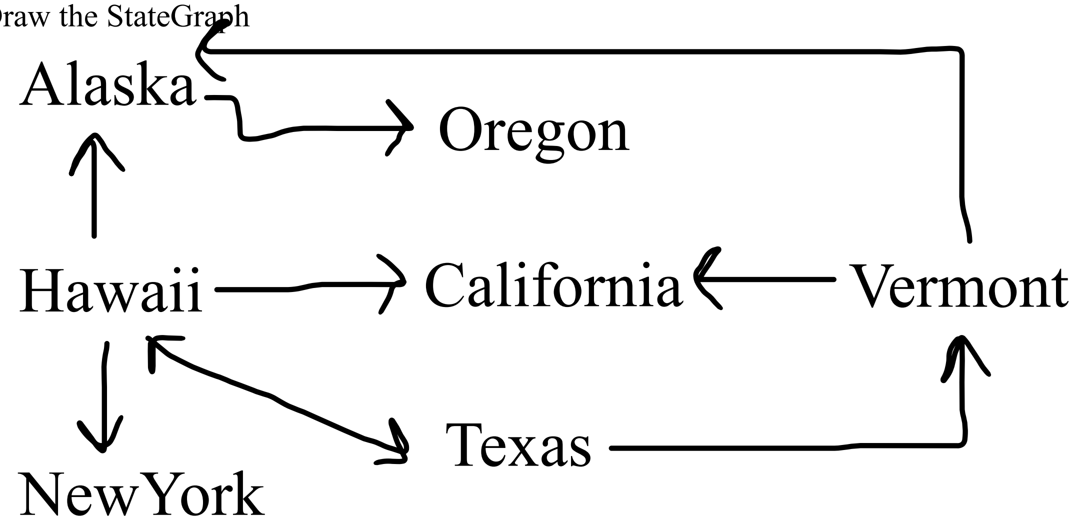
CMSC204
Kartchner

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) = {Oregon, Alaska, Texas, Hawaii, Vermont, NewYork, California}

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

2. a. Is there a path from Oregon to any other state in the graph? No

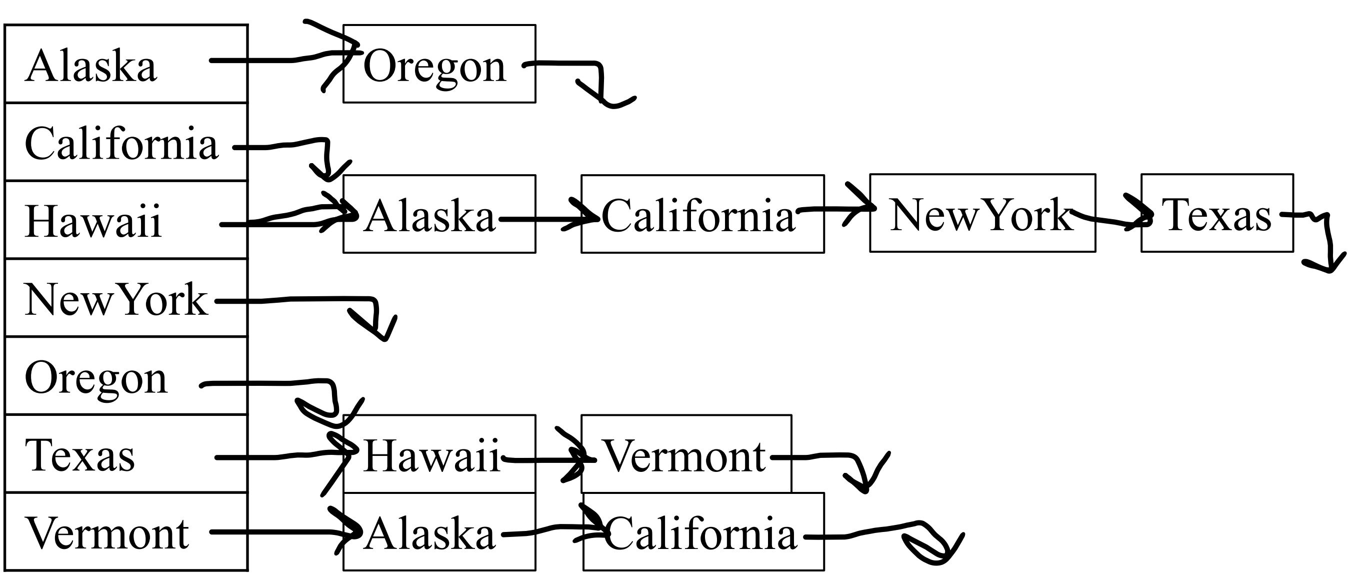
   b. Is there a path from Hawaii to every other state in the graph? Yes

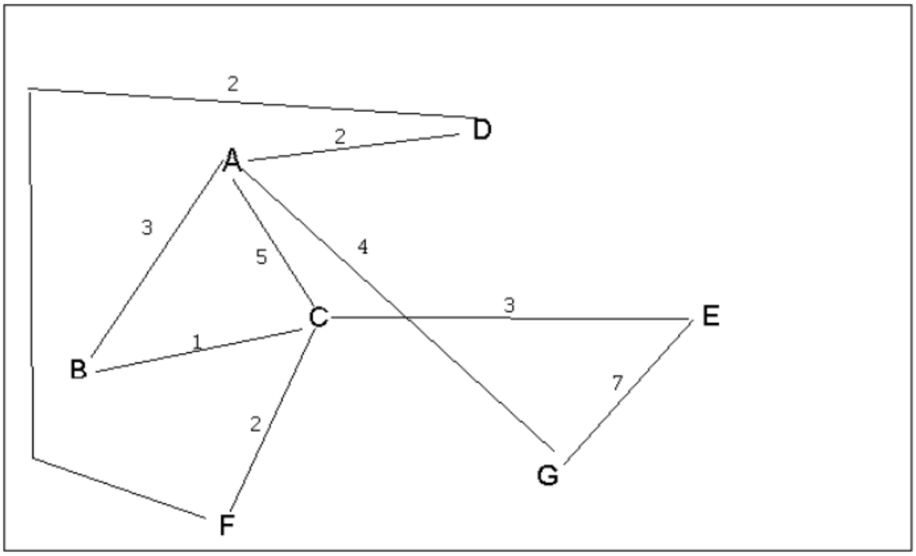
   c. From which state(s) in the graph is there a path to Hawaii? Texas

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

	Alaska	California	Hawaii	NewYork	Oregon	Texas	Vermont
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. Show the adjacency lists that would describe the edges in the graph



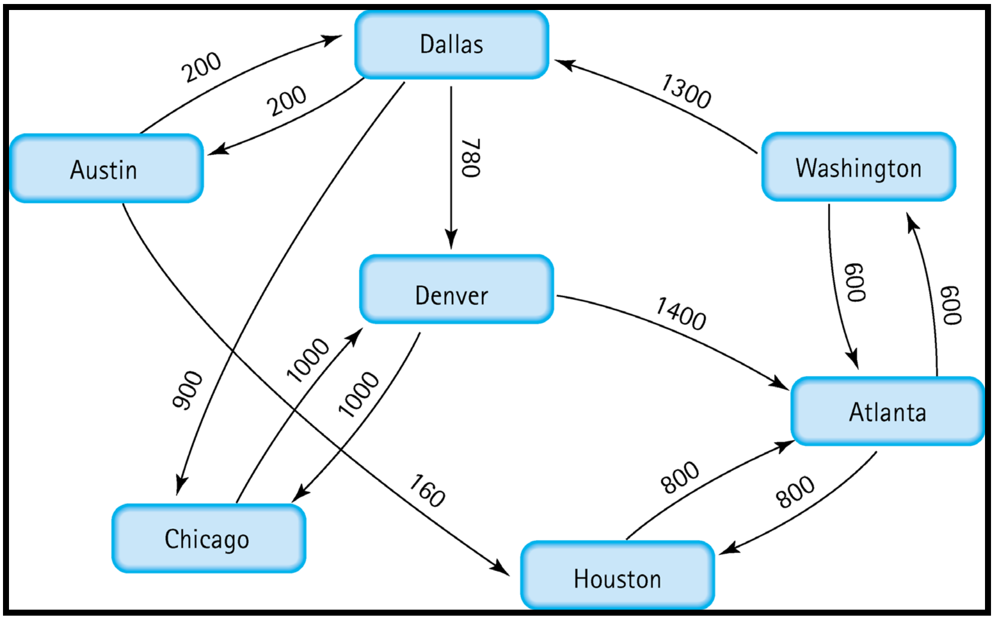


4 a. Which of the following lists the graph nodes in depth first order beginning with E?

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?

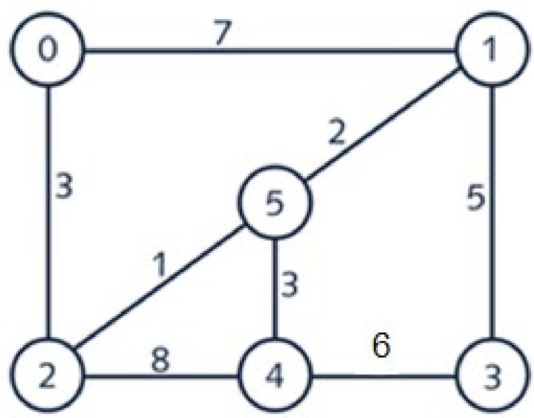
A) F, C, D, A, B, E, G
B) F, D, C, A, B, C, G
C) F, C, D, B, G, A, E
D) a, b, and c are all breadth first traversals



5. Find the shortest distance from Atlanta to every other city

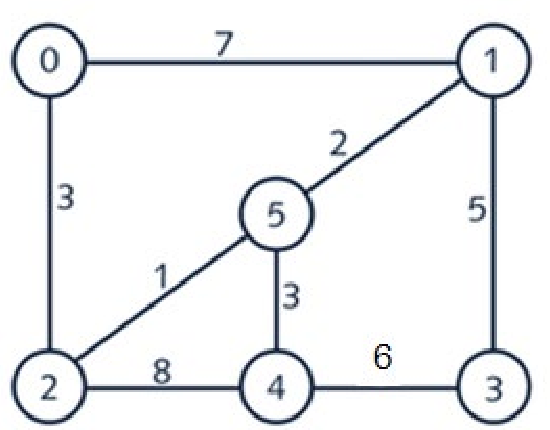
Goal	Path	Cost
Austin	Dallas	2100
Chicago	Dallas	2800
Dallas	Washington	1300
Denver	Dallas	2680
Houston	Atlanta	800
Washington	Atlanta	600

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



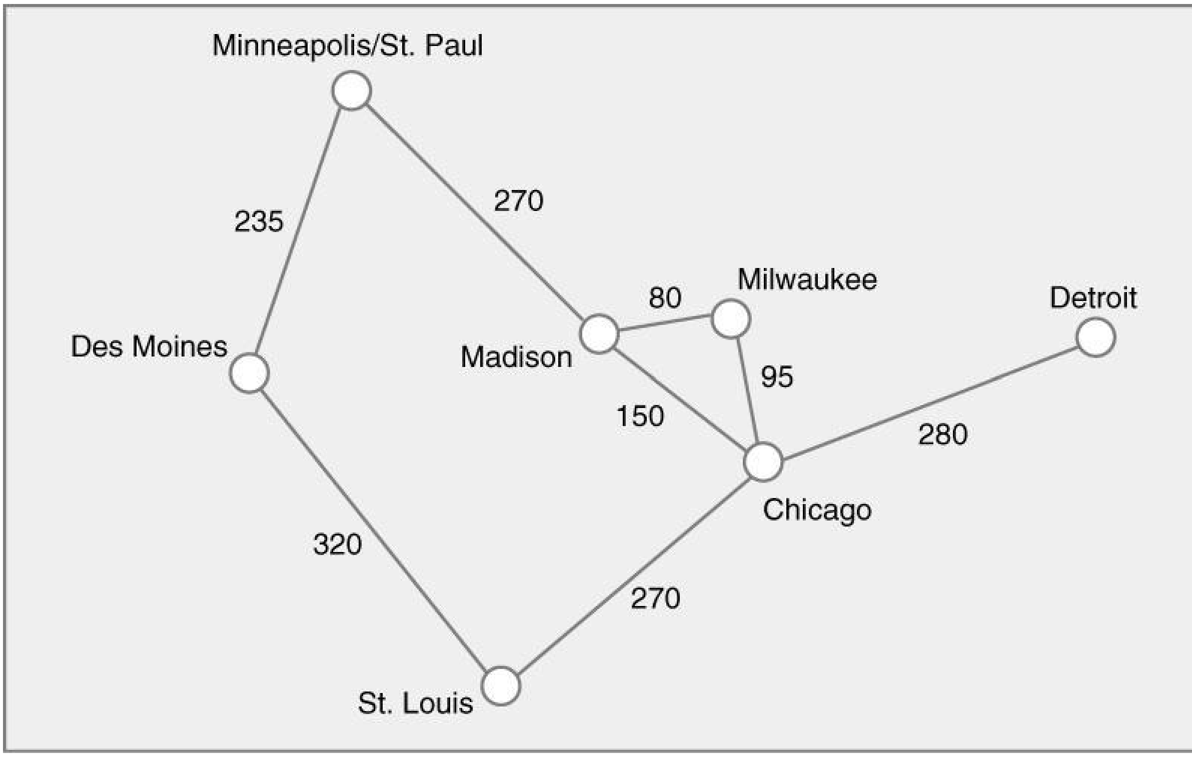
Start	Path	Cost
0	2	3
2	5	1
5	1	2
5	4	3
1	3	5
		Total: 14

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



Start	Path	Cost
2	4	1
5	1	2
0	2	3
5	4	3
1	3	5
		Total: 14

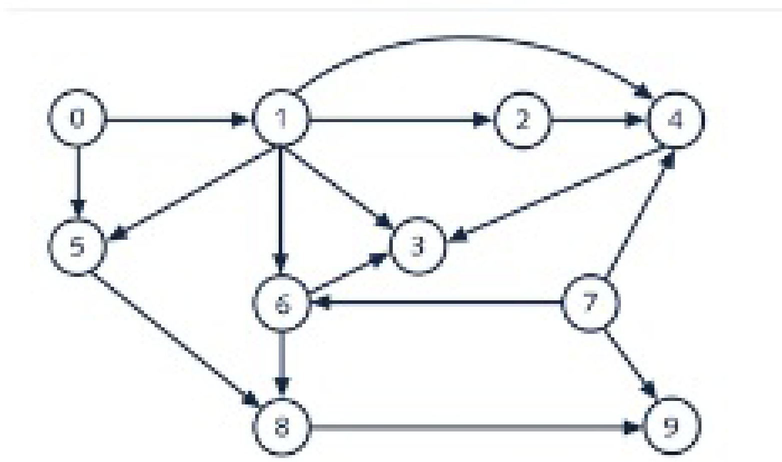
8. Find the minimal spanning tree using the algorithm you prefer. Use Minneapolis/St. Paul as the source vertex



Start	Path	Cost
Minneapolis/St. Paul	Des Moines	235
Minneapolis/St. Paul	Madison	270
Madison	Milwaukee	80
Milwaukee	Chicago	95
Chicago	St. Louis	270
Chicago	Detroit	280

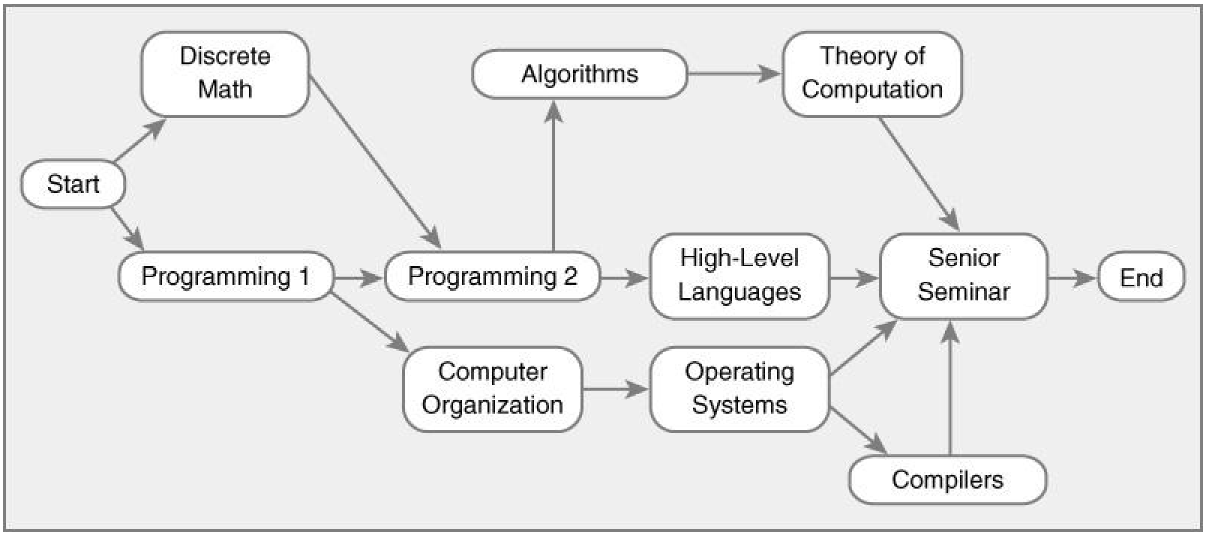
Total: 1230

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 5 4 2 3 6 8 9

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



Start
Discrete Math
Programming 1
Programming 2
Computer Organization
Algorithms
High-Level Languages
Theory of Computation
Operating Systems
Compilers
Senior Seminar
End