CSCI 2300 Intro to Algorithms

Syllabus

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Thu 2:00-3:00PM

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Thu 2:30-3:30PM

Course TAs and mentors

TA and mentor office hours posted on Submitty

- Graduate TAs:
  - Lorson Blair
  - Xingcheng Dong
  - Shuang Qiu
  - Zheng Sang
  - Yitao Shen
  - Liangbin Zhu
- Undergraduate mentors:
  - Joshua Batista
  - Sahith Bhamidipati
  - Liyun Dai
  - David Kim
  - Andrew Nagawiecki
  - Richard Pawelkiewicz
  - Thomas Su
  - Coen Valk
  - Yi Zhou
  - Jingyu Zhuang

Do not email our TAs or mentors; instead, we will use Submitty's Discussion Forum...!

Purpose of this course

Prerequisites: CSCI 1200, MATH 1010, and CSCI 2200

- **Catalog Description:** Data structures and algorithms, and the mathematical techniques necessary to design and analyze them. Basic data structures: lists, associative structures, trees. Mathematical techniques for designing algorithms and analyzing worst-case and expected-case algorithm efficiency. Advanced data structures: balanced trees, tries, heaps, priority queues, graphs. Searching, sorting. Algorithm design techniques: dynamic programming, greedy algorithms, divide-and-conquer, backtracking. Example graph, string, geometric, and numeric algorithms.
- **We will also study:** randomized algorithms, genetic algorithms, algorithmic tractability, NP complete, and algorithmic ethics

Learning objectives

- Understand the correctness of, and analyze the running times of, different algorithms.
- Use different algorithm-design techniques, including, but not limited to, greedy, divide-and-conquer, and dynamic programming techniques, to solve particular problems.
- Model real problems abstractly using the language of graphs and flows.
- Solve problems by reducing to other problems whose solution is known, and show that problems are hard by reducing from other problems.
- Make intelligent decisions about alternative data structures and algorithmic techniques in the context of practical problems, choosing from existing data structures and algorithms or designing your own when necessary.

Textbooks and resources

Be sure to regularly check the errata for corrections!

- Required textbook:
  - 
    Algorithms by Dasgupta, Papadimitriou, and Vazirani
    http://cseweb.ucsd.edu/~dasgupta/book/index.html
    http://cseweb.ucsd.edu/~dasgupta/book/errata.pdf
- Other recommended textbooks and resources:
  - 
    Introduction to Algorithms, 3rd ed. by Cormen, Leiserson, Rivest, and Stein [ISBN 9780262033848]
  - 
    Algorithm Design by Kleinberg and Tardos [ISBN 9780321295354]
    https://www.cs.princeton.edu/~wayne/kleinberg-tardos/
  - 
    The Ethical Algorithm: The Science of Socially Aware Algorithm Design by Kearns and Roth [ISBN 9780190948207]

Course materials and schedule

- All course materials will be available via Submitty:
  https://submitty.cs.rpi.edu/s20/csci2300
  - Log in using your RCS ID (e.g., "goldsd3")
- The course schedule is posted there (but will likely change)
- We will use Submitty's **Discussion Forum** for course announcements and for asking questions
  - Post questions; also answer questions
- And check your RPI email at least once per day, especially when we have inclement weather…

Attendance/classroom policies

- Attendance is required; please attend lectures and labs and be prepared to participate in class discussions and exercises
- Please remember to turn off phones and other non-classroom electronic devices before each class begins
- Please shut your laptops during lecture unless you are actively using them to take notes or participate in class activities, etc.
- **IMPORTANT:** For prescheduled and unforeseen absences, see http://studentlife.rpi.edu/student-success/excused-absence
  - Please do not ask for an extension, extra time, etc. without first obtaining an excused absence via the described policy

Wednesday labs and recitations

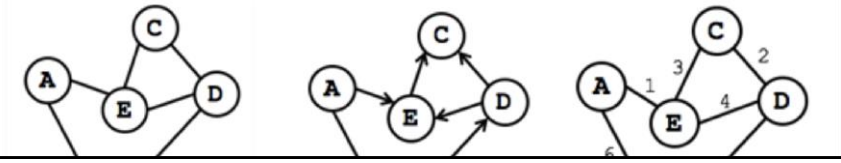
- Attendance is required at your assigned Wednesday labs, starting this week with Lab 1
- We will have six graded labs with checkpoints that must be checked off before the end of your assigned lab (no late days!)
- Graded lab assignments will be made available the Friday before lab (generally by early afternoon); new questions may be posed at your actual lab section
- Labs (and some homeworks) will require you to write code
  - You can usually choose your own language, though for anything auto-graded on Submitty, either Python or C++ will be required, depending on the assignment

Homework assignments

- We will have seven graded homeworks, each with Friday 11:59PM deadlines on Submitty
- You will initially have five "late days" to use as you see fit; use them wisely (if at all)
- Your lowest homework grade will be dropped (yay!)
- Homework assignments will be made available at least one week before the given due date
- If a homework requires you to write code, follow the homework specifications carefully as they will describe which language(s) to use (Python or C++), file naming requirements, etc.

Formatting your homework

- Each homework must be submitted as a single PDF file
  - Other formats will result in a grade of zero (for real!)
- While not required, it is very highly recommended that you learn and use LaTeX (https://www.latex-tutorial.com/) and an online editor such as Overleaf (https://www.overleaf.com/)
  - Learning LaTeX will be extremely useful to you beyond this course
- If you need to include a hand-drawn diagram in a PDF, please do so sparingly and be sure that it is clear and legible



Online materials

Use the textbooks and posted course materials, plus office hours!

- Searching for answers using Google and Stack Overflow is strongly discouraged
- Do not simply copy-and-paste large chunks of text or code from such sites
- Further, do not publicly post your code or solutions for any assignments, both during the course and after the course ends

- **Violations will be treated as academic integrity violations**

Exams

- We will have <u>two</u> exams and a comprehensive final exam
- Exams will be on 2/20 and 4/23 during our Thursday 6:00-7:50PM test block in West Hall Auditorium
- Exams will be open book(s), open notes
- Our comprehensive final exam will be at some point during final exams week (5/4-5/8)
- Make-up exams are only given with an excused absence
- If you have exam accommodations (e.g., extra time), please email me your PDF accommodations letter before 1/24

Grading criteria

- Grading breakdown is as follows:

Labs (6)	12%
Homeworks (best 6 out of 7)	18%
Attendance/Participation	4%
Exams (2)	36%
Final Exam (comprehensive)	30%

- The Attendance/Participation grade includes lab attendance and Discussion Forum participation
- Late days in Submitty (only for homeworks):
  - Late days are intended to cover minor illnesses, hardware malfunctions, schedule conflicts with other assignments, and other minor (or absurd) mishaps
  - Each student will initially be given five late days for the semester
  - No more than three late days may be used for any one assignment
  - To use a late day, simply submit the assignment as per usual via Submitty; you do not need to notify the TAs or instructor

Grading policies

- You may appeal a grade by submitting a written appeal via Submitty within seven days of grades being made available
  - Explain why you think a grading error was made
  - Please do not request a regrade only to argue over how much partial credit was awarded
- Final exams will not be available for review
- Final course grades are based on the following ranges:
  - 93-100 A; 90-92 A-; 87-89 B+; 83-86 B; 80-82 B-; 77-79 C+; 73-76 C; 70-72 C-; 67-69 D+; 60-66 D; 0-59 F
  - No curving of grades is expected
    (…and the likelihood goes down each time you ask!)

Disability services for students

- From http://studenthealth.rpi.edu/disabilityservices:
  - "The Office of Disability Services for Students (DSS) assists Rensselaer students with disabilities in gaining equal access to academic programs, extracurricular activities, and physical facilities on campus. DSS is the designated office at Rensselaer that obtains and files disability-related documentation, assesses for eligibility of services, and determines reasonable accommodations in consultation with students."
- Contact: dss@rpi.edu or 518-276-8197 or Academy Hall 4226
- Please take care of your accommodations by Friday 1/24
  - (You must renew your accommodations each academic year)

Academic integrity

- Rensselaer Handbook of Student Rights and Responsibilities:
  - "Intellectual integrity and credibility are the foundation of all academic work. A violation of the Academic Integrity policy is, by definition, considered a flagrant offense to the educational process. It is taken seriously by students, faculty, and Rensselaer and will be addressed in an effective manner."
  - "If found responsible for committing academic dishonesty, a student may be subject to one or both types of penalties: an academic (grade) penalty administered by the professor and/or disciplinary action through the Rensselaer judicial process described in this handbook."

https://info.rpi.edu/dean-students/student-rights-responsibilities-and-judicial-affairs

Academic integrity policy

- Individual assignments in this course must be the sole work of each individual student; while discussing (and debating) possible solutions is encouraged, please be sure to write up your own solution
- If you do discuss solutions with others, please include their name(s) in your individual written solutions
- If found in violation of the academic dishonesty policy:
  - You will receive a grade of zero on the given assignment
  - For a second offense, you will receive an F in the course
  - Each incident is reported to the Dean of Students and Department Head
  - Cheating may cause you to be ineligible to mentor for the department, participate in departmental organizations, etc.

Questions?

Welcome to Rensselaer's
Student Information System