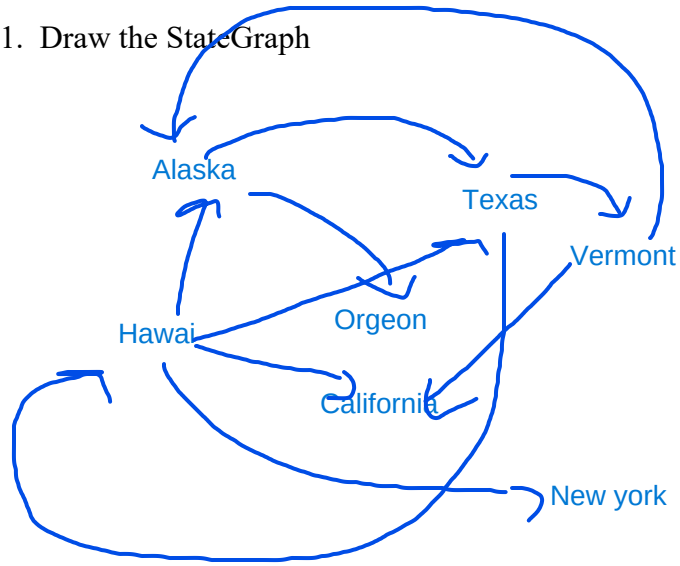
CMSC204
Kartchner

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) = {orgeon, alaska, texas, hawai, vermont, new york, california}

E(StateGraph) = {{alaska, orgeon}, {hawaii, alaska}, {hawaii, texas}, {vermont, alaska}, {vermont, california}, {hawaii, new york}, {texas, vermont}, {texas, hawai}, {hawai, california}, }

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?

texas

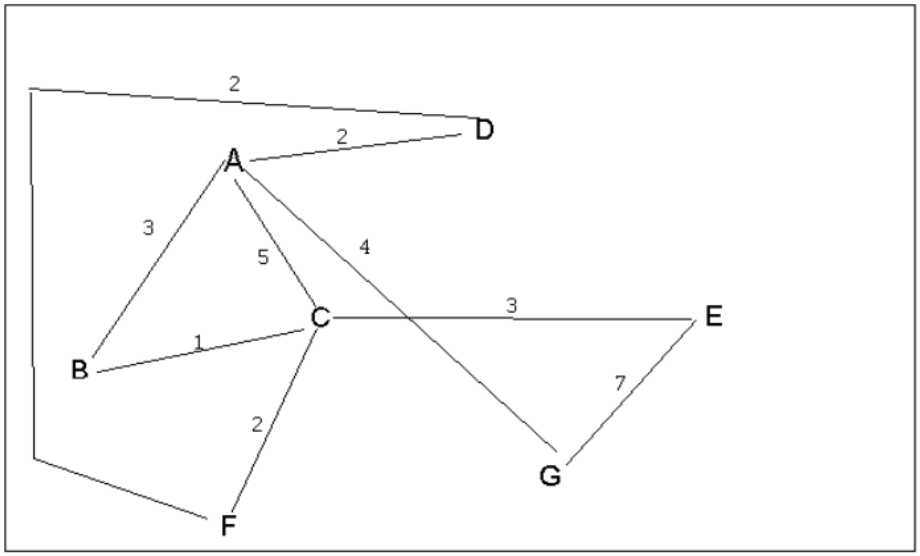
3. a. Show the adjacency matrix that would describe the edges in the graph.
Store the vertices in alphabetical order

States

alaska
california
hawai
new york
oregon
texas
vermont

AL	CA	HI	NY	OR	TX	VT
0	0	0	0	1	0	0
0	0	0	0	0	0	0
1	1	0	1	0	1	0
0	0	0	0	0	0	0
0	0	0	0	0	0	0
0	0	1	0	0	0	1
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 C

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

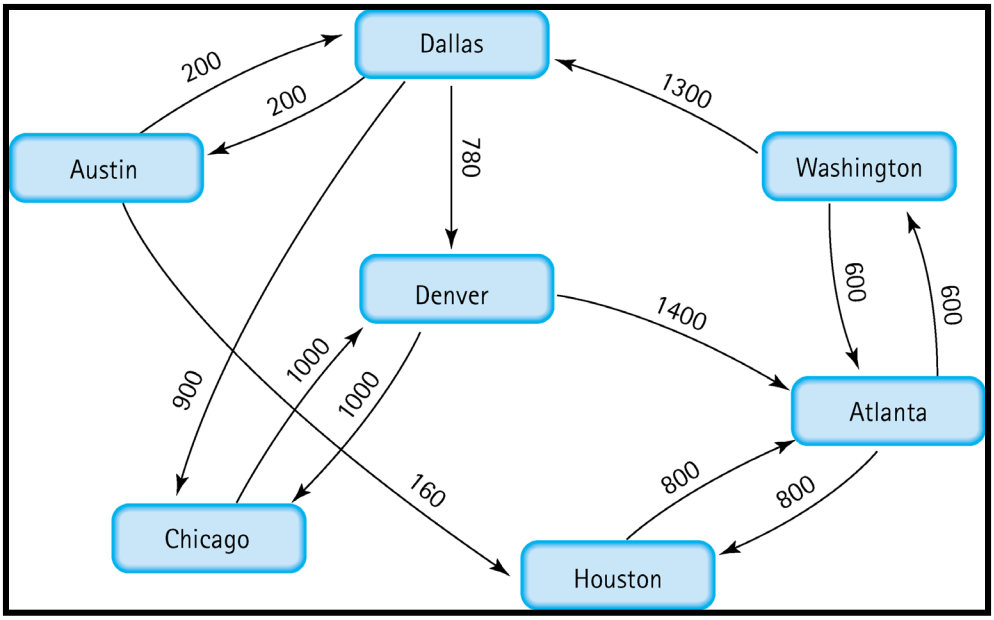
4 b. Which of the following lists the graph nodes in breadth first order beginning at F?

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

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

atlanta - > washington (600)

atlanta - > houston (800)

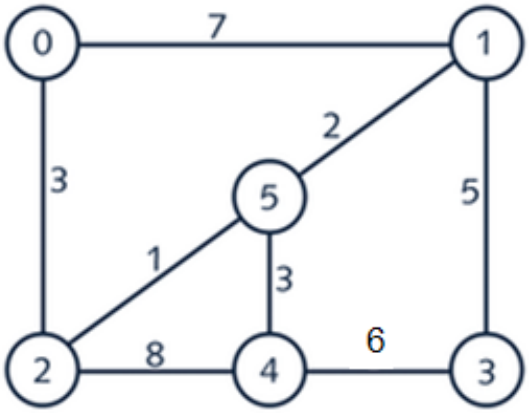
atlanta -> washington - > dallas (1300)

atlanta -> washington -> dallas -> austin (2100)

atlanta -> washington -> dallas -> denver (2680)

atlanta -> washington - > dallas -> chicago (2800)

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



0 → 2 (3)

2 → 5 (1)

5 → 1 (2)

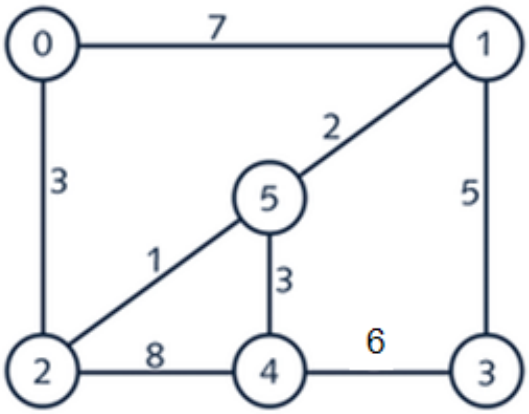
5 → 4 (3)

1 → 3 (3)

0, 2, 5, 1, 4, 3

(14)

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



2 — 5 (1)

5 — 1 (2)

0 — 2 (3)

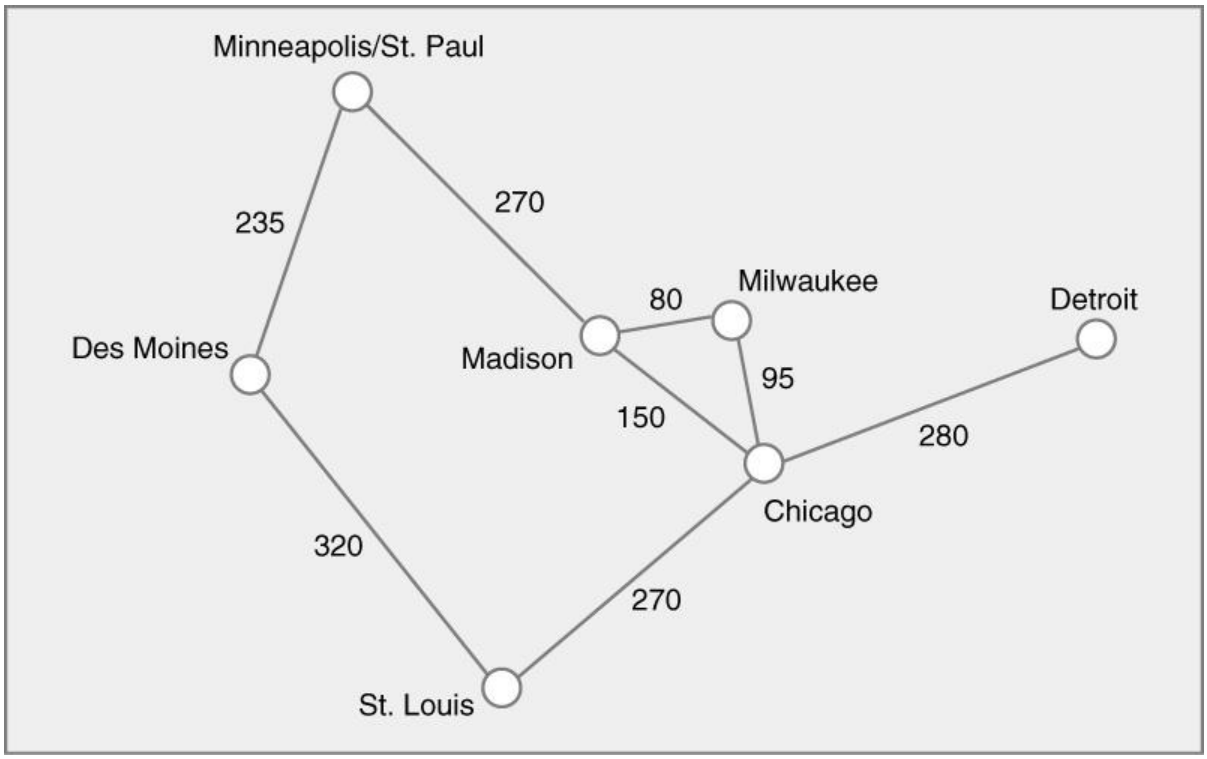
5 — 4 (3)

1 — 3 (5)

2, 5, 1, 0, 2, 4, 3

(14)

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



minneapolis/st paul - > desmoins (235)

minneapoli/st paul -> madison (270)

madison - > milwaukee (80)

milwaukee - > chicago (95)

chicago - > st louis (270)

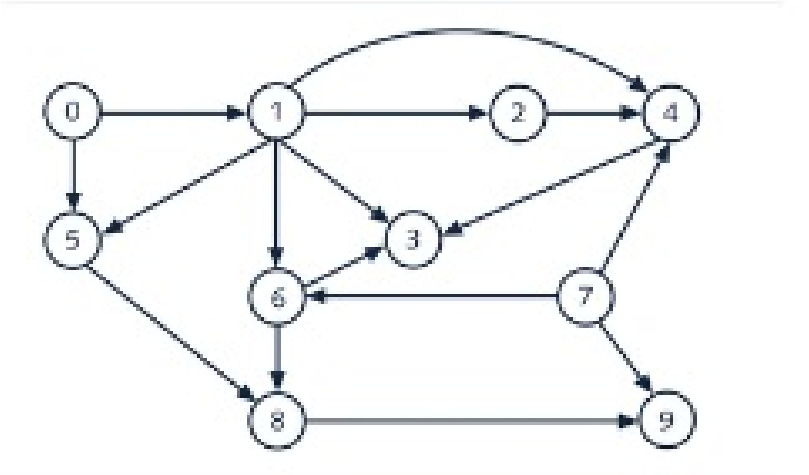
chicago -> detroit (280)

minneapolis/st paul, des moines, madison, milwaukee, chicago, st louis, detroit

(1230)

using kruskals

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

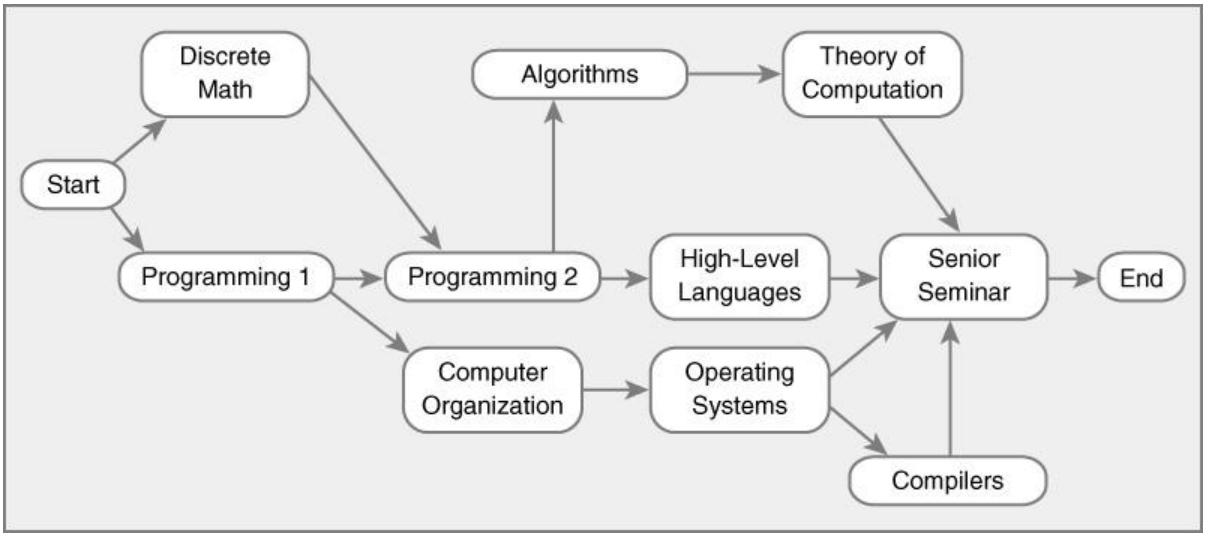


	0	1	2	3	4	5	6	7	8	9
predCount	0	0	0	0	0	0	0	0	0	0

topologicalOrder 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, prog 1, prog2, comp org, algorithms, high level languages, theory of computation, operating systems, compilers, senior seminar, end