Exam 1 Review

CS 1428
Spring 2018

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Exam 1

- Tuesday, Feb 27
- 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
  - 50 points: 25 multiple choice and T/F (scantron form)
  - 50 points: writing code on the test paper

    ➡ program and/or individual statements
- Tasks:
  - Tracing code (what is the output)
  - Finding errors in code
  - Evaluating C++ expressions
  - Demonstrate general knowledge about C++ and programming
  - Programming (writing code, like in the PAs)

Content from Textbook

Units 1, 2, and 3:

- Chapter 1: 1.1-3
- Chapter 2: 2.1-17 (except 2.11)
- Chapter 3: 3.1-10
- Chapter 4: 4.1-15 (except 4.7, 4.13)
- Chapter 5: 5.1 and 5.11 (first half)

See reading list online for specific topics of each section

Intro to Computers and Programming

- Definitions: Computer, Program, Programmer
- Hardware vs Software
- Hardware components: (cpu, main memory, secondary storage, input and output devices)
- Program vs. Algorithm
- Programming languages: machine lang vs low level lang vs high level lang
- Compilation: source code file -> executable
- Execution

Introduction to C++

- Literals: numbers, characters, strings
  - Special characters
- Identifiers, rules for valid names
- Variable Declarations and Initialization
- Assignment Statements
- Data Types
  - int, short, long, float, double, bool, char, string
  - values/ranges (rough idea)
  - suitability of each for various types of data
- Scope rules, comments, named constants

Expressions and Types

- Numerical Expressions
  - Operators: +, -, *, /, % (modulus)
  - Precedence rules, parens ( )
- Type Conversions:
  - binary operations
  - assignment
  - explicit type casting
- Integer division vs float division
- Pow(a,b) and other Math library functions

Assignment operators

- Multiple assignment
  - `a = b = c = 4;`
- Combined Assignment operators
  - `+=  -=  *=  /=`
- Increment and Decrement
  - `x++  y--`
- Hand Tracing a program

Input and output

- cout, stream insertion operator (<<), endl
- cin, stream extraction operator (>>)
- formatting: setw, setprecision+fixed, left/right
- inputting characters and strings
  - cin >> var versus getline(cin,var)
  - using cin >> ws to solve problem of >> followed by getline
- using file stream objects for file I/O:
  - using ifstream, ofstream variables
  - open and close, << and >>

Ifs and boolean expressions

- Relational and Logical Expressions
  - Rel. Operators: < <= > >= == !=
  - Logical Operators: ! && ||
  - Precedence rules, parens
- if statements:
  - if
  - if-else
  - nested if statements
  - if-else if (reformatting of nested if statements)
  - block or compound statement

Switch Statements
and programming with conditions

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

Software Development

Know what happens during each of these phases:

- Analysis and specification
- Design
- Implementation
- Testing and debugging
- Maintenance

Sample problem: what is output?

- What is the output of the following statements?

```
int fox = 6;
float dog = 5.7;
dog = fox + dog;
if (fox > dog)
   cout << "Hello!";
else if (fox < dog)
   cout << dog;
else
   cout << fox;
cout << endl;
cout << fixed << setprecision(1);
cout << "dog is: " << dog << endl;
```

A)
```
Hello!
dog is: 5.7
```

B)
```
Hello!
dog is: 11.7
```

C)
```
11.7
dog is: 11.7
```

D)
```
6
dog is: 5.7
```


Sample problem: Programming

- Write a C++ program that computes the tax and tip on a restaurant bill. The program should input the cost of the meal from the user. The tax should be 6.75 percent of the meal cost. The tip should be 20 percent of the total after adding the tax. Display the tax and tip amount to the screen, formatted to two decimal places.
- Sample run:

```
Enter the cost: 100
tax = 6.75
tip = 21.35
```


How to study

- Review the slides (Units 1 - 3, Software Dev)
  - 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 2 and 3 up front or in my office
- Review the Squarecap questions
- Try some exercises from the book
- Practice, practice, practice! Write code! Sleep!