Essentials: Communication, Content, and Structure

1 Communication

Class Meetings:	When: Tuesday, Friday 12:45 - 2:00 PM; Where: Hunter West 603
Office:	HN1090J
Office Hours:	Tuesday, Friday 11:15 - 12:15
Email:	stewart.weiss@hunter.cuny.edu
Telephone:	(212) 772-5469

You can see me during my office hours without an appointment. If you need to see me at a different time, you need an appointment. The best way to make an appointment is to request it by email. You can also call my office and leave a message. Regarding email, please note that I read only ASCII plain text messages, not HTML or other formatted documents. Also note that email concerning anything that might fall under the FERPA regulations (e.g. questions about grades or other personal, class related issues) must be sent from your "myhunter" email account.

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2 Resources

Required Textbook:	*Data Structures & Algorithm Analysis in C++*, 4th Edition. Mark Allen Weiss. Pearson, New York. ISBN: 013284737x.
Computing Facilities:	Registered students will be given user accounts on the Computer Science Department network of instructional computers. The labs that you can use for this class are located on the tenth floor of Hunter North. The lab of choice is the 1001B Walk-In lab, whose hosts run Ubuntu 16.04 (and which were in the old 1000G Linux Lab.) There is also the 1001B Linux/Windows Lab, which you may use if no class is scheduled there. In addition, students will be able to use a secure remote login service such as *ssh* to access these accounts. See Section 10 below for more details.
Website:	All course materials, including lecture notes, slides, assignments, syllabus, and other resources, including this document, are posted on the course website, at `http://www.compsci.hunter.cuny.edu/~sweiss/course_materials/csci335/csci335_spr19.php`
Discussion Board:	This class will use Piazza as a discussion board. Please see the section below entitled "Course Materials, the Web, Piazza, and Blackboard" for the details.

3 Prerequisites

You are required to complete CSci. 235 and Math 155 with a grade of C or better to take this course.

4 Departmental Learning Goals

Material in this course supports or partially supports the following departmental learning goals: 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; 2c: (ability to apply principles of design and analysis in creating substantial programs and have experience working in teams on projects of moderately realistic scope); 3a: (ability to communicate ideas effectively) by requiring homework that is graded in part on clarity and proper use of the English language.

5 Course and Learning Objectives

The principal objective of this course is to further your understanding of the design and analysis of algorithms and data structures. This includes the introduction of new abstract data types, including hashes, heaps, various forms of trees, graphs, and the sorting problem from a higher perspective than was [supposed to be] presented in CSci 235. It also covers worst and average case behavior analysis and optimality, and to a much smaller extent, polynomial time complexity classes and theory. Another objective of the course is to develop your C++ programming and software engineering skills a little more. This course requires that you write more complex software than you have done in the preceding courses.

We will not cover all of the topics contained in the textbook, as there is more than can be achieved in a one semester course. For a list of the actual topics that we will cover, as well as the readings and class schedule, see `http://www.compsci.hunter.cuny.edu/~sweiss/course_materials/csci335/csci335spr19_schedule.pdf`.

6 Doing Well in This Course

If you want to do well in this course then you should do all of the following:

- Read the assigned reading ***before*** the lecture, not after it.
- Post questions to the Piazza Discussion Board when you need help.
- Come to my office to ask questions when you need help and all else has failed.
- Submit all assignments on time. ***They are worth zero if submitted late***.
- Study for exams starting many days before the exam.
- Do as many of the textbook's sample questions as you have time to do.
- Do your assignments yourself.

7 Assignments, Exams, Grading, and Lateness

Your final grade is based on several components, whose weights are as follows:

Component	**Weight Towards Grade**
non-programming assignments	8%
programming assignments	24%
quizzes	12%
one midterm exam	20%
final exam	36%

7.1 About Non-Programming Assignments

A ***non-programming assignment*** is one in which you do not write an executable C++ program. These can, but not necessarily will, include

- **Environment configuration**. You will be given a first assignment that ensures that you have set up your work environment on the CS network properly and know how to perform certain basic tasks.
- **Code reading.** A code reading assignment is one in which you read existing code of a real application and answer questions about it or write documentation for it.
- **Reading about software issues.** In this type of assignment, you might be asked to read some articles about a topic such as intellectual property rights and software licenses, version control, or software quality issues.

7.2 Programming Assignments

I will assign two programming projects during the semester. This is not enough to become proficient. If you want to be proficient and have the time, you should make up your own small problems and write test programs to solve them. *Every program must comply with the programming requirements stated in the* ***Programming Requirements*** *document provided on the course website.* Rules governing lateness, plagiarism, and grading are also contained there. The due dates and weights of these assignments are listed below.

Programming Assignment	Weight Towards Final Grade	Due Date
1	12%	March 12
2	12%	May 3

7.3 Exams

There will be one midterm exam, one final exam, and from three to six short quizzes. Quizzes may be announced in advance or unannounced ("pop") quizzes and will usually be based on material from a scheduled reading, or a previous class, or your programming project. They will be at most ten minutes long. On all exams you may be required to write actual code or pseudo-code to describe algorithms, and to solve conceptual problems related to the course material. The final exam will cover the material from the end of the midterm exam to the end of the semester. *Please note that the final exam is not cumulative.*

Exam	Weight Towards Final Grade	Exam Date
Midterm	20%	March 22
Final	36%	May 17, 11:30 - 13:30

The quizzes will be short exams, usually no more than five minutes long, and will cover something from either assigned reading or material covered in the previous class or two. The total weight of the quizzes towards the final grade is 12%. The lowest quiz grade will be dropped.

7.4 Incomplete Grades

All assignments must be submitted by their due dates. Late assignments will not be accepted. Failure to take an exam counts as a zero grade on that exam. The only exceptions to these two rules are in the case that you have a legitimate, documented medical or personal emergency that prevents your timely completion of homework or sitting for an exam and have notified me in a timely manner about this emergency. I will schedule a make-up exam or grant a homework deadline extension only in that case. I do not give incomplete (IN) grades except to those students who were making progress through most of the semester and submitting assignments on time and who were unable to complete some work because of legitimate, documented medical or personal problems, and this is entirely at my discretion.

8 Class Schedule

The document at

http://www.compsci.hunter.cuny.edu/~sweiss/course_materials/csci335/csci335spr19_schedule.pdf

contains the detailed class schedule.

9 Class Calendar and Important Dates

There are no classes on Monday February 12 nor any day between April 19th through April 28. The last day to drop without a grade of W is February 14. ***The last day to withdraw is April 1.*** The last day of class is Monday, May 14.

10 Programming and System Access

All students enrolled in the class are given accounts on the Computer Science Department's network. This entitles you to physical access to the 1001B lab, which is equipped with Linux workstations. This lab is normally open from early morning through late evening. You may also use the 1001B Linux/Windows Lab if there is no class using it. The account also enables you to work from home or another remote computer by connecting to any of the lab machines remotely. The details are described below.

The advantage of working in the lab, as opposed to working remotely, is that you will be sitting at the console of a Linux host and will not be subject to potential disconnections that can take place when working remotely. You will also be much less affected by network problems than if you connect remotely from outside of Hunter. The disadvantage is that you have to be in school to do this.

When you are in the lab there are a few important rules that must be followed:

- Never power down a machine for any reason.
- Never leave a machine without logging out.
- Never use lockscreen to lock the screen in your login.

There are several other rules regarding lab use, which are posted in the lab. Also, please read the document posted by Tom Walter at

http://www.geography.hunter.cuny.edu/tbw/CS.Linux.Lab.FAQ/department_of_computer_science.faq.htm

for more information.Please take the time to read it and observe the rules.

The Computer Science Department makes a UNIX host, named

`eniac.cs.hunter.cuny.edu`,

available to students who have accounts on the network. `eniac` is a gateway computer - you will be able to login to this host from any computer that has *ssh* client software on the Internet. Once you login to `eniac`, you must login from `eniac` to one of the computers in the network that are named `cslab1`, `cslab2`, `cslab3`, and so on, up to `cslab29`. You cannot *ssh* directly to those machines from outside of Hunter College for security reasons. For example, you can first login to `eniac`, and then when it gives you a prompt such as "$", you would type

```
ssh cslab5
```

and re-enter your network password at the prompt from `cslab5`.

Many computers come with a version of *ssh* already installed. If yours does not, you can get one for free. There are several free versions of *ssh*. *OpenSSH* is an open source version developed for the *OpenBSD* project. *PuTTY ssh* is a free version for the Windows operating systems, available at

`http://www.chiark.greenend.org.uk/~sgtatham/putty/`.

Macintosh computers come with a command-line *ssh* client. You can also download a very old ssh client that runs on most versions of Windows from my webpage here:

`http://www.compsci.hunter.cuny.edu/~sweiss/resources/SSHWinClient-3.2.9.exe`

11 Course Materials, the Web, Piazza, and Blackboard

All lecture notes will be posted on the course's home webpage (whose URL is above), which does not require special privileges to access. The only thing for which I use Blackboard is for posting of grades, which will be posted in the grade center there. This term we will be using Piazza for class discussion. The system is highly catered to getting you help fast and efficiently from classmates and me. Rather than emailing questions to me, you are to post your questions on Piazza. If you have any problems or need feedback for the developers, email *team@piazza.com*.

You can find our class's home page at:

`piazza.com/hunter.cuny/spring2019/csci335/home`.

An invitation to join the Piazza discussion board will be sent to your Hunter College email address close to the start of the semester. You should accept this invitation. Your Hunter email address can be used for reading and sending messages to the group, or you can change the email address or add another on the settings page by visiting the above page and making a request to join the group with any email address you choose. The discussion board can be accessed at this URL:

`https://piazza.com/class/jqn04u4eiw6gt`

I require that you use the following protocol if you have a question:

1. Check whether the question you want to ask has been posted and answered on Piazza.
2. If it has been answered, you are finished. If not, post the question on Piazza.
3. Anyone in the class can answer the question. If no one else answers the question in a timely manner, I will post an answer to it.

I will ignore any non-personal questions sent to my Hunter email address. Personal questions (such as a questions about a grade or a missed class or alternative times to meet with me) should be sent via private email to my Hunter email address, not to Piazza.

12 Academic Honesty

The *Oxford English Dictionary* states that "plagiarism is the act or practice of taking someone else's work, idea, etc., and passing it off as one's own; literary theft." If you pass someone else's work as your own you have committed ***plagiarism***, which is an act of academic dishonesty. Unless I state otherwise, all assignments and projects are to be your work alone. If someone else does part of this for you, it is considered to be academic dishonesty. Hunter College regards acts of academic dishonesty, such as 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 class, I will enforce the ***University's Policy on Academic Integrity*** and bring any violations that I discover to the attention of the Dean of Students Office.

13 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, the student can call (212-772-4857)/TTY (212-650- 3230).

14 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.
- CUNY Policy on Sexual Misconduct Link: `http://www.cuny.edu/about/administration/offices/la/Policy-on-Sexual-Misconduct-12-1-14-with-links.pdf`

15 Changes to This Syllabus

Except for changes that substantially affect the implementation of the grading statement, this syllabus is a guide for the course and is subject to change with advance notice. Any changes will be posted to the course website and to the Piazza group for the course.

CSci 335 Class Schedule

The following table identifies the topics that we will cover, and approximately how much class time will be spent on each. ***You are expected to read the material in the given chapter before the class in which it is covered.*** (Quizzes may be based on it.) There is more material in the chapters than we will cover in class. There may be some small deviations from this plan, which will be announced in advance.

Class	**Date**	**Topic/Material**	**Textbook Chapters**
1 2	1/25 1/29	Administrative business/ Review of selected topics in C++	§1, except 1.7
3 4 5	2/1 2/5 2/8	Algorithm analysis, mathematical background, modeling running times	§2
	2/12	**No Class - College is closed**	
6 7 8 9	2/15 2/19 2/22 2/26	Trees: Tree fundamentals, binary trees, search trees, AVL trees, B-trees	§4, except 4.5, 4.8
10 11 12	3/1 3/5 3/8	Hashing: Hash functions, collision resolution, hash tables, rehashing, perfect hashing	§5, except 5.7, 5.8, 5.9
13 14	3/12 3/19	Priority queues: heap basics, binary heaps	§6, except 6.5, 6.6, 6.7, 6.8, 6.9
15	3/22	**Midterm Exam**	
16 17 18 19	3/26 3/29 4/2 4/5	Sorting: simple sorts, shell sort, heapsort, mergesort, quicksort, lower bound on sorting	§7
20 21	4/9 4/12	Disjoint sets: Equivalences, dynamic equivalence problem, smart union and path compression algorithms	§8, except 8.6, 8.7
22	4/16	Graph algorithms: graphs	§9.1, 9.2
	4/19 4/23 4/26	**Spring Recess**	
23 24 25 26	4/30 5/3 5/7 5/10	Graph algorithms: shortest path algorithms, minimum spanning tree algorithms, depth-first search, NP-completeness	§9.3, 9.5, 9.7
27	5/14	Topics subject to change, but might be: algorithm design techniques: dynamic programming; Review	§10.3