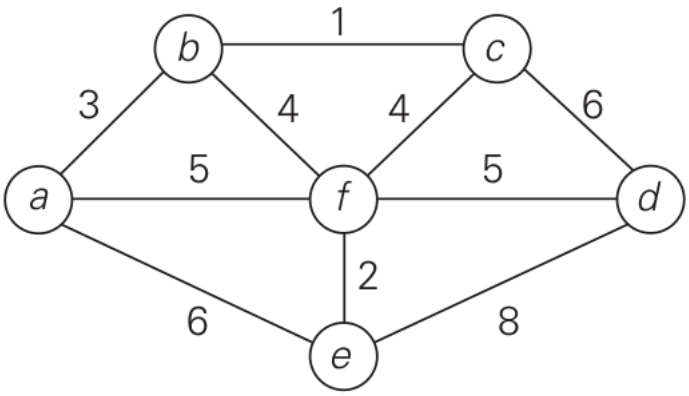
[CSL202] **2024-25-M**

TUTORIAL XI

Date: **Nov 21, 2024**.

1. Find the minimum spanning tree of the following graph using (a) Kruskal's Algorithm (b) Prim's Algorithm



2. TRUE/FALSE: Let G be an undirected graph with distinct edge weights, that is no two edges in the graph have equal weights.
   (a) The minimum weight edge is always be a part of a minimum spanning tree.
   (b) The maximum weight edge is never be a part of any minimum spanning tree.
   (c) The graph G has a unique minimum spanning tree.
3. TRUE/FALSE: Let G be an undirected edge-weighted graph.
   (a) The minimum weight edge is always be a part of a minimum spanning tree.
   (b) The maximum weight edge is never be a part of any minimum spanning tree.
   (c) The graph G has a unique minimum spanning tree.
4. TRUE/FALSE: Let e be a minimum-weight edge in a connected graph G, then e belongs to some minimum spanning tree of G.

5. Suppose we are given an undirected graph G with weighted edges and a MST T of G.

   (a) Describe an algorithm to update the MST T when the weight of a single edge e is INCREASED.

   (b) Describe an algorithm to update the MST T when the weight of a single edge e is DECREASED.

6. (*) Let G be an undirected, connected graph and all edge weights are distinct. A second best spanning tree T' is a spanning tree with smallest weight except for the MST.

   (a) TRUE/FALSE: the second-best minimum spanning tree is unique.

   (b) Give an algorithm to compute the second-best minimum spanning tree of G.