Exam 2 Review

CS 1428
Fall 2014
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Exam 2

- Wednesday, November 12
- In class, closed book, closed notes, clean desk
- 15% 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 or cell phones.

Exam Format

- 100 Points total
  - 30-35 points: writing programs/functions
  - Multiple choice
  - Short answers
  - Short code segments

- Tasks:
  - Tracing code (what is the output)
  - Finding errors in code
  - Label parts of a program/functions
  - Programming (writing code)

Content from Textbook

- Chapter 4: 4.10-15 (except 4.13)
- Chapter 5: 5.2-12
- Chapter 6: 6.1-5, 7-10, and 13
- Chapter 7: 7.1-6 (except 7.5)

Weeks 5 through 10, primarily loops, arrays, and functions
Switch Statements
and programming with conditions

- Input validation
- Comparing characters and strings
- The switch statement
  - the break statement
  - switch case fall-through
- Menus
- Scope of variables in blocks

Loops

- while loop
  - general purpose
- do-while
  - body always done once
  - good for menus, repeating a process
- for loop
  - init; test; update
  - all are optional
- Which loops are good for which situations

Loops

- Using a while loop for input validation
- Counters/count controlled loop
- Keeping a running total
- Sentinel controlled loop
- Nested loops
- Reading data from a file of unknown length
  - while (fin >> number)
- Break and continue
- Infinite loops

Arrays

- Array declaration/definition:
  - int list[10];
  - size declarator limitation (in the C++ standard)
- Array elements
  - list[i]
  - range of subscripts
  - types
- Array initialization:
  - int list[] = {6,7,8};
Arrays

- Processing arrays
  - input and output
  - sum, average
  - finding max, min (and index of which one)
  - counting values that pass a test
  - array assignment (copy)
  - array compare (for equality)
- Partially filled arrays
- Lack of bounds checking

Functions

- Function definition
  - name, return type, parameter list, body
- Function call
  - name, argument list
- Function prototype, when it is required
- Function parameters and arguments
  - Understand how they work

Sample problem: what is output?

Show the EXACT output of the following program:

```cpp
int list[] = {8, 10, 3, 55, 1, 2, 3, 7};
int x=10;
int i = 3;
while (i < 8) {
  x++;
  int t = list[i];
  if (t < 10) {
    x = list[i+1];
  } else if (t < 20) {
    x++;
  } else {
    x--;
  }
  i = i+3;
  cout << "x = " << x << endl;
}
```
**Sample problem: Programming**

The formula for converting a temperature from Fahrenheit to Celsius is

\[
C = \frac{5}{9}(F - 32)
\]

where \( F \) is the Fahrenheit temperature and \( C \) is the Celsius temperature. Write a function named `celsius` that accepts a Fahrenheit temperature as an argument. The function should return the temperature, converted to Celsius. Demonstrate the function by calling it in a loop that displays a table of the Fahrenheit temperatures 0 through 20 and their Celsius equivalents.

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**How to study**

- Review the slides (these, and weeks 5 - 10)
  - understand all the concepts, **quiz yourself**
- Use the book to help understand the slides
  - there will be no questions over material that is in the book but not on the slides
- Review programming assignments (fix yours!)
  - get printouts of solutions 4, 5 and 6 up front or in my office
- Try some exercises from the book
- Practice, practice, practice! Write code!
- Get some sleep