

Minimum cost spanning tree

A **Minimum Spanning Tree (MST)** works on graphs with directed and weighted (non-negative costs) edges. Consider a graph G with n vertices. The spanning tree is a subgraph of graph G with all its n vertices connected to each other using $n-1$ edges. Thus, there is no possibility of a cycle with the subgraph. If the spanning tree does have a cycle, then it is advisable to remove any one edge, probably the one with the highest cost. The spanning tree with the least sum of edge weights is termed as a MST. It is widely used in applications such as laying of power cables across the city, connecting all houses using the least length of power cables. Here, the weight of each edge is the length of the cable, and the vertices are houses in the city. The most common algorithms to find the minimum cost spanning tree are Prim's algorithm and Kruskal's algorithm. *Figure 8.11* shows the minimum cost spanning tree for an undirected-weighted graph.

