CS 24
Discrete Structures for Computer Science II
Syllabus, Spring 2024

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Office hours:
Thursday 10:30am - 1:30pm
Monday, Wednesday by appointment
Prerequisite: A C- or better in CSC-014, or permission of the professor

Text: Discrete Mathematics and its Applications, Kenneth Rosen, Eighth Edition, McGraw Hill Publishing

1 Overview

In this course we continue our study of the mathematical foundations of computer science begun in CS 14 with the aim of deepening our understanding of algorithm complexity. We will focus on problems from a branch of mathematics known as "graph theory", which is concerned with networks as they arise in all sorts of settings, from transportation to the internet. In order to be able to analyze the complexity of graph theory algorithms, we will also study functions in some depth, especially recursively defined functions.

2 Learning Objectives

Liberal Arts Objectives: The most important objectives for this course are those which are common to all computer science courses:

1. to learn to solve unfamiliar problems (without being taught how to solve them!);
2. to think clearly and analytically;
3. to work cooperatively;
4. to read closely;
5. to write and speak precisely;
6. to reflect on the role of the university and liberal arts education in society.

Computer Science Objectives: Here are some specific questions you will be able to answer by the end of the semester.

1. What is a relation? Give some examples of important relations that arise in computer science.
2. What does it mean for a relation to be a function? Which of your examples above are functions?
3. What are some methods for comparing the complexity of two functions? Why do we as computer scientists need to be able to perform such comparisons?
4. How can a function or relation be defined recursively? Why are recursively defined functions and relations important in computer science?
5. What is a graph? Give examples of how graphs arise in diverse applications, such as traffic engineering, artificial intelligence, and computer network theory.
6. How can graphs be represented and studied using a computer?

3 Graded Work

Your grade in this class will be based on your quizzes, your two midterm exams, and your final exam.

Grade Breakdown:

1. quizzes **30%**
2. midterms and final **70%**

Quizzes: Regular quizzes will be used to test your understanding of all the concepts discussed in class. Quizzes will be announced ahead of time. The lowest quiz grade will be dropped when calculating the average quiz grade. There will be no makeup quizzes: if you miss a quiz, that will be the one that is dropped.

Midterm and Final Exams: There will be two midterm exams and one final exam. The final exam will be cumulative. The final exam grade will be written down twice; the lowest of the four resulting grades will be dropped; the remaining three exam grades will be averaged. There will be no makeups. If you miss a midterm exam, that's the grade that is dropped. If you miss the final (for a valid reason), you will take the final at a mutually agreed upon time – usually at the start of the next semester.

Homework: Homework will *not* be collected or graded *even though in one sense it is the most important learning activity for this class.* Rather, quizzes are based closely on the homework. Students are encouraged to ask questions about the homework at the start of every class. I encourage each of you to form a study group that meets twice a week to work on homework together, and to develop the habit of coming with at least one question about homework to each class meeting. It is important to understand that most of the learning for this class takes place at home when working on homework problems by yourself, or with other students, as this is the setting in which you are most actively engaged with the material.

Definitions In order to succeed in this class you need to be able to understand and use precise mathematical definitions of the terms introduced. Each of you is required to keep a stack of index cards with the relevant definitions from the class and from the text. Each definition should be a complete sentence that incorporates the word being defined, and that avoids constructions like "is when". You are encouraged to copy these definitions verbatim from the text or from class notes. You must not include any examples or theorems on your index cards. You are allowed to bring these index cards to every quiz and exam. You are not allowed to share index cards, and each student should prepare his or her own stack of index cards.

4 Policies

Attendance and Makeup Policies and the use of Email Students are expected to attend every class, and are expected to attend office hours regularly as well.

If you miss a class, please reach out to a member of your class for lecture notes and announcements.

Email Policy Please feel free to contact me via email or phone if you need to make an appointment outside of my regularly scheduled office hours, or if you need to let me know about an illness or other situation that is making it difficult for you to do your work. You can also ask me after class for an individual appointment.

Please do not use email to ask for announcements and materials from a class you missed: use your peer study group for that. All handouts will be posted on my website. I cannot answer technical questions over email: ask questions in lecture and in office hours.

I will make every effort to get back to you within two business days of your email to me.

Academic Honesty: Students enrolled in this class implicitly promise to adhere to Hofstra's policies regarding academic honesty. Students who are found to have violated their promise (either by cheating or by assisting another student in cheating) are given a 0 on the given assignment, are reported to the dean, and may, furthermore, receive an automatic F in the class.

5 Important Dates

- Friday, February 23: last day to withdraw without a "W"
- Thursday, April 11: last day to withdraw with a "W"
- Thursday, May 9 and Friday, May 10: snow days for makeup classes
- Monday, May 13 or Wednesday, May 15 (TBA): final exam