Objectives:

1. Introduce Branch and Bound methodology and applications.
2. Introduction to Sorting Algorithms through Computational Complexity.

Reading Assignment:

Neapolitan and Naimipour: Chapter 6-7.1.

Contents:

1. Introduce Branch and Bound method. (1/4 hour)
2. Knapsack Problem using Branch and Bound. (1/2 hour)
3. Traveling Salesperson Problem. (3/4 hour)
4. Abductive Inference. (1/2 hour)
5. Introduce Sorting through Computational Complexity. (1 hour)
CS 430: Week 5

Time

1. Introduce Branch and Bound method. (1/4 hour)
   - Compare Branch and Bound method to Backtracking technique, and explain differences.
   - Define “promising” and “nonpromising.”

2. Knapsack Problem using Branch and Bound. (1/2 hour)
   - Demonstrate the Branch and Bound method using a Knapsack problem.
   - Work through example, and continue with another example if time allows.

3. Traveling Salesperson Problem. (3/4 hour)
   - Describe problem.
   - Describe how problem can be solved with a small number of vertices using an adjacency matrix.
   - Show how problem can be solved using a pruned state space tree.

4. Abductive Inference. (1/2 hour)
   - Review basic discrete probability and Bayes’ Theorem.
   - Describe process of determining the most probable explanation for a set of findings.
   - Refer students to the text if they wish to know more.

5. Introduce Sorting through Computational Complexity. (1 hour)
   - Define Computational Complexity.
   - Describe relationship between Computational Complexity and Sorting Algorithms.
   - Explain the purpose of Sorting Algorithms.
   - Briefly introduce algorithms that will be covered: insertion sort, selection sort, merge sort, quick sort, and heap sort.
Handouts, etc. for Lecture, including Knapsack problems for students to work through on their own.