Berkeley Time!

All lectures, sections, etc. will start 10 minutes past the official start time, as is Berkeley tradition! In the meantime, check out this fun word cloud of your classmates' interests and chat.

Lecture 1: Introduction

June 21st, 2022

Richard, Laryn, Cooper
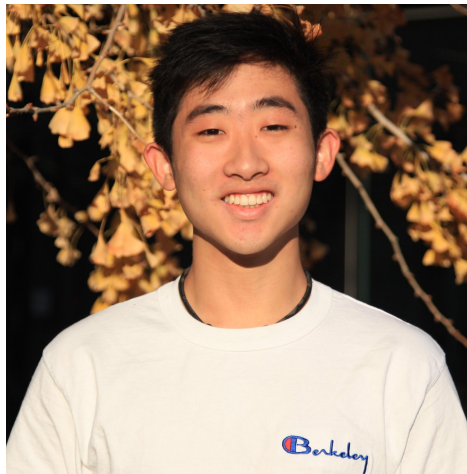
Welcome to CS 61A!

Humans of CS 61A

Instructors

Richard Roggenkemper (he/him/his)
roggenkemper@berkeley.edu
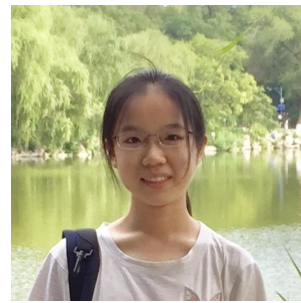
Laryn Qi (he/him/his)
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Cooper Bedin (any/all)
cooper.bedin@berkeley.edu
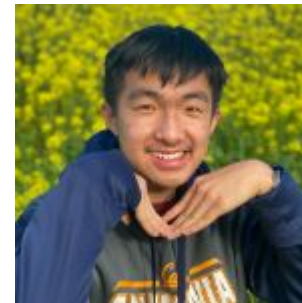
TAs!

Tutors!
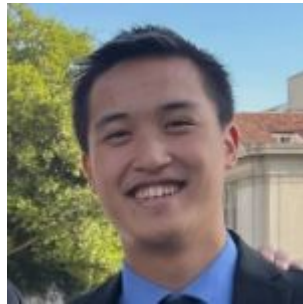
You!

**460+ students
31+ majors
UC Berkeley Students, Visiting
Students, High Schoolers**

Computer Science

What is Computer Science?

- What problems can be solved using computation?

- How do we solve those problems using computers?

- What techniques lead to effective solutions?

Systems

Artificial Intelligence ——————————— Games

Graphics   Computer Vision

Security   Natural Language Processing

Networking   Robotics

Programming Languages   Machine Learning

Theory   ...

...
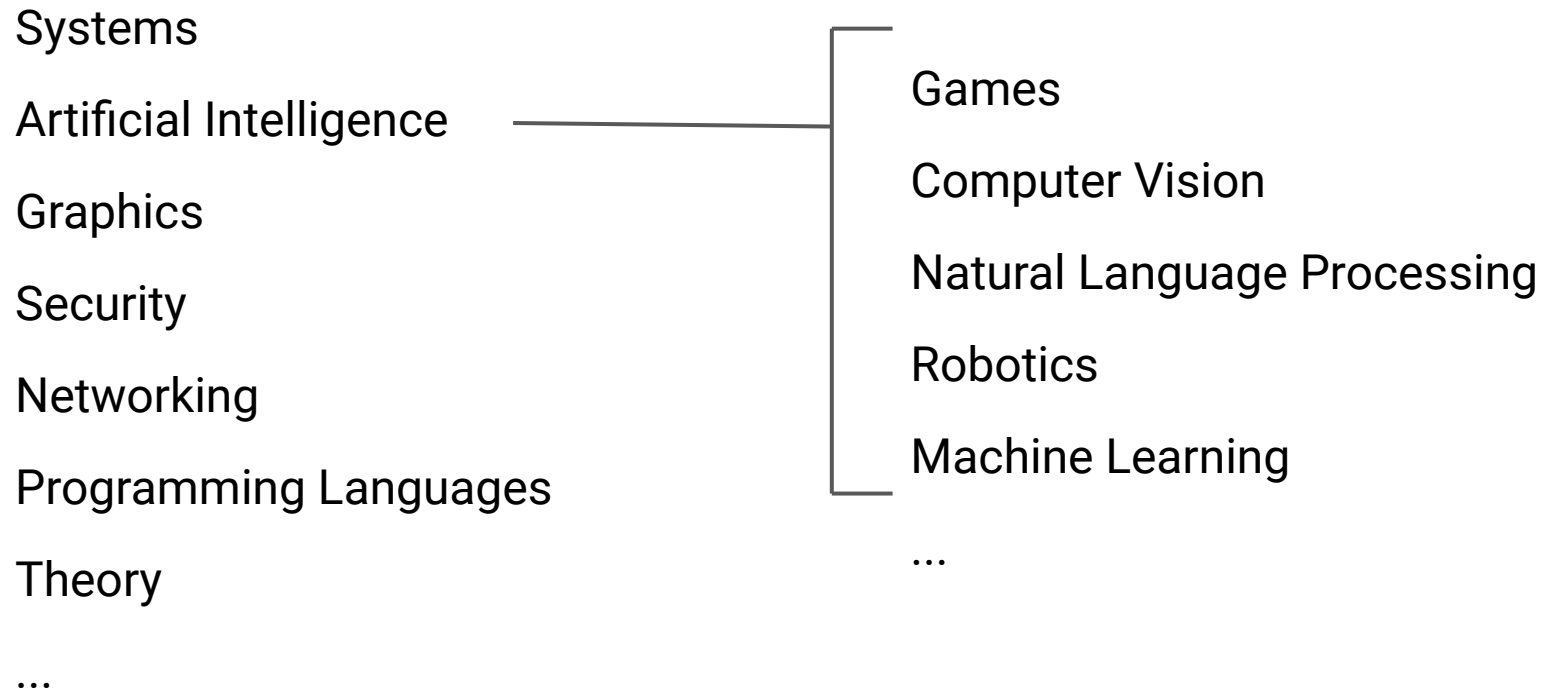
What is CS 61A?

- A course about managing complexity
  - Mastering abstraction
  - Programming paradigms

- An introduction to programming
  - Full understanding of Python fundamentals
  - Combining multiple ideas in large projects
  - How computers interpret programming languages

- Different languages: Scheme & SQL

- A challenging course that will demand a lot of you

Alternatives to CS 61A

CS10: **The Beauty and Joy of Computing**

An introduction to fundamentals (& Python) that sets students up for success in CS 61A

cs10.org
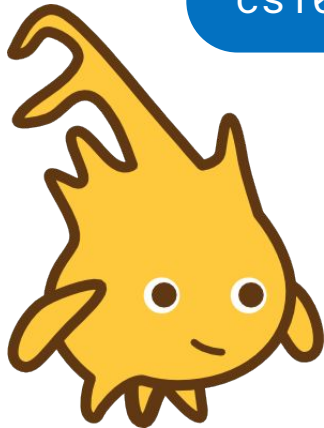
Data 8 **The Foundations of Data Science**

Fundamentals of computing, statistical inference, & machine learning applied to real-world data sets

data8.org

Course Format

Course Format

Lecture   MTWTh 11am-12:30pm in Dwinelle 155

Discussion   the most important part of this course

Lab   the most important part of this course

Office hours   the most important part of this course

Tutoring   the most important part of this course

Textbook   composingprograms.com

- 8 programming **homeworks**
- 4 programming **projects**
- 1 **midterm exam** and 1 **final exam**
- Lots of course support and a great community

Lecture

- Time/Location: 11am-12:30pm in Dwinelle 155 on M/T/W/Th

- First introduction to the material taught by instructors

- Nothing you need to prepare for lecture, just be ready to listen and take notes!

- You will have opportunities to ask questions about the material

- Will be recorded so you can re-watch later

- Alternative: Pre-recorded lectures by Professor John DeNero

  - These will not have announcements and may not be up to date

Lab

- Time/Location: Lots of different times on M/W, Soda Hall

- 90 minutes, twice a week

- Practice working with the material with brief review, good practice for homework and projects

- Assignment completed on your computer

- Lab section run by your TA

- You can work with other students on the problems and get help from TA and Academic Interns (AIs)

- Can be done independently, but attending 8 lab sections is required

Discussion

- Time/Location: Lots of different times/locations on T/Th

- 90 minutes, twice a week

- Practice working with the concepts more in the direction of what might seem on an exam

- Taught by your TA with more conceptual review & mini-lectures

- Nothing to turn in, just practice with the material

- Cannot be done independently, must come to section to get attendance credit

- Attending 8 discussions is required for full credit

- Sign up for Lab & Discussion on sections.cs61a.org – open now!

Office Hours

- Time/Location: Lots of different times/locations throughout the week (including online)

- This is a chance to get 1-on-1 help with the assignments during the week

- 2 options to get help

  1. Create an appointment online and you will be helped at the chosen time

  2. Come in person and put your name down on the queue and get help when it's your turn

- TAs/Tutors will spend about 10-15 minutes helping you out with your problem from lab, homework, or project

Small Group Tutoring

- Optional small group tutoring will be provided to students

- 1 hour, twice a week

- These sections will be taught by a tutor with 4-6 students in a section

- It will be a supplement to lab/discussion, not a replacement

- Great chance to practice the material and problem solving more

- Sign up information will be out later this week

Lab Assignments

- Usually more introductory to the material.

- Attending lab section to work on the lab assignment is highly encouraged.

- Each lab is worth 1 point and you can receive a maximum of 10 points, but there will be more than 10 labs

- ~2 days to complete each lab.

Homework

- Often more difficult problems (conceptually or implementation-wise).

- You will get 1 homework drop

- ~4 days to complete each homework.

Projects

- Contains many problems that work together to build a project (such as a game, or later, an interpreter).

- More difficult and longer than homeworks, labs

- ~1.5 weeks to complete each project with some checkpoints before the deadline

- Some projects will be group (pairs of 2) projects

Optional Assignments

- If you have time and want an excuse to work on some fun project prompts, we will have some optional assignments

- Coding recursive art

Weekly Schedule

	Monday	Tuesday	Wednesday	Thursday
Morning		Complete lab		Complete lab
11:00 AM-12:30PM	Lecture	Lecture	Lecture	Lecture
Afternoon	Lab	Discussion	Lab	Discussion

Exams

Midterm:

- 64 points of your grade

- Roughly halfway through the summer session (7/14)

- ~ 3 hours

Final:

- 96 points of your grade.

- At the end of the summer session (Tentatively 8/11).

- Cumulative (as the course itself is also fairly cumulative in its ideas).

- ~ 3 hours.

We will have a *full* clobber policy!

Important Websites

cs61a.org
- Hub for all things related to CS 61A! Lectures, assignments, etc

Piazza
- Ask questions and view announcements here

composingprograms.com
- Read the free, online textbook here

okpy.org
- Submit all your coding assignments here

howamidoing.cs61a.org
- Check your grades in a convenient online interface here

oh.cs61a.org
- Get help in Office Hours here

Grading

- Grading bins, not curved (everyone could get an A)

- These will not change

A+	≥ 305	A	≥ 285	A-	≥ 270
B+	≥ 250	B	≥ 225	B-	≥ 205
C+	≥ 190	C	≥ 180	C-	≥ 175
D+	≥ 170	D	≥ 165	D-	≥ 160

Discussion Participation
2.7%

Lab Participation
2.7%

Lab Assignments
3.3%

Lab0
0.3%

Homework
4.7%

Projects
33.0%

Midterm
21.3%

Final
32.0%

64

96

99

14

10

8

8
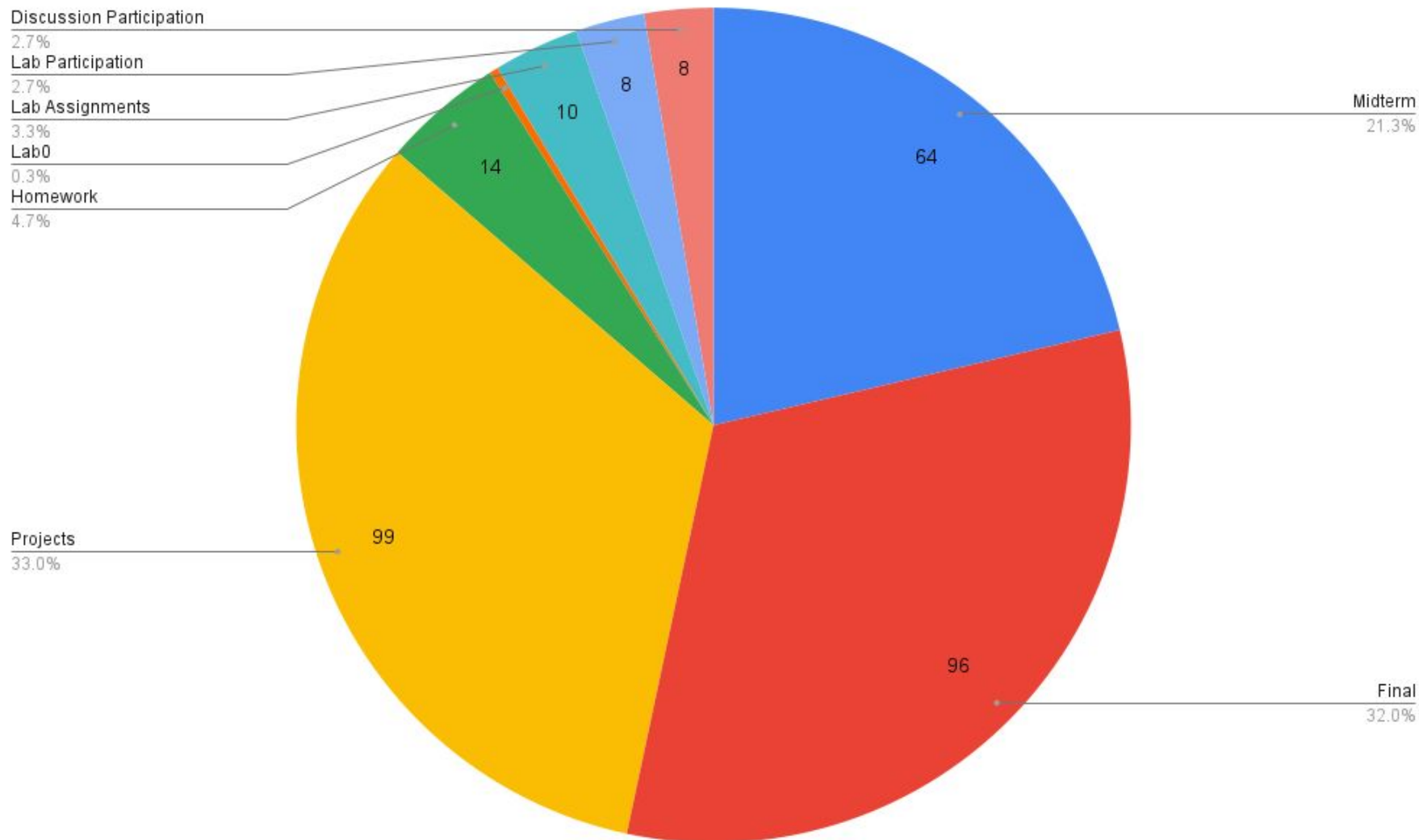
Academic Misconduct

- We actively encourage collaboration in this class!

- Do:

  - Discuss concepts

  - Share approaches to problems

  - Problem solving, debugging, exam tips

  - Share lab code & share project code <u>with your project partner</u>

- Do not:

  - Share (send nor receive) code with students who are not your project partner or the internet

  - Collaborate on an exam → **F**

- Rather than copying someone else's work, ask for help in Office Hours or Piazza!

Quick Break

Extensions and Accommodations

DSP Accommodations

- If you are enrolled in DSP (the Disabled Students Program), please reach out to your specialist to have them send us a letter, if they have not already

- We will provide accommodations in line with what is given to us in your letter—this most commonly includes increased flexibility on extensions or extended time on exams

- When we have received an accommodations letter for you, you will receive an email from us confirming that and what your provided accommodations will look like—if you do not receive such an email from us, please reach out (this may take some time, we are human too. Emails from us will begin to be sent out 6/24)

- If you are not enrolled in DSP but believe you are eligible for accommodations, you can visit https://dsp.berkeley.edu/ to begin the process of getting enrolled. We also recommend you book an accommodations appointment

Extensions

- We have a process for extensions! Sometimes life happens and we want to make sure that extenuating circumstances don't negatively impact your ability to succeed in the class

- You can request an extension by filling out https://go.cs61a.org/extensions (also linked on the "Contact" page of the course website)

- Any extension for 24 hours (1 day) past an assignment deadline will be granted automatically, no questions asked

- Any extension for up to 72 hours (3 days) past an assignment deadline, made by a DSP student with an accommodation for assignment extensions, will be granted automatically

- We will be flexible and reasonable with longer extensions—our goal is to support your well-being and ensure that you're keeping up with the class, not to enforce arbitrary deadlines

- This class over the summer moves very quickly. If you feel as though you need a lot of extensions or some extenuating circumstance is impacting your ability to complete assignments on time, please book an accommodations appointment to discuss further possible arrangements

Accommodations Appointments

- You can book a short appointment to discuss accommodations at
  https://go.cs61a.org/accommodation-appts if you believe extenuating
  circumstances will affect your ability to perform in the class. This will give you the
  opportunity to meet with one of our student support TAs to talk about ways we
  can make this class work best for you

- You can book an appointment for any reason, especially regarding personal,
  family, or medical emergencies. We also recommend that you book an
  appointment if you believe that you are eligible for DSP accommodations and are
  currently going through the process of enrolling in DSP, as we can discuss ways to
  support you intermediately while you are enrolling

Support Resources (Academic and Otherwise)

Finding resources

- We have a lot of study resources linked here on our course site! https://cs61a.org/resources/—this is great if you're looking for extra review materials

- We also have a collection of campus resources linked here—https://cs61a.org/articles/campus-res/, which can be helpful for support in all kinds of things, from adjunct tutoring to basic needs services

Tutoring

- We will have supplemental tutoring sections this summer

- There will be small group tutoring where you will be put in 4-6 person groups and will meet with a tutor twice a week for an hour and do a worksheet

  - Students historically have signed up for these sections if they feel like they want more time to work on the content and get more practice

- We will also have an online tutoring section, which will be similar, but will be bigger

  - This is meant for students who want more practice but either are uncomfortable attending the section in person, are remote, or are unable to sign up for a small group section

  - This will be recorded

Advising OH

- Most office hours are reserved for questions that directly pertain to course content, however, some TAs offer advising office hours as well—you can find more information at https://cs61a.org/articles/advising/

- These are a great opportunity to ask about study strategies, do a grade check-in, talk about research or internship opportunities, planning for future CS courses, or anything else you want to ask about!

2x Section

- We will have a 2x Discussion/Lab section which will move at a faster pace than a normal section

- In addition, you will most likely cover some exam level problems during these sections

- You do not need to attend these to do well on exams, they are meant to help students with more experience

Class Climate

In this section we will be briefly discussing sexual harassment and discrimination—if you would not feel comfortable being present for this part of lecture you may use this time to step out (we'll take a short break)

Sexual Harassment

- Often, people don't realize they are sexually harassing someone. The behavior still has the same impact and **impact is what matters**

- What is it?

  - Unwanted sexual or romantic advances:

    - Repeatedly asking someone out

    - Unwanted physical contact

    - Unwanted comments on someone's physical appearance

- See a full list in the [UCOP policy on SVSH](#)

Professional Boundaries

- While the summer session is happening, you should maintain professional boundaries with course staff (Tutors/TAs/AIs)

- Don't message them on social media or dating apps, don't give them physical compliments, don't flirt with them

- Just let them do their job

Reporting SVSH

- All faculty and staff members are Mandated Reporters. If we ever receive an incident report, we will need to make a report to OPHD—we cannot act as confidential resources

- Two goals to reporting

  - Getting you the support you need

  - Increasing our awareness of incidents so that we can try to make improvements

Where to Report

- [Office for the Prevention of Harassment and Discrimination](): Includes an online reporting form
- [Path to Care](): Includes 24/7 care line and advocate appointments
- [CS 61A Anonymous Feedback Form](): If you want to stay anonymous but make the instructors aware of something that happened in the course
- [EECS Anonymous Climate Form](): This will make the EECS department aware of any issues. You can also contact Susanne Kauer ([skauer@berkeley.edu]()) directly.

Racism

- In previous semesters of CS 61A, students reported that other students made racist comments suggesting that they did not belong in CS

- We live in a society with a long history of racism and need to actively combat that in both our actions and language

Community Values

- From the [Berkeley Principles of Community](#):

  - "We affirm the dignity of all individuals and strive to uphold a just community in which discrimination and hate are not tolerated"

- From the EECS Mission:

  - "Diversity, equity, and inclusion are core values in the Department of Electrical Engineering and Computer Sciences. Our excellence can only be full realized by faculty, students, and staff who share our commitment to these values. EECS's mission is to serve the communities to which we belong, at local, national, and international levels, with a deep awareness of our ethical responsibilities to our profession and to society"

- We need to bring more people into CS, so that tech can create a better future for all

Resources

- Our staff has put together [a set of campus resources](#) that includes links for reporting and many other helpful links

Behavior We Want to See

- **Helping each other** understand concepts in the class, whether in section, Piazza, or study groups, without expectation of anything in return

- **Saying "congratulations" to classmates** when they finish an assignment, receive a job offer, get into a club, etc.

- **Being a great partner while pair programming.** If driving, listen to what your partner suggests and consider their suggestions. If navigating, brainstorm ideas for how to tackle the problem, re-read the project description, check Piazza, etc.

- **Recognize that we're all valuable members of the CS community!**

Expressions

$$20 + 21$$

$$2^{100}$$

$$\sin \pi$$

$$\lim_{x \to \infty} \frac{1}{x}$$

$$f(x)$$

$$\frac{20}{21}$$

$$\sum_{i=1}^{n} i$$

$$\log x$$

$$\sqrt{2021}$$

$$\binom{n}{x}$$

$$-2021$$

An **expression** describes a computation and evaluates to a value.

Expressions in Python

- The Python Interpreter evaluates expressions and displays their value

>>> 1 + 2   # add 1 to 2, output the result

3

>>> 3 ** 2   # square 3, output the result

9

$$20 + 21$$

$$2^{100}$$

$$\sin \pi$$

$$\lim_{x \to \infty} \frac{1}{x}$$

$$f(x)$$

$$\log x$$

$$\frac{20}{21}$$

$$\sum_{i=1}^{n} i$$

$$\sqrt{2021}$$

$$\binom{n}{x}$$

$$-2021$$

An **expression** describes a computation and evaluates to a value.

What is a computer program?

- We will use **programs** to do manipulation of **values**

- **Expressions** in programs evaluate to values

- These expressions can be represented by **function calls** in Python

Call Expressions

Evaluation procedure for **call expressions**

1. Evaluate the **operator**

2. Evaluate the **operands** from left to right

3. **Apply** the operator (a **function**) to the evaluated operands (**arguments**)

$$add \quad (\quad 2 \quad , \quad 3 \quad)$$

Operator   Operand   Operand   Apply!

Operators and operands are also expressions

So they also *evaluate to values*

add(add(6, mul(4, 6)), mul(3, 5))

Operator   Operand   Operand

Nested Call Expressions

- Humans evaluate inside-out

```
add(add(6, mul(4, 6)), mul(3, 5))

add(add(6,    24    ), mul(3, 5))

add(add(6,    24    ), mul(3, 5))

add(          30     , mul(3, 5))

add(          30     , mul(3, 5))

add(          30     ,     15    )

add(          30     ,     15    )

                45
```

- We can jump ahead or skip around, but Python can't do that!
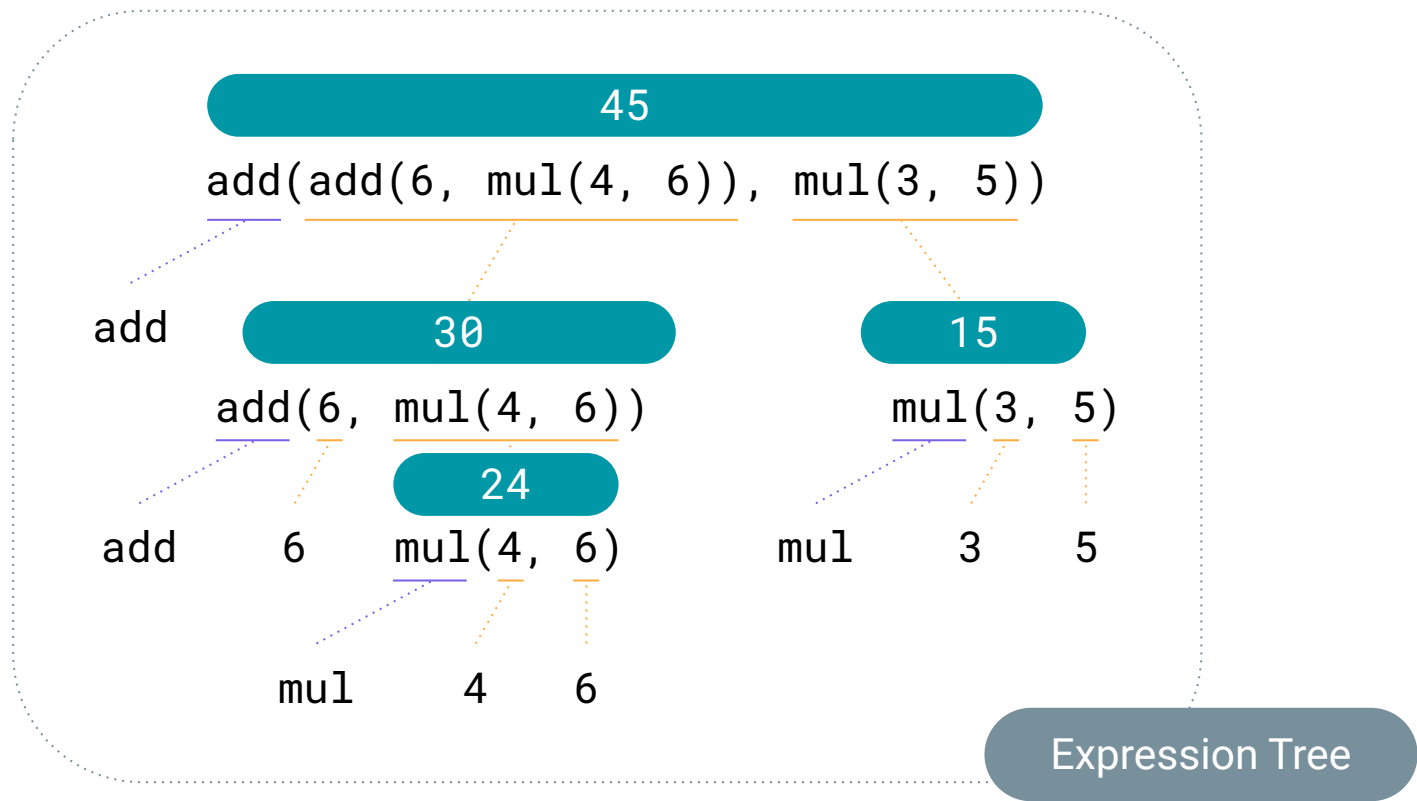
- How does the computer know which call to evaluate first?

Nested Call Expressions

1 Evaluate operator   2 Evaluate operands   3 Apply!

```
                            45
        add(add(6, mul(4, 6)), mul(3, 5))

add              30                    15
        add(6, mul(4, 6))         mul(3, 5)
                    24
add      6      mul(4, 6)      mul    3    5

              mul    4    6
```

Expression Tree

Values, Expressions, Objects, and Data

What's happens next?

- Today: Sign up for & Attend Discussion 00 (if you haven't already)

- Tomorrow: Lecture 2, Lab 00

- Thursday: Lecture 3, Discussion 01, Technical OH

- Friday: Lecture 4, Technical OH

- Ask any questions you have after lecture today or on Piazza

Let's have a great semester!