

CS 2

Introduction to Programming Methods

Welcome to CS 2!





- My pronouns are **they/them**.
- Call me “Adam” or “Prof. Blank”.
- I **care** about your experience in this course and at Caltech.
- CS 2 is my **favorite** course to teach!
- I love my dog **Hopper**.

Outline

1 Administrivia

2 Introduction to Java

- CS is for **EVERYONE!!!!!!**

- CS is for **EVERYONE!!!!!!**
- Aim is to be **practical** and **useful**

- CS is for **EVERYONE!!!!!!**
- Aim is to be **practical** and **useful**
- Centered around **labs** and **projects**

- CS is for **EVERYONE!!!!!!**
- Aim is to be **practical** and **useful**
- Centered around **labs** and **projects**
- Active Learning

- CS is for **EVERYONE!!!!!!**
- Aim is to be **practical** and **useful**
- Centered around **labs** and **projects**
- Active Learning
- Difficult, time-consuming, but well-supported

- CS is for **EVERYONE!!!!!!**
- Aim is to be **practical** and **useful**
- Centered around **labs** and **projects**
- Active Learning
- Difficult, time-consuming, but well-supported
- Programming language is an implementation detail

Some of the labs/projects you will be implementing are:

- Mini Google Maps
- A scheme to hide text in images
- A guitar sound synthesizer
- An Othello bot

Lab

- Weekly “lab” like a chemistry or physics lab
- Practice that fits between lecture and projects
- Attendance is mandatory (lowest lab grade is dropped)

Lab

- Weekly “lab” like a chemistry or physics lab
- Practice that fits between lecture and projects
- Attendance is mandatory (lowest lab grade is dropped)

Projects

- These are what you’d usually call “sets”
- Some will be partner assignments
- Some will span multiple weeks
- This is where you will spend the bulk of your time in this course

Lab

- Weekly “lab” like a chemistry or physics lab
- Practice that fits between lecture and projects
- Attendance is mandatory (lowest lab grade is dropped)

Projects

- These are what you’d usually call “sets”
- Some will be partner assignments
- Some will span multiple weeks
- This is where you will spend the bulk of your time in this course

Office Hours

- Adam holds six office hours a week.
- Feel free to set up a private appointment if you prefer.
- TAs hold office hours at all kinds of times! Times posted on the course website.

During the course, we will...

- do lots of programming
- create a foundation for further study in CS
- create a foundation for using CS in other fields
- see lots of applications of CS to various fields
- have fun (???)

During the course, we will...

- do lots of programming
- create a foundation for further study in CS
- create a foundation for using CS in other fields
- see lots of applications of CS to various fields
- have fun (???)

After the course, you will be able to...

- program a medium-sized project on your own or in a group
- do CS interviews
- structure data to handle large data sets

During the course, we will...

- do lots of programming
- create a foundation for further study in CS
- create a foundation for using CS in other fields
- see lots of applications of CS to various fields
- have fun (???)

After the course, you will be able to...

- program a medium-sized project on your own or in a group
- do CS interviews
- structure data to handle large data sets

**This is the course where you stop thinking like a “programmer”
and start thinking like a Computer Scientist!**

Course Website

<https://debuggi.ng>

Grading

Two options:

Course Website

<https://debuggi.ng>

Grading

Two options:

- If you average $\geq 85\%$ on the labs and projects, your grade is 40% labs and 60% projects (i.e., you are exempt from the final)

Course Website

<https://debuggi.ng>

Grading

Two options:

- If you average $\geq 85\%$ on the labs and projects, your grade is 40% labs and 60% projects (i.e., you are exempt from the final)
- Otherwise, your grade is 30% final exam, 28% labs, and 42% projects

Our goal is to make CS 2 better **because** it's online. . .

So, we've restructured several aspects of the course with this in mind:

- Adam AMA Hour (10am on Wednesdays)
- Lecture (w/ discord breakout rooms)
- Lab (w/ discord breakout rooms)
- Exploration Sessions with TAs
- CS + X Affinity Groups (more on this soon)

- All slides and code from lecture will be available after both lecture instances have occurred.

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time
 - If you are unable to make either lecture time

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time
 - If you are unable to make either lecture time
 - If you have a special circumstance that prevents you from attending a small number of lectures

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time
 - If you are unable to make either lecture time
 - If you have a special circumstance that prevents you from attending a small number of lectures
 - Some other reason that you e-mail Adam about.

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time
 - If you are unable to make either lecture time
 - If you have a special circumstance that prevents you from attending a small number of lectures
 - Some other reason that you e-mail Adam about.

Notably, missing from this list is “I plan on replacing lecture attendance with recordings.”. Why? Because lecture will involve **doing** things not just watching me talk.

- All slides and code from lecture will be available after both lecture instances have occurred.
- Lecture recordings are a bit more complicated. In this course, the following are legitimate ways to use lecture recordings:
 - To review parts of lecture that I miss the first time
 - If you are unable to make either lecture time
 - If you have a special circumstance that prevents you from attending a small number of lectures
 - Some other reason that you e-mail Adam about.

Notably, missing from this list is “I plan on replacing lecture attendance with recordings.”. Why? Because lecture will involve **doing** things not just watching me talk.

So, lecture recordings will be made available to students **who attend that lecture**. In the past, I haven't recorded lectures at all as it makes me deeply uncomfortable.

The Big Picture

- “Duck” types vs. explicit types

```
variable = "hello"
```

```
String variable = "hello";
```

The Big Picture

- “Duck” types vs. explicit types

```
variable = "hello"
```

```
String variable = "hello";
```

- White-space vs. braces

```
1 if condition:  
2     do_something()  
3 else:  
4     do_something_else()
```

```
1 if (condition) {  
2     do_something();  
3 }  
4 else {  
5     do_something_else();  
6 }
```

The Big Picture

- “Duck” types vs. explicit types

```
variable = "hello"
```

```
String variable = "hello";
```

- White-space vs. braces

```
1 if condition:  
2     do_something()  
3 else:  
4     do_something_else()
```

```
1 if (condition) {  
2     do_something();  
3 }  
4 else {  
5     do_something_else();  
6 }
```

- Procedural programming vs. object-oriented programming
 - Python: code does not need to be in a function
 - Java: not only does code need to be in a function, but all functions must be in a class