Exam 2 Review

CS 1428
Fall 2015

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Exam 2

- Wednesday, November 11
- In class, closed book, closed notes, clean desk
- 15% of your final grade
- 80 minutes to complete it
- Bring your ID card!!!!
- Bring a number 2 pencil! (and eraser)
- NO: calculators or cell phones.
- NO: headphones/earbuds.

Exam Format

- 100 Points total
  ‣ 56 points: multiple choice and T/F (scantron form)
  ‣ 44 points: writing code on the test paper
    ➡ programs, functions and individual statements
- Tasks:
  ‣ Tracing code (what is the output)
  ‣ Finding errors in code
  ‣ Demonstrate general knowledge about C++ and programming
  ‣ Programming (writing code)

Content from Textbook

Week 5 through Week 10:
- 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)

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

9

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

10

Functions

- The return statement
  - returning a value from a function
  - calling a function that returns a value
- Pass by value
- Pass by reference
- Scope
  - local and global variables
  - parameters
  - scope and lifetime
  - global constants

11

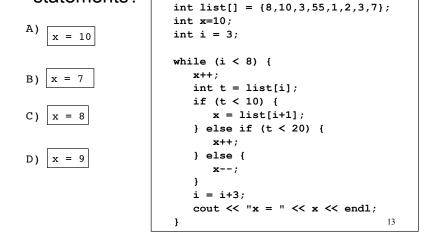# Software Development Process

- Top Down Design
  - Break tasks into subtasks
  - Make a hierarchy of tasks
- Incremental Development
  - Implement one piece at a time
- Testing
  - Test cases: input values and expected output
- Debugging
  - Strategy: output values of variables
  - Strategy: output literals to trace execution path

12

Sample problem: multiple choice

• What is the **last** line of output of the following statements?

A) `x = 10`

B) `x = 7`

C) `x = 8`

D) `x = 9`

```
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;
}                                    13
```

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 in the main function that displays a table of the Fahrenheit temperatures 0 through 20 and their Celsius equivalents.

14

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

15