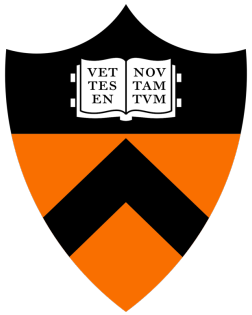
Course Overview



COS 418/518: Distributed Systems
Lecture 2

Jialin Ding, Mike Freedman

Learning Objectives

- Reasoning about concurrency
- Reasoning about failure
- Reasoning about performance

- Building systems that correctly handle concurrency and failure

Lectures

- M/W 9:35am-10:25am
  - Slides posted just before class

- Schedule posted on course website

Precepts

- Th or Fr
  - Slides will be posted after all precepts
- Helps with assignments and/or reinforces lecture material
- **Actively** work through problems together

Course Staff Intro

- Jialin Ding
- Mike Freedman
- Grad TAs:
  - Haoran Wan (P1)
  - Mohanna Shahrad (P2)
  - Zijian Qin (P3)
- Lab TA:
  - Alexander Ding

Grading

- Two exams (50%)
  - Midterm 25%
  - Final 25%

- Assignments (50%)
  - Five assignments 10% each

Grade Cutoffs

- We do not anticipate a curve up
- We will not curve down
- A [93, 100]
- A- [90, 93)
- B+ [87, 90)
- B [83, 87)
- …

Exams

- In person exams
  - 3 hours: should not have time pressure
  - Closed book

- Midterm
  - Registrar will schedule during week of October 6-10
  - Likely Thursday, October 9, 7:30pm-10:30pm

- Final
  - Wednesday, December 17, 8:30am–11:30am (in the morning)

Exams

- Test learning objectives mostly using designs covered in lectures
- And tests knowledge of specific design patterns and designs
- Recipe for success:
  - Attend lecture and actively think through problems
  - Ask questions during lecture and afterwards in my office hours
  - Attend precept and actively work through problems
  - Complete programming assignments
  - Study lecture materials for specific design patterns and designs
  - Run the system designs in your mind / on paper and see what happens

Midterm Review

- Monday, October 20, in class + time before and/or after
- Go over midterm together
- One and only opportunity to argue for points

Programming Assignments

- Reinforce / demonstrate all learning objectives!

- 1: “MapReduce” in Go
- 2: Distributed Snapshots
- 3: Raft Leader Election
- 4: Raft Log Consensus
- 5: Key-Value Storage Service

Programming Assignments

- All are individual assignments
- We will give you all the tests
  - Non-determinism for later tests though
    - Each failed test run => lose 50% of points for a test
- Grading script emails your grade
  - We use exactly this grade

Programming Assignments- Late Policy

- Late policy
  - G = Grade you would have earned if turned in on time
  - 1 day late => 90%*G
  - …
  - > 5 days late => 50%*G

- 3 “free” late days
  - We assign them at the end of the semester to maximize your score
  - Used in 1 day granularity
  - Cannot use for last assignment (Deans date)

Policies: Write Your Own Code

Programming is an individual creative process. At first, discussions with friends is fine. When writing code, however, the program must be your own work.

Do not copy another person's programs, comments, or any part of submitted assignment. This includes character-by-character transliteration but also derivative works. Cannot use another's code, etc. even while "citing" them.

Writing code for use by another or using another's code is academic fraud in context of coursework.

Do not publish your code e.g., on Github, during/after course!

Generative AI policy

- Heuristic: GenAI should aid your understanding, not replace it
- Allowed:
  - Explaining concepts in natural language
  - Syntax reminders
  - Understanding error messages
- Not allowed:
  - Copy/pasting entire functions into an LLM prompt
  - Coding assistants (e.g., Cursor, Copilot) that read the entire codebase
- Submit GenAI statement with each assignment
  - Whether or not you used GenAI, and if so, how (2-3 sentences)
  - Up to 5% bonus for longer insightful statements

Warnings

This is a 400-level course,
with expectations to match.

Warning #1: Assignments are a LOT of work

- Assignment 1 is purposely easy to teach Go. Don't be fooled.
- Starting 3-4 days before deadline for later assignment => **Disaster**.
- Distributed systems are hard
  - Need to understand problem and protocol, carefully design
  - Can take 5x more time to debug than "initially program"
- Assignment #4 builds on your Assignment #3 solution, i.e., you can't do #4 until your own #3 is working! (That's the real world!)

Programming Assignment Statistics

- Self Reported Hours Spent on Assignments: Median [Min-Max]

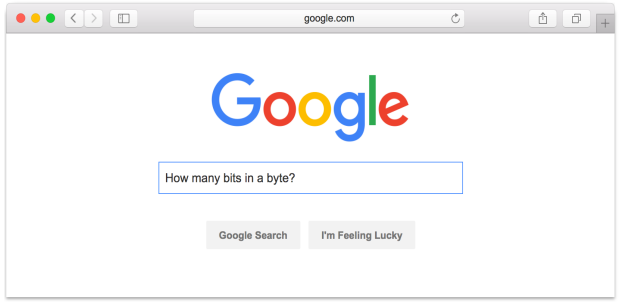
- 1-1: 2 [1-6]
- 1-2: 3 [1-8]
- 1-3: 4 [1-10]
- 2: 6 [2-15]
- 3: 12 [5-29]
- 4: 30 [10-100+]
- 5: 14 [3-25]

Warning #2:

Software engineering, not just programming

- COS 126, 217, 226 told you how to design & structure your programs. This class doesn't.
- Real software engineering projects don't either.
- You need to learn to do it.
- If your system isn't designed well, can be *significantly* harder to get right.
- Your friend: test-driven development
  - We'll supply tests, you're welcome to add more

Warning #3:
Don’t expect 24x7 answers



- Try to figure out yourself
- EdStem not designed for debugging
  - Utilize right venue: go to office hours
  - Send detailed Q’s / bug reports, not “no idea what’s wrong”
- Staff are not always online
  - Will aim to respond within one business day
  - Questions Friday night @ 11pm should not expect fast responses
- Implications
  - Students should answer each other
  - Start your assignments **early**!

Programming Assignment Office Hours

- 10 hours of office hours per week
  - 2 hours per day, Monday-Friday
- Schedule posted on pinned EdStem post
  - Any changes will be posted on EdStem
- Expectations
  - No: “You have a bug on line 17.”
  - Yes: Helping you think like they would think about a problem

Course Overview Conclusion

- Attend lecture, attend precept, think actively!
- Start programming assignments early, use the right strategy!
- Super cool distributed systems stuff starts Wednesday!