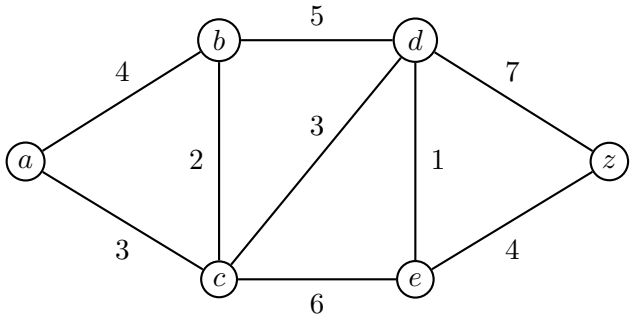
CS 228, Dijkstra's Algorithm

Name:

Some questions are from **Discrete Mathematics and It's Applications 7e** by Kenneth Rosen.

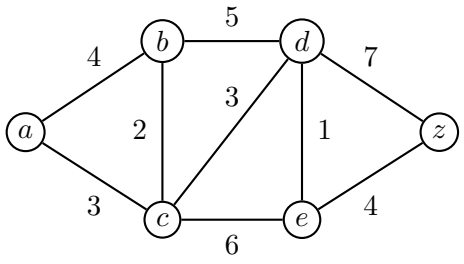
- Perform Dijkstra's algorithm to find the length of the shortest path from a to z by completing the table below.



Step	S	$L(a)$	$L(b)$	$L(c)$	$L(d)$	$L(e)$	$L(z)$
0	$\emptyset$	0	INF	INF	INF	INF	INF
1							
2							
3							
4							
5							
6							

The length of the shortest path from a to z is 11.

- As it is described in our textbook, Dijkstra's algorithm returns the *length* of the shortest path to the goal node, but it doesn't return the path itself. Dijkstra's algorithm can be modified to return the shortest path by storing the predecessor of every node whenever the L value for that node is modified. When a node is added to S, the predecessor is stored as well. It is then possible to reconstruct the shortest path by following the chain of predecessor nodes from the goal backward to the start node. Repeat the previous exercise using this modified version of Dijkstra's algorithm. I've completed through step 2 for you.



Step	S	$L(a)$	$L(b)$	$L(c)$	$L(d)$	$L(e)$	$L(z)$
0	$\emptyset$	$0, -$	INF	INF	INF	INF	INF
1	$(a, -)$	$0, -$	$4, a$	$3, a$	INF	INF	INF
2	$(a, -), (c, a)$	$0, -$	$4, a$	$3, a$	$6, c$	$9, c$	INF
3							
4							
5							
6							

- Solve the traveling salesperson problem for the following graph by finding the total weight of all Hamilton circuits and determining a circuit with minimum total weight.