CSEE 3827: Fundamentals of Computer Systems, Spring 2022

Lecture 0

Prof. Dan Rubenstein (danr@cs.columbia.edu)

Today's Lecture: Course Logistics

- Just covering the structure of the class
  - Grading
  - HW & Office Hour Policy (P-credit)
  - CAs
  - Things to sign up for (course calendar, OH availability)
  - Very high-level overview of course
  - Book / pre-reqs

Disclaimer on Harassment

- Me or CAs must report any harrassment / claims of harassment to http://eoaa.columbia.edu

Your To-Do list for 3827 for this week

To-Do

- Get on EdStem through Courseworks (all sections will be through Section 1)
- Take a crack at HW #0 (available on Courseworks) in Files under HW
- By Next week: Provide your schedule for P-credit office hour (http://uribe.cs.columbia.edu/sched/table.php)

Lecture: 3 sections

- Tu,Th Sections
  - 10:10-11:25 (sec 1), 11:40-12:55 (sec 2)
- Fr 10:10-12:40 (sec 3)
- You are enrolled in 1 section
- Will merge course across sections as often as possible.
- Merged:
  - Courseworks/EdStem
  - Office Hour scheduling
  - HW
- Not Merged (officially):
  - Lecture times
  - Exams

Section Policy

- The registrar has you registered in a specific section
- It really doesn't matter what section you are in (with small exceptions described next slide). So you can
  - Attend any section's lecture (or go to more than 1)
  - Take the midterm or final in any section's time

Section Policy Exceptions

- If lecture room is overflowing (doubtful), priority given to:
  - a) people who haven't already attended an earlier version of the lecture
  - b) people who can't attend a later version of the lecture
  - c) people "officially enrolled"
- Exams: I will send out a Google form (later) getting your preferred section to take the exam in
  - I have "overflow" rooms available, so can handle high diversity of choices, but not everyone @ same time
  - I'll let you know if there's a problem with your 1st choice (and which room to go to)
  - Don't fill in the form and show up to a packed room for exam, you'll have to resolve another way

Communications

Ways to communicate

- Class (in lecture)
- Office hours
- By email
- On EdStem

Email: subject header

- To email Prof. Rubenstein + CAs: 3827-staff@lists.cs.columbia.edu
- Emailing just Prof. Rubenstein
  - Please include "3827" in the subject header of your email!!!
  - I batch course emails a few times a week
  - I search on "3827" in the subject. If it's not there, I will miss your email.

Courseworks/EdStem

- We will use Courseworks as little as possible. Only for
  - EdStem
  - to access Zoom
- We will be using EdStem exclusively for:
  - posting information (lecture notes, HW, solutions, etc.)
  - Online Q&A

Grading

"Raw" Grade

- "Raw" grade based on 3 parts:
  - M: midterm exam: midterm date Mar 10 "IN CLASS" (Mar 11 for Fri class - half time exam)
  - F: end-of-term exam:
    - Tentative Thurs May 12, 9-12 (for 10:10 class), 4:10-7 (for 11:40 class), Fri May 6 9-12 (for Friday class)
  - H: homework
- "Raw" score S = 10% H + Max(30% M + 60% F, 45% M + 45% F)
- If you have a conflict with these dates, let me (Prof. Rubenstein) know before Jan 25 (Tuesday). You'll probably have to take an oral exam (more on this later)…

"Boosted Grade"

- You can boost your final grade by attending office hours each week
- Office Hour participation score. If you get a score of P for office hours, your raw score will be:
- 100 P + (1-P) S (recall S = 10% H + Max(30% M + 60% F, 45% M + 45% F))
- More on office hour score (P) later…

Homework

- Homework will be assigned (8 or 9 HWs)
- Homework will be discussed / worked on in Office Hours
- Homework WILL BE submitted and graded on a 3 point scale:
  - 0: didn't do it, 1: poorly done, 2: mostly right, 3: almost perfect
- Do it to learn / be prepared to talk about something in office hours
  - Doing the homework will prepare you for exams.

HW #0

- There is an initial homework (not due) to make sure you have requisite background for course
  - Modular arithmetic
  - basic logic
  - bit shifts
  - scientific notation
  - data flow
  - power-of-2 questions (ways to arrange k bits, gate depth)
  - coding / memory

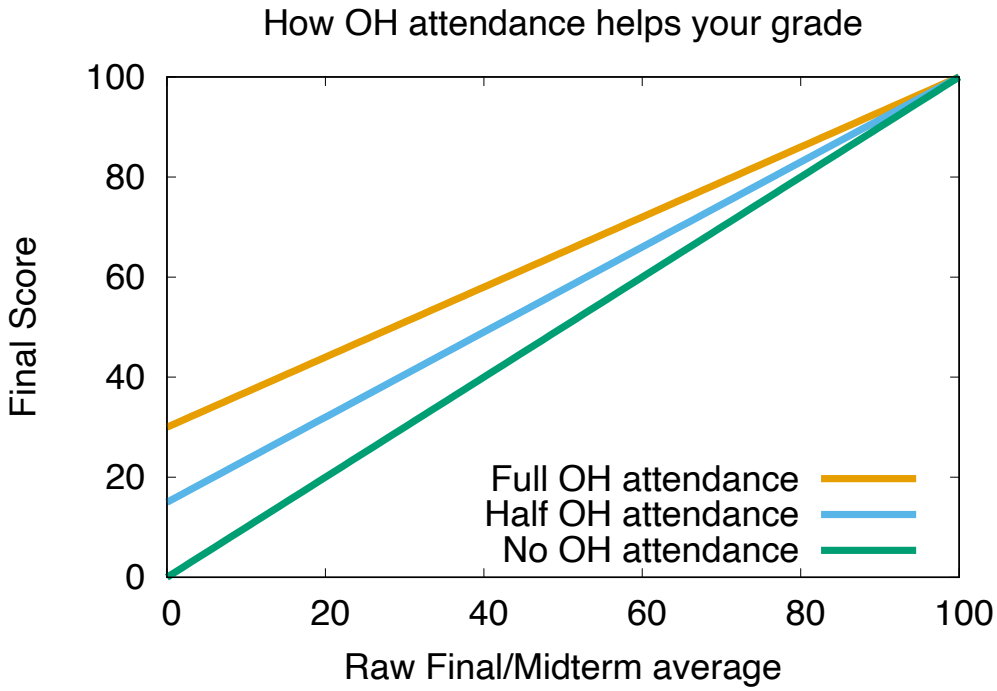
Office Hours and P-Credit

Office Hour Score (P)

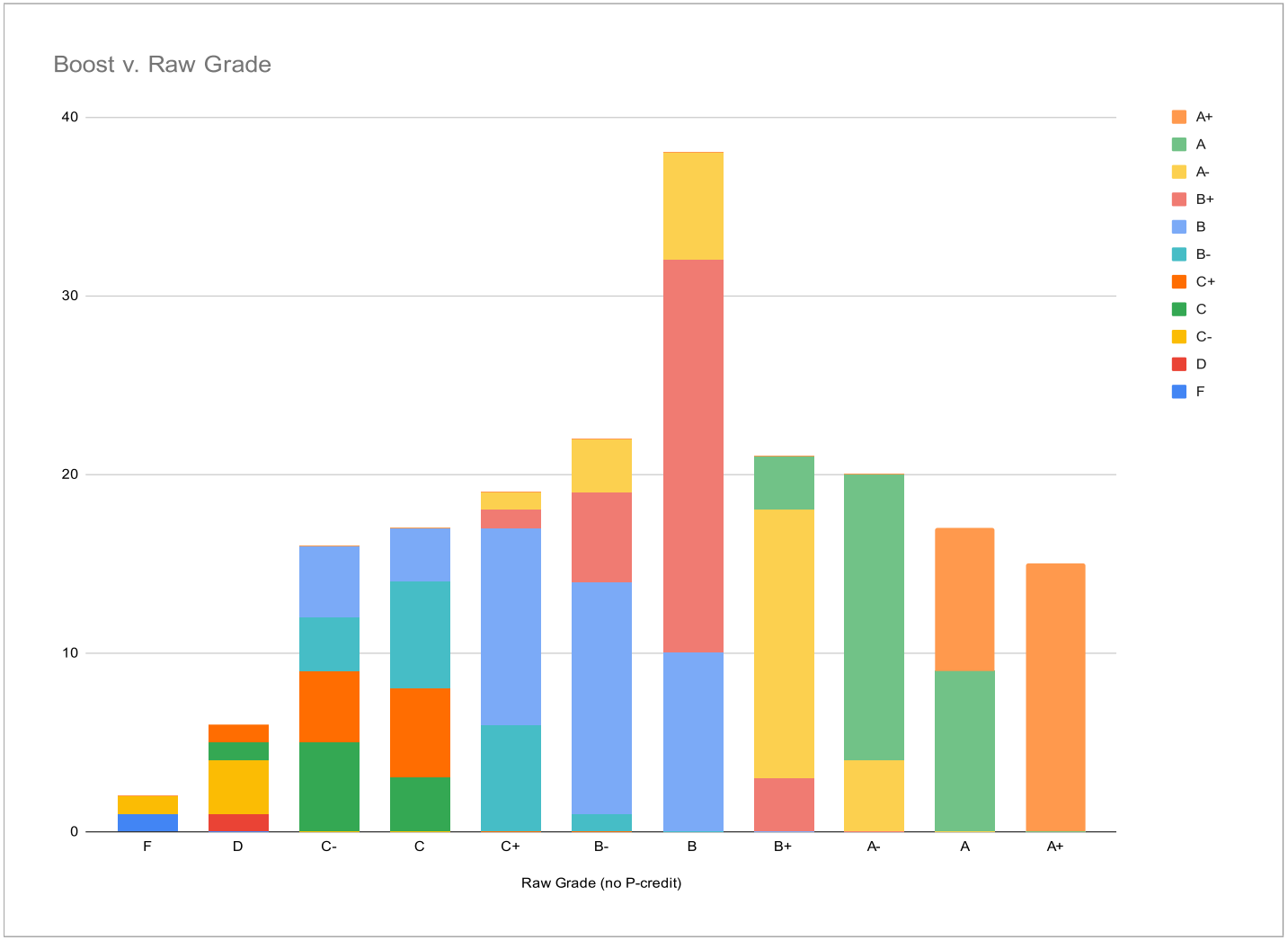
- Everyone will be assigned to a particular office hour
- You increase P by attending the full office hour
- You increase P by participating in the office hour
- You increase P by showing you've done your HW
  - Important: Enter your availability by 1/26 (next Wed) on http://uribe.cs.columbia.edu/sched/table.php
  - must provide at least 10 hour slots of potential availability
  - can select 1st, 2nd, 3rd choice per slot
  - choose hour blocks starting on any half-hour

More on P

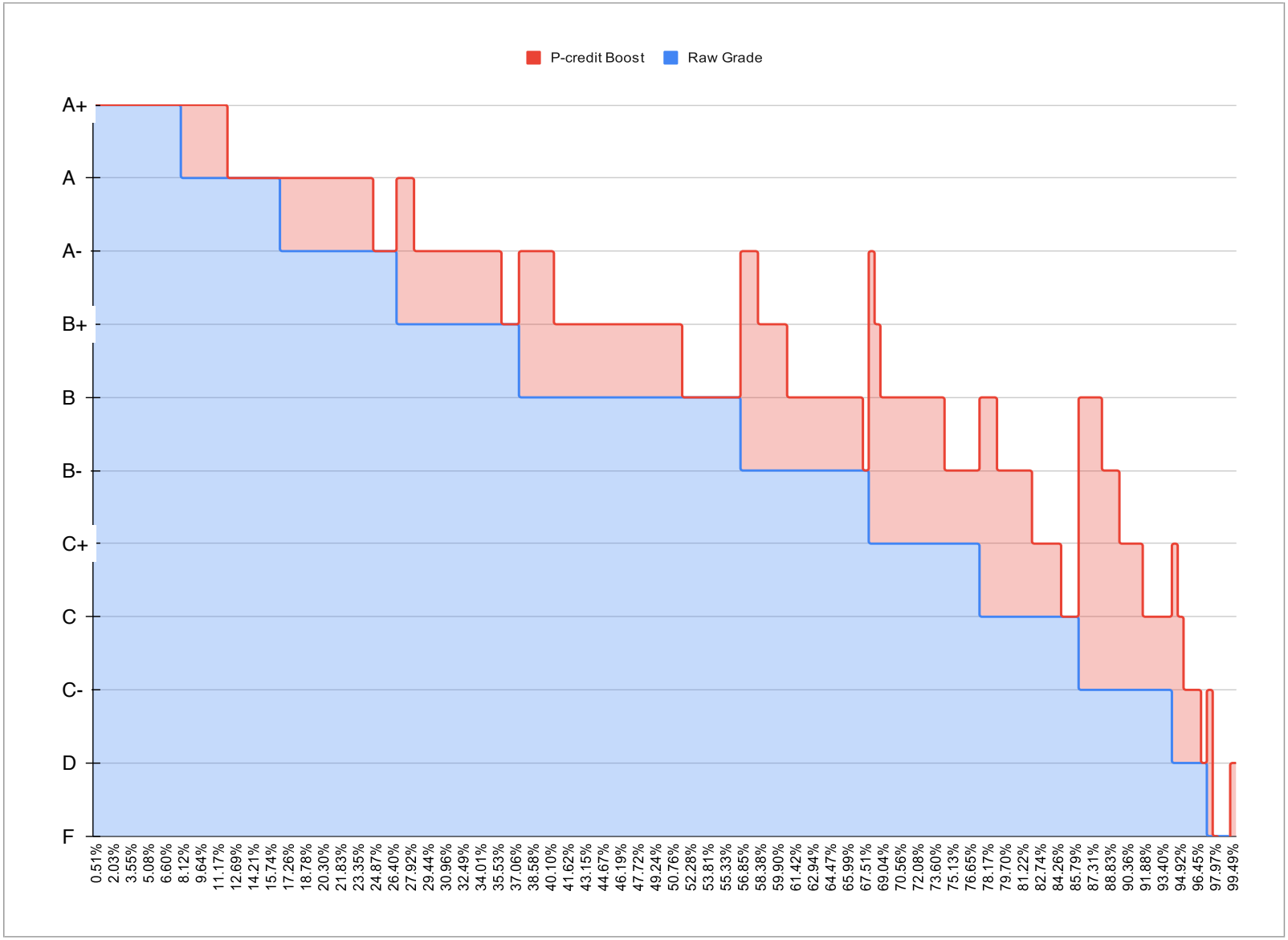
- Recall: Boosted score = 100 P + (1-P) * S
- 0 < P < 0.3 (you still have to take midterm and final exams)
- Never go to OH: P=0, boosted score = S
- Always go: P=.3, boosted score = 30 + 0.7 * S



3827 S'21 Grades (View 1)



3827 S'21 grades View 2



More on Office Hours

- You only get credit toward P by attending the office hour to which you were assigned
- You are still free to attend other office hours
- Prof. Rubenstein's OH not a P-credited OH, unless granted special permission
- CA's discretion to allow students to get credit for a non-assigned office hour (e.g., if can't make a session one week). Best if you ask in advance
- At most 1 credit per week (cannot make up for missed weeks by attending multiple OHs in a given week)
- Changing P-credit OH requires approval of CAs involved in change and Prof. Rubenstein

Thoughts on Office Hours

- Offer a great opportunity to really learn/understand the material
- You should go even if it wasn't part of the grade requirement
- The CAs are all excited to meet/work with you

CAs

CAs

- There should be 13-15 CAs - right now we have 12:

Andrew Tang <at3456@columbia.edu>
Joshua Kapilian <jhk2199@columbia.edu>
Tamjeed Azad <ta2553@columbia.edu>
Burcu Cetin <bc2714@columbia.edu>
Kennedy Salamat <kas2319@columbia.edu>
Habeeba Mansour <hm2853@barnard.edu>
Margherita Firenze <maf2299@columbia.edu>
Max Helman <mhh2148@columbia.edu>
Eumin Hong <eh2890@columbia.edu>
Erinn Sun <ys3409@columbia.edu>
Marvin Limpijankit <ml4431@columbia.edu>
Diego Jose Largacha Urrutia <djl2188@columbia.edu>

- All CAs and Professor will be reachable via email address: 3827-staff@lists.cs.columbia.edu
- also through EdStem

Office Hours Calendar

- Google/iCal calendar available listing our (Prof, CA) office hours
- Will be updated if office hours need to change in any week (e.g., cancelled, moved)
- Calendar link:
  - ical: https://calendar.google.com/calendar/ical/16uc8kberc2b6dtltq6e49dv3k%40group.calendar.google.com/public/basic.ics
  - html: https://calendar.google.com/calendar/embed?src=16uc8kberc2b6dtltq6e49dv3k%40group.calendar.google.com&ctz=America/New_York

The Course

Course is about…

- Building a computer from a digital / logical perspective
  - Intro/Overview
  - working with booleans (1=TRUE, 0=FALSE, basic arithmetic, integer # representations)
  - use AND, OR, NOT operations
  - Build simple boolean expressions / circuits that are used in computing:
    - shifter, decoder, encoder, adder, etc.
    - learn how to simplify circuits (K-maps)
    - build basic circuits with "state" (latch, flip-flop)
    - build common stateful circuits (counter, register)

Course about (cont'd)

- Design stateful circuits via state machines
- RAM Memory design
- Register design

- Part 2 of course: use the circuits designed in part 1 to build a computer
  - MIPS Architecture and MIPS assembly
  - ALU design, control word processing
  - Building MIPS microprocessor (incl. branching and jumps)
  - Pipelined architecture

- Part 3: Some memory hierarchy details (caching, virtual memory)

Knowledge for class

- High school algebra (we'll do boolean instead of base 10), e.g., material covered in COMS 3203
- higher-level programming language (than assembly language), e.g., C-language, java, python
- Knowledge of assembly language very helpful, but not required (will be teaching MIPS)

Books (not required)

Reorder	ISBN	Title	Authors	Publisher	Copyright	Price
1	9780133760637	Logic and computer design fundamentals	Mano, M. Morris,	Pearson,	[2016]	$242.60
2	9780124077263	Computer Organization and Design, 5th Edition	Patterson & Hennessy	Morgan Kaufmann	2013	$89.95

- Will you really need them? Not in my opinion, but some students find them helpful

Course Lecture Slides

- Slides will be made available (from previous years) on Courseworks
- I used to teach using slides - students complained, so this semester I'll be teaching on the board mostly
- After going on Courseworks, click on "Files"

HW vs. Exams

- HW can be tedious and/or challenging: trying to accommodate students at all levels. Every question does have a purpose.
- Exam questions like medium-difficulty HW questions.
  - Exams meant to assess how well you know material. Not meant for everyone to get 100
  - To get 100, you must not only understand the material, but demonstrate aptitude for it.
  - We try to be generous with partial credit on exams
- Do the HW: it will help greatly with the exams
- Attend Office Hours:
  - lessens the "pain" from a bad test
  - we have better sense how well you understand the material

Lecture v. HW v. Exams

- Lecture explains the concepts
- HW is where you apply the concepts using what was taught in lecture
- Exams are where you demonstrate mastery of the concepts
- Some students don't see the connection between lecture, HW, exam

Attendance / Announcements

- Attendance in lecture is not mandatory, but…
- Material is cumulative, the course builds on previous material: miss a lecture and the next one might be confusing
- Announcements that are made in class hold, and ARE NOT GUARANTEED TO BE REPEATED ON-LINE
  - It's your responsibility to find out what you missed
    - Don't ask Professor or CAs
    - Please limit such questions on EdStem (I won't answer)
    - Find a "class buddy" or 2 (now) - ask them.

Missed Exam

- You need a very good excuse (sickness with Dr note, family emergency, etc.)
- If you cannot take regular exam, I will give you a 1-on-1 oral exam.
  - It's scary (for you)
  - It's harder than the written exam, graded less leniently (no partial credit)

Final Thoughts

- Help your grade:
  - Go to office hours (don't be shy or ashamed): your tuition $$$ pay for this, you should take advantage
  - Participate in Class
- Don't cheat:
  - it's wrong, selfish, unfair to other students, unfair to your own education
  - I will report suspicious activity to the Dean's office
  - I reserve the right to reduce a student's grade (all the way to an F if I feel it's warranted) for students caught cheating

To-Do

- Mak sure you can get on EdStem (through Courseworks)
- Take a crack at HW #0 (available on Courseworks) in "Files"
- When your schedule is finalized: provide availability for P-credit office hour (http://uribe.cs.columbia.edu/sched/table.php)