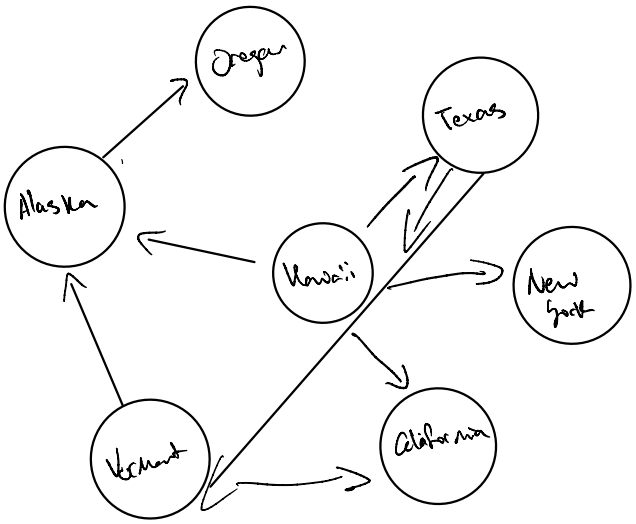
CMSC204
Kartchner

V(StateGraph) = {Oregon, Alaska, Texas, Hawaii, Vermont, NewYork, California}
E(StateGraph) = {(Alaska, Oregon), (Hawaii, Alaska), (Hawaii, Texas), (Texas, Hawaii), (Hawaii, California), (Hawaii, New York), (Texas, Vermont), (Vermont, California), (Vermont, Alaska)}

1. Draw the StateGraph



1. Describe the graph pictured above, using the formal graph notation.

V(StateGraph) ={Oregan, Alaska, Texas, Hawaii, Vermont, New York, California}

E(StateGraph) = {(Alaska, Oregon), (Hawaii, Alaska), (Hawaii, Texas), (Texas,Hawaii), (Hawaii, California), (Hawaii, New York), (Texas, Vermont), (Vermont,California),(Vermont,Alaska)}

2. a. Is there a path from Oregon to any other state in the graph?

No

b. Is there a path from Hawaii to every other state in the graph?

Yes

c. From which state(s) in the graph is there a path to Hawaii?

Texas

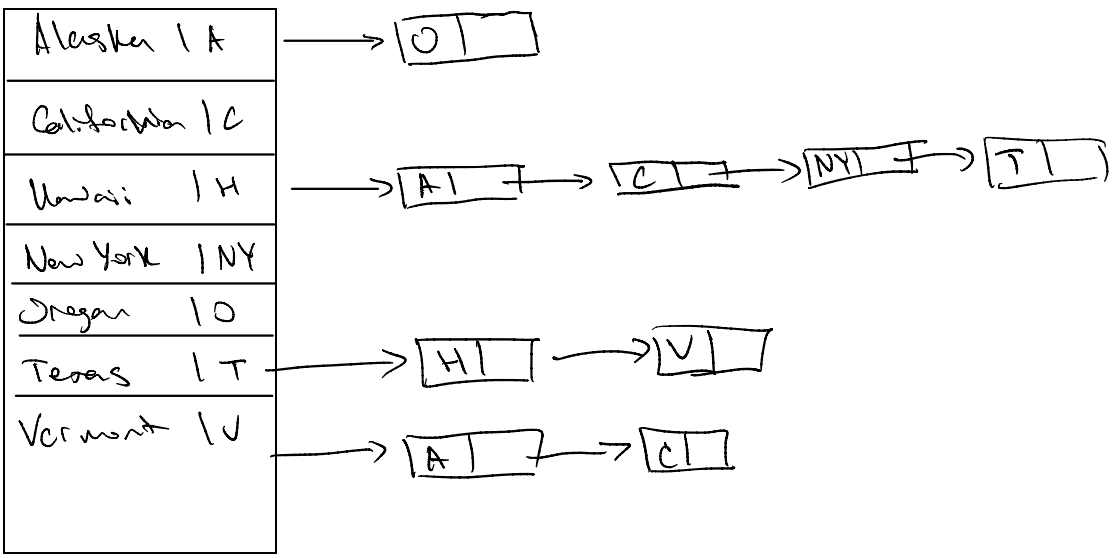
3. a. Show the adjacency matrix that would describe the edges in the graph.
Store the vertices in alphabetical order

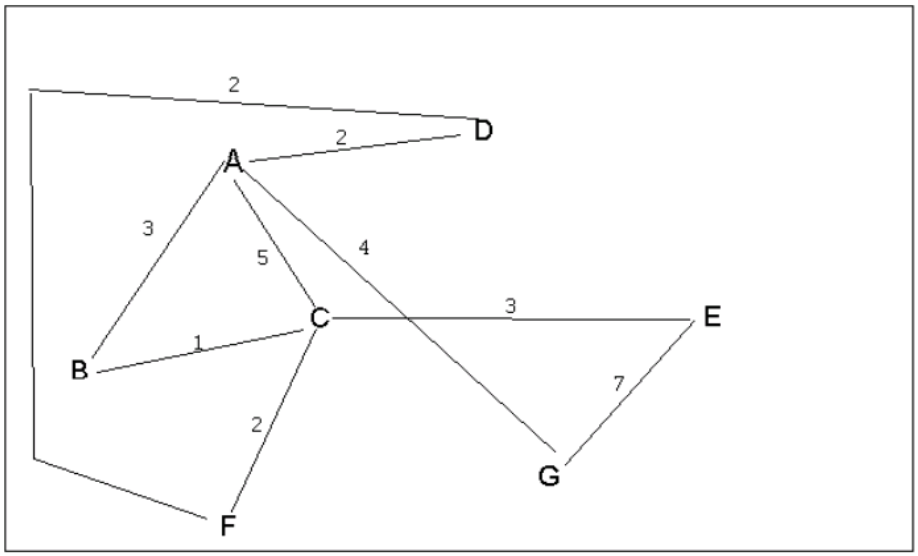
States

Alaska	0
California	1
Hawaii	2
New York	3
Oregon	4
Texas	5
Vermont	6

	0	1	2	3	4	5	6
0	0	0	0	0	1	0	0
1	0	0	0	0	0	0	0
2	1	1	0	1	0	1	0
3	0	0	0	0	0	0	0
4	0	0	0	0	0	0	0
5	0	0	1	0	0	0	1
6	1	1	0	0	0	0	0

3. b. Show the adjacency lists
that would describe the edges in the graph



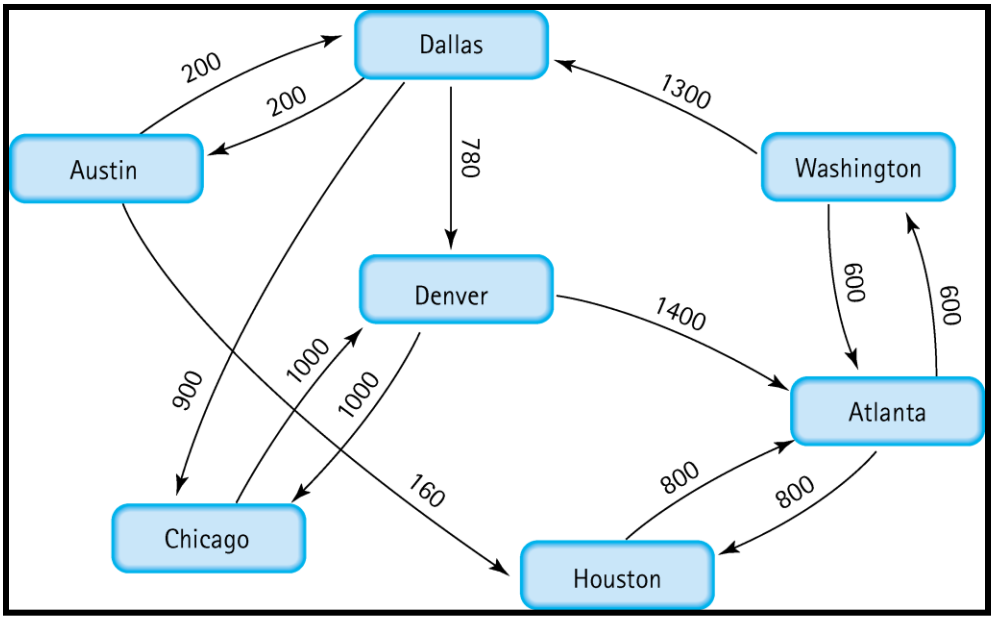


4 a. Which of the following lists the graph nodes in depth first order beginning with E?

A) E, G, F, C, D, B, A
B) G, A, E, C, B, F, D
C) E, G, A, D, F, C, B
D) E, C, F, B, A, D, G

4 b. Which of the following lists the graph nodes in breadth first order beginning at F?

A) F, C, D, A, B, E, G
B) F, D, C, A, B, C, G
C) F, C, D, B, G, A, E
D) a, b, and c are all breadth first traversals



5. Find the shortest <u>distance</u> from Atlanta to every other city

Washington → 600

Houston → 800

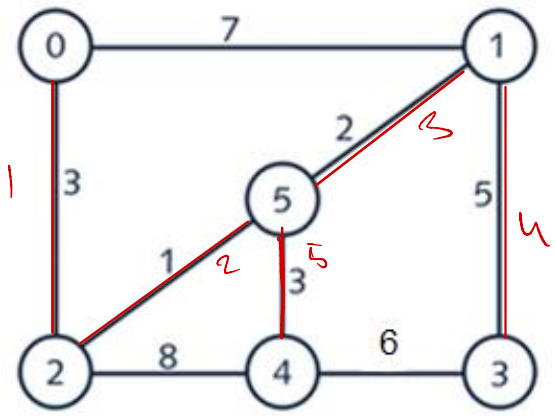
Dallas → 1900

Austin → 2100

Denver → 2680

Chicago → 2500

6. Find the minimal spanning tree using Prim's algorithm. Use 0 as the source vertex . Show the steps.



$V(T) = \{\}$ compare 3, 7

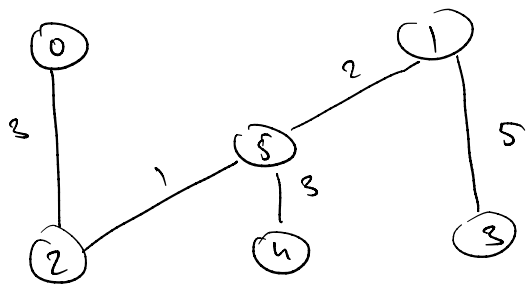
1. $V(T) = \{0, 2\}$ compare 1, 6

2. $V(T) = \{0, 2, 5\}$ compare 2, 3

3. $V(T) = \{0, 2, 5, 1\}$ compare 7, 5

4. $V(T) = \{0, 2, 5, 1, 3\}$ compare 6, 3

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



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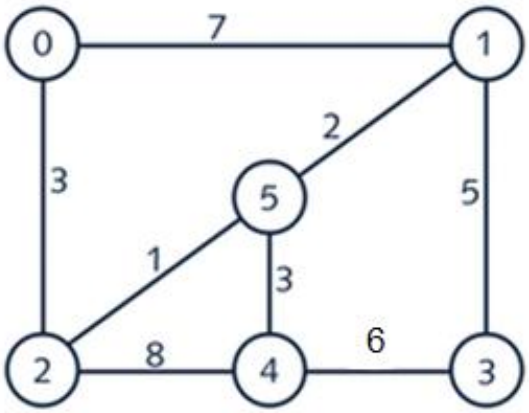
7. Find the minimal spanning tree using Kruskal's algorithm. Show the weights in order and the steps.



1. 2 → 5 (1)

2. 1 → 5 (2) ✓

3. 0 → 2 (3) ✓

4. 4 → 5 (3) ✓

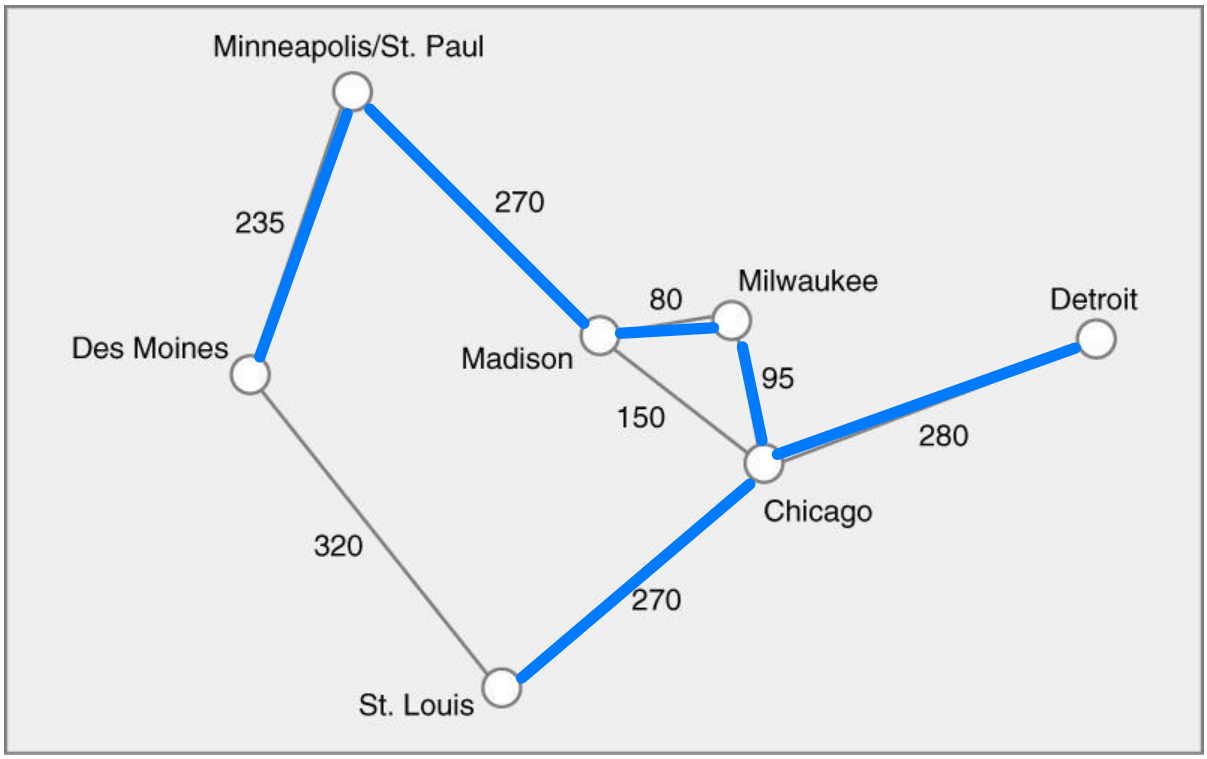
5. 1 → 3 (5) ✓

6. 3 → 4 (6) ✗

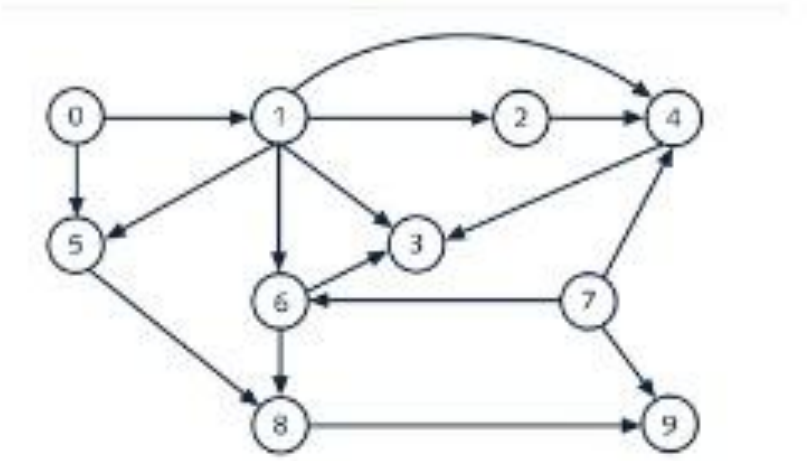
7. 0 → 1 (7) ✗

8. 2 → 4 (8) ✗

8. Find the minimal spanning tree using the algorithm you prefer. Use Minneapolis/St. Paul as the source vertex

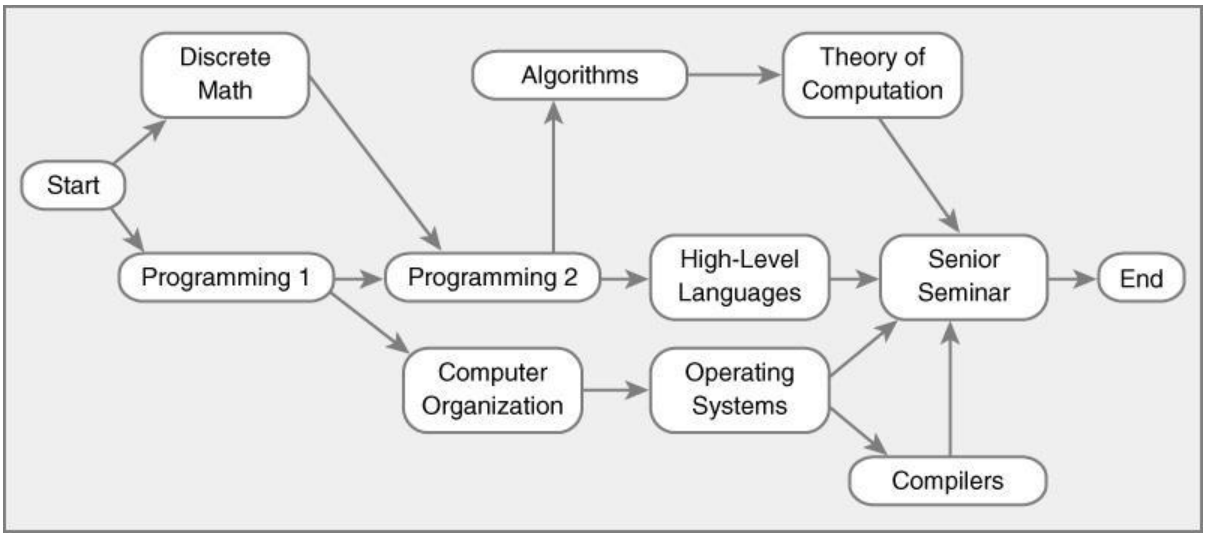


9. List the nodes of the graph in a breadth first topological ordering. Show the steps using arrays predCount, topologicalOrder and a queue



	0	1	2	3	4	5	6	7	8	9
pred count	0	0	0	0	0	0	0	0	0	0
topological order	0	7	1	2	5	6	4	8	3	9
queue	0	7	1	2	5	6	4	8	3	9

10. List the nodes of the graph in a breadth first topological ordering.



Start → Discrete Math → Programming 1 → Programming 2 → Computer Org

→ Algorithms → High-level Language → Operating Systems → Theory of Computation →

→ Compilers → Senior Seminar → End.