CS 206 - Data Structures
Spring 2019

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An introduction to the fundamental data structures of computer science: lists, stacks, queues, trees, BSTs, graphs, sets and their accompanying algorithms. Principles of algorithmic analysis and object reasoning and design will be introduced using mathematical techniques for the notions of both complexity and correctness. More practical issues, such as memory management and hashing, will also be covered.

Textbook

Required: Data Structures and Algorithms by Goodrich, Tamassia and Goldwasser

Class Time and Office Hours

- Class meets TTH 12:55pm - 2:15pm in Park 336
- Lab meets TH 2:25pm - 3:45pm in Park 231
- Office hours will be TBA in Park 203, and by appointment.
- TAs:
  - Nadine Adnane
  - Victoria Braun
  - Sonya Fucci
  - My Nguyen
  - Tessa Pham
  - Sunny Qi
- Check the class website often for updates. Deadlines will also be listed there.

Prerequisites

One of the following courses (or their equivalents at Haverford or Swarthmore) is required with a grade of 2.0 or better (or permission of the instructor).

1. CS 110

2. CS 113

3. CS 115

Schedule of Topics

This schedule is *tentative*. Programming assignments are due **electronically**. Students should expect ***at least*** **10 hours of work each week.**

Week 1. Introduction, Java Review

- Reading: Chapters 1
- Lab: Linux, Emacs and basics

Week 2. Object-oriented programming (OO design and inheritance)

- Reading: Chapters 2

Week 3. Linked Lists
- Reading: Chapters 3

Week 4. Algorithm Analysis
- Reading: Chapter 4

Week 5. Stacks and Queues
- Reading: Chapters 6

Week 6. List and Iterator, Bineary Search
- Reading: Chapter 7 and 5

Week 7. Midterm
- Review
- Midterm in class

Week 8. Spring break

Week 9. Binary Trees and Bineary Search Trees
- Reading: Chapter 8

Week 10. Priority Queues and Binary Heaps
- Reading: Chapter 9

Week 11. Maps and Hash Tables
- Reading: Chapter 10

Week 12. Sorting and Selection
- Reading: Chapter 12

Week 13. Sorted maps, Skiplists, Sets and Union-Find. Balanced Seach trees, AVL trees.
- Reading: Chapter 10 and 11

Week 14. Balanced search trees: splay trees, (2, 4) trees, red-black trees
- Reading: Chapter 11

Week 15. Graphs and review
- Reading Chapter 14

Week 16. Final exam week - the final exam will be self-scheduled through the registrar's office.

Total grade breakdown

Grades will be awarded based on the number of points earned and according to the percentage breakdowns shown. Students will not be graded on a curve.

Assignments	40%
Final project	10%
Midterm	20%
Final exam	30%

Late work policy

All extensions must be requested **at least 24 hours in advance** of the deadline. Extensions will be granted based on individual circumstances. Work handed in late without a previously granted extension may not be accepted.

Rules and Pet Peeves

- **Be on time.** This includes class, lab, office hours, and appointments.
- **Attend all classes and labs.**
- **Expect 24 hours before an email response** or longer on a weekend. I often respond MUCH faster than this, but you should NOT expect it. This means that waiting until the last minute to start your work is a very bad idea.

Attendance and Participation

Attendance at, and active participation in, all class sessions is expected of all students. Participation will be taken into account in awarding of final grades for students who are "on the edge" between two grades. For example, a student with a B+/A- average and a strong attendance and participation record would receive an A-, while a student with a weak record would receive a B+.

Collaboration

It is your responsibility to understand and follow the collaboration policy in this class. The goal of the policy is to encourage collaboration while ensuring that you and your classmates really engage in earning how to solve the challenging problems you'll see in this course. If you are ever uncertain if collaboration or certain sources are allowed, you should ask the professor.

You are encouraged to discuss the lecture material and the labs and assignments with other students, subject to the following restriction: the only "product" of your discussion should be your memory/understanding of it - you may not write up solutions together, or exchange written work or computer files. The group project is the only exception to this - in this case, these collaboration rules apply to students outside of your group and you may freely work closely with students within your group. Collaboration is not allowed on examinations or quizzes.

You should not use outside sources (the internet, other textbooks, students not in this class, etc.). Code should not be copied without permission from the author. If permission is given, code should be cited at the location it is used with a comment. If your solution is inspired by any outside resources (I understand that sometimes it is hard to not see things), you MUST cite.

Learning Accommodations

Students requesting accommodations in this course because of the impact of disability are encouraged to meet with me privately early in the semester with a verification letter. Students not yet approved to receive accomodations should also contact Deb Alder, Coordinator of Accessibility Services, at 610-526-7351 in Guild Hall, as soon as possible, to verify their eligibility for reasonable accommodations. Early contact will help avoid unneccessary inconvenience and delays.