Team 3

CS330

Week 14: Lecture

Objectives:
To introduce students to more advanced concepts in trees and graphs and their associated algorithms and applications.

Reading Assignment:
Discrete Mathematics and Its Applications: Chapter 8.4-8.6, Chapter 7.5 – 7.8

Contents:

1. Trees 1.5 hours
2. Graphs 1.5 hours
1. Trees (1.5 hours total)  
a. Trees and Sorting (0.5 hours)  
   i. Complexity  
   ii. Bubble Sort  
   iii. Merge Sort  
b. Spanning Trees (0.5 hours)  
   i. Definitions  
   ii. Algorithms  
      1. Backtracking  
c. Minimum Spanning Trees (0.5 hours)  
   i. Weighted Graphs  
   ii. Prim’s Algorithm  
   iii. Kruskal’s Algorithm  

2. Graphs (1.5 hours total)  
a. Euler and Hamilton Paths (0.5 hours)  
   i. Definitions  
   ii. Conditions for existence  
   iii. Algorithms  
b. Shortest Path Problems (0.5 hours)  
   i. Weighted Graphs  
   ii. Dijkstra’s Algorithm  
   iii. Traveling Salesman Problem  
c. Planar Graphs (0.3 hours)  
   i. Euler’s Formula  
   ii. Kuratowski’s Theorem  
d. Graph Coloring (0.2 hours)  
   i. Applications