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CS 2413: Design and Analysis of Algorithms: INFO

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When and Where:

- When: Mondays and Wednesdays, 4:30 - 5:50
- Where: 370 Jay, room 202

Instructor:

- Greg Aloupis
  - Office: 866, at 370 Jay.
  - Gmail: cs2413greg (please use this address instead of my NYU email, which is greg.aloupis @nyu...)
  - Office hours will be updated in Piazza.

TAs:

- Office hours may vary and will be updated weekly in Piazza.
- Click on a TA name below to see their photo.
- email addresses are @nyu.edu

Aditya Sirish	(asy278)
Bixing Jie	(bx357)
Christian Lee	(cjlee)
Jonny Sassoon	(jonny.sassoon)
Mengyang Zhang	(mz2325)
Mike Singh	(ms9744)

Prasanna Surianarayanan (ps3703)
Ravi Sinha (ravi.sinha)
Lala Shashank Shivam (lss469)
Shivam Bawane (sb6818)
Sofiia Barysheva (sb6266)

Who to contact, and when:

- First make sure the answer to your question isn't already on the course website (e.g., when is the exam, when are office hours, etc)
- We have a Piazza page.
  Piazza is meant for asking questions that your classmates would benefit from seeing. If you have a question that does not affect other students, please use email instead. Also please refrain from giving away answers or hints to homework questions until the "deadline" has passed. In other words do not post questions like "I tried to solve homework X like this but I'm not sure it's correct" while others are trying to figure it out on their own. After the deadline, go for it.
- Grading concerns: submit a regrade request in Gradescope. If it remains unresolved for a few days, contact me.
- Major illness or other issue? Feel free to contact me, but you are expected to contact Health Services and/or your academic advisor or dean.

Non-required textbook: Introduction to Algorithms, 3rd edition, by Cormen, Leiserson, Rivest and Stein.
This is commonly just referred to as ``CLRS". More info at MIT press.
Note: my Resources page refers to this book so you can find relevant chapters if you wish. The course doesn't explicitly rely on the book though. Also, this book is massive. We will not cover everything in it. See "Topics" below.

Prerequisites: Discrete math is important. Basic understanding of some data structures will matter too. Technically, OOP is a prerequisite but my course does not rely on this directly.
See the Resources page and search for the word "prerequisite" to see when you will need to know background material.
You will probably find this course difficult if you're not comfortable with induction, recursion and proofs, or if big-O seems like a challenging concept. It is assumed that you know the basics about arrays, linked lists and trees. Knowledge of basic probability will be helpful for two or three lectures but I will recap what you need to know.
If you have not done well in discrete math or have not passed data structures, you should contact me.

Topics: This is an introduction to the design and analysis of algorithms, which involves discussing a few basic data structures as well. Many topics could fit in such a course, and not all intro courses go over exactly the same material.

We will place all emphasis on theory instead of programming. This course is about figuring out how to solve a problem before you start coding.
To see what is taught in this course, please visit the Resources page.

Grading:

- Four exams, each worth 25% of your final grade. For dates see the Schedule page.
  All exams are closed book. No notes whatsoever.

- Homework will be assigned and feedback will be given, but it will not affect your grade. Submitting homework is not mandatory, but it is highly recommended to try the problems on your own, then if you're having difficulty try again with classmates and / or TAs, and eventually read my solutions. This will help you understand the topics at a deeper level than what you might think is sufficient, and it will help you prepare for the pressure of job interviews.

Excused absence:
If you have a serious reason for not taking an exam, you should notify your academic advisor, Dean and/or Health Services, and of course you may CC me as well.
There is no penalty if you do not attend lectures, and I don't need to be notified.
I cannot arrange a makeup exam if you have a predictable conflict that could be reasonably avoided. Check the final exam schedule before making travel arrangements.

Important note:
The way I have taught the course until now, exam scores are typically low; the median is often in the 40's. Few students get over 80%. (I always include two hard questions, each worth 10%. In some sense, consider these to be extra credit, and focus on doing well on the other questions first).
Don't expect to pass the course if your exam average is under 30%. There are enough easy questions to reach this score, even if the median is not that far above it.

Warning:
If you need credit for this course in order to graduate, it is your responsibility to do well. There is no extra work that you can do to make up for low exam scores. Rather than notifying me after the final exam that your life will be ruined if you don't get a good grade, discuss your situation with me when the course begins!

How to submit homework

- You will find assignments posted in Piazza, in a tab called "Resources". Typically they are posted a week or two before the deadline. Solutions will be posted on the same page.

- Submit homework in Gradescope. That's where you will find feedback too. The code to join Gradescope will be posted in Piazza. Instructions for submitting and tagging your files are given in this video. You must tag pages as shown in the video. In fact you should tag the pages of a particular problem in the order that we need to read them. If there are multiple problems on an assignment, keep them on separate pages. (This should not be done for subproblems though).
- Ideally your submissions should be typed. If not, they should be produced by writing extremely clearly and scanning with good contrast. Make sure that your scan does not appear sideways. You may include figures, in fact you are encouraged to do so. If the figures are photographs or scans of work done on paper, make sure that they are clear, with proper contrast and resolution. There should be no shadows, coffee mugs, pets, body parts, etc, visible in your figures. In general, leave enough space so we can annotate with comments.
  If you submit untagged or messy work, your grader may choose to ignore it. Please respect your grader's time and effort.

Tips for doing well in this course, if you find it challenging:

- Come to class! However, don't expect that all you need to do is show up and simply soak in information. Lectures should serve as an introduction to material, which you should further study on your own later. If you find that the in-class pace is too fast, consider reading some basic material beforehand.
- Taking extensive notes in class works well for some people, but keep in mind that all class notes displayed are already available to you. Consider bringing a printout of the *condensed* notes to class. Then you can mark your own observations, clarifications and questions quickly, and spend more time paying attention.
- Use the *full* version of the course notes when studying, *not* the condensed version. Try to anticipate what is coming next. Try to re-prove things. Derive on your own, rather than verifying what is written. When you simply verify what's there, it is easy to overestimate what you've understood.
- Don't cram. The most common reason students don't do well on the exams in this course is that they think they can learn the material for an exam in two days. Spend time on this course regularly. Many students underestimate how much time is required to truly understand some of these topics.
- Use all resources available: class notes, the summary PDF document at the top of the Resources page, the videos, the book, the web. Do practice problems from the book, starting with the more basic ones. In many cases you can make your own practice problems (e.g. draw an arbitrary graph and find shortest paths).
- As much as possible, don't memorize. Instead, understand. I do realize that some basic memory is required in any case. But if you think you need to memorize how algorithms work, why they are correct, or what their time complexities are, then you're not approaching this course correctly and should talk to me.
- Pretend that you will have to teach the material that you're reading, to 100 people.
- Try to do the homework on your own. If you are entirely stuck, get only basic hints from

your classmates and TAs, but don't rush to do this if you've only spent an hour or two on a problem. If you have no idea how to approach a problem, then you probably need to study the basics a bit more: take the time to review the material from the corresponding lectures, and solve some easier exercises on your own. Then think about what tools you have just learned about, and whether they might help. If none of this works, then get some hints. Homework should take multiple hours.

- When stuck solving homework problems, see how you'd handle a made-up example. Think about whether your example is oversimplified, whether you've made unnecessary assumptions, and whether your solution is generalizable (if applicable). Also, sometimes it's a good idea to add extra assumptions, thus making the problem easier to solve, and gradually remove the assumptions.
- Read the homework solutions even if you got a good score. Sometimes graders don't notice subtle mistakes on homework submissions. Reading the solutions might help you avoid repeating such mistakes on an exam. Also, even if your ideas worked, the solutions might have a more efficient idea or description that will end up worth knowing about.
- Don't hesitate to talk to me and to the TAs.

Everyone involved in this course is to respect the following:

- NYU academic integrity policy
- NYU non-discrimination policy
- Student code of conduct, excused absence, and other things
- Basically, be nice.

Don't cheat:

- If you cheat on an exam, you will likely face suspension and most likely an F in the course.
- If, for whatever reason, your exam solutions end up matching the course notes or my solutions word for word, this will be interpreted as cheating. If the reasoning of this rule is not clear, please ask. If you have photographic memory and are concerned that you might accidentally match the course notes perfectly, please let me know at the start of the term.

Moses Center Statement of Disability:

- If you are student with a disability who is requesting accommodations, please contact New York University's Moses Center for Students with Disabilities at 212-998-4980 or mosescsd@nyu.edu. You must be registered with CSD to receive accommodations.

Information about the Moses Center can be found at nyu.edu/csd. The Moses Center is located at 726 Broadway on the 2nd floor. Please do this at the start of the semester.

For more about academic misconduct, the Moses Center, school calendar, etc, see this document.