CS 374 Section B: Algorithms and Models of Computation

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Instructional Staff

- **Instructor:** Mahesh Viswanathan
- **Teaching Assistants:**
  - Shruti Bhargava
  - Charles Carlson
  - Patrick Lin
  - Abhishek Narwekar
  - Vishal Jagannath Ravi
  - Yipu Wang
- **Office Hours:** To be announced on webpage.
- **Contacting Staff:** Use “private note” in Piazza.
- **Course Aides:** To be announced.
Electronic Bulletin Boards

- **Webpage:** General information, course policies, lecture notes
  [https://courses.engr.illinois.edu/cs374/sp2018/B/](https://courses.engr.illinois.edu/cs374/sp2018/B/)

- **Piazza:** Announcements, online questions and discussion, contacting course staff. Sign up at

- **Moodle:** Everything related to homeworks, quizzes, grades, announcements
  [https://learn.illinois.edu/course/view.php?id=28683](https://learn.illinois.edu/course/view.php?id=28683)
Resources for class material

- **Prerequisites:** All material in CS 173, and CS 225
- **Lecture Notes:** Available on course web-page
- **Video Recording of Lectures:** See course website for link.
- **Additional References:**
  - Automata and Computability: Dexter Kozen
  - Algorithms: Sanjoy Dasgupta, Christos Papadimitriou, Umesh Vazirani
  - See website for more resources
Grading Policy: Overview

Total Grade and Weight

- **Homeworks**: 24%
- **Quizzes**: 6%
- **Midterms**: 40% (2 × 20)
- **Finals**: 30%
Homeworks

- One homework every week: Due on Tuesdays at midnight on Moodle. Assigned at least one week in advance.
- **No late homeworks.** Lowest 6 homework problem scores will be dropped.
- Homeworks may be solved in groups of size at most 3 and each group submits one written solution on Gradescope.
Homeworks

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- No late homeworks. Lowest 6 homework problem scores will be dropped.
- Homeworks may be solved in groups of size at most 3 and each group submits one written solution on Gradescope.
- For the other homeworks, read Homework Guidelines and Academic integrity policies on course website.
Quizzes

- The day before every class on Moodle.
- About 25 to 26 in total.
- We will drop the 5 lowest scores.
Examinations

- First Midterm: Monday February 19, 7pm to 9pm
  - Conflict exam on Tuesday February 20.
- Second Midterm: Monday April 9, 7pm to 9pm
  - Conflict exam on Tuesday April 10.
- Final Exam: Tuesday May 8, 8am to 11am
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- No conflict exam offered unless you have valid excuse.
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- No conflict exam offered unless you have valid excuse.
- Midterms will only test material since the previous exam
- Final Exam will test all the course material
Advice

- Attend lectures and discussion sessions
- Make use of office hours/Piazza
- Study regularly and keep up with the material
- Ask plenty of questions, and promptly. Don’t delay getting doubts cleared
- This course is on problem solving. Solve as many as you can
- This course about writing rigorous proofs. Review 173 material on writing proofs, especially induction.
Part I

Course Overview
High-Level Questions

What is the nature of computation? Our answer will be independent of our understanding of the physical laws (or on the laws themselves).

How can one come up with a way to solve a problem computationally?

What are the limits of computation?
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High-Level Questions

- What is the nature of computation? Our answer will be independent of our understanding of the physical laws (or on the laws themselves).
- How can one come up with a way to solve a problem computationally?
- What are the limits of computation?
The course can be roughly divided into three parts.

- **Models of Computation**: Regular languages, finite state machines, context-free grammars, and Turing machines
- **Algorithms**: Algorithm design techniques illustrated through specific algorithms for certain problems
- **Lower Bounds**: Undecidability and NP-completeness
Skills

- Comprehend mathematical definitions
- Write mathematical definitions
- Comprehend mathematical proofs
- Write mathematical proofs
- Learn algorithmic techniques that help solve problems computationally