Data Structures and Programming

CMPT 225
Greg Mori – Spring 2013

Outline

- Today:
  - Administrivia
  - Introduction to 225, Stacks
- Course website:
  - http://www.cs.sfu.ca/~mori/courses/cmpt225/
  - All slides available before lecture on website
  - Acknowledgement

CMPT 225 Topics

- Data Structures
- Algorithms
- Programming

CMPT 225 Topics

- Data Structures and Abstract Data Types
  - Stacks
  - Queues
  - Priority Queues
  - Trees
  - Graphs
  - Hash Tables
- Algorithms
- Programming

CMPT 225 Topics

- Data Structures
- Algorithms
  - Tools – Recursion
  - Efficiency – O Notation
  - Algorithms to support data structures
  - Sorting
- Programming

CMPT 225 Topics

- Data Structures
- Algorithms
- Programming
  - C++ coding skills
  - Memory management, pointers

Course Objectives

- Develop problem solving techniques
  - To take a problem statement
  - And develop a computer program to solve the problem
- A solution consists of two components
  - Algorithms
  - Data storage

Course Focus

- Problem solving
  - Use abstraction to design solutions
  - Design modular programs
  - Use recursion as a problem-solving strategy
- Provide tools for the management of data
  - Identify abstract data types (ADTs)
  - Examine applications that use the ADTs
  - Construct implementations of the ADTs

People

- Instructor: Greg Mori
  - Office hours:
    - Tues 14:30-15:30, Wed 15:30-16:30 in TASC1 8007
- TAs: Hossein, Jinling, Yasaman
  - Office hours:
    - Thurs 11:00-13:00, Fri 11:00-12:00 in CSIL

Prerequisites

- CMPT 125/126/128 and MACM 101
  - Familiarity with algorithms
    - E.g. searching, sorting
    - Some running time analysis, recursion
  - Knowledge/use of fundamental data types
    - E.g. numbers, characters, booleans
  - Basic programming skills
    - E.g. Loops, ifs, I/O
  - Java or C++

Prerequisite Quiz

- What does this do?

```
int nums[] = {4,20,19,3,-1,42,22,18};
for (int i=0; i<8; i++) {
  for (int j=i+1; j<8; j++) {
    if (nums[i] < nums[j]) {
      int t = nums[j];
      nums[j] = nums[i];
      nums[i] = t;
    }
  }
}
```

Schedule

- See syllabus for list of topics

Assessment

- Assignments – 12%
- Labs – 8%
- Written midterm exam in class – 15%
- Programming exams in CSIL – 20%
- Final exam – 45%

- Grades will be recorded in CourSys

Assignments

- Individual programming assignments
  - Dates on syllabus
- Note late policy
  - 4 "grace days" for the trimester
- Academic Honesty (cheating)
  - We're very serious about it
    - 17 cheating cases last time I taught this course
  - See syllabus

Labs

- Tuesdays in CSIL ASB 9840
  - NONE TOMORROW
  - Instruction from TAs and fellow students
  - Released in advance (Lab 0 available now)
  - 1% each
    - ½ credit if late, but DON'T fall behind

Software

- All programming assignments in C++
- Labs will use
  - Linux, command-line interface
  - Programming midterm will be in lab

- If you've never used Linux, go to the lab this week (starting today is a good idea)
  - Do Lab 0
  - Do a Linux command-line interface tutorial

Exams

- Midterm exam in class March 11
- Programming exams in CSIL in final 2 lab slots
- Final exam Saturday April 20 8:30-11:30 location TBA
  - Comprehensive, covers whole course

- All exams are closed-book
- See syllabus regarding medical factors

Textbook

- No "required" books
  - I.e. no homework questions, etc. from books
- Reading alternative descriptions before/after lecture highly recommended
- C++ language help
  - Reference books, online resources listed

And on to the course…