

# Data Structures

## Introduction

CS 225

August 25, 2025

Brad Solomon



UNIVERSITY OF  
**ILLINOIS**  
URBANA - CHAMPAIGN

Department of Computer Science

# Learning Objectives

Get to know course staff

Introduce this year's Honors Course

An overview of course expectations, goals, and structure



# Who am I?



**Brad Solomon** (He/him/his)

Teaching Assistant Professor, Computer Science

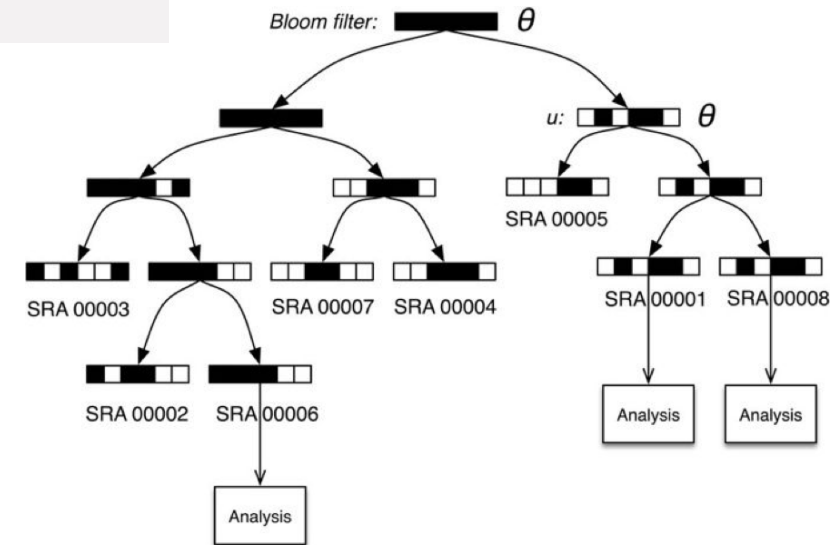
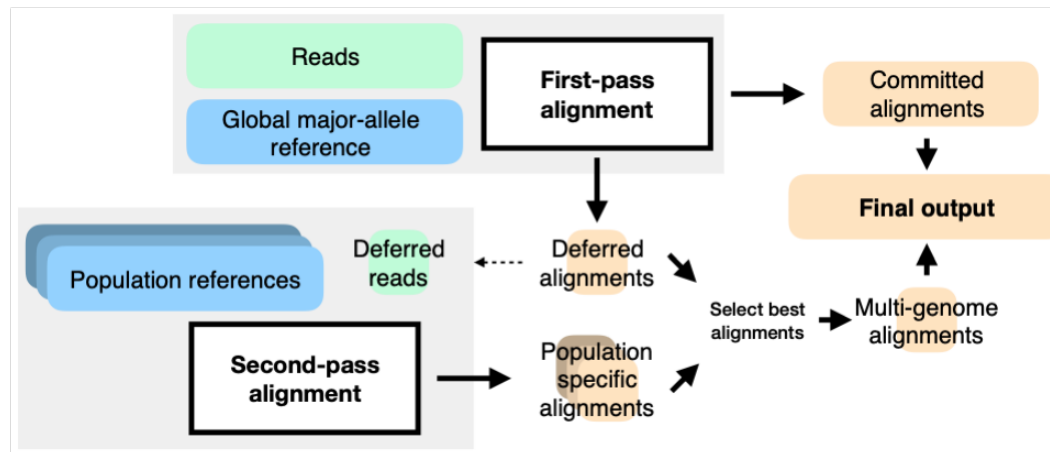
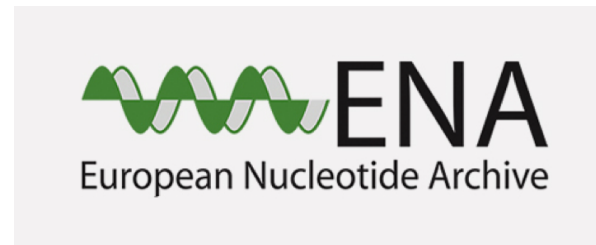
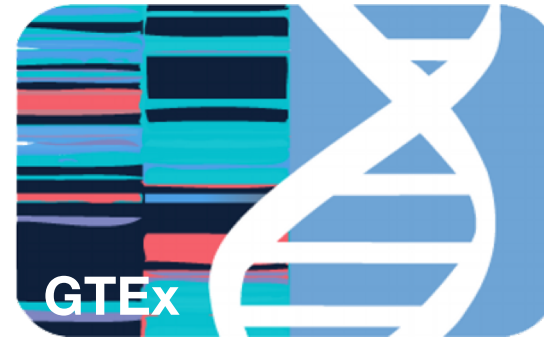
2233 Siebel Center for Computer Science

Email: [bradsol@illinois.edu](mailto:bradsol@illinois.edu)

**Hobbies:** Board games, video games,  
tabletop RPGs

**Research Areas:** CS Education,  
Computational Biology, Data Structures

# Brad Solomon



Fast search of thousands of short read sequencing experiments. Brad Solomon and Carl Kingsford. *Nature Biotech* 2016.

Reducing reference bias using multiple population reference genomes. Chen et al. *Genome Biology* 2021

# Me!

**Name** Mattox Beckman

**History** PhD, Fall 2003, University of Illinois at Urbana-Champaign  
Lecturer 2003–2015 Illinois Institute of Technology

**Research Areas** CS Education, Programming Languages, Mathematical Foundations of Computer Science

**Specialty** Partial Evaluation, Functional Programming

**Professional Interests** Teaching; Computer Science Education; Functional Programming; Semantics and Types; Category Theory

**Personal Interests** Irish Music; Cooking; Go (Baduk, Wei-Qi, Igo); Philosophy; Evolution; Meditation; Kerbal Space Program; Home-brewing; ... and many many more ...



# Harsha Srimath Tirumala

(He/him/his)

**Hometown:** Hyderabad, India

**Graduate School:** Rutgers University  
(NJ)

**Interests:** Soccer, Tennis, Chess (none of which I am good at)

**Favourite part of my job:** **Students!**

**Fun Fact:** I have a twin brother



# CS 199-225 Honors Section

- Topic - Advanced Data Structures
- Focus : Analysis of complexity, Structural limits
- Lower bounds for fundamental problems like sorting
- A few additional data structures to be discussed (time permitting)
- Assignments will be theoretical and involve analysis, proofs

# Enrolling in CS 199-225

## **James Scholar Enrollment:**

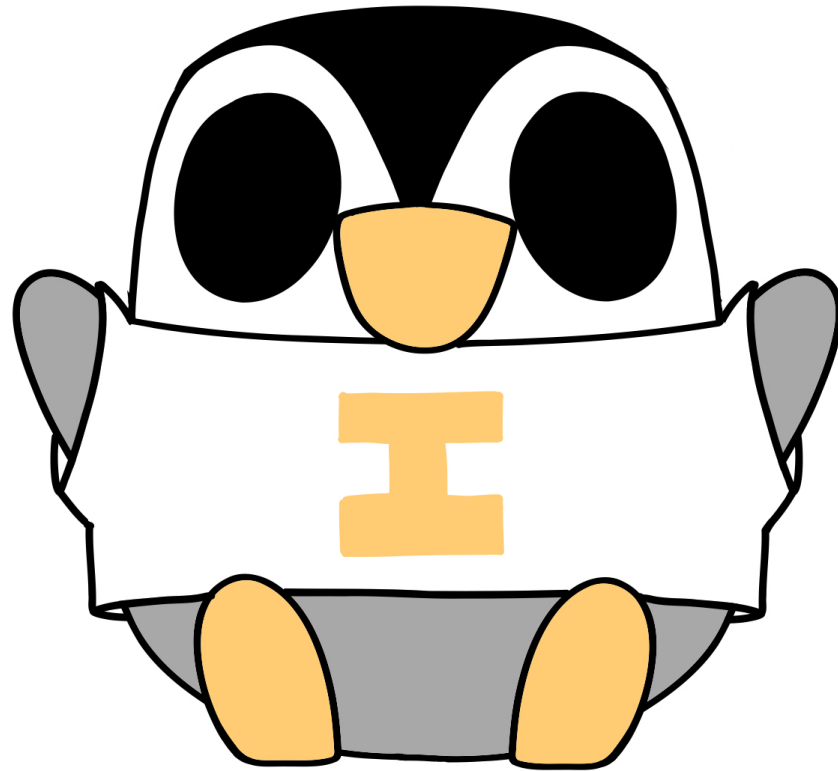
1. Register for CS 225 section AH (CRN 75824)
2. Fill out the appropriate Honors Credit Learning Agreement

***Check your individual college for James Scholar deadlines***

## **Standard Enrollment:**

1. Register for CS 199-225 (CRN 40944)

***This is a pass-fail grade and a 0-credit course***



CS225 STAFF



# How to contact us?

Admin Email: [cs225admin@lists.cs.illinois.edu](mailto:cs225admin@lists.cs.illinois.edu)

For best results, give a descriptive subject header!

It may take a day or two to get a response.

Discord: <https://discord.gg/YuEwhnR>

Don't DM course staff on Discord

Be respectful to one another online

**Use Discord in class to ask questions!**



# Everything about CS 225

<https://courses.engr.illinois.edu/cs225/>

## **Information on:**

Staff

Communications

Lab Sections

MPs

Exams

Grading

Academic Integrity



A surprise pop quiz!

I missed the Discord link. Where can I find it?

When is exam 0? What is on it?

# Exam 0 (9/3 — 9/5)

An introduction to CBTF exam environment / expectations

Quiz on foundational knowledge from all pre-reqs

Practice questions can be found on PL

Topics covered can be found on website

**Registration started August 21**

# Grading — Point Distribution

Category	Contribution	Notes
Machine Problems	300	50 points each
Lab Assignments	120	10 points each
Exams	420	70 points each
Final Exam	160	

All MPs have a one-day late policy for 93% credit

**There are no built-in extensions for labs**

# Grading — Final Grades

<b>Points</b> [930, $\infty$ )*	<b>Grade</b> A+	<b>Points</b> [930, $\infty$ )*	<b>Grade</b> A	<b>Points</b> [900, 930)	<b>Grade</b> A-
[870, 900)	B+	[830, 870)	B	[800, 830)	B-
[770, 800)	C+	[730, 770)	C	[700, 730)	C-
[670, 700)	D+	[630, 670)	D	[600, 630)	D-
		(600, 0]	F		

\* An A+ requires both a minimum amount of points and the support of one or more course staff members who have found some part of your work exceptional.

# Extra Credit Opportunities

MP Extra Credit Submission (20 pts)

*4 points per MP (first MP no early submission)*

Problems of the day (30 pts)

*1 point per PoTD*

Course Feedback Surveys (16 pts)

*2 points per survey; 4 points for Informal Early Feedback*

**Extra credit is capped at 66 points.**

# Extra Credit Opportunities

New this semester: Exam retake opportunity

See website for details (retake is last week of class)!

Final grade will be the average of original and retake

**This can result in lowering your final grade!**

# Extension Policy

**Every MP has a built-in 24-hour extension for 93% credit**

**Every student gets one free extension on any assignment!**

Free extensions are 48 hours from **original deadline!**

To get your extension, fill out the [extension request form](#).

For best results, request 48 hours ahead of deadline!



# Plagiarism Policy

**Don't share your code with anyone! Ever!**

**Don't use or look up code solutions from any source!**

**Don't use generative AI tools!**

Infractions will result in 0s on the assignment, 100 point loss in class, and a loss of all extra credit\*

All infractions will be reported through FAIR and remain on your permanent record.

# Statement on Mental Health

This class has a relatively high workload. If you are struggling...

**Consider reaching out to course staff!**

Come to any faculty member's OH (email to schedule a one-on-one)

Take advantage of extension request forms!

**UIUC offers a variety of confidential services:**

**Counseling Center:** 217-333-3704

610 East John Street Champaign, IL 61820

**McKinley Health Center:** 217-333-2700

1109 South Lincoln Avenue, Urbana, Illinois 61801

# Diversity, Equity, and Inclusion

“If you witness or experience racism, discrimination, micro-aggressions, or other offensive behavior, you are encouraged to bring this to the attention of...”

Course CAs

Faculty

Campus Belonging Office ([Link](#))

The Office of Student Conflict Resolution ([Link](#))

CS CARES ([Link](#))

Questions about course policy / structure?





What is this course about?

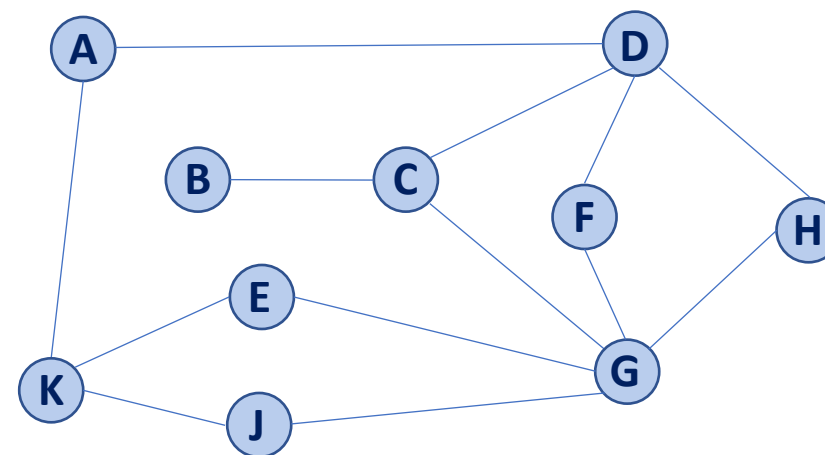
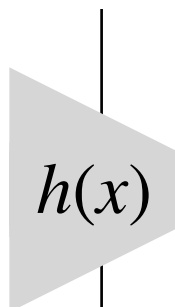
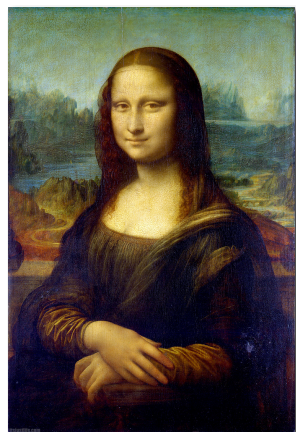
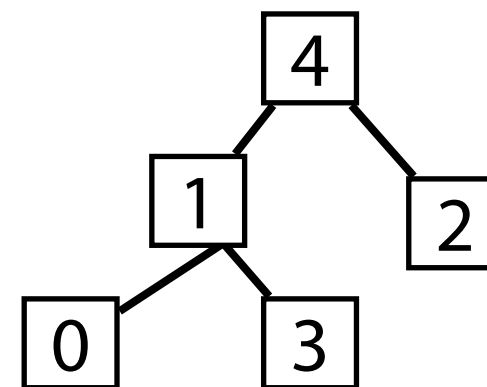






# CS 225 — Course Goals

Understand foundational data structures and algorithms

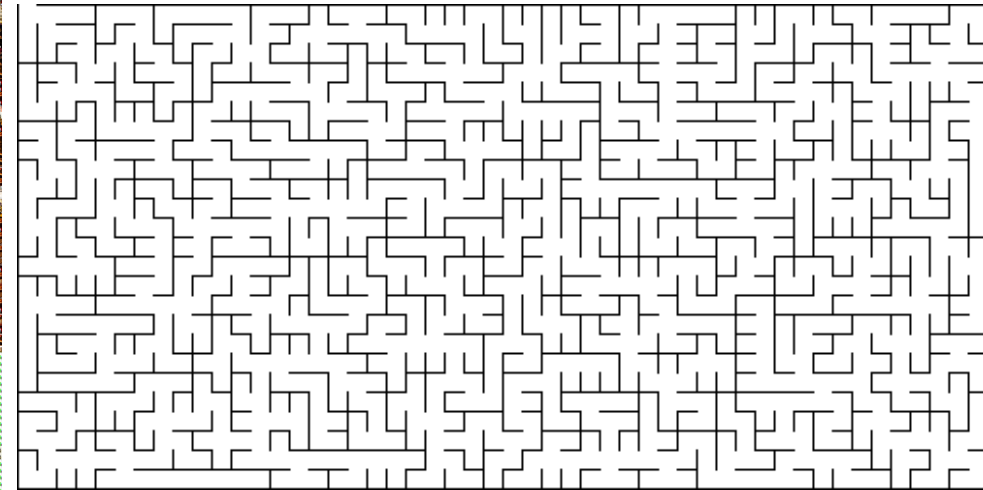
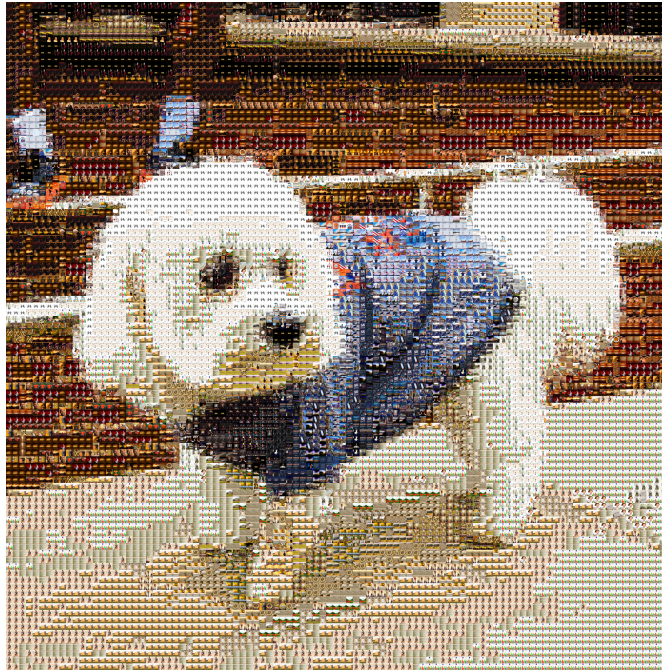
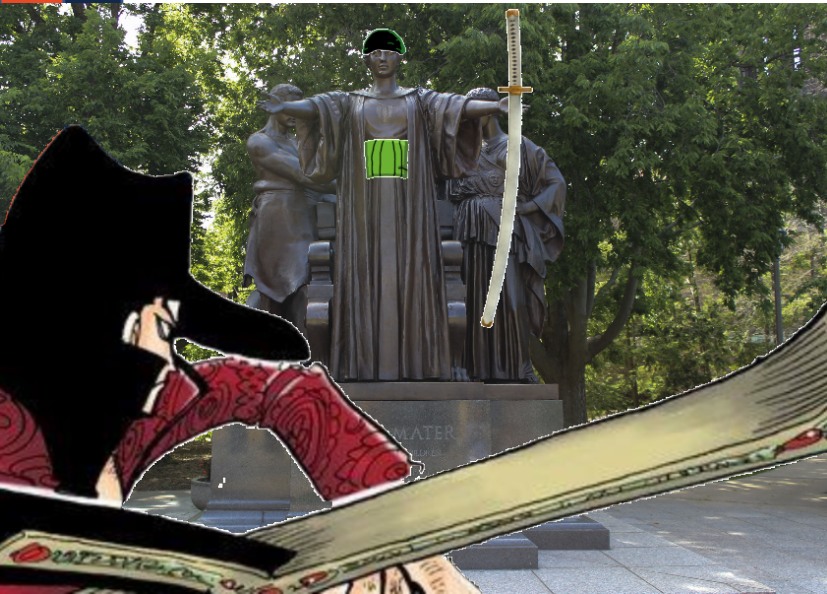


# CS 225 — Course Goals

Justify appropriate algorithms for complex problems

*Decompose problem into supporting data structures*

*Analyze efficiency of implementation choices*





# CS 225 — Course Goals

## Implement intermediate difficulty problems in C++

## Segmentation fault

*You can't defeat me.*

*I know, but he can.*

```
valgrind --leak-check=full ./mai
```

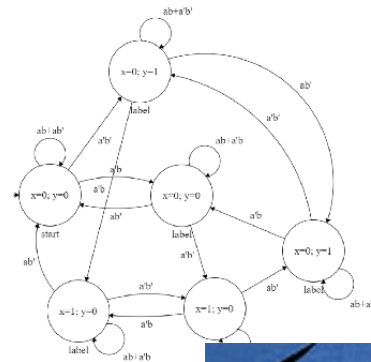
```

/workspace/cs225git/mp_stickers/tests/tests-part2.cpp:227: FAILED:
  REQUIRE( sheet.render() == alpha )
with expansions:
  PNS(w=901, h=600, hash=103ac580ac38a31d)
  ==
  PNS(w=900, h=600, hash=103ac580ac38a31d)

AC
StickerSheet::getSticker() returns NULL for a removed sticker
-----
/workspace/cs225git/mp_stickers/tests/tests-part2.cpp:255

/workspace/cs225git/mp_stickers/tests/tests-part2.cpp:255: FAILED:
due to a fatal error condition:

```



THIS IS FINE.

Submitted answer 1

Submitted at 2023-08-30 21:35:35 (CDT)

invalid, not gradable

 [show](#) 

✖ [0/5] A StickerSheet with no stickers works

✖ [0/5] StickerSheet does not duplicate stickers in memory

✖ [0/5] StickerView behaves correctly when a sticker is updated

Save only

Grading possible in 238 min

Can only be graded once every 360 minutes ?

✖ [0/5] StickerSheet::setStickerAtLayer() fails for an invalid layer

✓ [10/10] myImage.png exists and contains stickers

# CS 225 — Course Goals

Understand foundational data structures and algorithms

Justify appropriate algorithms for complex problems

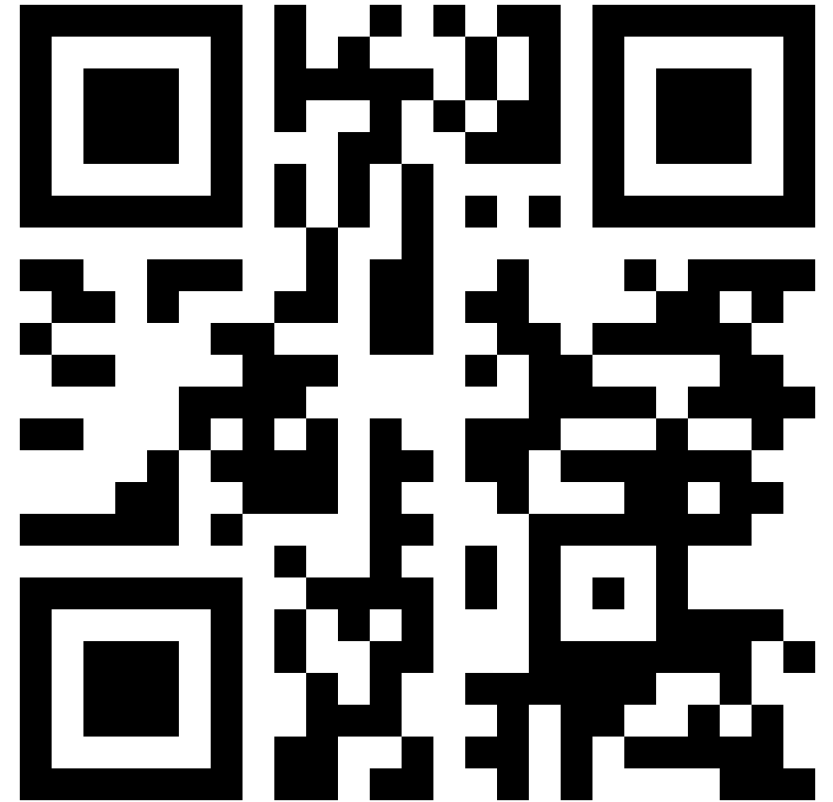
Implement intermediate difficulty problems in C++

Improve your foundation of CS theory

# Surprise Survey!

On a scale of 1—5, how confident are you in your coding skills?

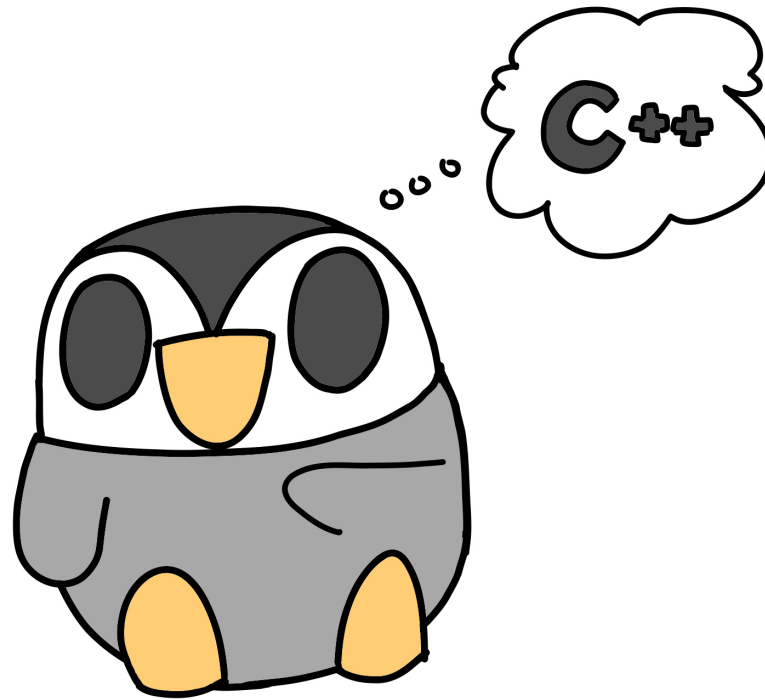
- 1) Not at all confident
- 2) Slightly confident
- 3) Somewhat confident
- 4) Confident
- 5) Very confident



Respond at <https://clicker.cs.illinois.edu/>

Join Code: 225

# What about C++



Lectures from Previous Semesters Covering C++ Available Here

[https://mediaspace.illinois.edu/playlist/dedicated/177553201/1\\_s10ctiib/1\\_z2cz05fi](https://mediaspace.illinois.edu/playlist/dedicated/177553201/1_s10ctiib/1_z2cz05fi)

# (Optional) Open Lab This Week

This week's lab is open office hours

Focus is making sure your machine is setup for semester

Installation information available on website

