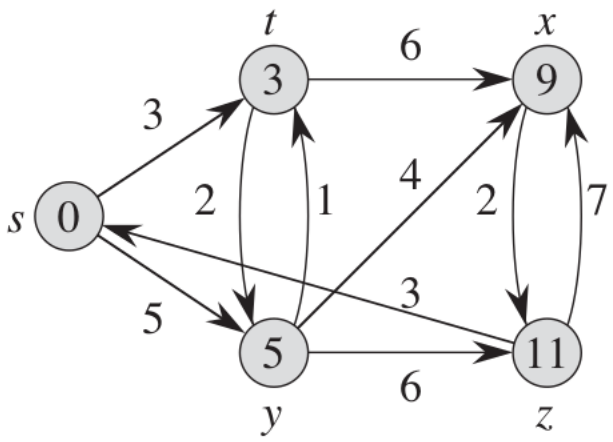
[CSL202] **2024-25-M**

TUTORIAL X

Date: **Nov 13, 2024**.

1. Run the Dijkstra's algorithm on the following weighted directed graph and find the shortest distance from source s to every other vertex. Draw the shortest-path tree.



2. Run the Dijkstra's algorithm on the above graph using priority queue implementation. Show the priority queue after every step.

3. Give an example of a directed graph with negative-weight edges for which Dijkstra's algorithm produces incorrect answers.

4. (a) Consider a directed graph which has exactly one negative edge leaving s; all other edges are positive. Can Dijkstra's algorithm, started at s, fail on such a graph? justify your answer.

   (b) Consider a directed graph in which the only negative edges are those that leave s; all other edges are positive. Can Dijkstra's algorithm, starting at s, fail on such a graph? justify your answer.

5. We know that Dijkstra's algorithm may not work if the graph has negative-weight edges.

Let G be a weighted (edge weights may be negative) directed acyclic graph with a source vertex s. Design an algorithm to compute the length of the shortest path from s to every other vertex of G.