

CSc 21200 Fall 2022

Data Structures
Lecture TuTh 8-9.40am
Office Hours TBD

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<https://csc-212-fall-2022.github.io/>

Description

From the Bulletin:

Extension of the knowledge of algorithm design and programming gained in CSC 10300 with continued emphasis on the logic underlying the transition from specification to program. Particular attention is paid to issues arising in the implementation of larger programs: introduction of data structures and data abstraction; the basics of object-oriented programming. Introduction of recursion as a design tool. Introduction of complexity analysis.

Prerequisites

CSC 10300 and CSC 10400

Course Materials and Technical Requirements

- Cormen, Leiserson, Rivest and Stein, *Introduction to Algorithms*
 - Feel free to use either the 3rd or 4th edition. (The 4th edition was released in April, so it's unlikely used copies are available.)
 - An electronic edition of the 3rd edition is available through the library.
- A C++ 17 dev environment
- Zoom for online class meetings

Course-specific Policies

- Late assignments will be allowed within 48 hours of the submission deadline. Each day late will incur a 25% penalty. Submissions more than 48 hours late will not be accepted.
- Blackboard's timestamps will be used to determine the time of submission. An assignment due (for example) on March 3rd will be considered on time if submitted before 11.59pm on March 3rd.
- The two midterms exams will be given in class. You are expected to arrive at the beginning of the class and no extra time will be given for late arrivals. Make-up exams will not be given.
- Any disagreement or dispute around grading must be submitted in writing (i.e. via email).

Objectives and Student Outcomes

	1	2	3	4	5	6
a) the student acquires knowledge of object-oriented data types, abstract vs implementation		R				
b) the student acquires knowledge of how to manipulate arrays and linked lists; pointers and memory management		R				
c) the student acquires knowledge of space and time complexity	I	I				
d) the student develops familiarity in the implementation and application of stacks, queues, lists, trees, graphs, modular design and hash tables		R				
e) the student acquires knowledge of program design techniques including object oriented design, recursion, pre- and post- conditions, and invariants	P	P				P

Grading

Your grade will be computed according to the following weighting scheme.

Assignments (7)	25%
Midterms (2)	30%
Final	45%

- If it is to your advantage, I will replace the lower of your two midterm scores with your final exam score.
- Grade boundaries are not determined in advance, but will be no harsher than 90/80/70/60 for A-/B-/C-/D(-).

Academic Integrity

This is a course where you "learn by doing". Failing to uphold the highest standards of academic integrity means that you are hurting yourself and being unfair to your classmates. The university Academic Integrity Policy contains definitions and examples of academic dishonesty. Please familiarize yourself with them.

A few extra "don't"s the context of this course (this list is not exhaustive):

- **unless specified in the assignment**, you should complete all work independently
- **do not** copy code from anyone in the class
- **do not** copy code from StackOverflow, Github, etc

That said, you *can* talk to and learn from one another, just don't look at each other's code. Some examples of things that are okay or encouraged:

- Point people to resources you've found useful
- Reminding your friend of the existence of a function in the standard library.
- Sharing high level hints/comments about your approach (e.g. "I used depth first search")

Attendance

Please make an effort to attend lectures.

Students are expected to attend every class session of each course in which they are enrolled and to be on time. A WU grade will be assigned to a student by the instructor for excessive absence. Students are advised to determine the instructor's policy at the first class session. They should note that an instructor may treat lateness as equivalent to absence. No distinction is made between excused and unexcused absences. Each

instructor retains the right to establish his or her own policy, but students should be guided by the following general College policy:

In courses designated as clinical, performance, laboratory or field work courses, the limit on absences is established by the individual instructor. For all other courses, the number of hours absent may not exceed twice the number of contact hours the course meets per week.

Disability Accommodations

The AccessAbility Center/Student Disability Services (AAC/SDS) can help set up accommodations or provide support to reduce barriers you might be facing. If you think they might be able to help you, please contact them.

In compliance with CCNY policy and equal access laws, appropriate accommodations are administered by the Access Ability Center. Students who register with Access Ability, and are entitled to specific accommodations, must request a letter from Access Ability to present to the Professor that states what their accommodations are. If specific accommodations are required for a test, students must present an "Exam Administration Request Form" from Access Ability, at least one week prior to the test date in order to receive their accommodations.

Equal Opportunity and Non-Discrimination

I am committed to fostering a classroom environment where everyone can learn free from discrimination and harassment. In addition to the official statements below, you can find additional policy details and resources on the Office of Diversity and Compliance website.

The City College of The City University of New York (CUNY) is committed to providing equal employment and educational opportunity to all persons without regard to race, color, religion, national or ethnic origin, age, gender, sexual orientation, transgender, disability, genetic predisposition or carrier status, alienage or citizenship, prior arrest record, or marital, military, or veteran status. It is a violation of this policy for any member of the college community to engage in discrimination or to retaliate against a member of the community for raising an allegation of discrimination, filing a complaint alleging discrimination, or for participating in any proceeding to determine whether discrimination has occurred.

Diana Cuzzo (dcuzzo@ccny.cuny.edu) is the College's Interim Chief Diversity Officer for the Title 504 and Title IX programs. Complaints, comments and/or questions regarding applicable policies, procedures or the college's AAP, or discrimination generally, should be directed to the Office of Diversity located in Shepard Hall, Room 109 A-D, telephone: (212) 650-6310.

Gender-Based Violence

The City College of New York is committed to fostering a safe environment that is free of sexual misconduct. This includes sexual violence, intimate partner/domestic violence, gender-based discrimination, harassment and stalking. CCNY has resources to support you if you are currently or have experienced gender-based violence either on or off campus.

For confidential support, you can contact the Psychological Counselor/Confidential Advocate at senglish@ccny.cuny.edu or the Gender Resources at genderresources@ccny.cuny.edu. If you would like to report sexual misconduct, you can contact the Title IX Coordinator, Diana Cuzzo, at (212) 650-7330 or dcuzzo@ccny.cuny.edu.

Tentative Schedule

Date	Class Material	Reading	Assignment
Th 8/25	Course Overview	Chapter 1	
Tu 8/30	Insertion Sort & Merge Sort	Chapter 2	
Th 9/1	Asymptotic Bounds	Chapter 3	
Tu 9/6	Stacks and Queues	10.1	HW1 Due
Th 9/8	Linked Lists	10.2	
Tu 9/13	Direct Address Tables + Hash Tables	11.1, 11.2	
Th 9/15	Hash Function + Open Addressing	11.3, 11.4	HW2 Due
Tu 9/20	Open Addressing, continued		
Th 9/22	Bloom Filters		
Tu 9/27	No Class - Rosh Hashanah		
Th 9/29	No Class - Monday Schedule		
Tu 10/3	No Class - Yom Kippur		
Th 10/6	Binary Search Trees	12.1, 12.2	HW3 Due
Tu 10/11	Exam 1		
Th 10/13	BST insertion and deletion	12.3	
Tu 10/18	Heaps	6.1, 6.2	
Th 10/20	Heaps, continued	6.3	
Tu 10/25	Heapsort and Priority Queues	6.4	
Th 10/27	Quicksort	7.1	HW4 Due
Tu 11/1	Quicksort analysis, part 1	7.2-7.4	
Th 11/3	Quicksort analysis, part 2		
Tu 11/8	Comparison sort overview	8.1	Election Day
Th 11/10	Counting sort	8.2	
Tu 11/15	Radix sort	8.3	HW5 Due
Th 11/17	Bucket Sort	8.4	
Tu 11/22	Exam 2		
Th 11/24	No Class - Thanksgiving		
Tu 11/29	Graphs	22.1	HW6 Due
Th 12/1	BFS	22.2	
Tu 12/6	DFS	22.3	
Th 12/8	Topological Sorts	22.4	
Tu 12/13	Strongly Connected Components	22.5	HW7 Due