

Data Structures

Introduction

CS 225
Brad Solomon

January 21, 2026

Welcome! 😊



UNIVERSITY OF
ILLINOIS
URBANA - CHAMPAIGN

Department of Computer Science

Announcements

This is where we would have announcements!

... if we had any today.

→ Exam next week

→ "Lab" on Thursday

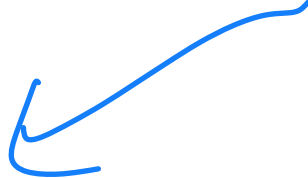
(We do they are baked into the day one lecture though)

Learning Objectives

Get to know course staff



Introduce this year's Honors Course



An overview of course expectations, goals, and structure



↳ why we teach what we do

Who am I?



Brad Solomon (He/him/his)

Teaching Assistant Professor, Computer Science

2233 Siebel Center for Computer Science

Email: bradsol@illinois.edu

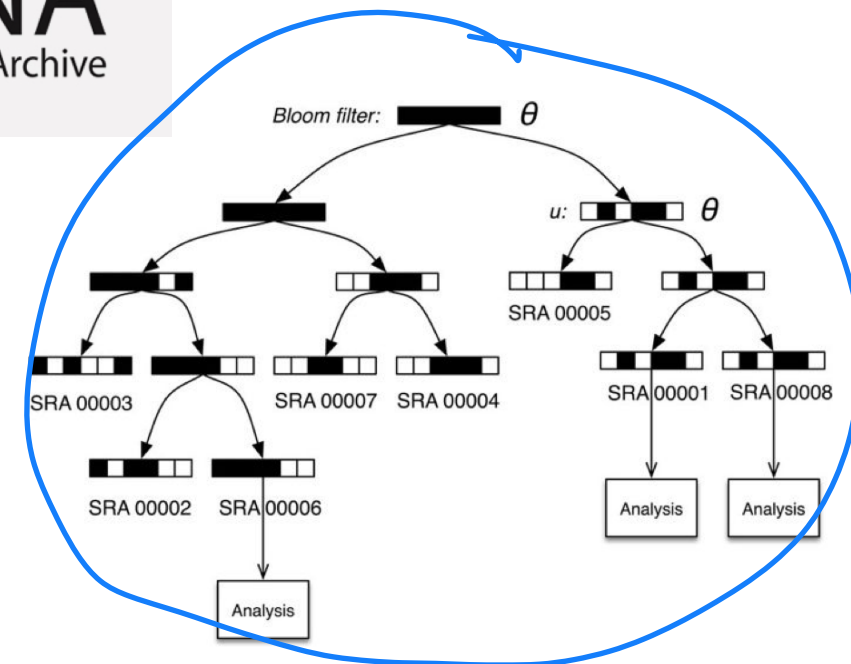
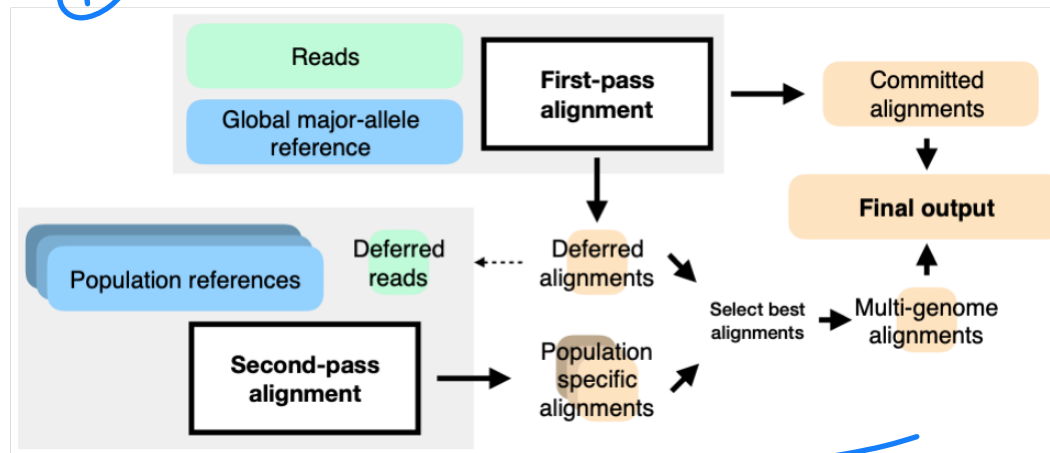
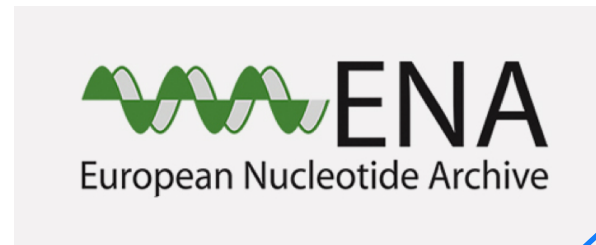
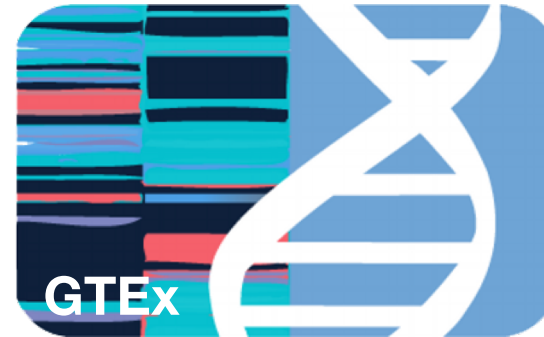
Hobbies: Board games, video games,
tabletop RPGs

Research Areas: CS Education,
Computational Biology, Data Structures

Brad Solomon



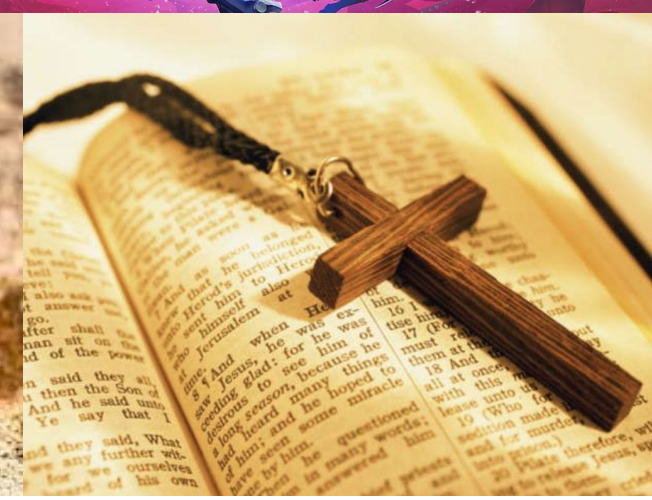
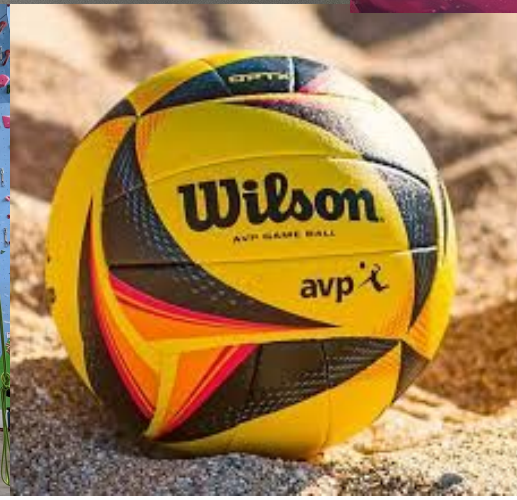
Strings



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

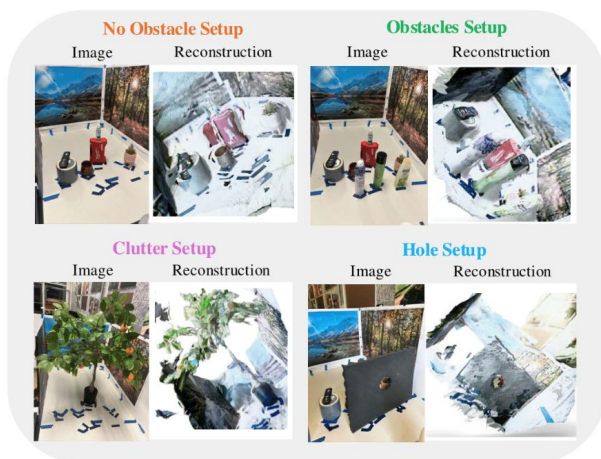
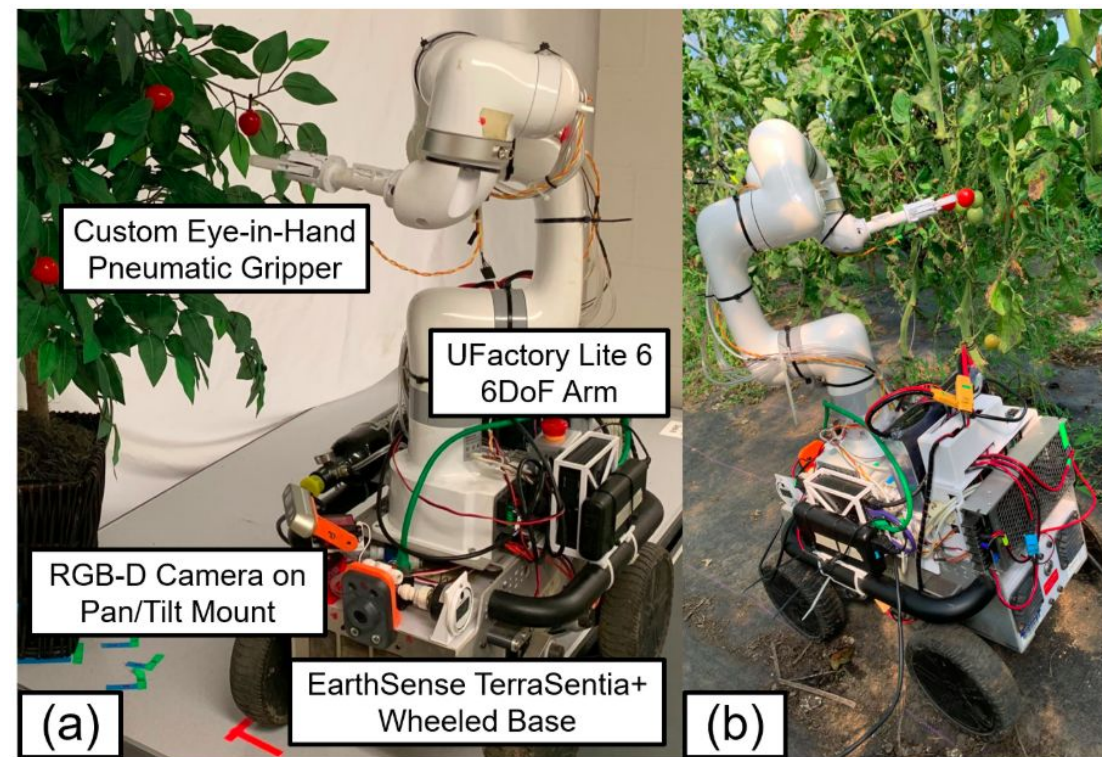
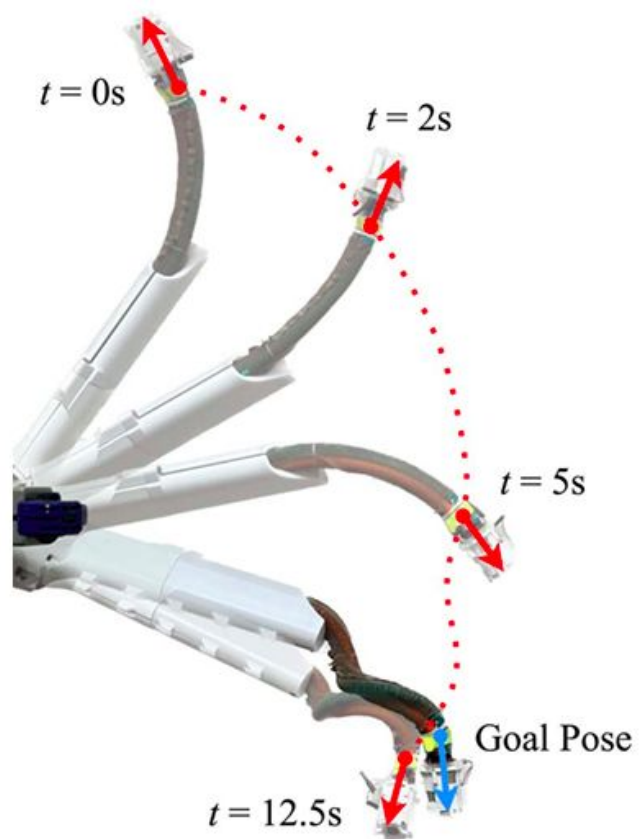
Kendall Koe



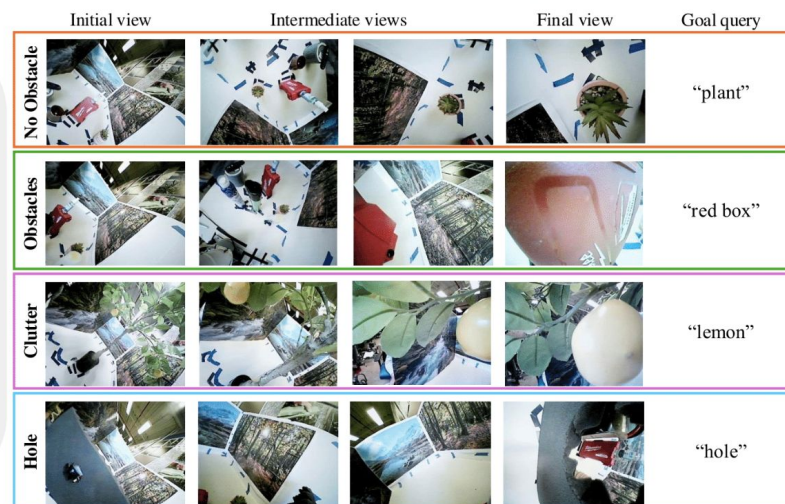
Research

AI + Robotics

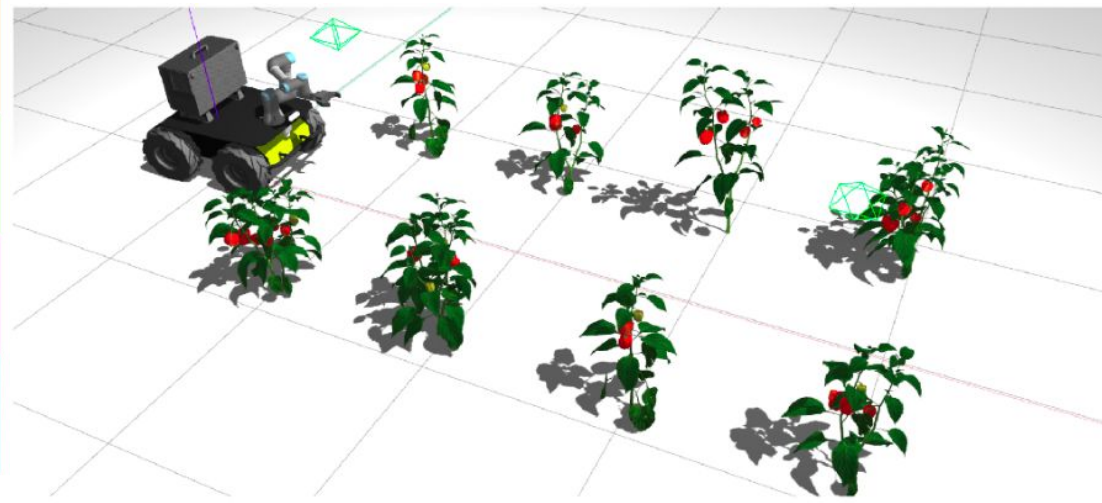
Manipulation in
Agriculture



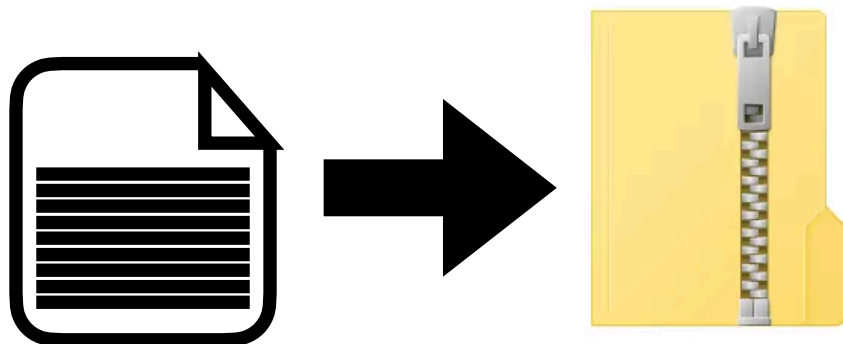
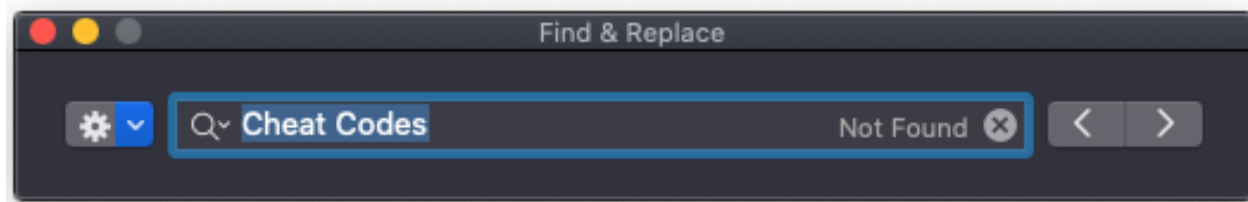
(a)



(b)



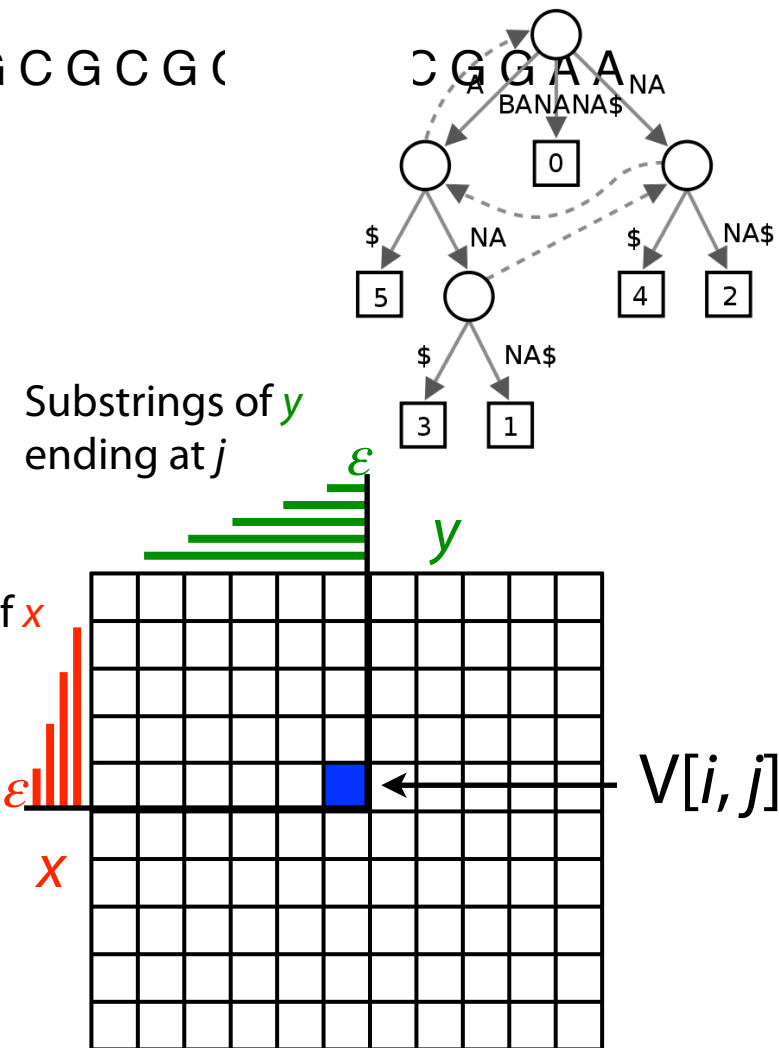
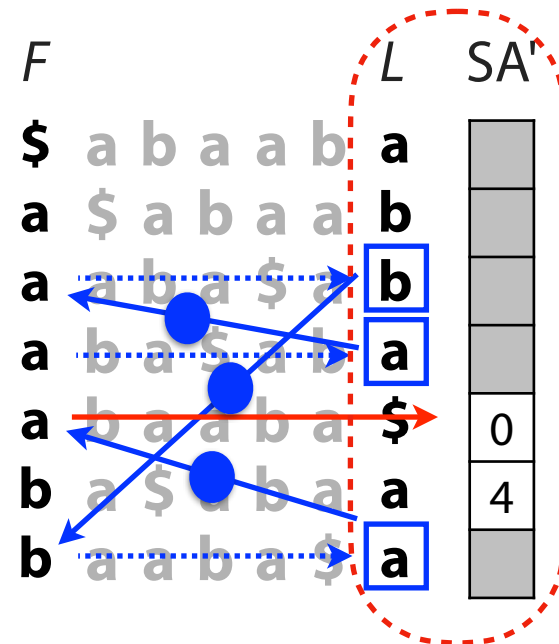
CS 199-225: String Algorithms and Data Structures



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CCGCCATCTTCAGCAAACCCTGATGAAGGCTACAAAGAGCGCAAGTA
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CCGATAAGCAGCAAGCAGAGAAGACCTTATGGAGCTTTAATTTATTAATGCAAAAGCTA
CCTAACAAACCCACAGGTCCTAAACTACCAAACTGCATTAATAATTTTCGGTTGGGGCGA

T: C C T T C T G C T A C C T T T T G C G C G C
P: C C T T T T G C



CS 199-225: String Algorithms and Data Structures

Logistics:

Weekly lecture followed by weekly assignment

Monday 5-5:50 PM

↳ 8 / 11 total assignments

Siebel 0216

First lecture 1/26/26

<https://courses.grainger.illinois.edu/cs225/pages/honors.html>

Syllabus has information on enrollment / HCLAs

Enrolling in CS 199-225

James Scholar Enrollment:

A+H

1. Register for CS 225 section AH (CRN 70578)
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 61879)

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

How to contact us?

Admin Email: cs225admin@lists.cs.illinois.edu

For best results, give a descriptive subject header!

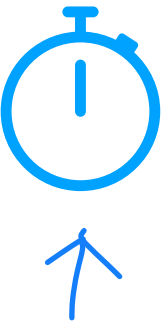
It may take a day or two to get a response.

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?

↳ Slides for the day

↳ welcome email

↳ website has direct link (resources)

↳ syllabus

When is exam 0? What is on it?

1/26 - 1/29

Exam page on website

Exam 0 (1/26 — 1/29) *Friday lecture on this material*

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 starts 1/15

Grading — Point Distribution

Category	Contribution	Notes
Machine Problems	300	50 points each
Lab Assignments	120	12 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

Points	Grade	Points	Grade	Points	Grade
<u>$[930, \infty)^*$</u>	A+	<u>$[930, \infty)^*$</u>	A	<u>$[900, 930)$</u>	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 a minimum amount of points and/or 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 (8 pts)

collective
responsibility

2 points per survey; 4 points for Informal Early Feedback

Extra credit is capped at 70 points.

Tentative Extra Credit Opportunities

Create a PoTD

Work with course staff to create a new coding question

Bonus Labs (This semester 10 labs instead of 12 labs)

Replacement lab sections will be exam review

Removed labs will still be available for EC

Extra credit is capped at 70 points.

Retake Exam

Exam Page on website has details

Final grade will be a 70-30 averaging

(only 0-4)



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!

Further extension require justification

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..."

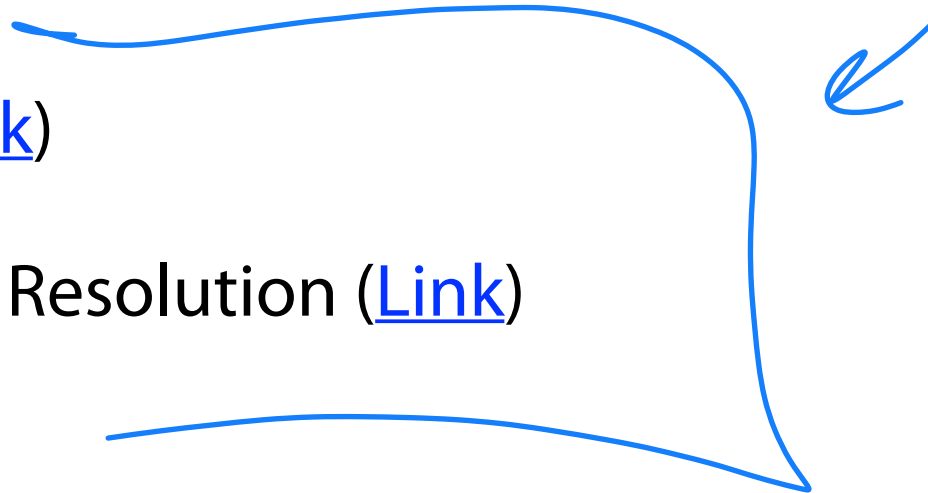
Course CAs / TAs

Faculty

Campus Belonging Office ([Link](#))

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

CS CARES ([Link](#))



Questions about course policy / structure?



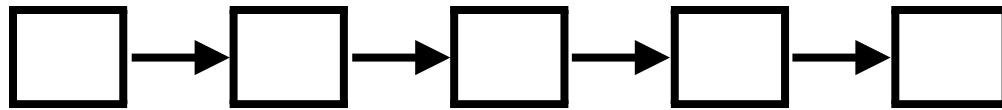


What is this course about?



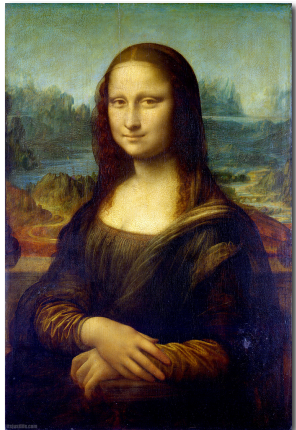
CS 225 — Course Goals

Understand foundational data structures and algorithms

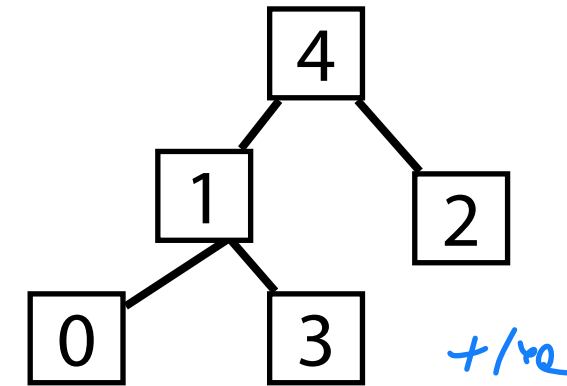


list

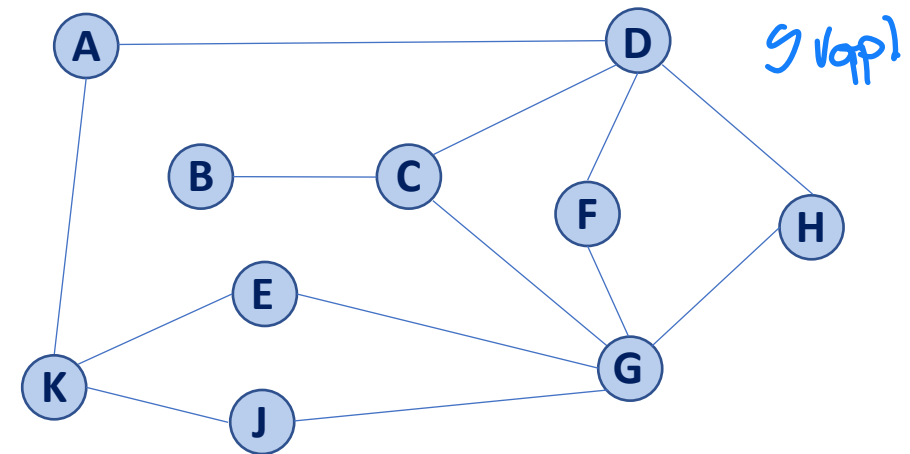
hash



$h(x)$



tree



graph

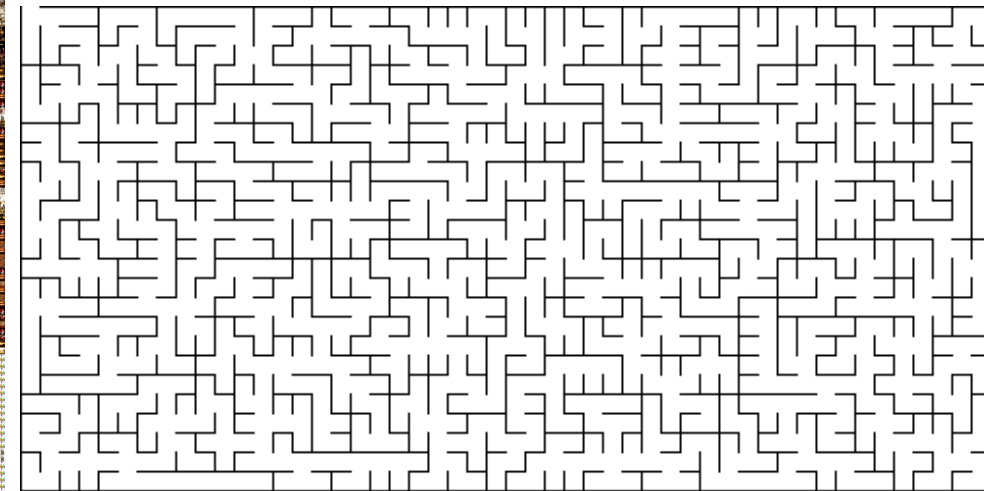
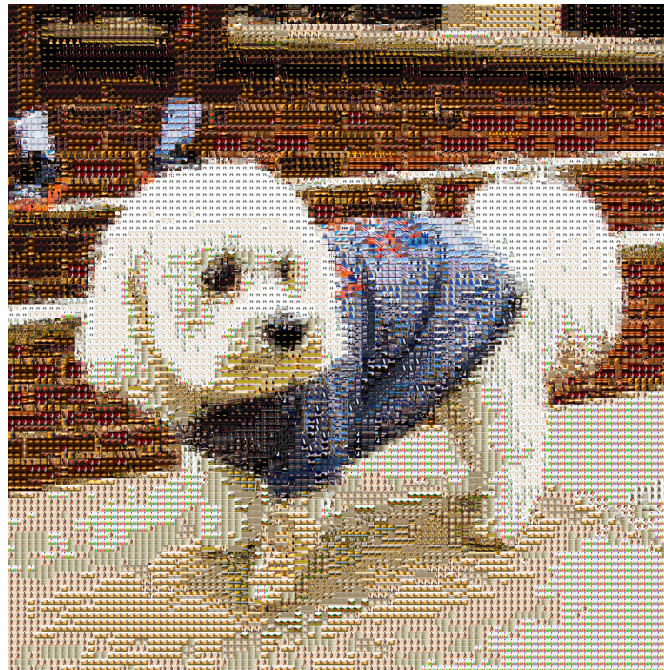
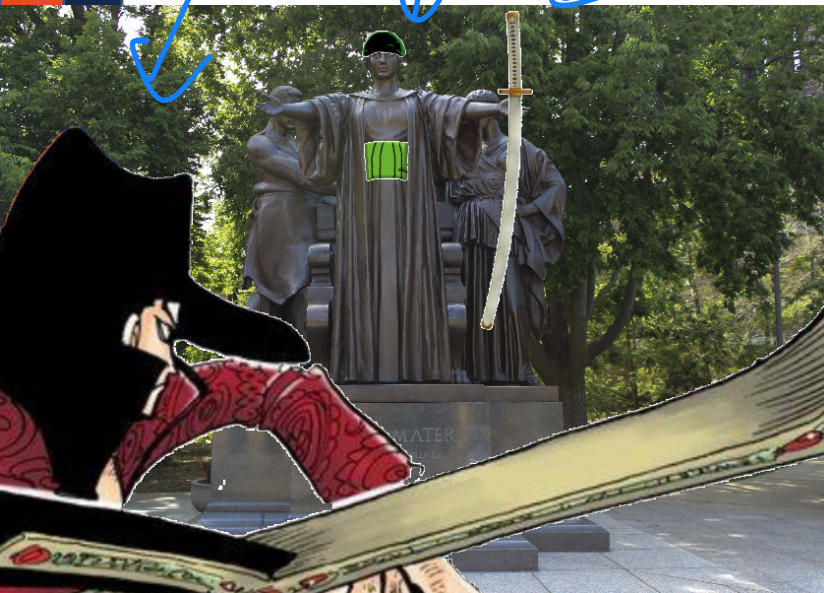
CS 225 — Course Goals

Justify appropriate algorithms for complex problems



Decompose problem into supporting data structures

Analyze efficiency of implementation choices



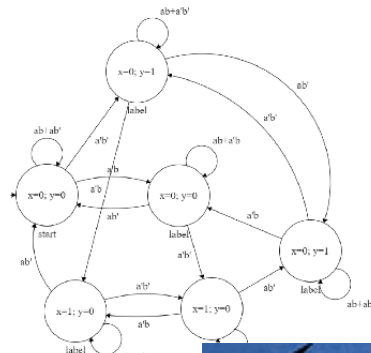
CS 225 — Course Goals

Implement intermediate difficulty problems in C++

```
/workspaces/cs225git/mp_stickers/tests/tests-part2.cpp:227: FAILED:
  REQUIRE( sheet.render() == alma )
with expansion:
  PNG(w=961, h=600, hash=103ac580ac38a31d)
  ==
  PNG(w=960, h=600, hash=103ac580ac38a31d)

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

/workspaces/cs225git/mp_stickers/tests/tests-part2.cpp:256: 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] StickerSheet behaves correctly when a sticker is updated

Save & Grade Unlimited attempts

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?

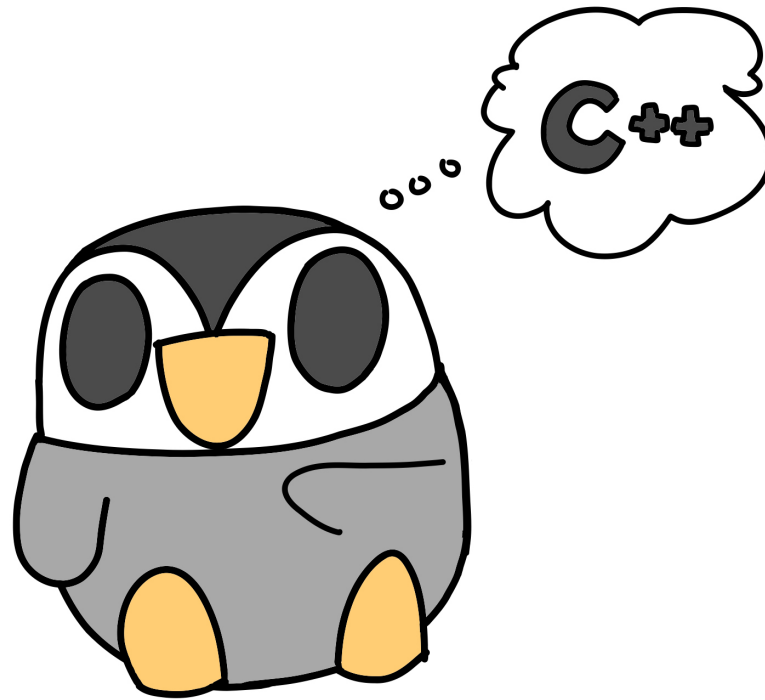
- 1) Not at all confident
- 2) Slightly confident
- 3) Somewhat confident
- 4) Confident
- 5) Very confident



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

(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

