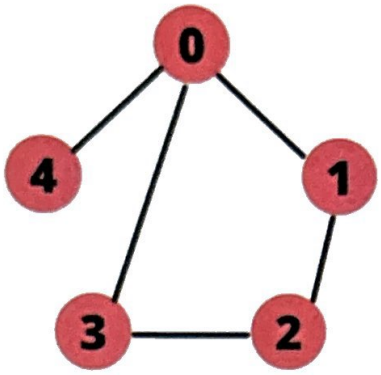
Assignment #9: Graphs (50 Pts)

Part 1: Representation of Graphs (10 Pts)

Draw an adjacency matrix and an adjacency list for each graph below.

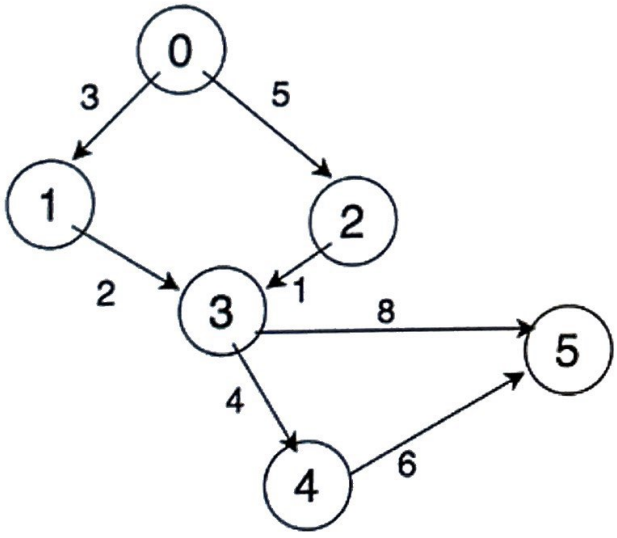
#1 (4 Pts)



	0	1	2	3	4
0	0	1	0	1	1
1	1	0	1	0	0
2	0	1	0	1	0
3	1	0	1	0	0
4	1	0	0	0	0

0	→ 1, 3, 4
1	→ 0, 2
2	→ 1, 3
3	→ 0, 2
4	→ 0

#2 (6 Pts)



	0	1	2	3	4	5
0	-	3	5	-	-	-
1	-	-	-	2	-	-
2	-	-	-	1	-	-
3	-	-	-	-	4	8
4	-	-	-	-	-	6
5	-	-	-	-	-	-

0	→ 1(3), 2(5)
1	→ 3(2)
2	→ 3(1)
3	→ 4(4), 5(8)
4	→ 5(6)
5	→ ∞

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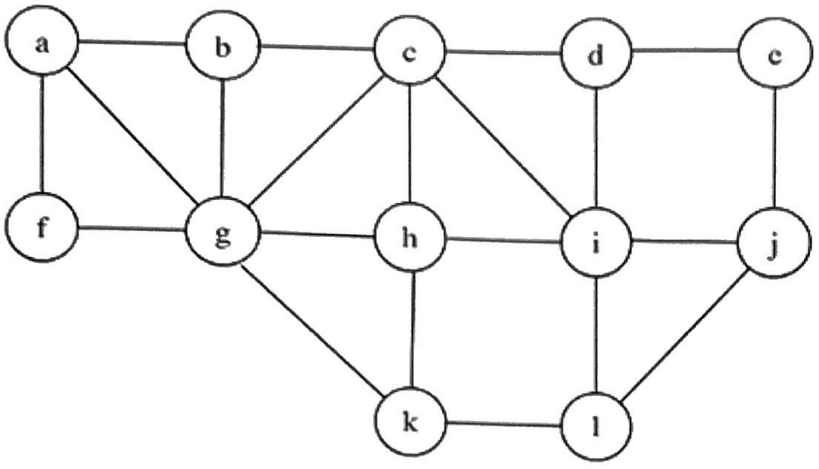
Part2: Breadth First Search & Depth First Search (20 Pts)

Given the graph below, list the order in which the vertices will be visited if conducting a breadth first search and a depth first search from vertex A. Always take the lower cost or vertex which comes first alphabetically when presented with multiple options.

#3 (10 Pts)



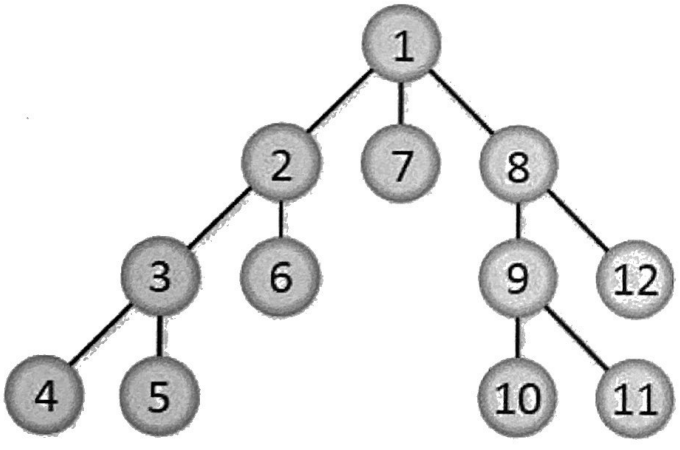
Queue:

BFS: a, b, f, g, c, d, h, i, e, j, k, l

DFS: a, b, c, d, e, j, i, h, g, f, k, l

Stack:

#4 (10 Pts)



Queue:

Stack:

BFS: 1, 2, 7, 8, 3, 6, 4, 5, 9, 12, 10, 11

DFS: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

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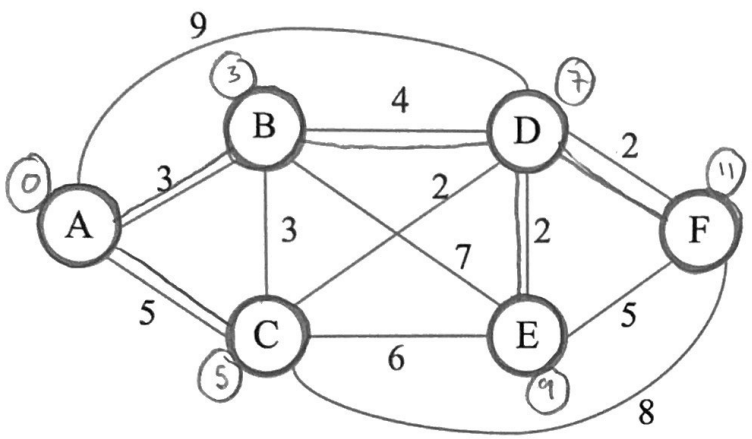
rt3: Dijkstra's Algorithm & Minimum Paths (20 Pts)

Given the graphs below, draw the minimum path tree from the specified vertex to every other vertex in the graph.

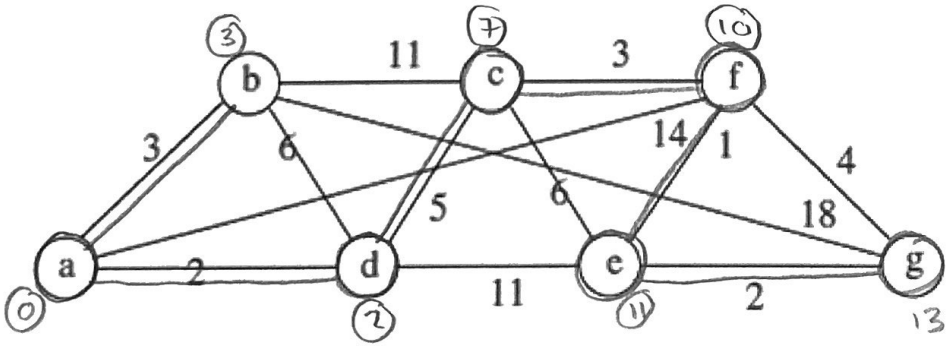
#5. Start at A. (10 Pts)



A: 0
B: 3
C: 5
D: ~~7~~
E: ~~9~~ 9
F: ~~11~~ 11

A, B, C, D, E, F

#5 Start at a. (10 Pts)



a: 0
b: 3
c: ~~7~~ 7
d: 2
e: ~~11~~ 11
f: ~~14~~ 10
g: ~~21~~ ~~14~~ 13

a, d, b, c, f, e, g

What to turn in:

Submit a document with your solutions via Canvas. This doesn't lend itself perfectly to any particular format. It can be typed or hand-written.