ENGRI 1101	Engineering Applications of OR	Fall 2020	Prelab 3

The Minimum Spanning Tree Problem

Name:

Objectives:

- Introduce students to the graph theoretic concept of spanning trees.

- Show three different combinatorial algorithms for solving the minimum spanning tree problem.

- Demonstrate a practical use of minimum spanning trees.

Optional Reading Assignment:

- Read Handout 4 on the minimum spanning tree problem.

onsider the following input for the minimum spanning tree problem.
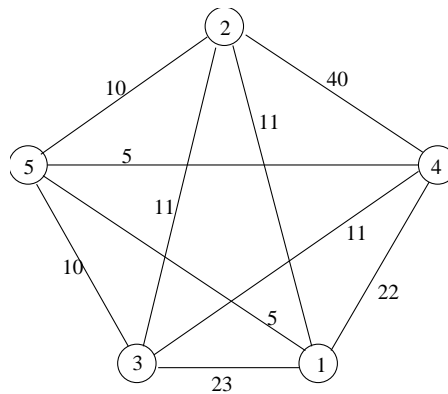
1. Find the minimum spanning tree in this graph, and give a very simple argument why it is optimal.

2. It turns out that our input was more complicated: only nodes 1 through 4 need to be connected. We may include node 5 if this yields a cheaper solution, but we don't need to. Node 5 is called a *Steiner* node. We wish to compute the minimum-cost tree that connects the first four nodes. Note that this need not be a spanning tree of the graph, since the node 5 need not be included. Find the optimal solution, and explain why it is optimal.