

Exam 1 Review

CS 2308
Spring 2013

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Exam 1

- Mon, Feb. 25 and Tues, Feb. 26
- In class, closed book, closed notes, clean desk
- 20% of your final grade
- 80 minutes to complete it
- I recommend using a pencil (and eraser)
- All writing will be done on the test paper I will hand out.
- No calculators.

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Exam Format

- 100 points total
 - Writing programs/functions/code
 - Multiple choice
 - Fill-in-the-blank/short answer
 - Tracing code (what is the output)
 - Tracing search/sort algorithms

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C++ Programming on Linux

- What is Linux
- Linux file system
- Basic shell commands

pwd	more/less/cat
ls	cp
cd	mv
mkdir	rm
rmdir	

- Basic file editing (nano, etc.)
- edit, compile, run

nano
g++
./a.out

- know how to use the commands

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Chapters 1-7 Review

- Know how to program with arrays and functions
- Passing parameters by reference
- Passing arrays to functions
- Overloaded functions
- Default arguments
- Understand Programming Assignment 1

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Ch.8: Searching and Sorting Arrays

- Searching
 - Linear Search
 - Binary Search
- Sorting
 - Bubble Sort
 - Selection Sort
- Efficiency
 - Growth rate functions, which are faster/slower
 - Efficiency of each searching/sorting algorithm

You will not need to know the code
--but I may ask you to implement linear search
See exercises at end for the others

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Ch 9: Pointers

- Address operator (&)
- Pointer variables: how to define (data type)
- Dereferencing operator (*)
- Pointers and arrays
 - * an array variable is the address of its first element
 - * $\text{array}[\text{index}] = *(\text{array} + \text{index})$
- Pointer arithmetic (if ptr points to a var of type d):
 - * $\text{ptr} + n = \text{address in ptr} + n * \text{sizeof}(d)$
- Initializing Pointers

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Ch 9: Pointers, cont.

- Comparing pointers
- Pointers as function parameters
 - * Pass by reference using pointers as parameters
 - * Pointers used as parameters accepting arrays as arguments
- Dynamic memory allocation
 - * new operator
 - * new with arrays
 - * delete
 - * return pointers from functions

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Ch.10: Strings and Things

- Character testing + conversion
 - isalpha, isdigit, isupper, islower, isspace
 - toupper tolower
- C-strings
 - definition (char array), '\0' -terminated
- C-strings: library functions
 - strlen
 - strcpy (assignment)
 - strcmp (test, comparison)

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Ch.10: Strings and Things (cont.)

- Predefined string class
 - how to define and initialize string variables
- operations:
 - =, <<, >>, +, relational ops, [n]
- member functions
 - length()
 - size()
 - append(str) and append(n,char)
- know how to use these to write code

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Ch 11: Structured Data

- Structures:
 - Definition (new data type)
 - Variable definitions
 - How to access members (fields)
 - Operations (which are valid)
 - Arrays of structures
 - Nested structures
 - Structures as function args

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Example Programming Problem

Write a function that accepts an array of integers and the size of the array and prints out a table listing how many values in the array fall in each of the following ranges:

less than 50
50 to 59
60 to 69
70 to 84
85 to 99
over 100

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Example Tracing Problem

What will the EXACT output of the following program be?

```
int main () {
    int *ptr1, *ptr2;
    int fool, foo2 = 13;

    fool = 42;
    ptr1 = &fool;
    ptr2 = ptr1;

    cout << "*ptr1 - " << *ptr1 << endl;
    cout << "fool - " << fool << endl;
    cout << "*ptr2 - " << *ptr2 << endl;

    *ptr1 = 100;
    *ptr2 = 200;

    cout << endl;
    cout << "*ptr2 - " << *ptr2 << endl;
    cout << "what? " << fool%10 << endl;

    return EXIT_SUCCESS;
}
```

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Binary Search Example

The target of your search is 42. Given the following list of integers, record the values of first, last, and middle during a binary search. Assume the following numbers are in an array.

1 7 8 14 20 42 55 67 78 101 112 122 170 179 190

Repeat the exercise with a target of 82

first	0	0	4
last	14	6	6
middle	7	3	5

first	0	8	8	8	9
last	14	14	10	8	8
middle	7	11	9	8	

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Sorting Example

Use the following array for both questions:

11	8	14	7	12	18	2	17
0	1	2	3	4	5	6	7

Show the contents of the array after 2 passes of the selection sort

Show the contents of the array after 2 passes of the bubble sort

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How to Study

- Review the slides
 - * understand all the concepts
- Use the book to help understand the slides
 - * there will be no questions over material (or code) that is in the book but not on the slides
- Review assignments + solutions
- Try some exercises from the book
- Practice, practice, practice
- Get some sleep

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