CSCI 235: Software Design & Analysis II
Hunter College – Fall 2021
Syllabus

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Office Hours: Mondays and Thursdays, 11am-12pm or by appointment.

Course Objectives

This course is the second in a three-course series, and it is a major stepping-stone in your software development journey. The primary focus of this course is the design and analysis of algorithms and abstract data types. To this end, it introduces elementary data structures with related algorithms and their use in problem solving such as lists, stacks, queues, binary trees, recursion, analysis of simple algorithms, and some searching and sorting algorithms. The course also covers core computer science concepts such as abstraction, algorithm complexity, performance analysis and the tradeoffs between running time, storage size, clarity and extensibility that are at the core of software design. As a sequel to CSCI 135 it will also enhance your programming skills in C++ and Object-Oriented Programming by introducing Templates, Inheritance, Polymorphism, extend your understanding of pointers and dynamic memory allocation.

Course Outline

1. Introduction
2. Abstraction / OOP
3. Inheritance / Abstract Data Types / Templates
4. Array-Based Implementation
5. Link-based Implementation
6. Lists and Sorted Lists
7. Exceptions
8. Polymorphism
9. Recursion
10. Algorithm Efficiency
11. Searching and Sorting Algorithms and their Efficiency
12. Smart Pointers
13. Stack
14. Queue
15. Trees

Prerequisites

CSCI 135 and CSCI 150.

Blackboard

Course Webpage: Blackboard

Please check this page regularly for announcements, updates, lecture notes and schedule.

Please check the course page on Blackboard regularly. We will use the forum here to answer questions to FAQ about course material. This should be your first go-to place when you have a question about course content or project assignments. Please keep all conversation on this forum about course content ONLY. I will also post here course documents and code for projects. You must also regularly check your Hunter email. This is where you will receive important course-related communication.

Programming Projects

There will be five programming projects. Every program must comply with the Programming Guidelines provided in a separate document, which contains guidelines about submission, lateness, plagiarism, grading and logging into your Linux accounts.

Course Grading:

	Per Item %	Total %
Attendance		5%
Participation - In-class Polls	Multiple choice and True/False Questions	Extra Credit - TBD
In-class Quizzes	Multiple choice Questions	20%
Programming Projects	5 projects @ 7% each	35%
Exams	Midterm Exam 15%	40%
	Final Exam 25%	

How to pass this course

ATTEND CLASS: Some of my exam questions will be based on class questions and discussions. ASK QUESTIONS: Do not be shy to ask questions, it is the best way to learn, and there is a lot of support available to you. The first step is to post your question on the Blackboard forum. If you find that the same question has already been answered on Blackboard, you are done! We will strive to answer questions that come up on the forum daily. I may also address relevant topics that come up on the forum in subsequent lectures as I see fit. If the help you need is not easily expressed/resolved with a single question, you may seek help from our wonderful UTAs. UTAs will be available for drop-in help in tutoring lab sessions. Finally, if you have questions that are not about course material, you can talk to me during office hours (listed at the top of this syllabus) or make an appointment. Submit all assignments on time. Study well for exams, and I'll strongly advise you to attend the exam review lectures.

Textbook (Optional)

Data Abstraction and Problem Solving with C++: Walls and Mirrors, 7th Edition, Frank M. Carrano, ISBN-13: 978-0134463971.

Other resources:
Open Data Structures in C++ (http://opendatastructures.org/)
Prof. Stewart Weiss' notes
(http://www.compsci.hunter.cuny.edu/~sweiss/course_materials/csci235/csci235_lecture_notes.php)

UNIX Lab
All students enrolled in this class are given accounts on the Computer Science Department's network. Students must reclaim existing Linux accounts. This account entitles you to physical access to the Linux workstations in the labs on the 10th floor of Hunter North and enables you to connect to any of the lab machines remotely via ssh from another computer. First read the Programming Guidelines document.

Please note that all programming project submissions must compile and run without issue on the Linux lab machines. These computers provide a common platform to evaluate program execution, free of issues related to OS or IDE. You should always confirm that your assignment code successfully compiles and executes on these machines before submitting.

Syllabus Compliance

Except for changes that substantially affect implementation of the grading policy, this syllabus is a guide for the course and is subject to change. In particular, the course schedule on the webpage, including topics, readings and project assignments, is subject to change. Any changes will be announced in class and on the course webpage. Be sure to check for updates online regularly.

Hunter College Policy on Academic Integrity

Hunter College regards acts of academic dishonesty (e.g., plagiarism, cheating on examinations, obtaining unfair advantage, and falsification of records and official documents) as serious offenses against the values of intellectual honesty. The college is committed to enforcing the CUNY Policy on Academic Integrity and will pursue cases of academic dishonesty according to the Hunter College Academic Integrity Procedures.
In this course, special attention is given to contract cheating, where students have work completed on their behalf that is then submitted for academic credit. All submitted projects will be thoroughly checked for authenticity/originality with screening software in order to prevent contract cheating. Please read more information on Contract cheating from
http://en.wikipedia.org/wiki/Contract_cheating
Clarification: There are plenty of resources and examples available that you may consult and understand to incorporate those ideas into your projects. However, you must ultimately write your programs yourself. You are actively encouraged to discuss ideas with one other. However,

unless otherwise stated, you may not give code to or receive code from anyone else. If you are uncertain about the appropriateness of a particular case, you may ask.

ADA Compliance

In compliance with the American Disability Act of 1990 (ADA) and with Section 504 of the Rehabilitation Act of 1973, Hunter College is committed to ensuring educational parity and accommodations for all students with documented disabilities and / or medical conditions. It is recommended that all students with documented disabilities (Emotional, Medical, Physical and / or Learning) consult the Office of AccessABILITY located in Room E1124 to secure necessary academic accommodations. For further information and assistance please call (212-772-4857)/TTY (212-650-3230).

Hunter College Policy on Sexual Misconduct:

In compliance with the CUNY Policy on Sexual Misconduct, Hunter College reaffirms the prohibition of any sexual misconduct, which includes sexual violence, sexual harassment, and gender-based harassment retaliation against students, employees, or visitors, as well as certain intimate relationships. Students who have experienced any form of sexual violence on or off campus (including CUNY-sponsored trips and events) are entitled to the rights outlined in the Bill of Rights for Hunter College. Sexual Violence: Students are strongly encouraged to immediately report the incident by calling 911, contacting NYPD Special Victims Division Hotline (646-610-7272) or their local police precinct, or contacting the College's Public Safety Office (212-772-4444).
All Other Forms of Sexual Misconduct: Students are also encouraged to contact the College's Title IX Campus Coordinator, Dean John Rose (jtrose@hunter.cuny.edu or 212-650-3262) or Colleen Barry (colleen.barry@hunter.cuny.edu or 212-772-4534) and seek complimentary services through the Counseling and Wellness Services Office, Hunter East 1123.
http://www2.cuny.edu/wp-content/uploads/sites/4/page-assets/about/administration/offices/legal-affairs/POLICY-ON-SEXUAL-MISCONDUCT-10.1.2015-with-links.pdf

Departmental Learning Goals

This class satisfies the following learning goals, as set forth by the Computer Science department: (1a) Understanding the basic foundations and relevant applications of mathematics and statistics, particularly those branches related to computer science, by using mathematics to analyze algorithm performance. (1b) Understand the relationship between computer architectures and software systems. (2a) Deep practical knowledge of one widely used programming language (C++). (2c) Be able to apply principles of design and analysis in creating substantial programs.

Acknowledgments