Final Exam Review

CS 2308
Fall 2012
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Final Exam

• Section 001(MW): Fri, Dec 14, 2:00PM to 4:30PM
• Section 003(TH): Tues, Dec 11, 11:00AM to 1:30PM

• Closed book, closed notes, clean desk
• Comprehensive (covers entire course)
• 30% of your final grade
• I recommend using a pencil (and eraser)
• I will bring scratch paper.
• No calculators.

Exam Format

• See exam header for total points (150 or 200):
  • Plenty of writing programs/functions/classes/code
  • Tracing code
  • Finding errors in code
  • Multiple choice
  • Short answer (some very short, some longer)

Example Problems

See the lecture notes titled:
Final Exam Review Exercises
on the website
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

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

Analysis of Algorithms: efficiency

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

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)
**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

**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.

**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
    - array[index] = *(array + index)
- Dynamic memory allocation
  - new + delete
  - allocate new arrays (Assignment 3)
- Using pointers with linked lists

**Classes and Objects: concepts**

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

**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.

**Stacks and Queues**

- Know what LIFO and FIFO mean
- Know the 4 basic operations of each data type:
  - pop  
  - push  
  - isEmpty  
  - isFull  
  - enqueue  
  - dequeue  
  - isEmpty  
  - 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)

**Office Hours**

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<tr>
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<tr>
<td>F</td>
<td>12/14</td>
<td>None (exams)</td>
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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!