

Final Exam Review

CS 2308
Fall 2011

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Final Exam

- Thursday, December 8, Derr 235 (here)
- Closed book, closed notes, clean desk
- Comprehensive (covers entire course)
- 30% of your final grade
- 11am to 1:30pm
- I recommend using a pencil (and eraser)
- I will bring scratch paper.
- No calculators.

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Exam Format

- See exam header for total points (100 or 200):
 - * Plenty of writing programs/functions/classes/code
 - * Tracing code
 - * Finding errors in code
 - * Multiple choice
 - * Short answer (some very short, some longer)

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Example Problems

See the lecture notes titled:

Final Exam Review Exercises

on the website

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Chapters 1-7 Review

- Know how to program with arrays and functions
- Passing parameters by reference
- Passing arrays to functions
- Be able to process arrays
 - Be able to find the minimum/maximum value!
 - See review exercises

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Searching and Sorting Arrays

- Searching
 - Linear Search
 - Binary Search
- Sorting
 - Bubble Sort
 - Selection Sort
- See review exercises:
 - Describe algorithms in English
 - Sample exercises to demonstrate algorithms

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Analysis of Algorithms: efficiency

- Efficiency
 - Growth rate functions, which are faster/slower
 - Use big-O notation
 - Efficiency of
 - ▶ searching/sorting
 - ▶ array access and traversal
 - ▶ linked list operations
 - See the Final Exam Review Exercises for good coverage on this

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Structures

- Structures:
 - Definition (new data type) and variables
 - How to access members (dot operator)
 - Arrays of structures
 - Pointers to structures (-> operator) and dynamic memory allocation
 - Use of structures in linked lists (Nodes)

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Linux

- Basic shell commands
- edit, compile, run (nano, g++, a.out)
- Compiling multiple files:
 - g++ a.cpp b.cpp
 - separate compilation
 - g++ -c a.cpp
 - g++ -c b.cpp
 - g++ a.o b.o
 - makefile: understand the ones for the assignments, how to use them

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Strings

- C-strings:
 - a sequence of characters stored in consecutive memory locations (char array)
 - terminated by a null character ('\0')
 - library functions: strlen, strcpy, strcmp
- string data type provided by C++
 - a class with member functions
 - = and the relational operators are overloaded for it
- Be able to write a function that processes string data.

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Pointers

- Pointer variables: how to define + initialize
- Address of (&) and Dereferencing (*) operators
- Pointers and arrays
 - * an array variable IS a pointer to its first element
 - * $\text{array}[\text{index}] = *(\text{array} + \text{index})$
- Dynamic memory allocation
 - * new + delete
 - * allocate new arrays (Assignment 3)
- Using pointers with linked lists

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Classes and Objects: concepts

- Procedural programming vs object oriented programming
- Separating specifications from implementation (interface concept)

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Classes and Objects

- Fundamentals of classes and objects:
 - Members: variables and functions
 - private vs public, access rules
 - constructors and destructors
 - copy constructor (default)
 - instance variables vs static variables
 - declaration and implementation of classes
 - ▶ defining member functions
 - ▶ overloaded operators
 - defining instances of a class (objects)
 - pointers to objects

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Linked Lists

- How to define a linked list (node declaration and head pointer definition).
- Adding a node (insert at front or append)
- Describe how to insert or delete node from the middle of a list
- How to traverse a linked list to
 - display it
 - calculate some value
 - find minimum/maximum
 - etc.

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Stacks and Queues

- Know what LIFO and FIFO mean
- Know the 4 basic operations of each data type:

pop	enqueue
push	dequeue
isEmpty	isEmpty
isFull	isFull

- Understand how to use a stack to perform algorithms done in class
- Be able to show contents of stack or queue after a series of operations (see Final Exam Review Exercises)

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How to Study

- Start with the topics from this set of slides (Final Exam Review).
- Use the regular semester lectures to make sure you understand the topics.
- Use the textbook to make sure you understand the lectures about the topics.
- Do the review exercises on the Final Exam Review Exercises slides.
- Go over the midterm exams and assignment solutions.
- Discuss with others!

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