Objective:

1. To introduce students to the design and analysis of algorithms.

Reading Assignment:

Neapolitan and Naimipour: Chapter 1

Contents:

1. Discuss class syllabus. ($\frac{1}{4}$ hour)
2. Define “Algorithm.” ($\frac{1}{4}$ hour)
3. Show example problems & solutions. ($\frac{3}{4}$ hour)
4. Efficient Algorithms: Sequential vs. Binary Search ($\frac{1}{2}$ hour)
5. Recursive Algorithms ($\frac{1}{4}$ hour)
6. Time Complexity Analysis of Algorithms ($\frac{1}{2}$ hour)
7. Order ($\frac{1}{2}$ hour)
CS 430: Week 1

Time

1. Discuss class syllabus. (1/4 hour)
   - Course expectations
   - Grading Policy

2. Define “Algorithm.” (1/4 hour)
   - Techniques for solving problems using a computer.
   - Multiple approaches for solving the same problem.

3. Show example problems & solutions. (3/4 hour)
   - Sort a list of $n$ numbers in decreasing order.
   - Determine whether the number $x$ is in a list of $n$ numbers.
   - Add array members.
   - Matrix multiplication.

4. Efficient Algorithms: Sequential vs. Binary Search (1/2 hour)
   - Sequential search.
   - Binary search.

5. Recursive Algorithms (1/4 hour)
   - Fibonacci sequence example.

6. Time Complexity Analysis of Algorithms (1/2 hour)
   - Worst-Case Time Complexity Analysis of Algorithm
   - Average-Case Time Complexity Analysis of Algorithm
   - Best-Case Time Complexity Analysis of Algorithm:

7. Order (1/2 hour)
   - Quadratic-Time Algorithms
   - Theta Notation
   - “Big O” Notation
Handouts, etc. for Lecture, including Syllabus.