COMP 2080 - Analysis of Algorithms

Calendar Description: Methods of analyzing the time and space requirements of algorithms. Average case and worst case analysis. Models of computation.
Prerequisites: COMP 2130 and COMP 2140
Recommended: STAT 1000 or STAT 1001 or STAT 2210
This course is a prerequisite for: COMP 3030, COMP 3170, and COMP 4310.

Outline

1) Introduction to analysis of algorithms and review (1 ½ weeks)
    Includes review of logarithms, summations, and binomial theorem. Introduce concept of algorithm run-time analysis.
2) Asymptotic Notation (2 weeks)
    Introduction to Big-Oh, Big-Omega, Big-Theta and their properties.
3) Introduction to greedy algorithms (1 ½ weeks)
    Discussion of greedy algorithms and proof of correctness.
3) Recurrences (3 weeks)
    Introduction to linear recurrences. This includes homogenous, non-homogenous recurrences, characteristic equation, change of variable, and the Master theorem.
4) Divide and conquer algorithms (2 weeks)
    Introduce divide and conquer design technique, proof of correctness, and run-time analysis.
5) Dynamic Programming (2 weeks)
    Introduce the dynamic programming technique, principle of optimality, and runtime analysis.
6) Review (1/2 week)

Recommended Text: R. Neapolitan and K. Naimipour, *Foundations of Algorithms using C++ Pseudocode, third edition,* Prentice Hall, 2004.