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1 Course Description

1.1 Material Covered

The course covers the design and analysis of combinatorial algorithms. The curriculum is concept-based and emphasizes the art of problem-solving. Although not programming will be assigned, students are presumed to have adequate programming skills and to have a solid understanding of basic data structures and their implementation in the programming languages of their choice. Although some mathematical sophistication is very helpful for this course, the necessary mathematics is contained within the curriculum.

Topics covered will to very large extent be selected from the following, though only a part of them will be covered due to time constraints:
1. Algorithmic Design Paradigms


2. The Analysis of Algorithmic Performance

Asymptotic Growth, Recurrence Equations, The Recursion Tree Solution Method, Probabilistic Analysis, Structural Analysis. Lower Bounds

3. Managing Data for Efficient Processing

Lists, Stacks, Queues, Priority Queues, Trees and Graphs, Tarjan’s Categorization of Data Structures, Search Trees and their Enhancement, Union-Find, Sorting, Selection, and Hashing.

4. Selected Representative Algorithms/Problems


1.2 Required Textbook

An Introduction to Algorithms: their Methods and Madness, by A.R. Siegel. This textbook is updated regularly and its new edition will be available before the first day of class, and information about how to acquire it will be included in an updated version of this document.

2 Academic Integrity

You have to follow all the departmental academic integrity rules as listed in https://www.cs.nyu.edu/home/undergrad/policy.html, unless I explicitly relax them as part of the written description of the assignment. To make some of the rules more explicit in this course, I add that whereas it is fine to discuss the lectures, the readings, and similar, with anybody you like, you must not show your assignments’ work to other and the work also has to be completely your own. You are only permitted to discuss the assignments (other than reading assignments, if any) with me and the designated course grader, as specified in the assignment. We will be available for that to the extent that you need that.

Work that plagiarizes another person’s work may result in the grade of F for the course and additional disciplinary consequences. Other irregularities, such helping another student with an assignment, including letting another student look at your assignment’s work, will also result in disciplinary consequences.
3 Assignments, Exams, and Grading

3.1 Class Attendance

Attendance will not be taken but attending the class meetings is expected and necessary for understanding the material. Please do not register for the class if you are not sure to attend the meetings regularly.

3.2 Homework

Do the homework.

It may include reading assignments and written assignments. It is extremely important to do all the homeworks, as this is critical to learning the material covered. Just listening to the lectures and reading the textbook and the solutions provided is mostly passive and not sufficient.

As part of the written assignments you may be asked to grade your own solution, after a solution prepared by the teaching staff is provided. The purpose of that self-grading is two-fold. First, to make sure that you understand the provided solution and second, to make sure that you understand if and where your solution is not fully correct. So your grade for the assignment would be a combination of the grades for both of those tasks.

3.3 Midterm Exam

Take the midterm exam. It will take place during the class period and in the classroom on October 25. The material will be announced later, once we know the progress made.

Your midterm will be handed back to you, but you will need to return it.

3.4 Final Exam

Take the final exam. Its locations and time will be set by the registrar. The material will be announced later, once we know the progress made and the material assigned for the midterm.

Your final will not be handed out to you as there will be no class meetings after the final, but you will be able to see it if you wish to do so.

3.5 Course Grade

The grades posted will be adjusted to compute the course grade, so that each solution to the homework and its components, the midterm, and the final will be weighted to reflect its importance and the percentages listed below. Therefore, you cannot just average all the raw grades to estimate your course grade.
The percentage of the course grade for each of the three components is

1. Homework 20%
2. Midterm 30%
3. Final 50%