

COP 3502 Exam #1 Review

Test Date/Time: February 16 (Thursday) 4:30-5:45 pm

CB1-121

I. Dynamic Memory Allocation

- a. malloc**
 - i. for 1D arrays**
 - ii. for 1D array of pointers to structs**
 - iii. for multidimensional arrays**
- b. calloc**
- c. realloc**
- d. free**

II. Math Background, Order Analysis

- a. Base Conversion**
- b. Timing Problems when Big-Oh is known.**
- c. Summations of constants and linear terms.**
- d. Infinite Geometric Summation**
- e. Analyzing Code Segments using Summations**
- f. Recurrence Relations**

III. Recursion

- a. Tracing, Writing**
- b. Fibonacci, Factorial, Power, TipChart**
- c. Binary Search**
- d. Towers of Hanoi**
- e. Fast Exponentiation**
- f. Floodfill (ie Minesweeper)**
- g. Combination/Odometer**
- h. Permutation**

IV. Sorting

- a. Bubble Sort**
- b. Insertion Sort**
- c. Selection Sort**
- d. Merge Sort**
- e. Quick Sort**
- f. Quick Select**
- g. Run Time Analysis of All**

How to Study:

- 1) Look over the notes.**
- 2) Look over example code.**
- 3) Look over your code.**
- 4) 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 one sheet of paper (front and back) with notes (typed or written). You may NOT use a calculator or any other electronic aids.

Approximate Point Break Down

| | |
|----------------------------|--------|
| Dynamic Memory Allocation: | 20 pts |
| Math Background: | 30 pts |
| Recursion: | 30 pts |
| Sorting: | 20 pts |