Review and Wrap Up
Announcements

- Final Exam, Tuesday 8-11am slot
  - Alternate 3pm Tuesday
  - We will email those with alternates/accommodations soon.
- One last HW, and final time to use slip days on Ants.
  - Also, make sure to address composition feedback from the tutors.
- The grading info is all based on points you earned
  - Sum everything up! (Everything except lecture self-checks are in Okpy.)
    » Almost everyone is getting 20/20 on the lecture self-checks. That’s the point. 😊
- 200 points is a pass! You don’t need to take the final exam.
- http://howamidoing.cs88.not.cs61a.org/
Head Teaching Assistants

Shreya Kannan
Office Hours: Friday 10 am - 12 pm
shreyakannan@berkeley.edu

Hi everyone, I'm super thrilled to meet y'all this semester! In no particular order, I prefer musicals over concerts, cold over warm weather, dancing over singing, and sushi over tacos. Feel free to talk to me about great restaurants, cool study spots, and of course, CS 88 ;)

Vandana Ganesh
Office Hours: Monday 10 am - 12 pm
vandanag@berkeley.edu

Hey everyone, I am super excited to meet all of you virtually! This is my 3rd time TAing for 88, but my 5th time being involved with it and I look forward to a great semester. A bit about me - I enjoy going on walks, attempting painting/drawing (recently), and going through my favorite tv shows, movies, and books. Feel free to come to me with recommendations and definitely feel free to reach out about CS 88!

Teaching Assistants
# Teaching Assistants

<table>
<thead>
<tr>
<th>Name</th>
<th>Office Hours</th>
<th>Email</th>
<th>Introduction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lukas Chang</td>
<td>Thursday 1 - 2 pm</td>
<td><a href="mailto:lukasc@berkeley.edu">lukasc@berkeley.edu</a></td>
<td>Hi everyone! I'm excited to work with you all this upcoming semester! I'm Lukas, a 2nd year CS major from the bay area. This is my first semester TAing, but my second teaching CS88 material. A little about me—in my free time I love making music though I kind of suck at playing piano, and I also like going on nightly walks. I hope I can share my love for CS with all of you!</td>
</tr>
<tr>
<td>Sophia Qin</td>
<td>Tuesday 9 - 10 am</td>
<td><a href="mailto:sophia.qin@berkeley.edu">sophia.qin@berkeley.edu</a></td>
<td>Hi! I'm Sophia, a fourth-year EECS major from sunny SoCal. In my free time, I love experimenting with new dessert recipes, watching sunsets, and binging the Office. Feel free to reach out to me about anything! :D</td>
</tr>
<tr>
<td>Nicholas Ng</td>
<td>Tuesday 2 - 3 pm</td>
<td><a href="mailto:nickng589@berkeley.edu">nickng589@berkeley.edu</a></td>
<td>Hi! I'm Nicholas, and I'm a third year Computer Science Major from the San Gabriel Valley. I like playing video games (I probably spent too much of my summer playing Valorant), and every once in a while I'll go outside for a run (but not really though). I look forward to meeting everyone!</td>
</tr>
<tr>
<td>Tommy Joseph</td>
<td>Tuesday 1 - 2 pm</td>
<td><a href="mailto:tommy11jo@berkeley.edu">tommy11jo@berkeley.edu</a></td>
<td>Hi, I'm a second-year CS major from Southern California. I enjoy experimenting with pasta recipes and playing sports that involve rackets or paddles. I look forward to meeting you all!</td>
</tr>
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UC Berkeley | Computer Science 88 | Michael Ball | http://cs88.org
Tutors

Kevin Gu
Office Hours: Monday 5:30 - 7:30 pm
kevinjgu@berkeley.edu
Hi everyone! I’m Kevin, a 4th year Data Science major and CS minor from Irvine, So Cal. I am so excited to be tutoring in this class again as I really like the content in this class. While I’m not analyzing data or programming/coding, I like to appreciate the humanities in general. Specifically, I love music, especially classical music or just any classics in general. I also love learning languages and enjoy talking/typing in French. Feel free to talk to me in any of these things, in either English, French (but speak SLOWLY please!), or even Python print statements and strings!

Minnie Chen
Office Hours: Thursday 6 - 8 pm
chn_minnie_22@berkeley.edu
Hi, I’m Minnie and I’m a third year Civil Engineering major and EECS+Sustainability minor from San Gabriel Valley. When I’m lazy, I enjoy watching all kinds of movies/shows (from cheesy rom-coms to horrors and action) and when I’m not feeling like a couch potato, I love to do physical activities like hiking or basketball. Excited to meet everyone!

Matt Au
Office Hours: Friday 3 - 5 pm
mattau@berkeley.edu
Hello, I’m a 2nd-year CS major from Southern California. I enjoy listening to music, watching food tiktoks, and learning about investing on r/wallstreetbets. I look forward to meeting you all!
THANK YOU!
The One Big Thing...
Abstraction

• Detail removal
  “The act of leaving out of consideration one or more properties of a complex object so as to attend to others.”

• Generalization
  “The process of formulating general concepts by abstracting common properties of instances”

• Technical terms: Compression, Quantization, Clustering, Unsupervised Learning

Henri Matisse “Naked Blue IV”
The Power of Abstraction, Everywhere!

- **Examples:**
  - Functions (e.g., $\sin x$)
  - Hiring contractors
  - Application Programming Interfaces (APIs)
  - Technology (e.g., cars)

- **Amazing things are built when these layer**
  - And the abstraction layers are getting deeper by the day!

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We only need to worry about the interface, or specification, or contract NOT how (or by whom) it's built

Above the abstraction line

Abstraction Barrier (Interface)
(the interface, or specification, or contract)

Below the abstraction line

This is where / how / when / by whom it is actually built, which is done according to the interface, specification, or contract.
Abstraction: Pitfalls

• Abstraction is not universal without loss of information (mathematically provable). This means, in the end, the complexity can only be “moved around”

• Abstraction makes us forget how things actually work and can therefore hide bias. Example: AI and hiring decisions.

• Abstraction makes things special and that creates dependencies. Dependencies grow longer and longer over time and can become unmanageable.
Is Your Brain Full Yet?

Python Tools:
• Data type: values, literals, operations,
• Expressions, Call expression
• Variables
• Assignment Statement, Tuple assignment
• Sequences: tuple, list
• Dictionaries
• Function Definition Statement
• Conditional Statement
• Iteration: list comp, for, while
• Lambda function expr.

• Higher Order Functions
  – Functions as Values
  – Functions with functions as argument
  – Assignment of function values
  – Function factories – create and return functions

• Higher order function patterns
  – Map, Filter, Reduce

• Recursion
• Abstract Data Types
• Mutation
• Class & Inheritance
• Exceptions
• Iterators & Generators
• SQL / Declarative Programming
Keep on Programming
Where to go from here?

<table>
<thead>
<tr>
<th>Year</th>
<th>Course 1</th>
<th>Course 2</th>
<th>Course 3</th>
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<tbody>
<tr>
<td>2018</td>
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<td>2022</td>
<td>CS88</td>
<td>CS61A</td>
<td>CS61B</td>
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CS Major Options:
The Data Science Major

- **Computational & Inferential Depth**
  - Data 8: Foundations of Data Science
  - Data 100: Principles & Techniques of Data Science

- **Modeling, Learning & Decision Making**
  - Probability

- **Domain Emphasis**
  - Electives

- **College Breadth & Electives**

- **Human Contexts & Ethics**

**Foundational Lower Division**

- Mathematics
- Computing

**Individualized Upper Division**

- 30 units

Data Science Info: [https://data.berkeley.edu/2020-cal-week](https://data.berkeley.edu/2020-cal-week) (Recordings)
There’s also a minor!
Ask Is Anything!
THANK YOU!

(Again!)