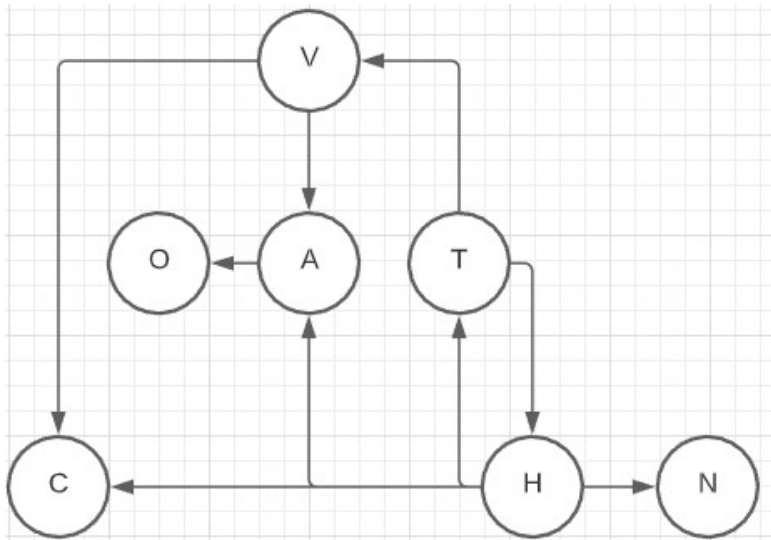


CMSC204
Kartchner

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

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

1. Draw the StateGraph



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

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

$E(\text{StateGraph}) = \{(A, O), (H, A), (H, T), (T, H), (H, C), (H, N), (T, V), (V, C), (V, A)\}$

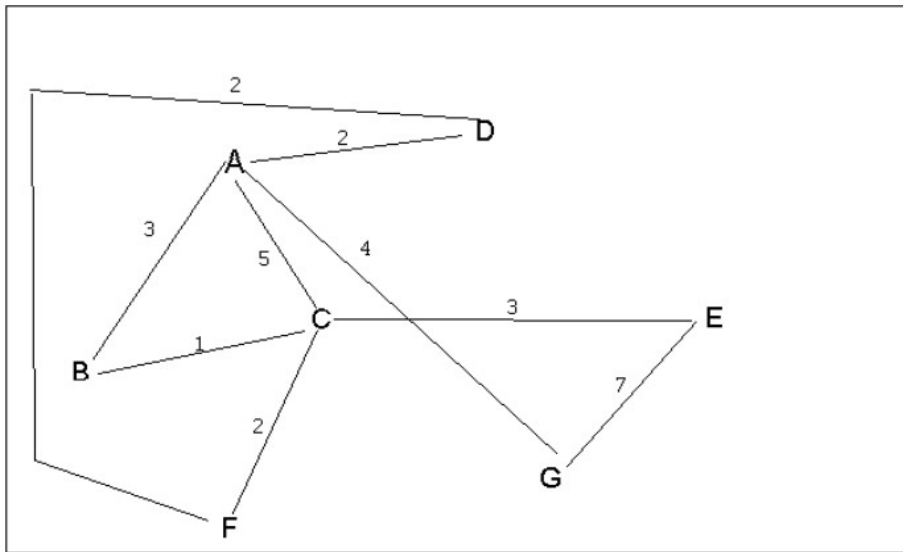
2. a. Is there a path from Oregon to any other state in the graph?
No
- b. Is there a path from Hawaii to every other state in the graph?
Yes
- c. From which state(s) in the graph is there a path to Hawaii?
Texas

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

States		O	A	T	H	V	N	C1
Oregon	O	0	0	0	0	0	0	0
Alaska	A	1	0	0	0	0	0	0
Texas	T	0	0	0	1	1	0	0
Hawaii	H	0	1	1	0	0	1	1
Vermont	V	0	1	0	0	0	0	1
NewYork	N	0	0	0	0	0	0	0
California	C	0	0	0	0	0	0	0

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

Oregon				
Alaska	Oregon			
Texas	Hawaii	Vermont		
Hawaii	Alaska	California	New York	Texas
Vermont	Alaska	California		
New York				
California				

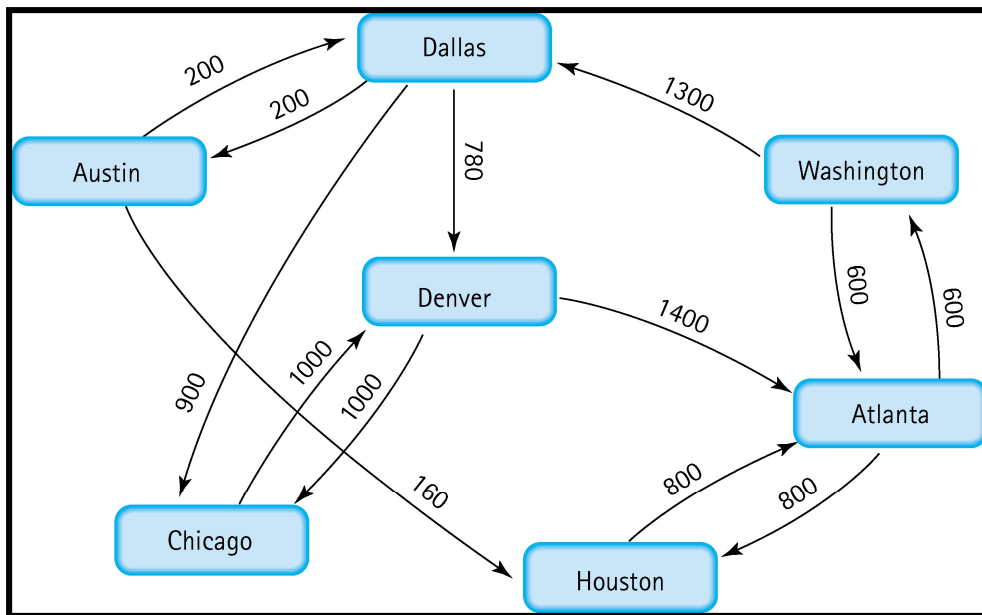


4 a. Which of the following lists the graph nodes in depth first order beginning with E?

- 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 distance from Atlanta to every other city

Washington: 600

Denver: 2680

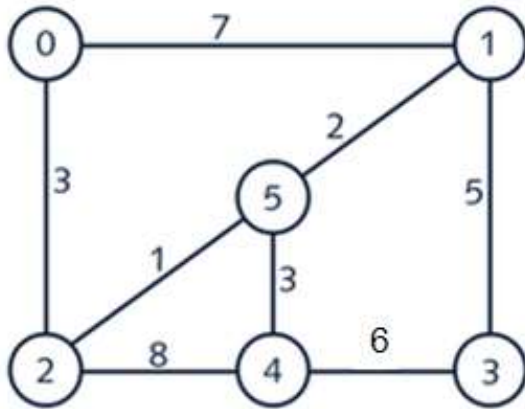
Houston: 800

Dallas: 1900

Chicago: 2800

Austin: 2100

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



By vertices:

0

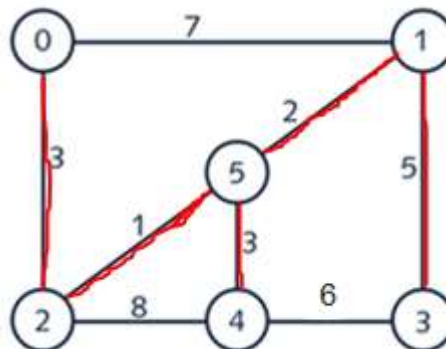
2

5

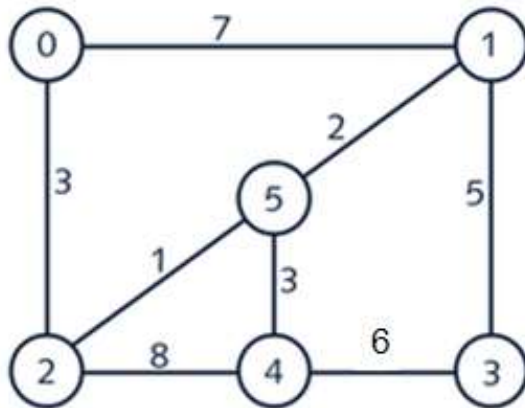
1

4

3



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



By vertices :

2

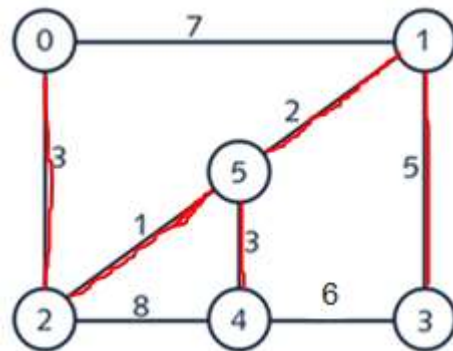
5

1

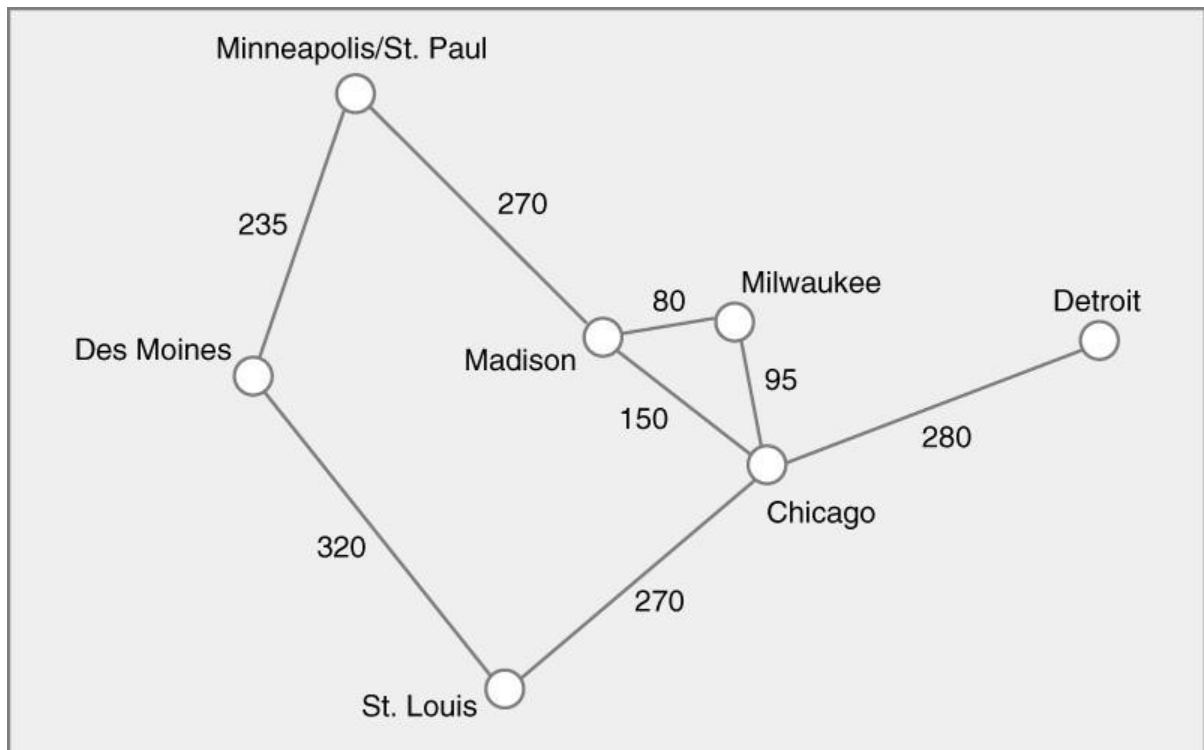
4

0

3

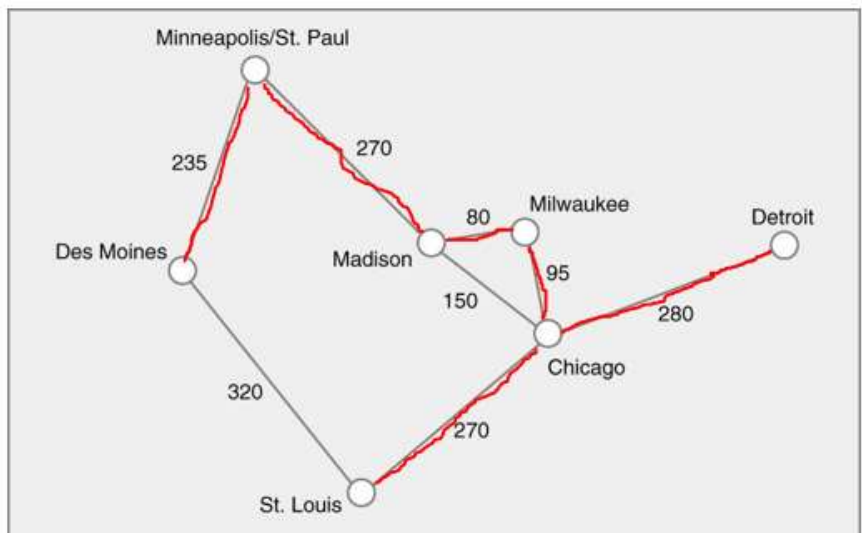


8. Find the minimal spanning tree using the algorithm you prefer. Use Minneapolis/St. Paul as the source vertex

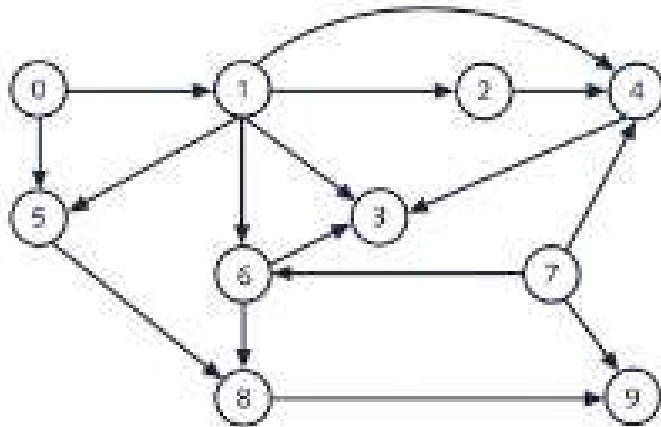


By Prim's Algorithm:
Minneapolis/St. Paul

Des Moines
Madison
Milwaukee
Chicago
St. Louis
Detroit



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

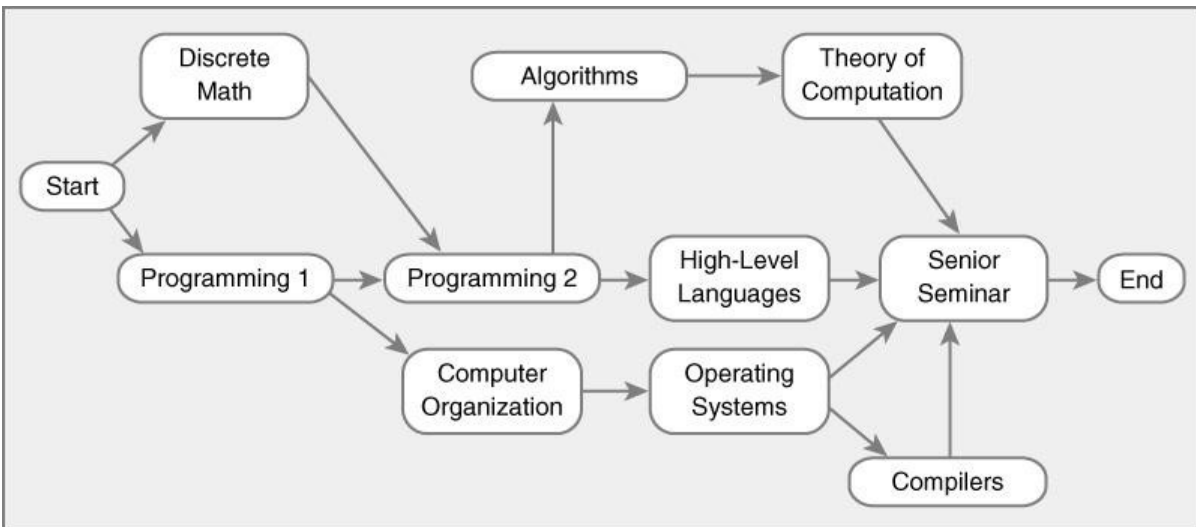


Pred Count [i]	0	1	2	3	4	5	6	7	8	9
1 st iter	0	1	1	3	3	2	2	0	2	2
end iter	0	0	0	0	0	0	0	0	0	0

Topological Order [i]	0	1	2	3	4	5	6	7	8	9
Final values	0	7	1	2	5	6	4	8	3	9

Queue first iter	0, 7
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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

Operating Systems

Theory of Computation

Compilers

Senior Seminar

End