Network Models

Chapter 2

Network Models

Basic Network Applications

- ➢ Shortest Path Problem
- ➢ Traveling Salesperson Problem (TSP)
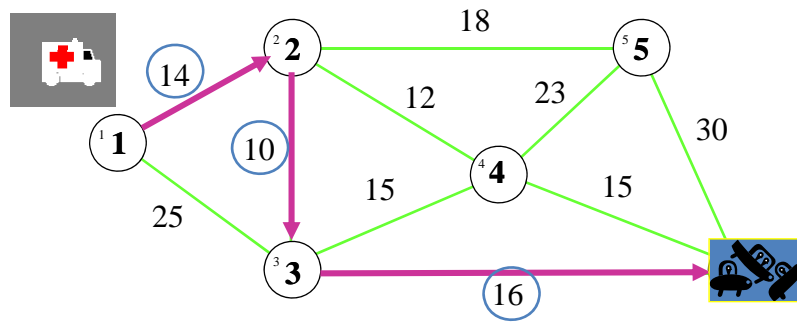- ➢ Minimal Spanning Tree
- ➢ Maximum Flow Problem

Project Management

- ➢ Critical Path Method (CPM)
- ➢ Program Evaluation Review Technique (PERT)

Network Models

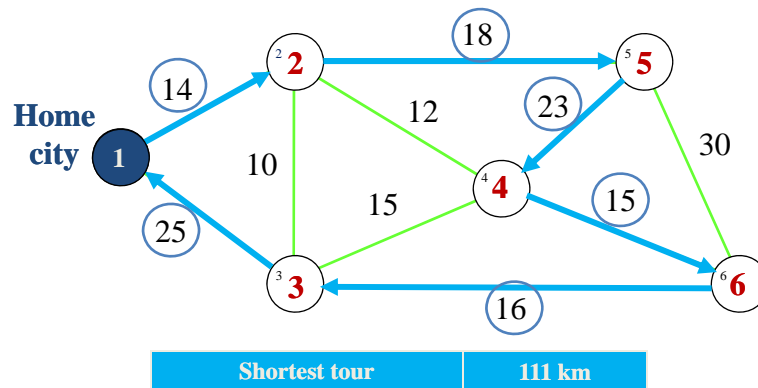### 1. Shortest Path Problem

Shortest path between 2 nodes

Network Models

Shortest Path Problem

Shortest Paths Between All Pairs of Nodes

	1	2	3	4	5	6
1	-	14	24	26	32	40
2	14	-	10	12	18	26
3	24	10	-	15	28	16
4	26	12	15	-	23	15
5	32	18	28	23	-	30
6	40	26	16	15	30	-

Network Models

2. Traveling Salesperson Problem (TSP)

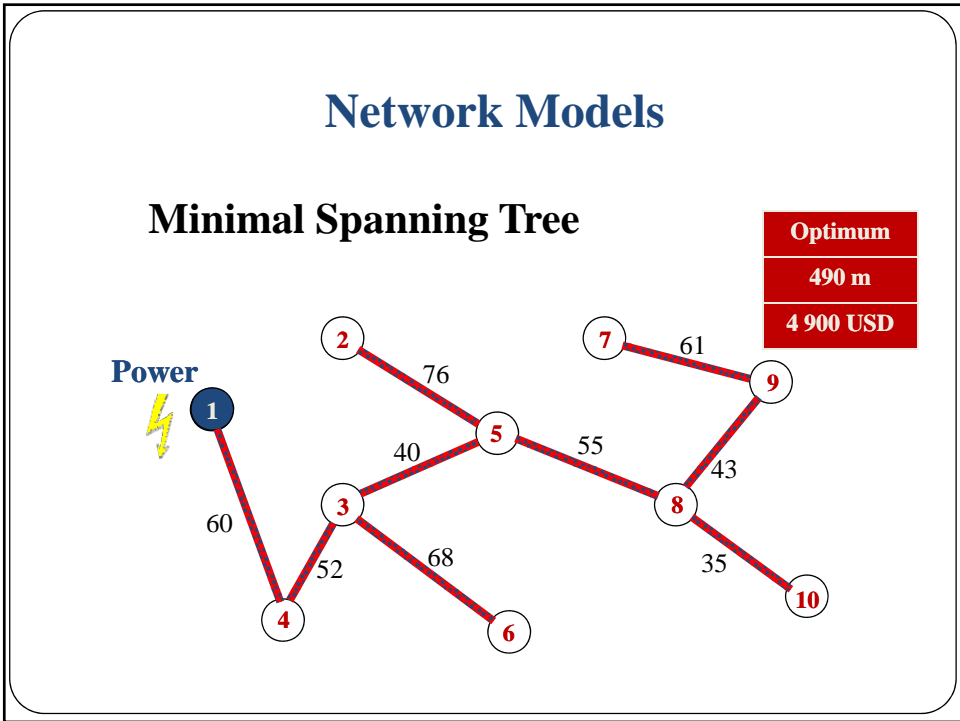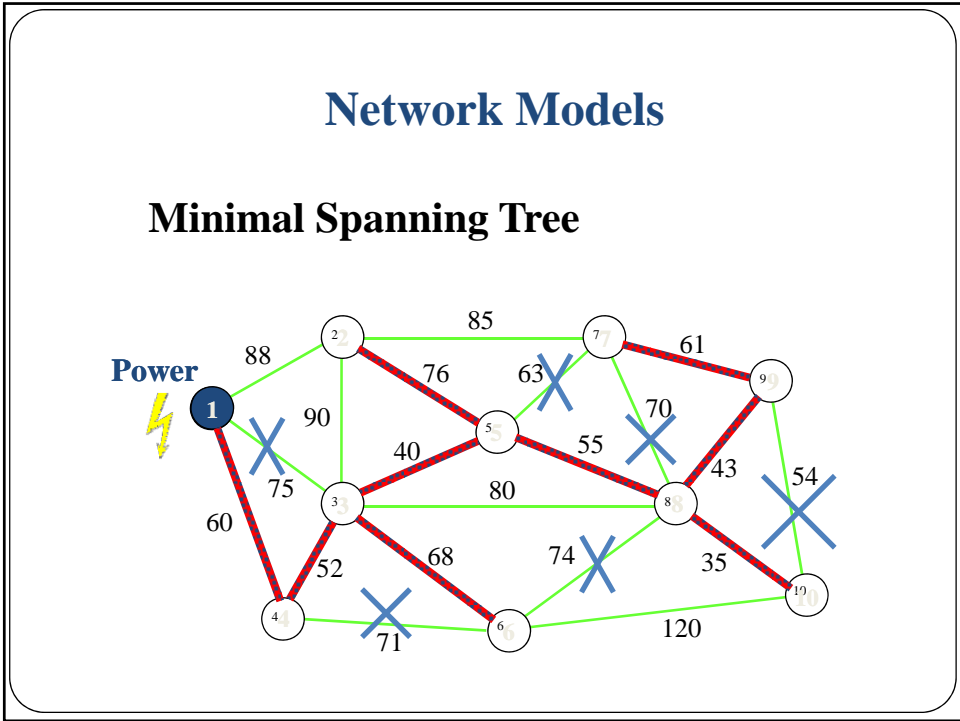| Shortest tour	111 km

---

Network Models

3. Minimal Spanning Tree

Example - Exhibition

➤ **Exhibition area with 9 locations that need electricity power**

➤ **Use cable for extensions**

➤ **Price of cable = 10 USD/ m**

Objective: minimize the cost of all the extensions

Network Models

Minimal Spanning Tree

Network Models

Minimal Spanning Tree

Optimum
490 m
4 900 USD

Network Models

4.   Maximum Flow Problem