Data Structures, Algorithms, and Generic Programming

Breno de Medeiros

COP 4530 / CGS 5425 (Fall 2006)

Instructor

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Teaching Assistant

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Office hours location: Majors lab
Office hours:
  - 2:00pm to 4:00pm (Thu.)
  - 9:30am to 11:30am (Fri.)

Why learn this material?

Well... it’s required!
- Why is it required (in pretty much every respectable CS program in the country)?
- Programming usable, complex software requires both analytical and practical
  - Efficient in both speed and resource usage
  - Maintainable
  - Reusable

Course Coverage

Data structures
- Program performance is affected by how fast data can be found when needed.
- Good data structures are like efficient filing. You can find what you’re looking for, fast

Algorithms
- All roads may lead to your destination, but some will get you there faster

Generic programming
- A programming paradigm to reuse code and data structures
  - Hides internal details of data representation, while incurring little performance hit

Learning Objectives

Data structures
- Vector, list, stack, queue, table, map…

Algorithms
- Design and analyze running time of programming various data structures

Generic programming
- Class and function templates
Prerequisites
- COP 3330: Object-Oriented Programming
- MAD 2104: Discrete Mathematics
- Pre or Corequisite: CDA 3101: Computer Organization

This course requires that you should be proficient with C++ and object oriented programming concepts
You also need to have a user-level knowledge of Unix, and be comfortable working in a Unix environment

What you should already know
- Pointers and pointer arithmetic
- Classes/objects
- Constructors/destructors
- Dynamic memory allocation/de-allocation
- Operator/function overloading
- Parameter passing by reference/value
- The C++ I/O system

Course Material
- Required Textbook:
- Recommended Reference Textbook:
- Lecture slides posted at the class website

Grading
- Programming Assignments – 45%
  - 1 and 2 - 15% (7.5% each = 75 points)
  - 3, 4, and 5 - 30% (10% each = 100 points)
- Exams – 45%
  - Midterm Exam 1 - 10% (100 points)
    - February 14 Tuesday 5:15PM to 6:30PM
  - Midterm Exam 2 - 10% (100 points)
    - March 16 Thursday 5:15PM to 6:30PM
  - Final Exam - 25% (250 points)
    - April 27 Thursday 5:30PM to 7:30PM
- Recitation Quizzes – 10% (100 points)

Grade scale
- A: 91-100
- A-: 89, 90
- B: 79 - 88
- C: 70 - 78
- D: 59 - 69
- F: 0 - 58

For a grade of C or better you must have both:
- At least 300 points from all programming assignments
- At least 300 points from exams

Accounts
- Computer Science account (<yourid>@cs.fsu.edu)
  - For doing assignments
    - http://system.cs.fsu.edu/newusers/newaccount.php
- ACNS account (<yourid>@fsu.edu)
  - For receiving class announcements
  - For submitting assignments
  - For getting your grades
    - https://cars.acns.fsu.edu/
- Access to blackboard
  - For class materials, discussion board, grades etc.
    - Through your ACNS account
      - http://campus.fsu.edu
## Assignments
- All assignments are individual:
  - **Plagiarism is not tolerated!** FSU Honor Code strictly enforced (see details in syllabus).
  - Automated detection tools will be employed!
- Typically two weeks per-assignment:
  - Start early
  - Ask questions early
- Submit on time:
  - Lateness policy (after 11:59PM on Fridays):
    - 10% penalty < 24 hours delay
    - 20% penalty < 48 hours delay
    - No points awarded > 48 hours delay, except in special cases with documented reasons

## Academic Integrity
- In this course, all your source code should be original, except for anything we supply to you as codebase:
  - Don't copy from anywhere (yes, that includes the Internet)
  - Don't solve assignments for others
  - Don't ask/give solutions
  - Protect your code
- **Moss:** An automated tool for comparing code will be used.
- Please read the policies on course web page
- Dishonesty → Not fair to others.
  - You may get a grade of F.
  - It's better to submit an imperfect assignment than to submit a copied one.

## Course Policies
- Attendance is **mandatory**:
  - Problems likely to appear on the midterm problems will be discussed in each lecture
  - Recitation quizzes will comprise 10% of grade
  - Will affect borderline grades (up or down)
  - Good attendance = missing 3 or fewer lectures
  - Let the Instructor/TA know in advance when possible
- Missed exams:
  - No makeup exams will be given
    - except as provided for by University policies, with appropriate documentation

## To ask or not to ask?
- **Me and TA are not psychics 😊**
- Please let us know if…
  - You are lost and it is not a case for
  - You don’t understand something
  - You don’t have the background
  - You have a suggestion to improve the effectiveness of lectures
- Feel free to give anonymous feedback online
  - Though direct feedback is always welcome!

## Getting help
- Make Google your friend!
  - Can’t beat the response time!
- Make Wikipedia your source
- Email me/TA
  - We’ll typically respond within a day
- Drop by during office hours
  - Please ask for help early
  - Don’t wait till the last minute

## This week’s Reading Assignment
- Sections 1.1, 1.2, 1.3, 1.4, 1.5