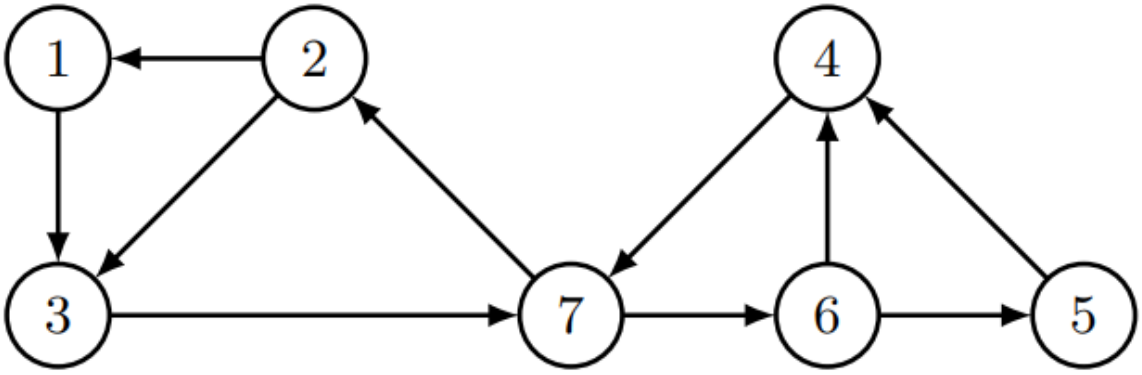
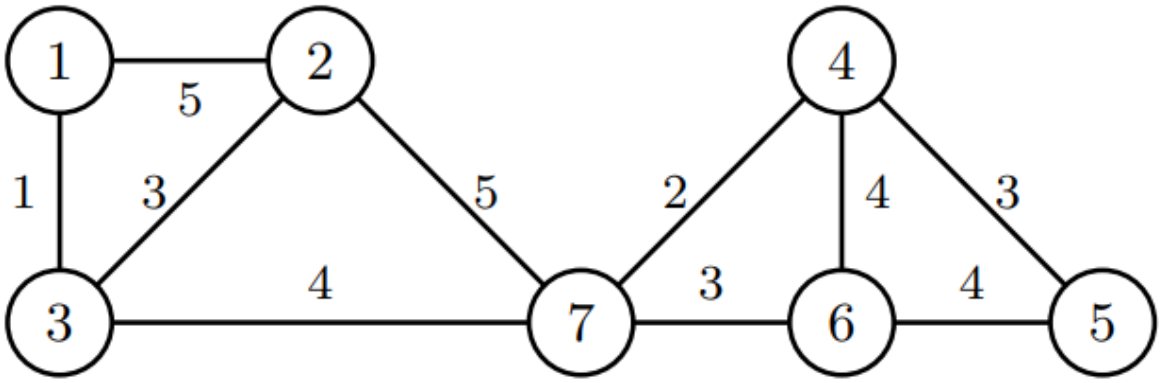
CSE225 [Summer 2023]: Assignment on Graphs (equivalent to Class Test – 04)

1. Suppose a digraph G = (V, E) below with the sets V = {1, 2, 3, 4, 5, 6, 7} of nodes and E = {(1, 3),(2, 1),(2, 3),(3, 7),(4, 7),(5, 4),(6, 4),(6, 5),(7, 2),(7, 6)} of arcs:



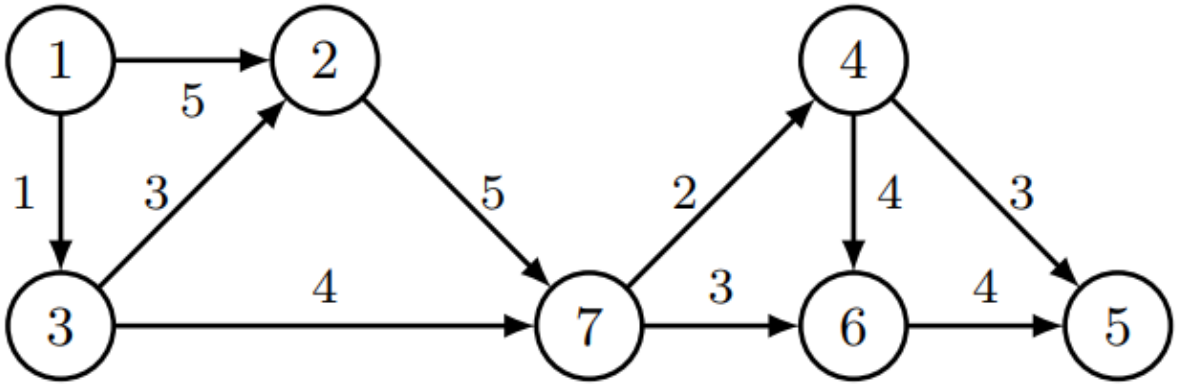
Represent G with adjacency lists and an adjacency matrix for numerically ordered nodes 1, 2, 3, 4, … ,7.

2. A weighted graph G = (V, E), below has the sets V = {1, 2, 3, 4, 5, 6, 7} of vertices and E = {(1, 2),(1, 3),(2, 3),(2, 7),(3, 7),(4, 5),(4, 6),(4, 7),(5, 6),(6, 7)} of edges:



Apply both Prim's and Kruskal's Algorithm on this graph to build its minimum spanning tree. Show the detailed calculation at each step.

3. A weighted digraph G = (V, E), below has the sets V = {1, 2, 3, 4, 5, 6, 7} of nodes and E = {(1, 2),(1, 3),(2, 7),(3, 2),(3, 7),(4, 5),(4, 6),(6, 5),(7, 4),(7, 6)} of arcs:



Apply Dijkstra's Algorithm on this weighted graph to find the minimum-weight paths from the source node 1 to each other node v. Show the detailed calculation at each step.