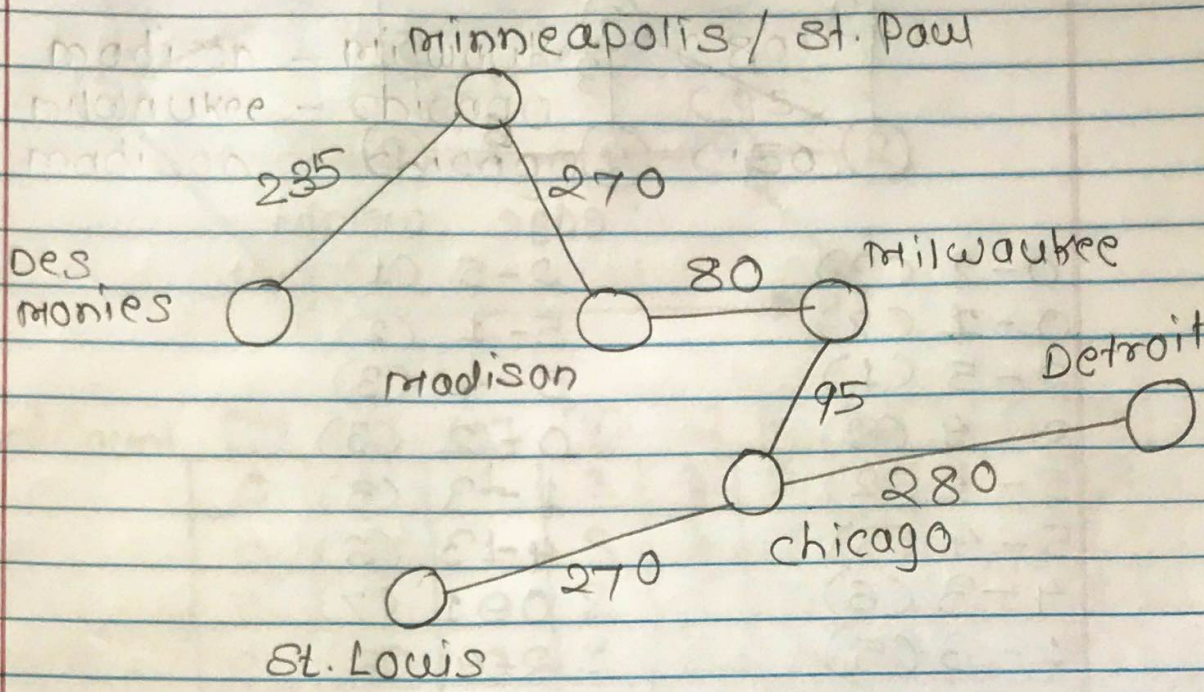
edge	weight
0-2	(3)
0-1	(7)
2-5	(1)
2-4	(8)
5-1	(2)
5-4	(3)
4-3	(6)
1-3	(5)

edge	weight
2-5	(1)
5-1	(2)
5-4	(3)
0-2	(3)
1-3	(5)
4-3	(6)
0-1	(7)
2-4	(8)

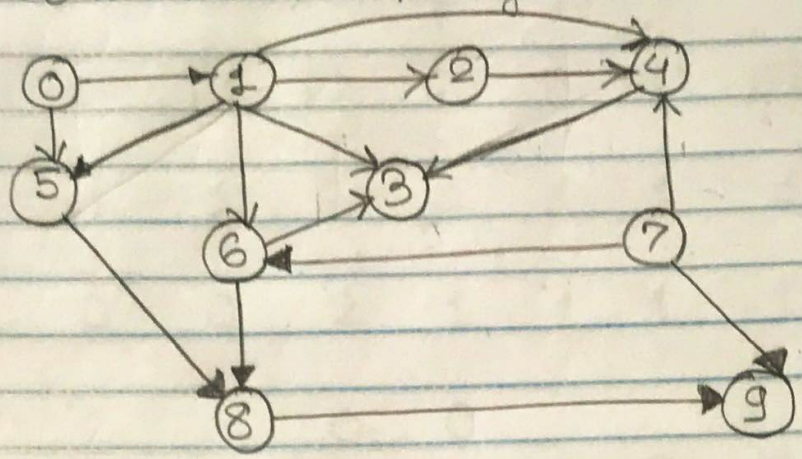


$V = \{0, 1, 2, 3, 4, 5, 6\}$

(8) minimal spanning tree using prim's algorithm



9) Breadth first topological order.



predCount

[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
0	1	1	3	3	2	2	0	2	2
0	0	1	3	3	1	1	0	2	1
0	0	0	2	1	0	0	0	2	1
0	0	0	1	0	0	0	0	1	1
0	0	0	0	0	0	0	0	0	0

queue

0	7					
7	1					
1	2	5	6			
2	5	6	4	8		
5	6	4	8	3	9	

topological order

[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]
0	7	1	2	5	6	4	8	3	9

10) Nodes of the graph in a breadth first topological ordering.

Start	DM	P1	P2	CO	A	HLL	OS	TC	SS	C	End
0	1	1	2	1	1	1	1	1	4	1	1
	0	0	2	1	1	1	1	1	4	1	1
			0	0							
					0	0	0				
								0	2	0	
									0		0

Topological ordering

Start, Discrete Math, programming 1, programming 2, Computer Organization, Algorithms, High level Languages, operating System, Theory of Computation, compilers, Senior Seminar, End.

[0]	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]
S	DM	P1	P2	CO	A	HLL	OS	TC	C	SS	End