CS 260 Extra credit

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Question 1

part a

a,b,c,d,e,f are considered 0,1,2,3,4,5 respectively.

[0.0, 3.0, 4.0, 4.0, inf, 4.0]

Predecessor=[0, 0, 1, 0, 'N', 1] a to b to c. b to f. a to d.

part b

Distance matrix:

[0.0, 3.0, 4.0, 4.0, inf, 4.0] [inf, 0.0, 1.0, 3.0, inf, 1.0] [inf, 5.0, 0.0, 2.0, inf, 6.0] [inf, 3.0, 4.0, 0.0, inf, 4.0] [inf, 6.0, 7.0, 3.0, 0.0, 2.0] [inf, 5.0, 6.0, 2.0, inf, 0.0]

Predecessor matrix in the order [a b c d e f] [0, 0, 1, 0, 'N', 1] ['N', 1, 1, 1, 'N', 1] ['N', 2, 2, 2, 'N', 2] ['N', 3, 3, 3, 'N', 3] ['N', 4, 4, 4, 4, 4] ['N', 3, 1, 5, 'N', 5]

Question 2

Let us consider the following scenario:

Let A, B, C be nodes in a graph.

(A,B,10) (B,C,8) (C,B,-5)

Dijkstra would miss the miss the path A→B→C

This would be because of the negative edge weight. If edge weight is less than 0, adding new edges to the shortest path makes it shorter.

Question 3

Let us consider the following scenario:

Let A, B, C, D be nodes in a graph.

(A,B,10) (B,C,8) (C,D,-4) (D,B,-5) s algorithm will fail to find shortest path to 3 because of the negative weight cycle that exists. The algorithm will fall into an infinite loop. Thus, negative cycles do not work in floyds.