MPCS 50103: Discrete Mathematics for Computer Science
Autumn 2019

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Announcements

Tushant's Wednesday December 4 office hours will begin at 1:00 pm — 30 minutes earlier than usual

Quiz 4: Thursday December 5 at 11:00 am in JCL 011

Final exam: Tuesday December 10 from 11:00 am to 2:00 pm in JCL 011

Homework 9 is posted: due Monday December 2 at 11:59 pm: homework 9

Textbook: Discrete Mathematics and its Applications. 7e. (McGraw-Hill) by Kenneth H. Rosen (ISBN 978-0073383095) = Rosen

The course grade will be determined using the following weights:

- **(5%) Homework assignments**
- **(20%) Quizzes (5% per quiz): Thursday October 17, Thursday October 24, Thursday November 21, and Thursday December 5**
- **(25%) Midterm examination: Thursday October 31**
- **(50%) Final examination: Tuesday December 10**

Course Policies:

- **Homework collaboration: You are allowed and encouraged to discuss course material and homework assignments with each other, but you must work out and write up each assigned homework problem solution by yourself without assistance. Exchanging solutions to homework problems or sharing solutions is strictly prohibited.**
- **Internet and written source use: Looking for solutions to problems on the internet, even when acknowledged, is STRONGLY DISCOURAGED. Any sources used on homework, including textbooks other than CLRS, lecture notes from other courses, material found on the internet, and ideas from other people must be explicitly acknowledged and should never be copied or paraphrased.**
- **Copied solutions obtained from a written source, from the internet, or from another person will receive ZERO credit and will be flagged to the attention of the instructor.**
- **It is a violation of course policy to submit a homework solution that you cannot explain orally to the instructor/TAs.**

Schedule of lectures and reading assignments

October 1

Lecture 1: Logic and methods of proof

11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 1, sections 1.1–1.5, 1.7–1.8.

October 3
Lecture 2: Mathematical induction and strong induction
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 5, sections 5.1–5.2.

October 8
Lecture 3: Number theory I: divisibility; greatest common divisor
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 4, sections 4.1, 4.3.

October 10
Lecture 4: Number theory II: modular arithmetic; prime numbers and prime factorization
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 4, sections 4.3–4.4.

October 15
Lecture 5: Number theory III: Fermat's little theorem, RSA cryptography
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 4, sections 4.4, 4.6.

October 17
Quiz 1
Lecture 6: Counting I: basics of counting; permutations and combinations
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 6, sections 6.1, 6.3.

October 22
Lecture 7: Counting II: generalized permutations and combinations; pigeonhole principle; binomial theorem; combinatorial proofs
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 6, sections 6.2, 6.4–6.5.

October 24
Quiz 2
Lecture 8: Discrete probability I: basic probability theory; conditional probability
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 7, sections 7.1–7.2.

October 29
Lecture 9: Discrete probability II: Bayes's rule, independence
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 7, sections 7.2–7.3.

October 31
Midterm
11:00 am to 12:20 pm in JCL 011

November 5
Lecture 10: Discrete probability III: random variables, expected value, linearity of expectation
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 7, section 7.4.

November 7
Lecture 11: Discrete probability IV: variance, Chebyshev's inequality
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 7, section 7.4.

November 12
Lecture 12: Graph theory I: basic graph theory; special types of graphs, graph isomorphism
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 10, sections 10.2–10.3.

November 14
Lecture 13: Graph theory II: connectivity in graphs

11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 10, section 10.4.

November 19
Lecture 14: Graph Theory III: trees and spanning trees
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 11, section 11.1. 11.5.

November 21
Quiz 3
Lecture 15: Graph Theory IV: Euler and Hamilton paths and circuits
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 10, section 10.5.

November 26
Lecture 16: Recurrences I: modeling problems with recurrences
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 8, sections 8.1–8.2.

November 28
No class: Happy Thanksgiving!

December 3
Lecture 17: Recurrences II: linear recurrences and divide and conquer recurrences
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e, chapter 8, sections 8.2&ndahs;8.3.

December 5
Quiz 4
Lecture 18: tbd
11:00 am to 12:20 pm in JCL 011
Reading assignment: Rosen 7e,

December 10
Final examination
11:00 am to 2:00 pm in JCL 011

Organization

Staff

- **Instructor:**
  Gerry Brady
  Office hours: Wednesday 8:30 pm in Ryerson 255
  Office: JCL 398A
  Email: brady at cs dot uchicago dot edu

- **Teaching Assistants**:
  Tushant Mittal
  Email: tushant at uchicago dot edu
  Office hours: Wednesday 1:30–2:30 pm in JCL 205

  Theodoros Papamakarios
  Email: papamakarios at uchicago dot edu
  Office hours: Monday 1:30–2:30 pm in JCL 205

- **Graders**:
  Josh Cruz
  Email: joshrcruz at uchicago dot edu

Arthur Tseng
Email: atseng at uchicago dot edu

Alex Zhao
Email: zhaozixuan at uchicago dot edu

Lectures

- **Tuesday and Thursday 11:00 to 12:20 pm in JCL 011**

Problem sessions

- **Saturday 10:00 am to 12:00 noon in JCL 298**

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