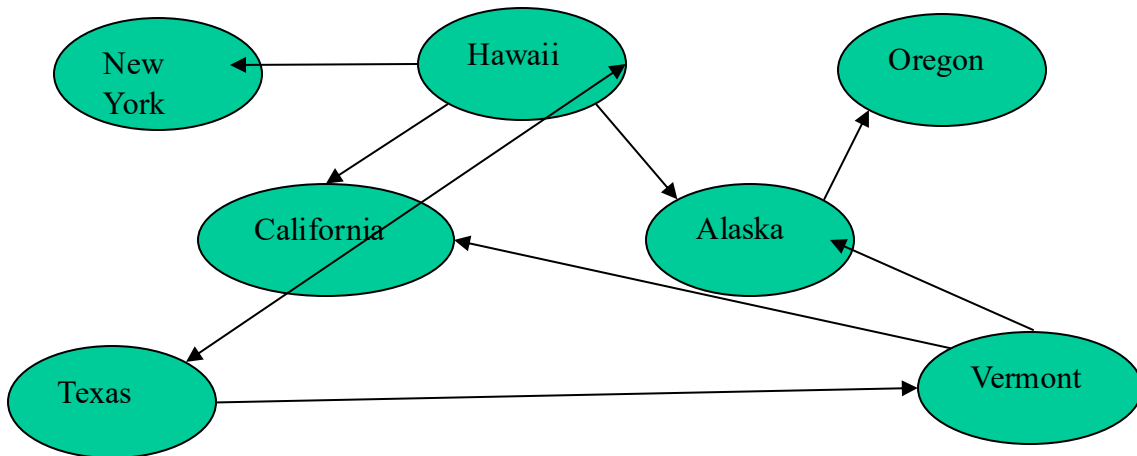V(StateGraph) = {Oregon, Alaska, Texas, Hawaii, Vermont, NewYork, California}
E(StateGraph) = {(Alaska, Oregon), (Hawaii, Alaska), (Hawaii, Texas), (Texas, Hawaii), (Hawaii, California), (Hawaii, New York), (Texas, Vermont), (Vermont, California),   (Vermont, Alaska)}

1. Draw the StateGraph

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

V(StateGraph) = {Oregon, Alaska, Texas, Hawaii , Vermont, 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?

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

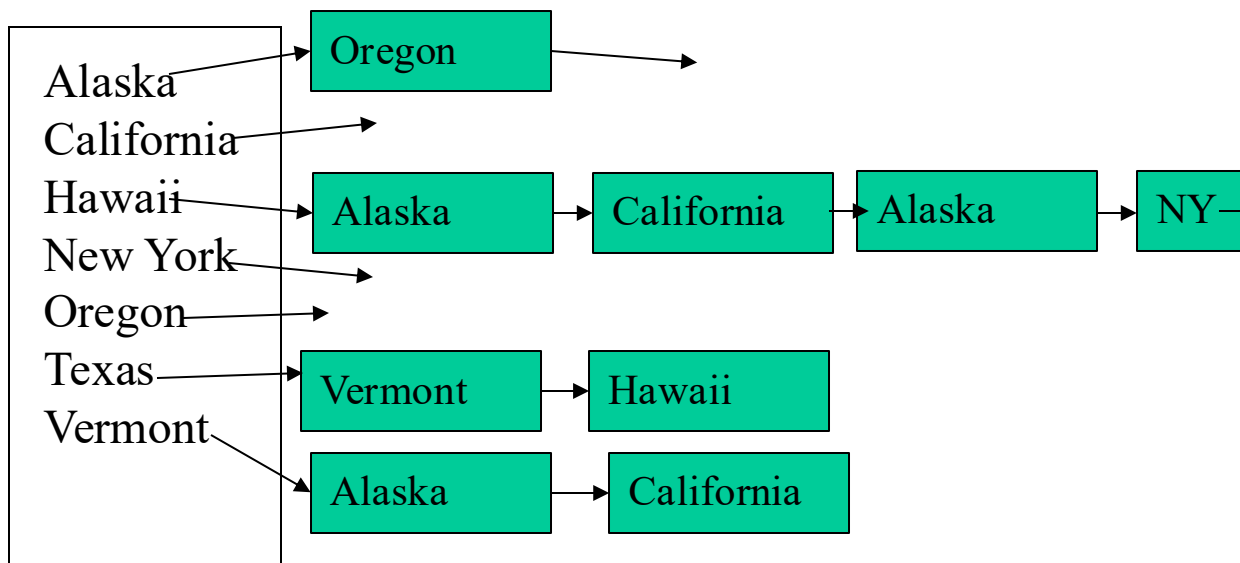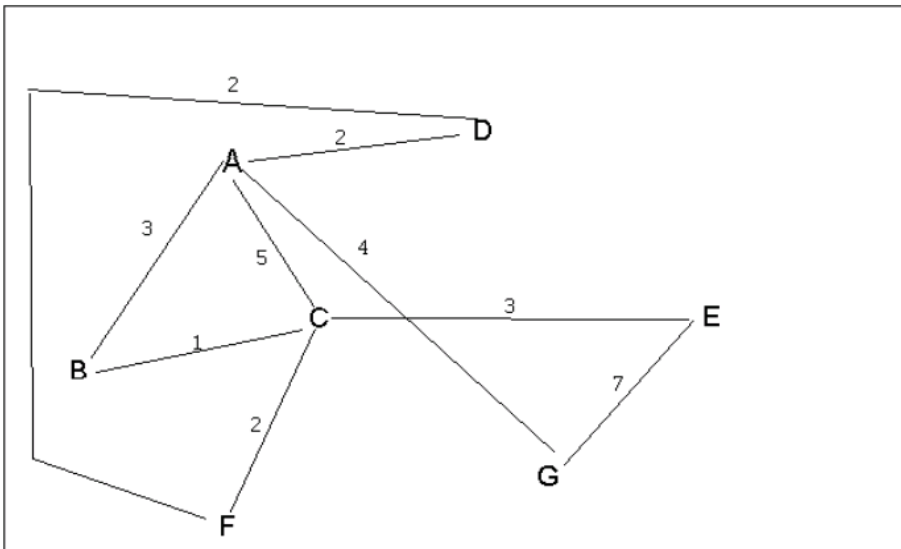c. From which state(s) in the graph is there a path to Hawaii?

a.) No
b.) Yes
c.) Texas

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

States

Alaska	0 0 0 0 1 0 0
California	0 0 0 0 0 0 0
Hawaii	1 1 0 1 0 1 0
New York	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

Alaska → Oregon →
California →
Hawaii → Alaska → California → Alaska → NY–
New York
Oregon →
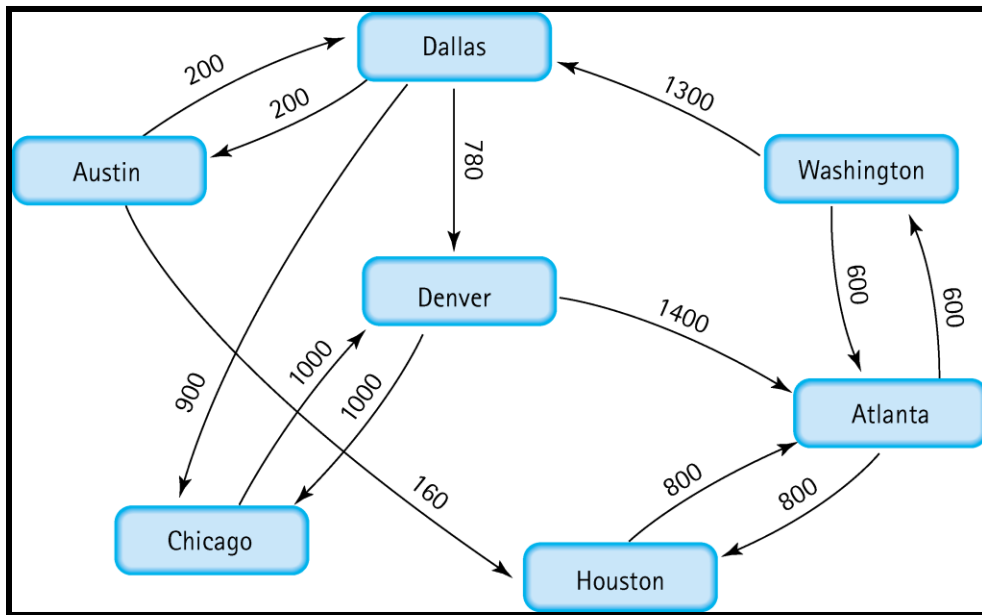Texas → Vermont → Hawaii
Vermont → Alaska → California

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

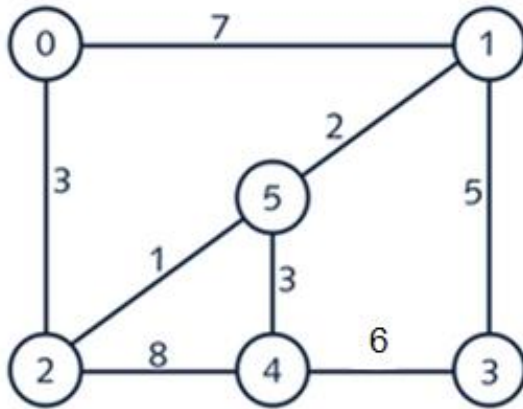to Austin 600+1300+200 = 2100
to Chicago 600 +1300+900 = 2800
to Dallas 600 + 1300 = 1900
to Denver 600 + 1300 + 780 = 26980
to Houston 800
to Washington 600

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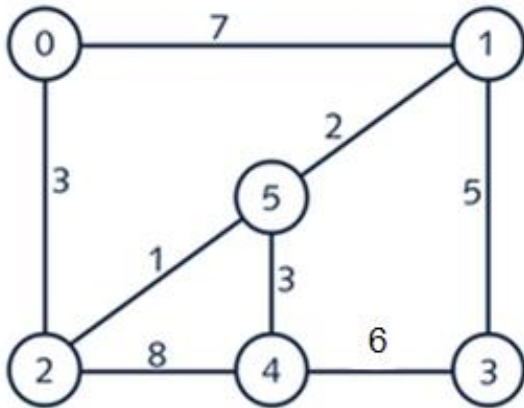

0 to 2

0 to 2 to 5

0 to 2 to 5 to 1

0 to 2 to 5 to 1 to 4

0 to 2 to 5 to 1 to 4 to 3

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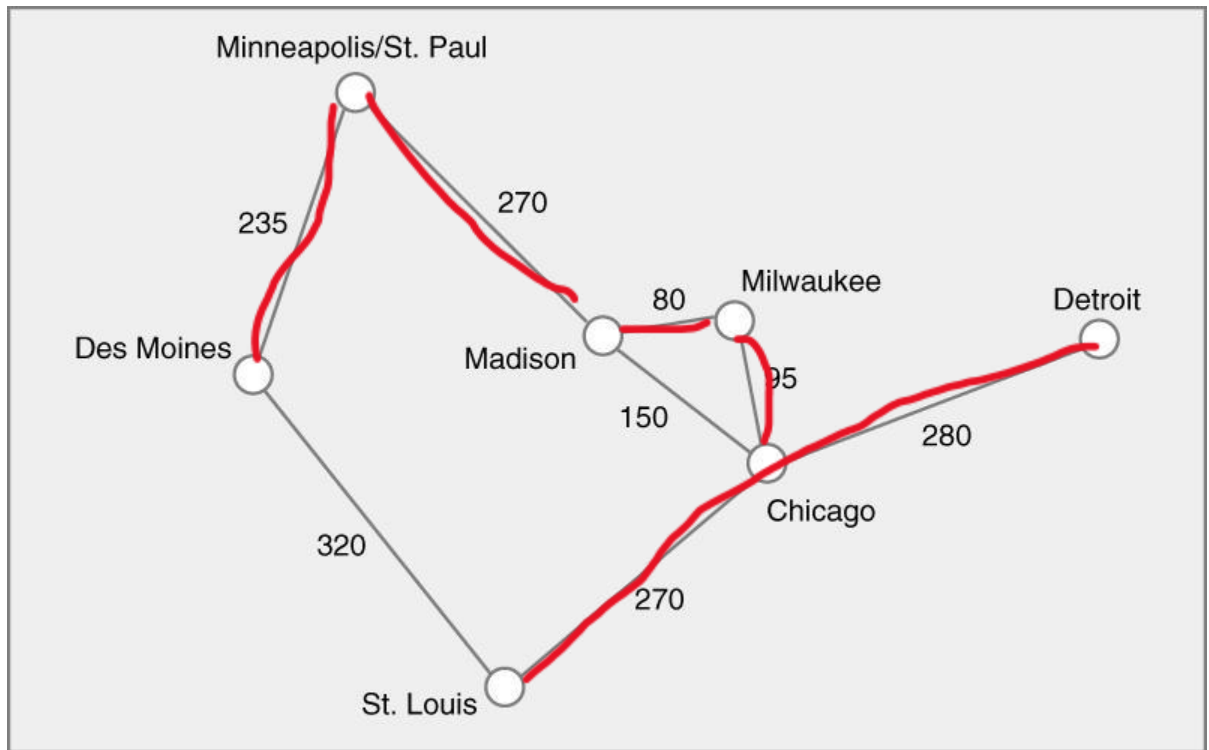

2 to 5 (weight 1)
1 to 5 (weight 2)
0 to 2 (weight 3)
4 to 5 (weight 3)
1 to 3 (weight 5)

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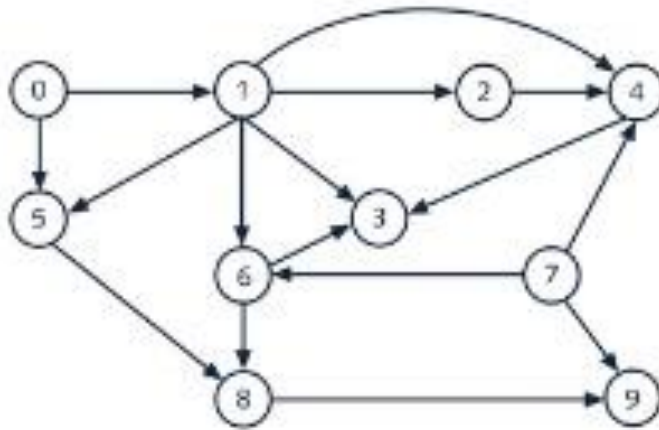

Kruskal:
Madison to Milwaukee 80
Milwaukee to Chicago 95
Minneapolis to Des Moines 235
Minneapolis to Madison 270
Chicago to St. Louis 270

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	1	3	3	2	2	0	2	2	PredCount
										topologicalOrder

Queue: 0,7

0	0	1	3	3	1	2	0	2	2	PredCount
0										topologicalOrder

Queue: 7, 1

0	0	1	3	2	1	1	0	2	1	PredCount
0	7									topologicalOrder

Queue: 7, 1

0	0	0	1	0	0	0	0	0	1	PredCount
0	7	1	2	5	6					topologicalOrder

Queue: 4, 8

0	0	0	0	0	0	0	0	0	0	PredCount
0	7	1	2	5	6	4	8			topologicalOrder

Queue: 3,9

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

Queue:

10. List the nodes of the graph in a breadth first topological ordering.
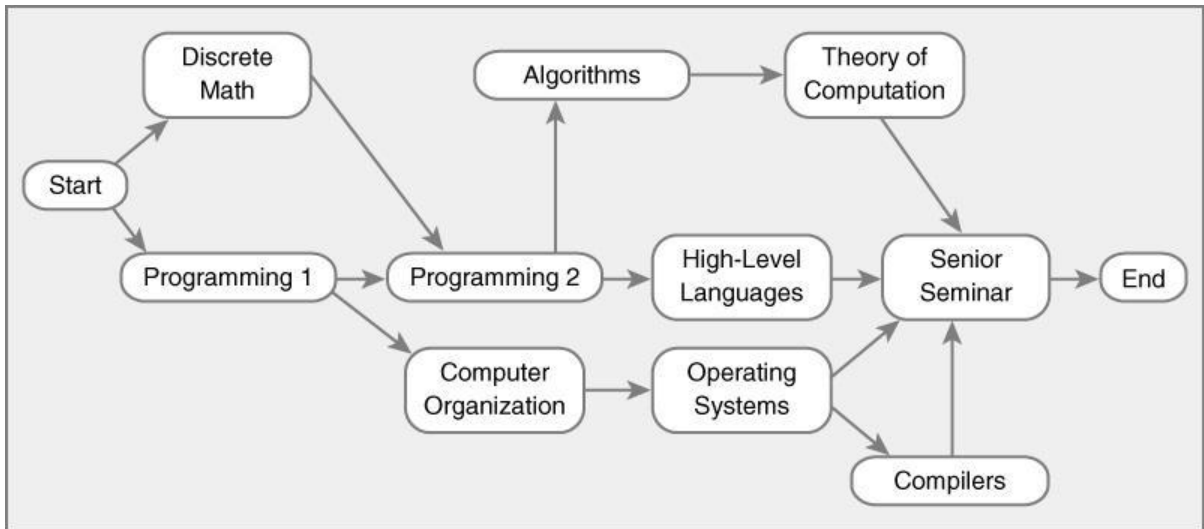
1. Start
2. Discrete Math
3. Programming
4. Computer Org
5. Programming 2
6. OS
7. Alg
8. High-Level Lang
9. Compliers
10. Theory of Comp
11. Senior Seminar
12. End