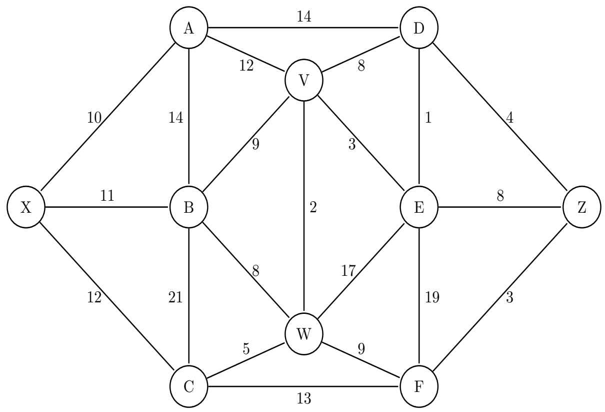
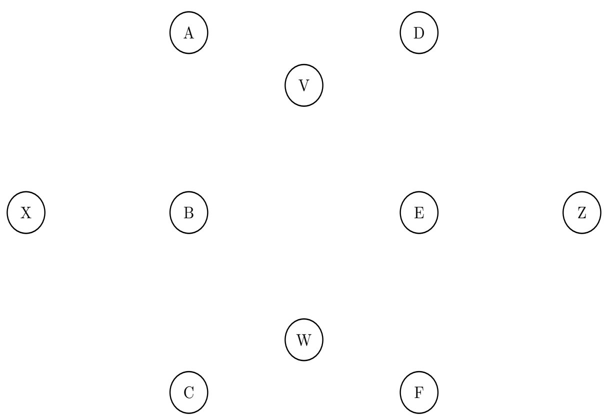
CS2223 D Term 2020 Quiz 15

(1 point) Question 1: “My brain is open. . . .”
I pledge that I am taking this quiz on my own, with help from no one else and no notes:

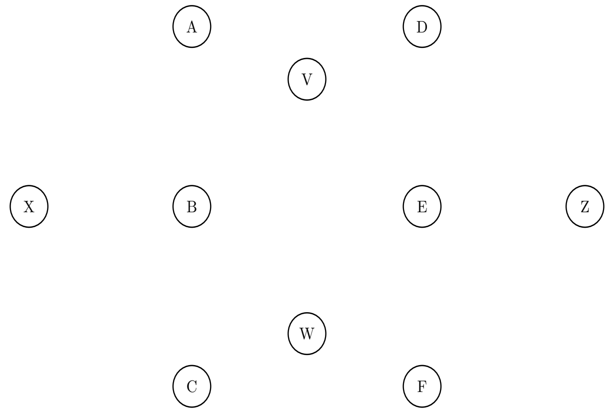


(3 points) Question 2: Perform Dijkstra’s Algorithm on the graph above using X as the source. After determining the minimum distance of each vertex from X and its penultimate vertex on the shortest path from X, describe the path from X to Z:



a.) Length 27; penultimate vertex E; 4 edges
b.) Length 27; penultimate vertex D; 6 edges
c.) Length 28; penultimate vertex D; 6 edges
d.) Length 28; penultimate vertex E; 4 edges
e.) Length 28; penultimate vertex F; 3 edges

(3 points) Question 3: Perform Dijkstra's Algorithm on the graph above using Z as the source. After determining the minimum distance of each vertex from Z and its penultimate vertex on the shortest path from Z, describe the path from Z to X:



a.) Length 27; penultimate vertex C; 3 edges
b.) Length 27; penultimate vertex C; 6 edges
c.) Length 28; penultimate vertex A; 5 edges
d.) Length 28; penultimate vertex B; 5 edges
e.) Length 28; penultimate vertex C; 4 edges

(3 point) Question 4: Compare the results generated by your executions of Dijkstra's Algorithm in Question 2 and Question 3 above. Which of the following best describes them?

a.) Both runs generate the same spanning tree of the underlying graph.
b.) Both runs generate the same path (as a set of edges) connecting X and Z.
c.) Both runs generate different paths connecting X and Z but with the same edge-weight sum (length).
d.) Both runs generate different paths connecting X and Z with different edge-weight sums (lengths).
e.) Both a) and b)

(1 point) Bonus Question: We have used only positive[1] edge weights for graphs and digraphs in class. Negative edge weights might suggest...

a.) We get a rebate for that leg of the journey.
b.) The destination end of the edge is lower in altitude than the origination.
c.) Someone invented a (virtual) time machine.
d.) An implementation is using a max priority queue instead of a min priority queue.
e.) We should know the details of our algorithms and whether they work on graphs with negative edge weights.
f.) Any or All of the Above
g.) None of the Above

[1] Technically, non-negative. Why does Dijkstra's Algorithm fail for negative edge weights? Or, does it?