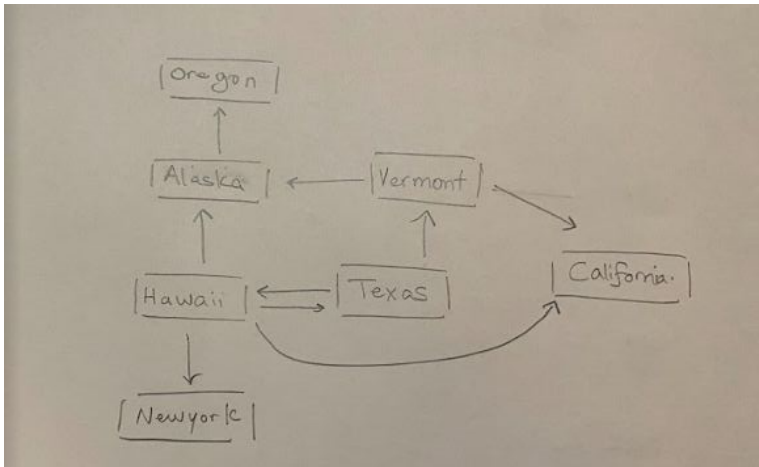


$V(\text{StateGraph}) = \{\text{Oregon, Alaska, Texas, Hawaii, Vermont, New York, California}\}$   
 $E(\text{StateGraph}) = \{(\text{Alaska, Oregon}), (\text{Hawaii, Alaska}), (\text{Hawaii, Texas}), (\text{Texas, Hawaii}), (\text{Hawaii, California}), (\text{Hawaii, New York}), (\text{Texas, Vermont}),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

1. Draw the StateGraph



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

$V(\text{StateGraph}) = \{\text{Oregon, Alaska, Texas, Hawaii, Vermont, New York, California}\}$

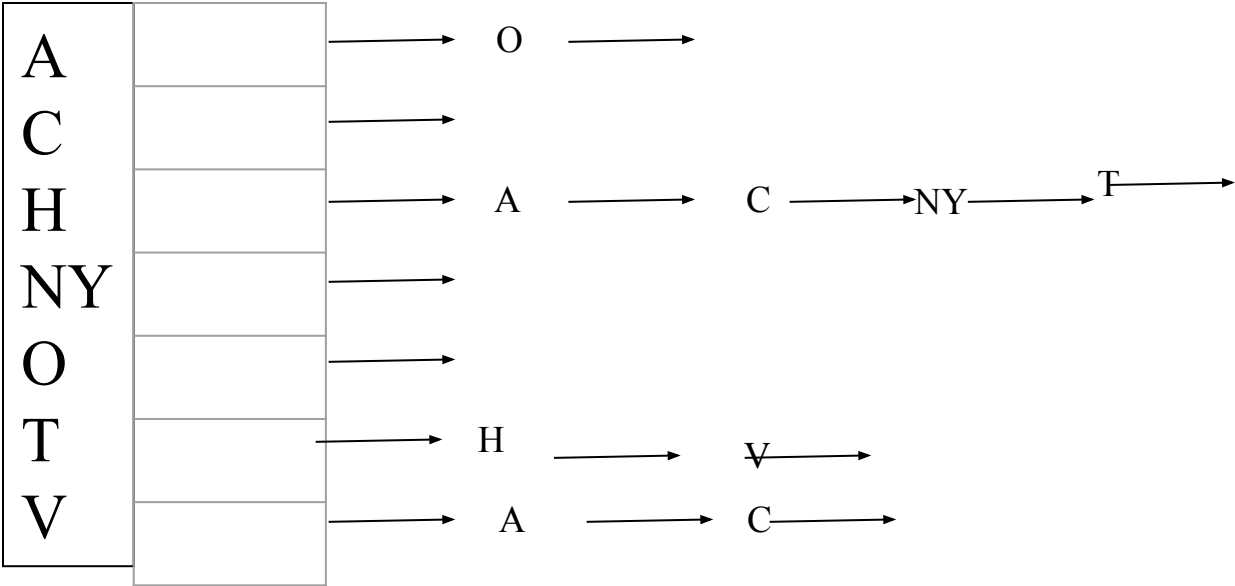
$E(\text{StateGraph}) = \{(\text{Alaska, Oregon}), (\text{Hawaii, Alaska}), (\text{Hawaii, Texas}), (\text{Texas, Hawaii}), (\text{Hawaii, California}), (\text{Hawaii, New York}), (\text{Texas, Vermont}), (\text{Vermont, California}), (\text{Vermont, Alaska})\}$

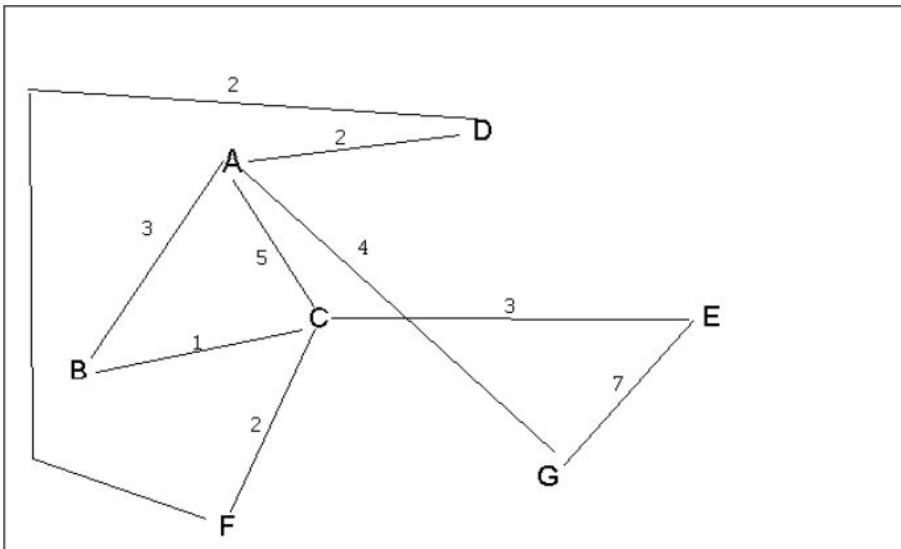
2. a. Is there a path from Oregon to any other state in the graph? **a, no**
- b. Is there a path from Hawaii to every other state in the graph? **b, Yes**
- c. From which state(s) in the graph is there a path to Hawaii? **c, Texas**

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

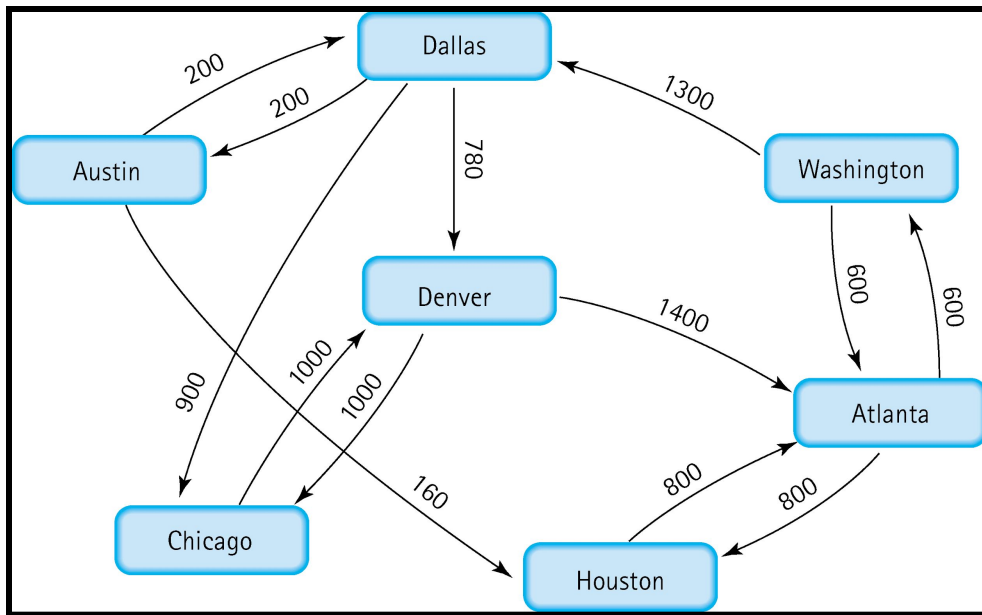
States	
A	0000100
C	0000000
H	1101010
NY	0000000
O	0000000
T	0010001
V	1100000

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

Atlanta - washington (600)

Atlanta - Huston (800)

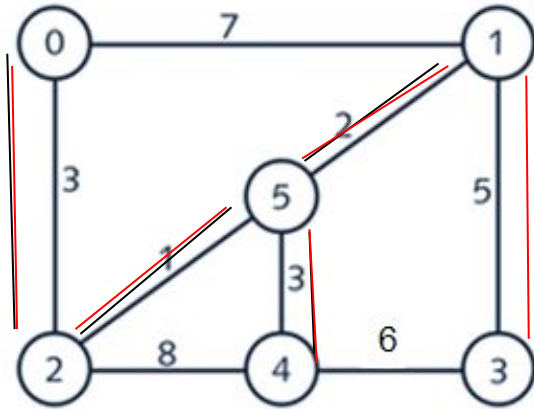
Atlanta - Austin (2100)

Atlanta- Chicago (2800)

Atlanta- Denver (2680)

Atlanta- Dallas (1900)

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



Add 0 to MST

consider edge 3,7 and choose the smallest

3 is the smallest, add 2 to MST

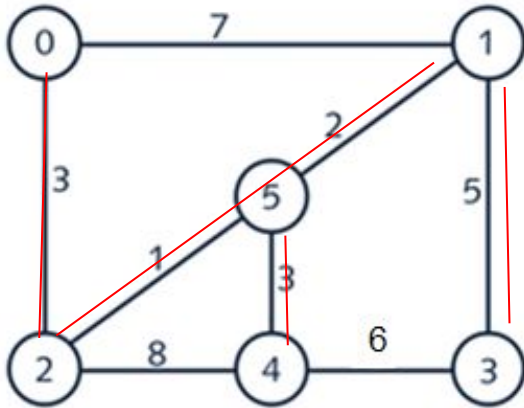
consider edge 1,8 and choose smallest 1 is the  
smallest, add 5 to MST

consider edges 2,5,7 choose smallest, 2 is the  
smallest, add 1 to mst.

consider edges 7,5 and choos smallest, 5 is  
smallest add 3 to MST.

consider edges 6,3. choose smallest. 3 is  
smallest, add 4 to MS.

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



2-5 (1)

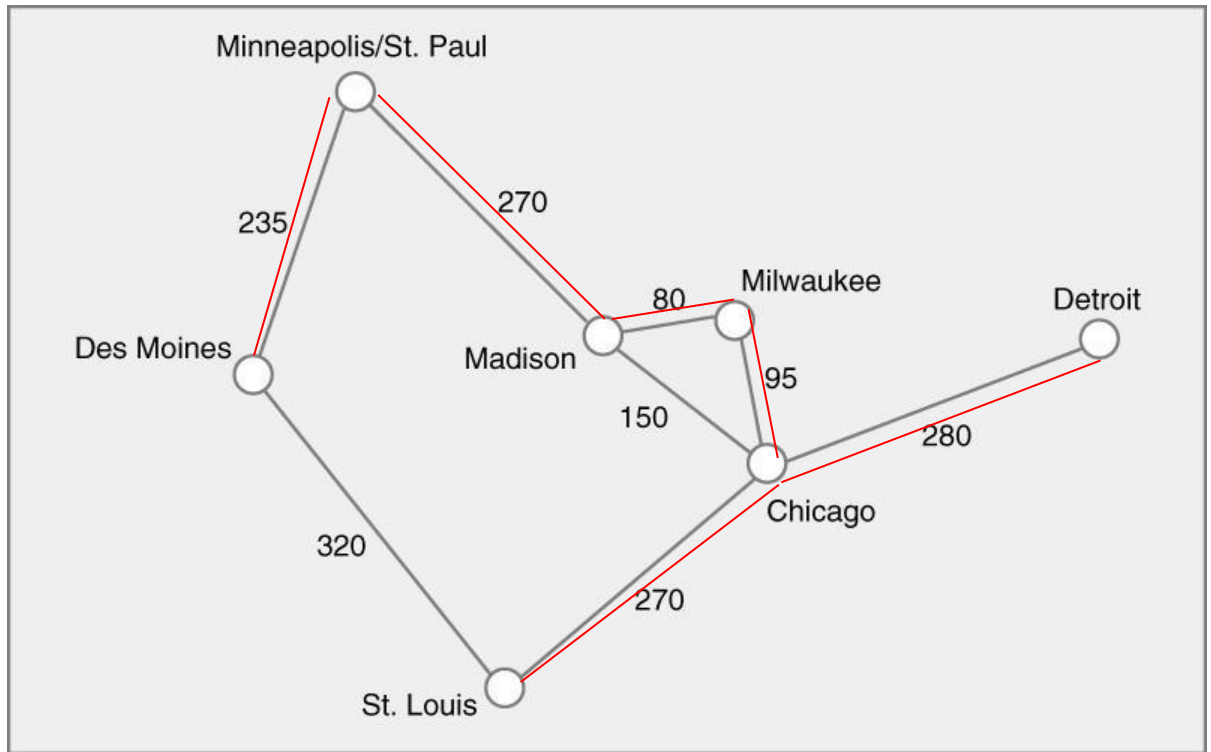
1-5(2)

0-2(3)

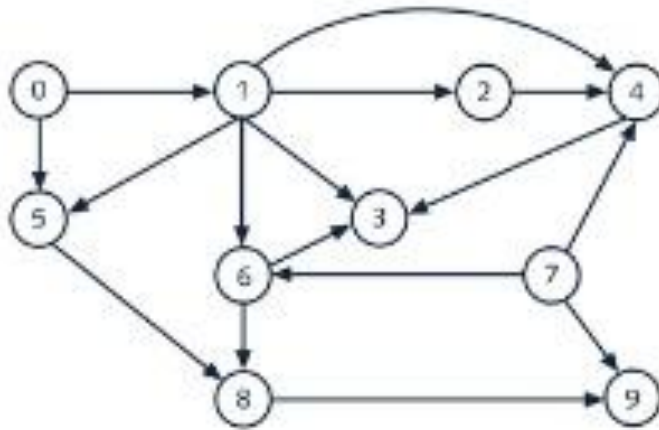
4-5(3)

1-3(5)

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



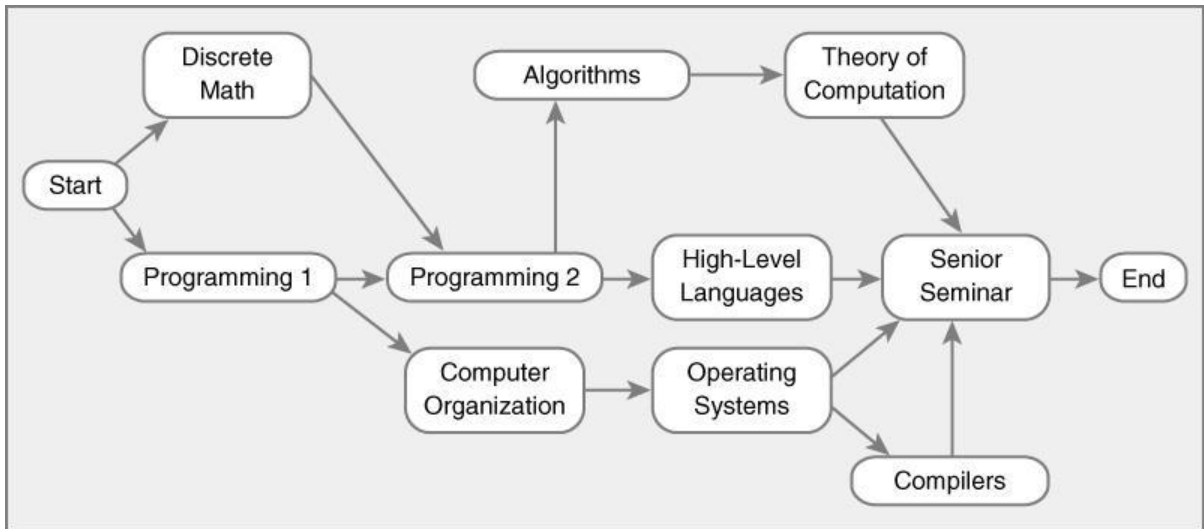
9. List the nodes of the graph in a breadth first topological ordering. Show the steps using arrays predCount, topologicalOrder and a queue



predCount 0000000000  
topoorder 0712564839



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



S:start

Discrete Math

Programming 1

Programming 2

Computer Organization

Algorithms

High Level Languages

Operating Systems

Theory of computation

compilers

senior seminar

E:end