COP 3502 Exam #1 Review Section 1
Test Date/Time:
Thursday October 12 3:00 pm – 4:20 pm (80 minutes)

Exam Outline (40 pts first 3 topics, 35 pts last 3 topics)

I. Linked Lists
   a. Struct to Use
   b. Inserting to front, in order, back
   c. Deleting element
   d. Singly Linked
   e. Doubly Linked
   f. Circularly Linked
   g. Idea to store big integer or string
   h. Linked List of linked lists example

II. Stacks
   a. LIFO behavior
   b. Evaluate Postfix Expression Algorithm
   c. Infix to Postfix Algorithm
   d. Linked List Implementation
   e. Array Implementation

III. Queues
   a. FIFO behavior
   b. Use in a search (corn maze)
   c. Linked List Implementation
   d. Array Implementation

IV. Recursion
 a. Basic idea – base case, recursive breakdown
 b. Straightforward – fact, fib, power, tipchart
 c. Towers of Hanoi
 d. Binary Search
 e. Fast Modular Exponentiation
 f. Floodfill
 g. Odometer/Combo/Permutation and Brute Force
 h. Rewriting Linked List Code recursively

V. Tools for Algorithm Analysis
 a. Summations
 b. Recurrence Relations

VI. Algorithm Analysis Problems
 a. Timing Predictions
 b. Mapping Code Segments to Sums to Evaluate Run Time
 c. Mapping Rec. Func. To Rec. Rel. to Evaluate Run Time

How to Study:

1) Look over the notes.
2) Look at past exams for types of questions I typically ask.
3) Look over example code.
4) Look over your code.
5) Look for general patterns.

Don't try to just memorize each algorithm, though you should remember the steps in each algorithm. Instead, try to understand the underlying reason the algorithm works so that you can apply those ideas to problems that may call for slightly different algorithms.

Types of Questions:

Short Answer: Write a single line of code to complete some task.

Function Tracing: Give the output of some program or segment of code.

Code Writing: Write a function or complete a segment of code to solve some problem.

Problem Solving: Solve a non-coding problem based upon what we've learned (ie run time analysis, etc.)

Exam Aids

You may use <u>two sheets</u> of paper 8.5" x 11" (front and back) with notes (typed or written).

<u>**You may NOT use a calculator or any other electronic aids.**</u>