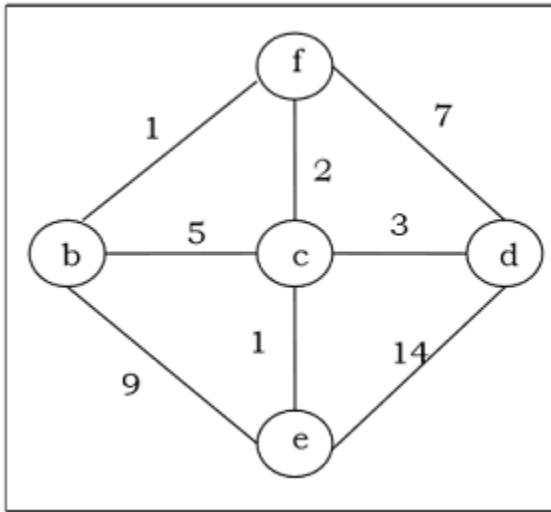


Spanning Trees

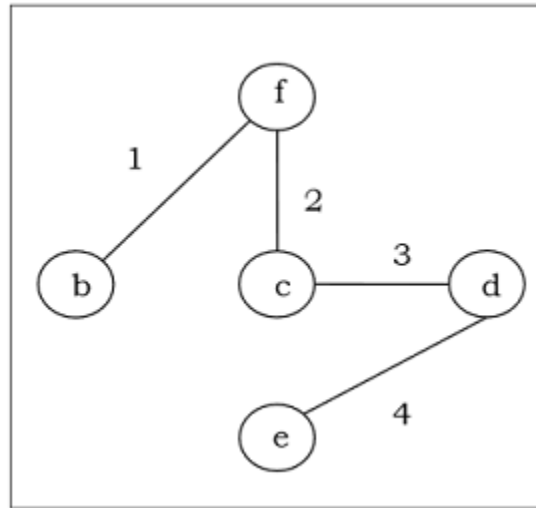
Basic Definitions

1. Spanning Tree:

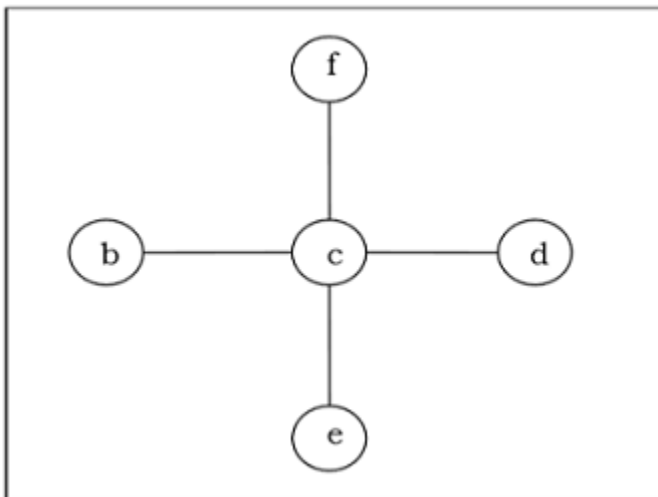
- A spanning tree of a connected undirected graph G is a tree that minimally includes all of the vertices of G .
- A graph may have many spanning trees.
- Example



Graph G



Spanning Tree 1



Spanning Tree 2

There will be more trees of the above graph G

2. **Minimum Spanning Tree:**

- A spanning tree with assigned weight less than or equal to the weight of every possible spanning tree of a weighted, connected and undirected graph G , is called minimum spanning tree (MST).
- The weight of a spanning tree is the sum of all the weights assigned to each edge of the spanning tree.

Algorithms for finding minimum spanning tree (MST)

1. **Kruskal's Algorithm:**

- Kruskal's algorithm is a greedy algorithm that finds a minimum spanning tree for a connected weighted graph.
- It finds a tree of that graph which includes every vertex and the total weight of all the edges in the tree is less than or equal to every possible spanning tree.
-

2. **Prim's algorithm:**

- Prim's algorithm is a greedy algorithm that finds a minimum spanning tree for a connected weighted graph.
- It finds a tree of that graph which includes every vertex and the total weight of all the edges in the tree is less than or equal to every possible spanning tree.
- Prim's algorithm is faster on dense graphs.