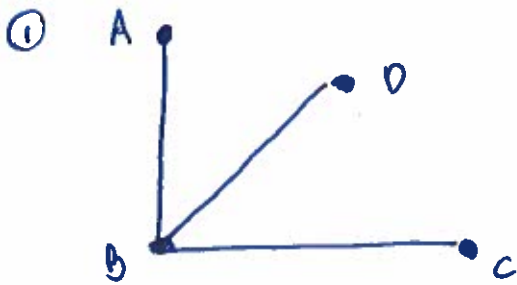


Part V (Section 7.3): Trees and Spanning Trees

The properties of a tree are:

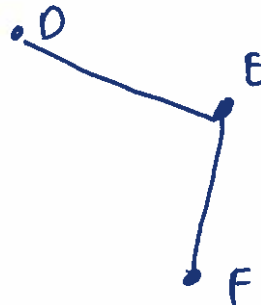
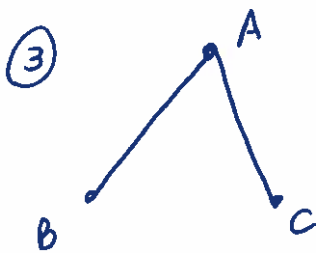
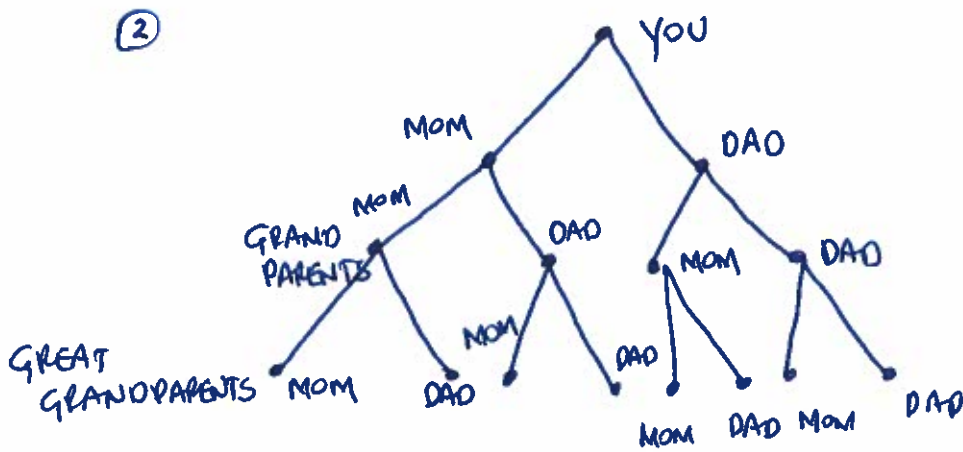
- ✓1. There are no circuits in a tree (no closed loops)
- ✓2. Each node is connected.
- ✓3. There is an edge to each node.
- ✓4. There are always $n-1$ edges for n nodes in a tree.

Examples:



$$n = 4 \text{ NODES}$$

$$\text{EDGES} = n - 1 = 4 - 1 = 3$$



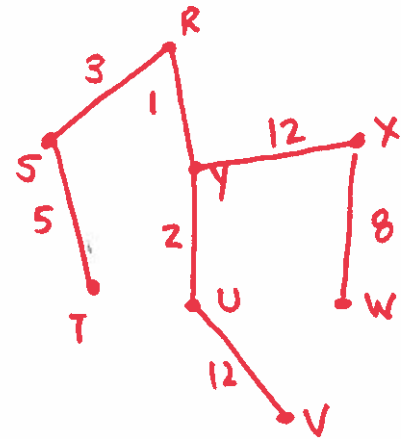
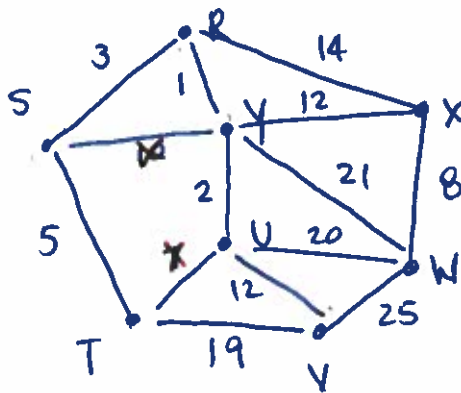
Part VI: Minimum Spanning Trees

A minimum spanning tree is a tree that is the most efficient tree that can be formed to connect all nodes.

Kruskal's Algorithm to find a minimum spanning tree

1. Select the shortest edge in a graph.
2. Keep selecting the shortest edge until all nodes are connected (with no circuits).

Examples



$$\begin{aligned} \text{TOTAL COST} &: 1 + 2 + 3 + 5 + 8 + 12 + 12 \\ &= 43 \text{ UNITS} \end{aligned}$$

$$\text{EDGES: } n - 1 = 8 - 1 = 7$$