Welcome

to

CSE 331

Please have a face mask on

Masking requirement

UB requires all students, employees and visitors – regardless of their vaccination status – to wear face coverings while inside campus buildings.

https://www.buffalo.edu/coronavirus/health-and-safety/health-safety-guidelines.html

Let’s do some introductions

http://www.zazzle.com/warning_teaching_assistant_bag-149882665435161818

TAs first

Robert

Nitya

Alex

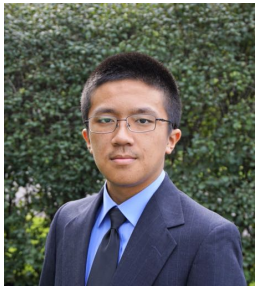
Asif

Snigdha

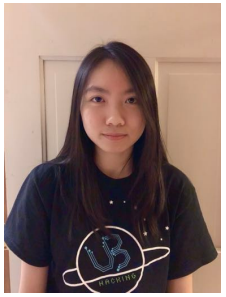
Ben

Aman

Connor



Joseph



Megan

Lectures will be videotaped

http://www.imdb.com/title/tt0363510/mediaviewer/rm2499681792

About Me

Atri Rudra

atri@buffalo.edu

Office: See piazza for location

Office hours: Mon 4:30-5:20pm; Fri, 1:00-1:50pm

OH starts today

Contact us all at

cse-331-staff@buffalo.edu

TAs will not respond to individual emails (except for re-grading requests)

COVID-19 makes it non-ideal

Masking requirement

UB requires all students, employees and visitors – regardless of their vaccination status – to wear face coverings while inside campus buildings.

https://www.buffalo.edu/coronavirus/health-and-safety/health-safety-guidelines.html

Guidelines at a Glance

UB's health and safety guidelines are multifaceted and comprehensive. While we encourage you to familiarize yourself with them in full, here are a few key takeaways:

- Students who live on or visit campus must be vaccinated (except for medical and religious exemptions)
- Employees are strongly encouraged to get vaccinated
- Masks are required indoors (except in certain settings), even if you're vaccinated
- Masks are required outdoors at large gatherings
- If you're on campus, you must complete the Daily Health Check
- Monitor your health, stay home if you're sick

Vaccination requirements

learn more at UB Vaccination Updates and Protocols

Submit proof of vaccination

CSE 331 in times of COVID

Lectures and recitations will be in-person

Office hours will be a mix of in-person and virtual locations

Exams and Quizzes will be in-person

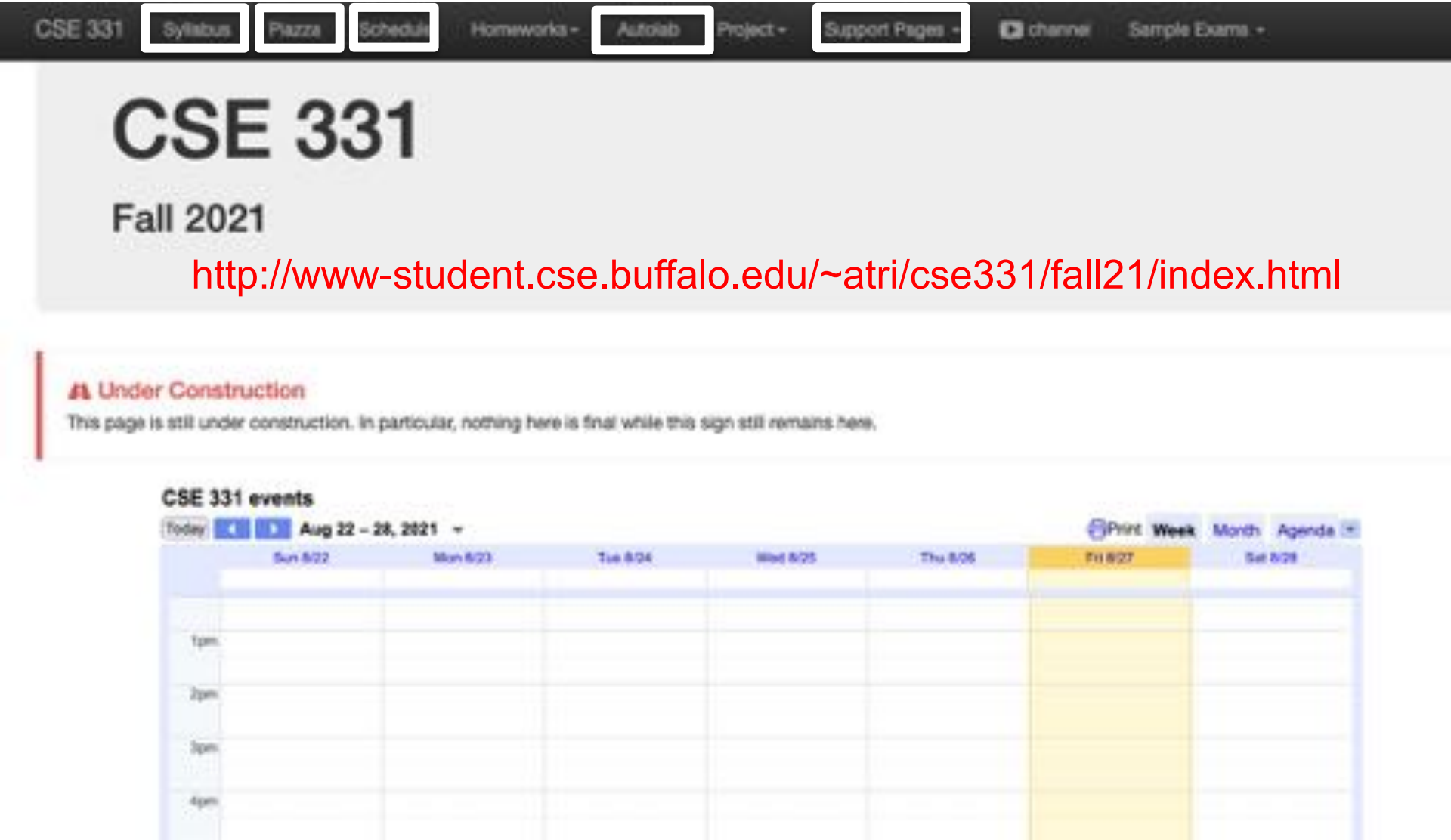
Questions/Comments?

Handouts for today

Syllabus (online)

Homework Policy document (online)

One Stop Shop for the Course



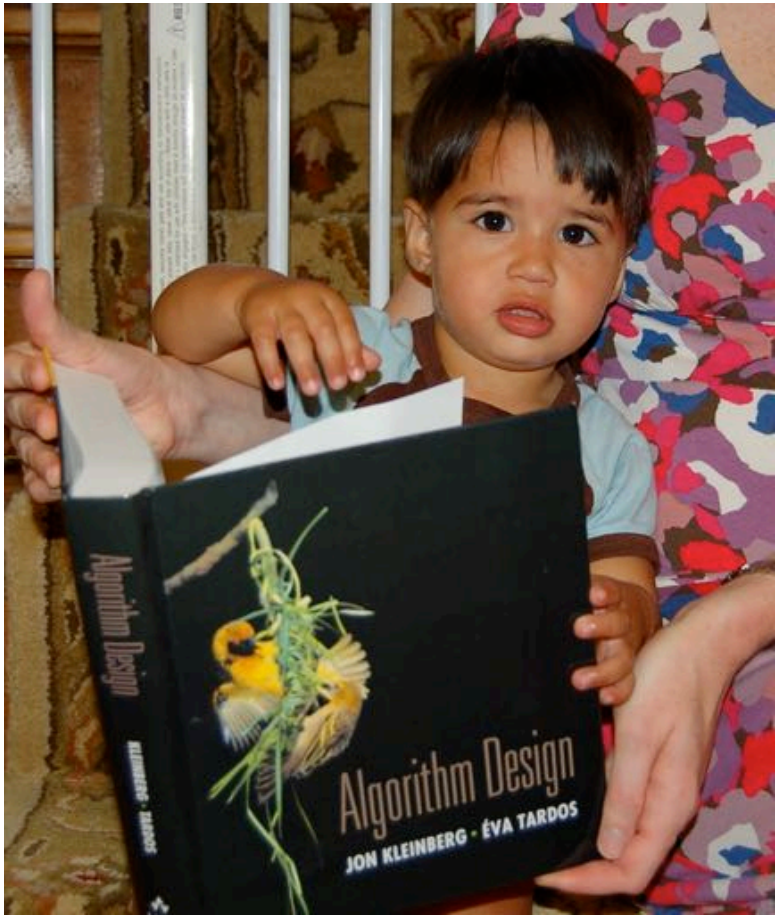
Three things to remember

WORK HARD!

DO NOT CHEAT!

READ CAREFULLY!

Wait.. What???



Make sure you follow submission instructions

Two most common ways of losing points

Make sure you read problem statements carefully

Advice from 331 TAs

CSE 331 Advice from TAs

Where students who took CSE 331 and became TAs share their experiences of how to fully utilize the class to your advantage. (And no, Atri did not pay them to say these things.)

http://www-student.cse.buffalo.edu/~atri/cse331/support/advice/index.html

Under Construction

This is a living document that will get updated over time. However, all the advice below is valid and you should pay attention to them!

The class is structured to your advantage

Utilize the before, during and after aspects of the course to their fullest.

Do the assigned readings before coming to class and if you get time even watch lecture videos from previous years. Atri will give you plenty of time during lecture to ask questions about the readings or the lecture itself. And of course get the most out of the assignments (Explained further below).

The assignments are separated into different parts for your convenience.

Questions 1 and 2

Academic Dishonesty

All your submissions must be your own work

Penalty:

- Minimum: A **grade reduction in course**
- Possible: **F** (or higher penalty) if warranted

YOUR responsibility to know what is cheating, plagiarism etc.

- If not sure, come talk to me

Excuses like "I have a job," "This was OK earlier/in my country," "This course is hard," etc. **WON'T WORK**

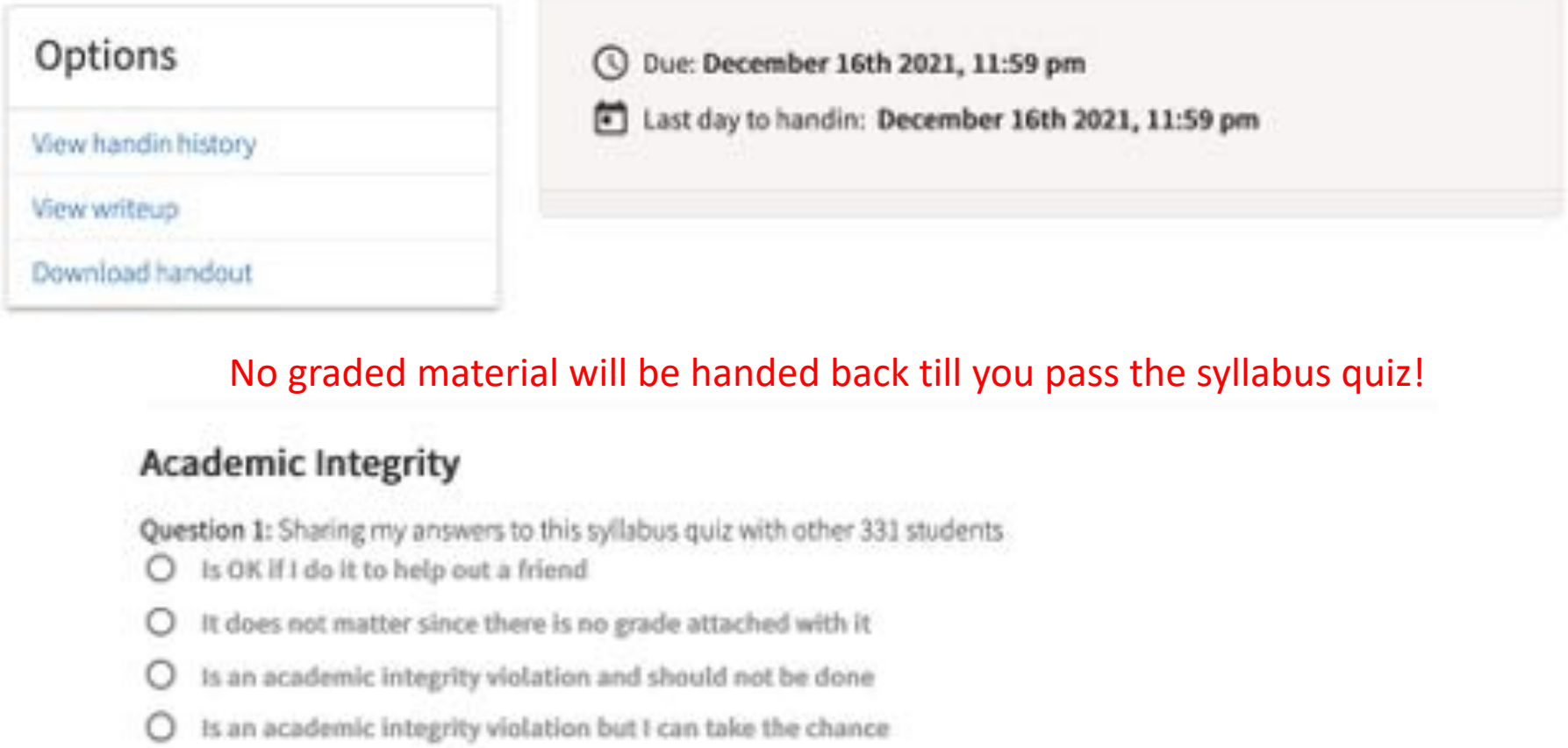
I DO NOT HAVE ANY PATIENCE WITH ANY CHEATING :

YOU WILL GET A GRADE REDUCTION IN THE COURSE

FOR YOUR FIRST MISTAKE

Read the syllabus CAREFULLY!

Syllabus Quiz



More information on the quiz

CSE 331 Syllabus

Algorithms and Complexity

Fall 2021

Time and location: **Mondays, Wednesdays** and **Fridays, 10:20-11:10am**, **Knox** 110

Under Construction

This page is still under construction. In particular, nothing here is final while this sign still remains here.

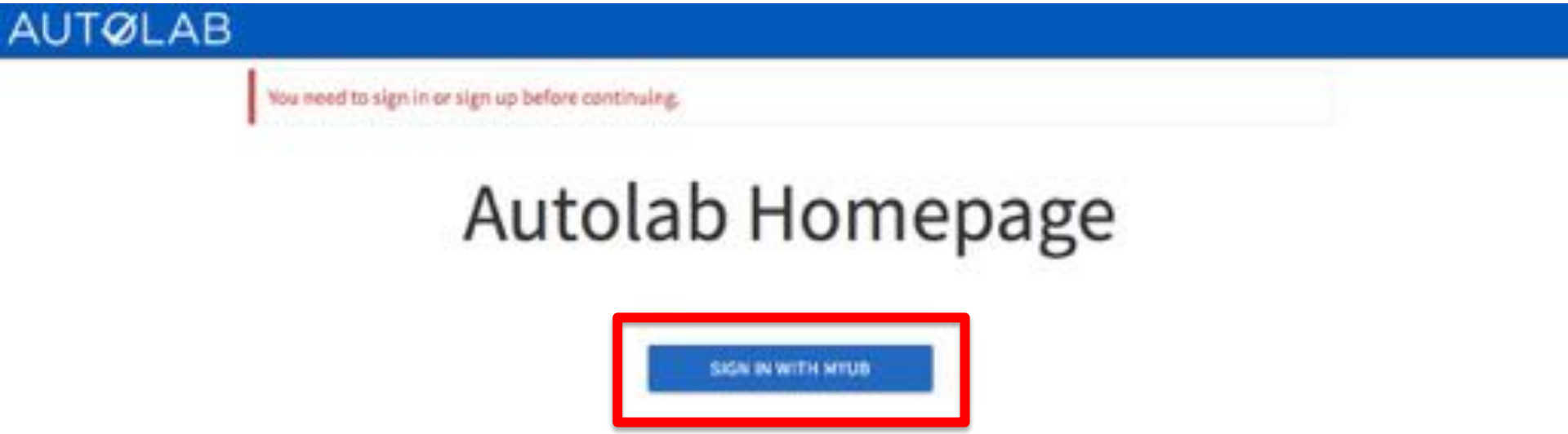
Please note

It is **your responsibility** to make sure you read and understand the contents of this syllabus. If you have any questions, please contact the instructor.

Acknowledgment

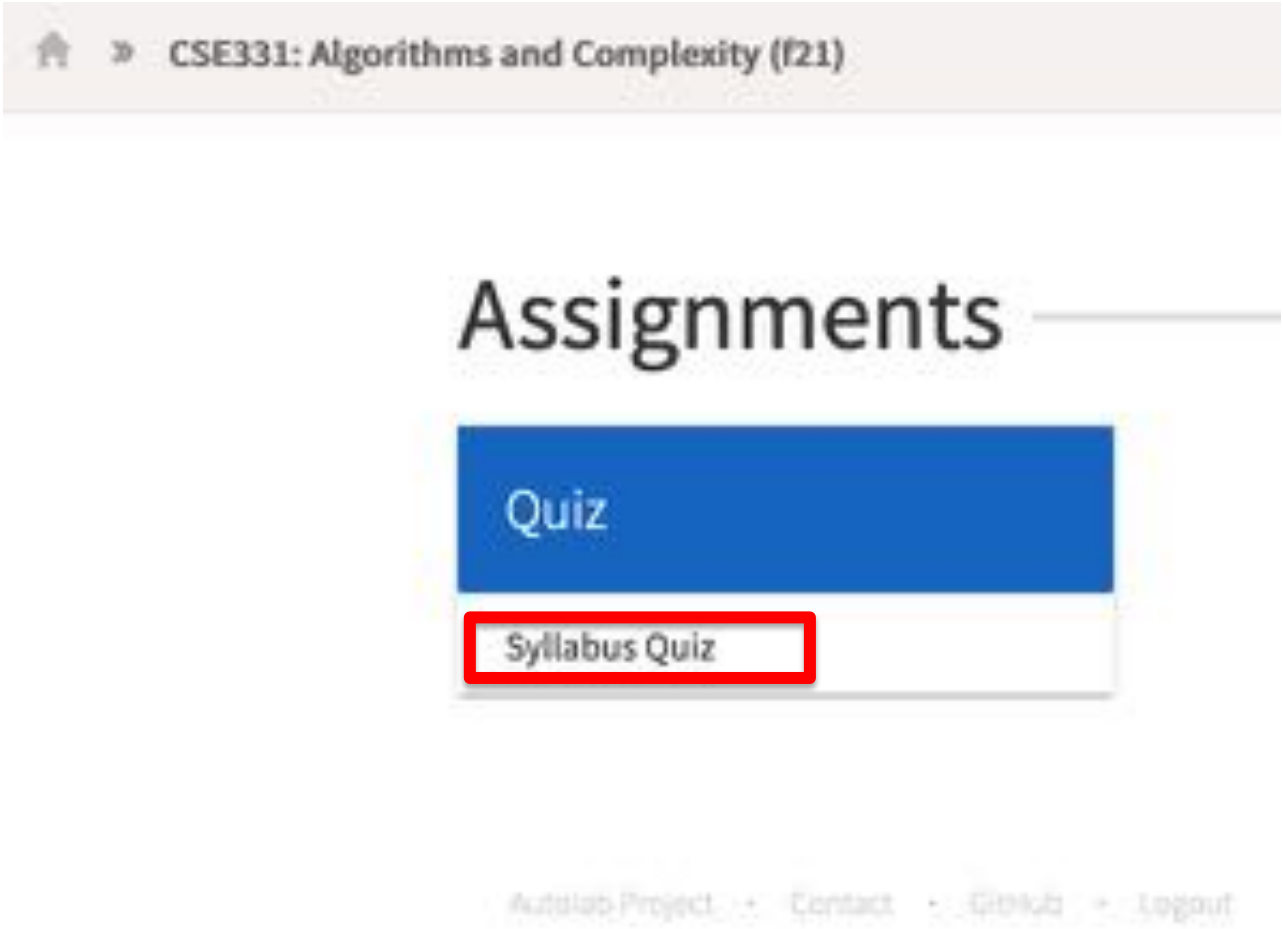
Once you have read the syllabus carefully, please fill in the Syllabus quiz on Autolab. As an incentive for you to fill in this form, **you will not receive any feedback on your assignments till you successfully answer AT LEAST 18 out of the 20 questions in the quiz**. (You can attempt the quiz as many times as you want.) Note that in addition to this syllabus, the quiz will also ask questions based on the homework policies.

Autolab



https://autograder.cse.buffalo.edu/

You can submit the following now



If you were registered by 9pm on Friday, Aug 27 you should be on Autolab

Grading break-down

Grading Policy

Here is the split of grades:

Course Component	% of grade
Project	10%
Homeworks	30%
Quizzes	3%
Exams	57%

Questions/Comments?

Pre-requisites

Required (officially)

- CSE 250, [CSE 191 or MTH 311] and MTH 142
- At least a C- (this is recommended)

Required (for practical purposes)

- Comfort with proofs
- Willingness to work hard!

Accessibility Resources

Information included in the syllabus

In short, let me know and consult with Accessibility Resources

Preferred Name

If you prefer using name diff from UB records

Let me know and we'll make a note of it.

Critical Campus Resources

Sexual Violence

UB is committed to providing a safe learning environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic and dating violence and stalking. If you have experienced gender-based violence (intimate partner violence, attempted or completed sexual assault, harassment, coercion, stalking, etc.), UB has resources to help. This includes academic accommodations, health and counseling services, housing accommodations, helping with legal protective orders, and assistance with reporting the incident to police or other UB officials if you so choose. Please contact UB's Title IX Coordinator at 716-645-2266 for more information. For confidential assistance, you may also contact a Crisis Services Campus Advocate at 716-796-4399.

Mental Health

As a student you may experience a range of issues that can cause barriers to learning or reduce your ability to participate in daily activities. These might include strained relationships, anxiety, high levels of stress, alcohol/drug problems, feeling down, health concerns, or unwanted sexual experiences. Counseling, Health Services, and Health Promotion are here to help with these or other issues you may experience. You can learn more about these programs and services by contacting:

Counseling Services

- 120 Richmond Quad (North Campus), 716-645-2720
- 202 Michael Hall (South Campus), 716-829-5800

Health Services

Michael Hall (South Campus), 716-829-3316

Health Promotion

114 Student Union (North Campus), 716-645-2837

TA Office hours

YOU decide!


poll @16

stop following 0 viewers

TA office hours

Please select all the time slots below that you will able to attend (even if for part of the time) for TA office hours. If you do not have preference for in-person vs. virtual please pick BOTH options (but if you have a strong preference please pick the in-peron or virtual option). Recall that homeworks are due on Wednesdays at 8am.

We will pick the top 20 choices at the end of Thursday (subject to TA availability) for the TA office hours.

Please note that the TA office hours start next week (i.e. from Tue, Sep 7).

- ☐ Mondays, 9-10am (in-person)
- ☐ Mondays, 9-10am (virtual)
- ☐ Mondays, 11:30am-12:30pm (in-person)
- ☐ Mondays, 11:30am-12:30pm (virtual)
- ☐ Mondays, 12:30pm-1:30pm (in-person)
- ☐ Mondays, 12:30pm-1:30pm (virtual)
- ☐ Mondays, 1:30pm-2:30pm (in-person)
- ☐ Mondays, 1:30pm-2:30pm (virtual)
- ☐ Mondays, 2:30pm-3:30pm (in-person)
- ☐ Mondays, 2:30pm-3:30pm (virtual)
- ☐ Mondays, 3:30pm-4:30pm (in-person)

Late night office hour

YOU decide!

poll @17 ☆

stop following 4 views

Actions

Late night office hour

(For TA office hour slots, please vote in @16)

This year, I plan to re-introduce night office hours in CSE 331 (I used to have them before my kids were born-- now they are old enough for me to re-start those). Note that these are in addition to my Monday and Friday office hours.

These will be **virtual only**.

We will pick the most popular slot at the end of Thursdays (these will start from next week).

Some comments:

- These office hours are meant for general chat related to CSE 331. The other 331 office hours will be one-on-one but these office hours are meant to be communal ones where we can talk about anything related to CSE 331.
- By default we will *not* discuss your specific HW solutions since those are supposed to be for one-on-one office hours.
- There will be one TA present as well in case there are questions related to your specific questions.
- I realize the night times might not work for all of you so to make sure you do not miss out because of your schedule, these office hours *will be recorded* and I will post the link on piazza.

- ☐ Wednesdays, 9:30pm-10:30pm
- ☐ Wednesdays, 10:00pm-11:00pm
- ☐ Thursdays, 9:30pm-10:30pm
- ☐ Thursdays, 10:00pm-11:00pm

Recitations

Are on for this week!

Please stick to your recitation section

At least for the first month since all sections are full

Exams

Mid term (two parts)

Mon, **Oct 11** and Wed, **Oct 13**, 2021. Usual place and time.

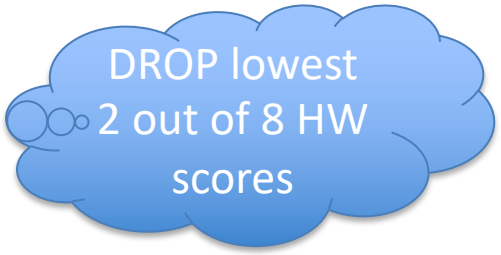
Final exam

Fri, **Dec 17**, 2021. Knox 110, **8:30-11:00am**

I had NO say in choosing the time

The HW structure

Three questions



Q1 and Q2 are proof based while Q3 is programming

Q1 worth 50 points

The hard proof based Q2 and programming Q3 worth 25 points each

HWs due by 8:00am on Wednesdays

Big change from Spring 21: project!

(Click on the image above and then checkout out the recording (the access code is in the linked webpage). I attended the webinar and found it to be very eye-opening.)

Acknowledgment

The development of this project was supported by a Mozilla Responsible Computer Science award. The support is gratefully acknowledged.

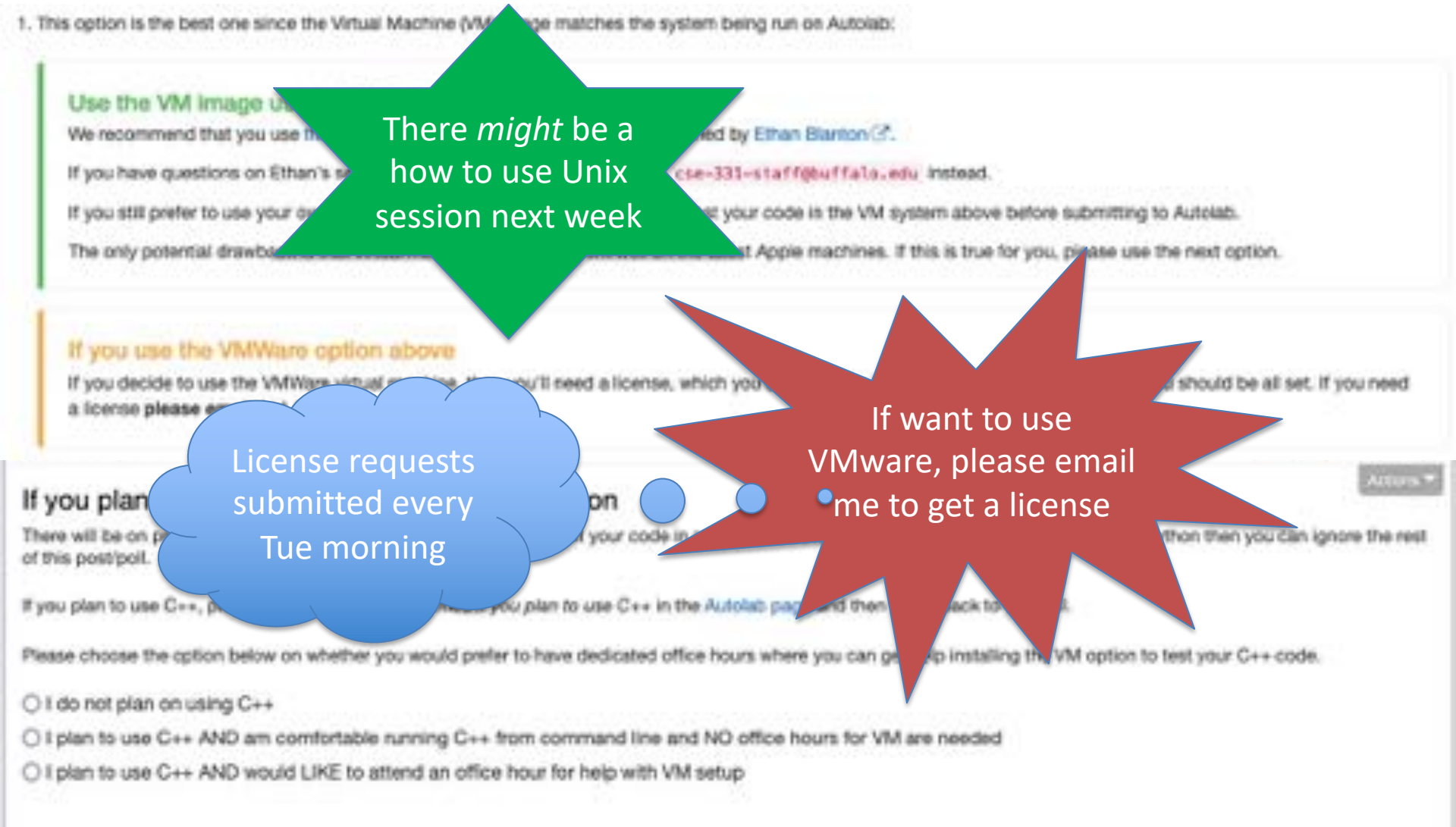
Project has three parts

Your project will have three parts:

1. Do five programming problems that involves making tradeoffs between various choices among which some have ethical dimensions. This will be a group assignment.
2. Each programming question will be paired with (a series of) reflection questions that involves you writing down and reflecting on some of the design decisions you made in the corresponding programming problem. In particular, these questions will ask you to reflect on the societal and ethical implications of your decisions. This will also be a group assignment.
3. At the end of the project, each group member will fill in a survey rating their own and their other group member's contribution to the project.

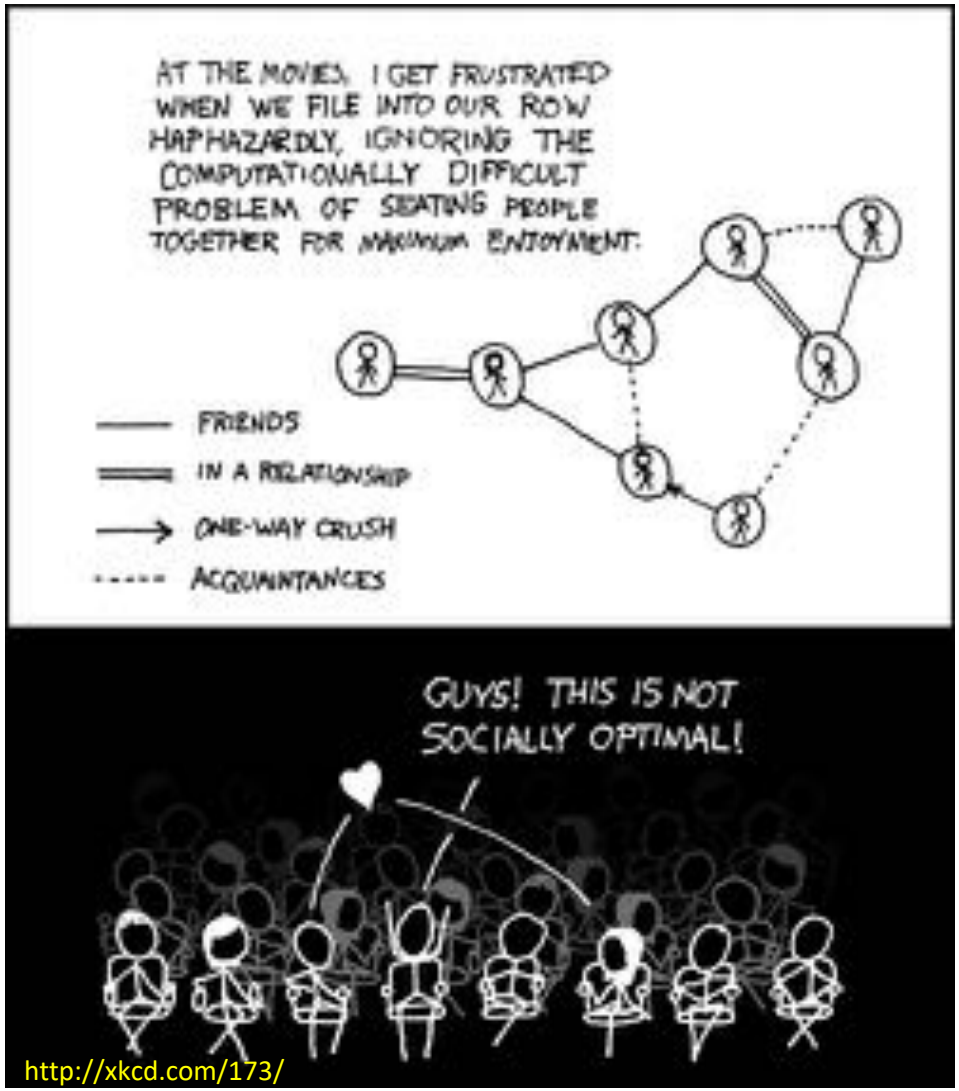
C++ vs Java/Python

Use Java/Python if as you just as comfortable with as C++

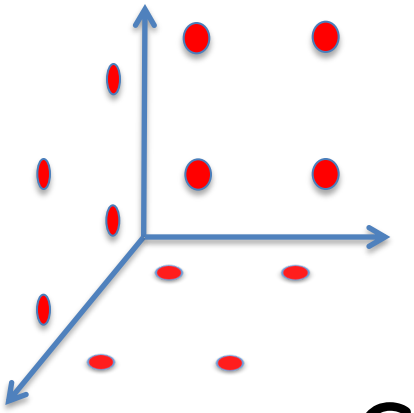


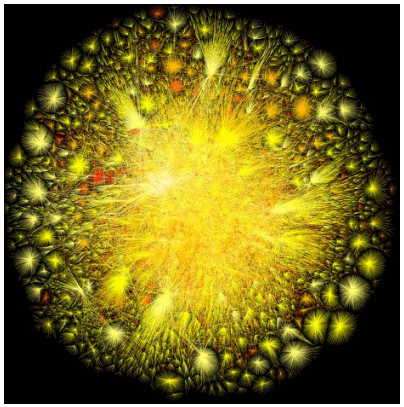
Questions/Comments?

This course: how to solve problems!

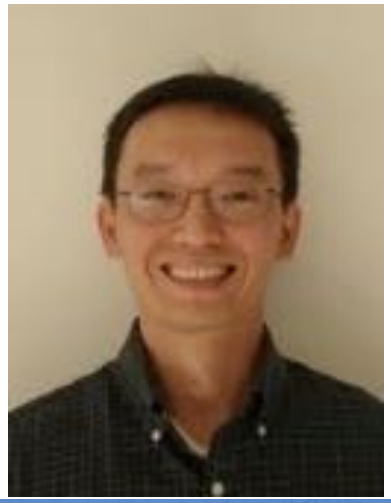


Why should I care ?





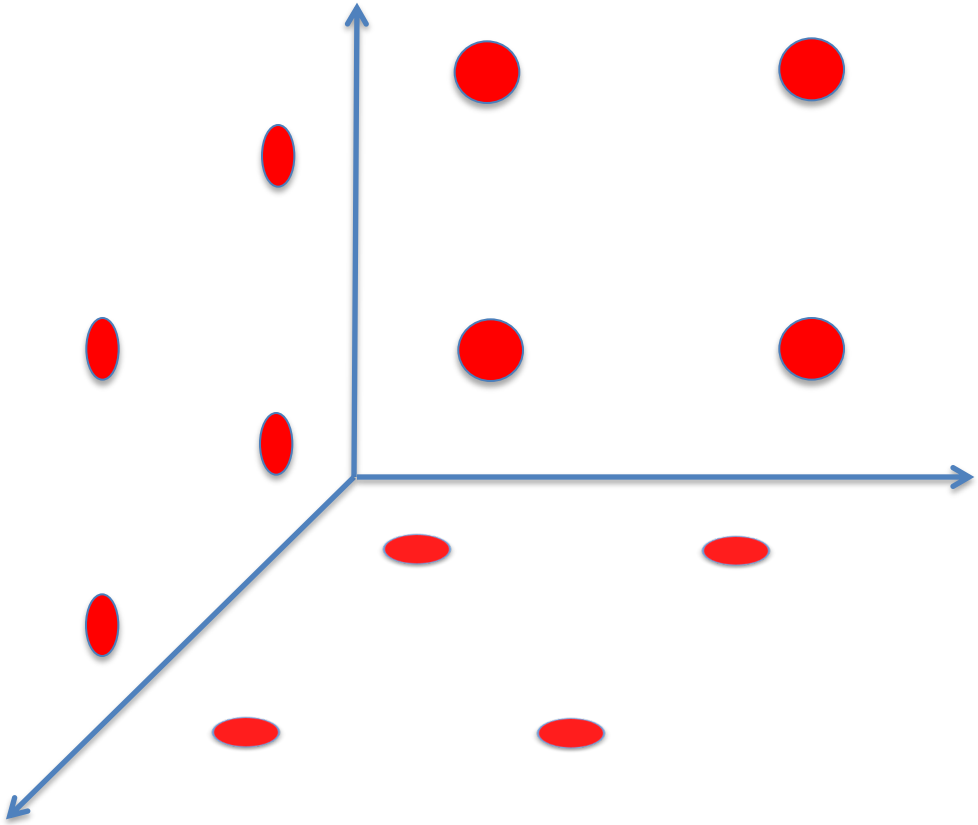
Combining Shadows to Understanding the network



relationalAI

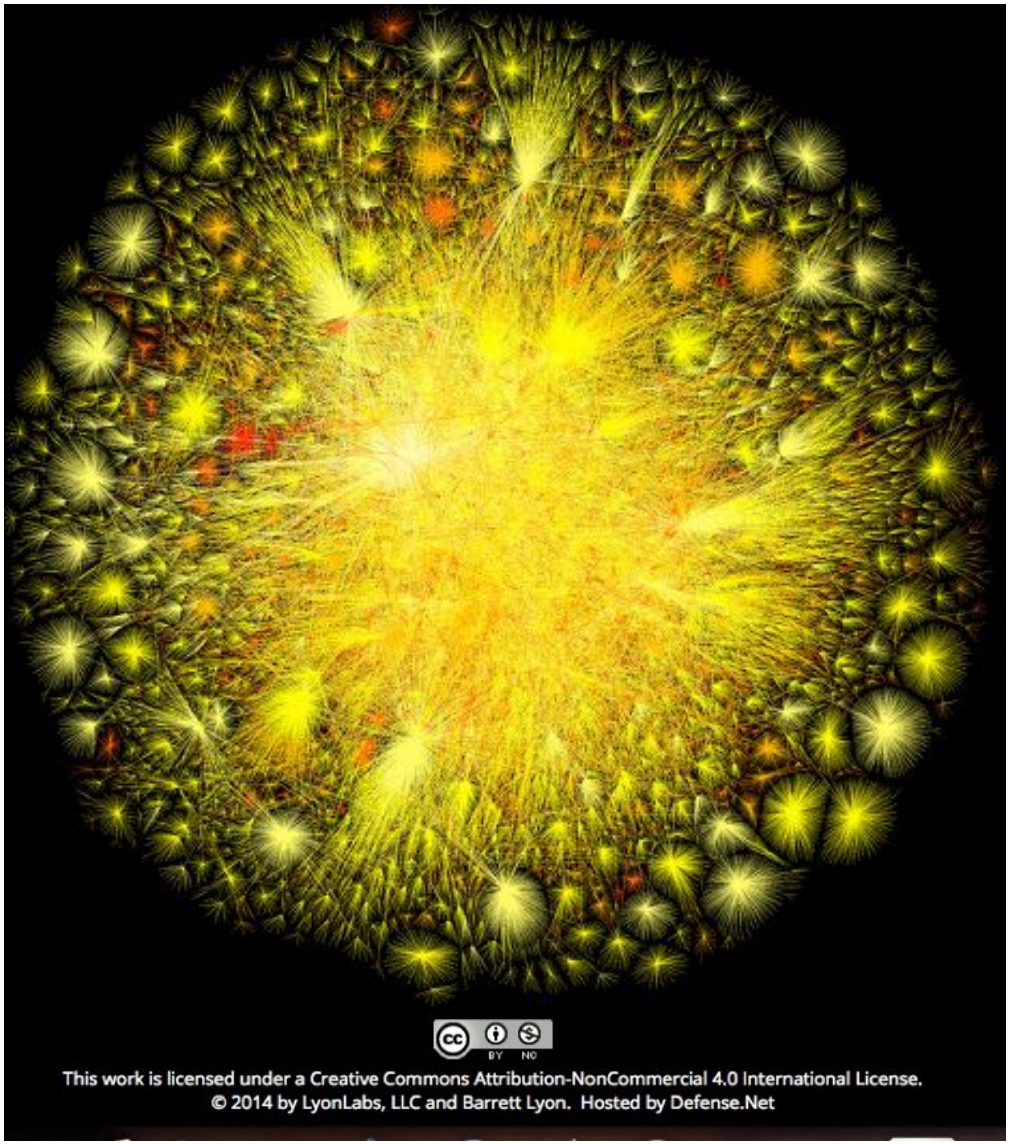
Stanford University

The key technical problem

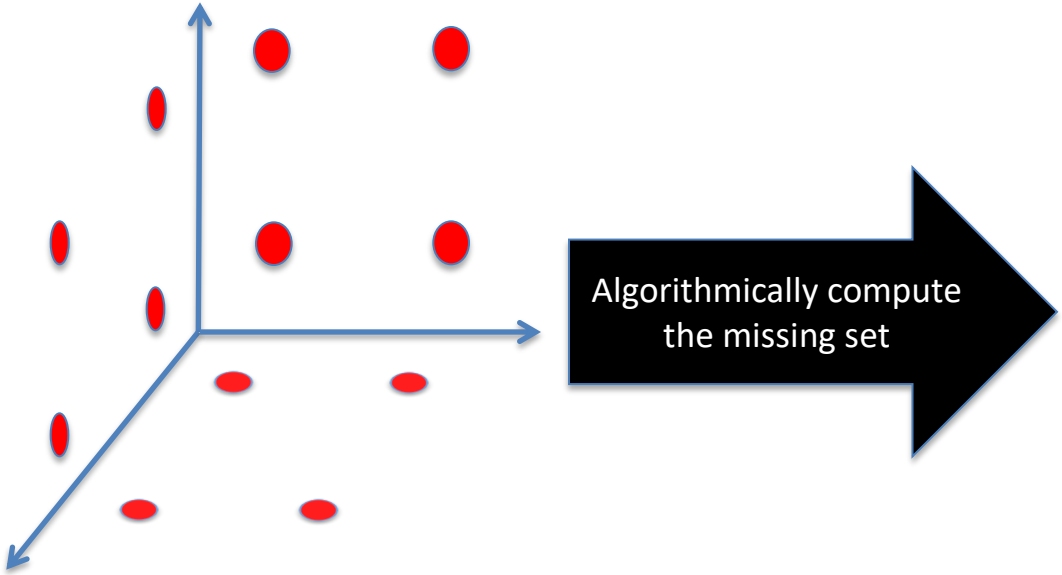


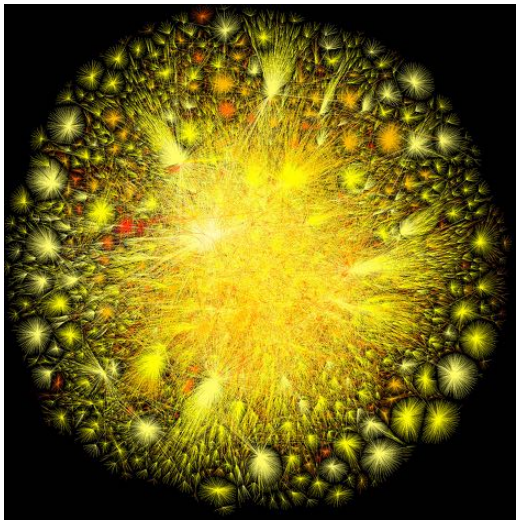
Given the three projections, what is the largest size of the original set of points?

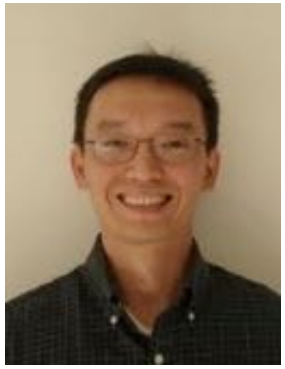
Detecting Communities



Conquering Shadows to Conquering the Internet







The proof is in the performance

EMPTYHEADED




10x faster

ORACLE

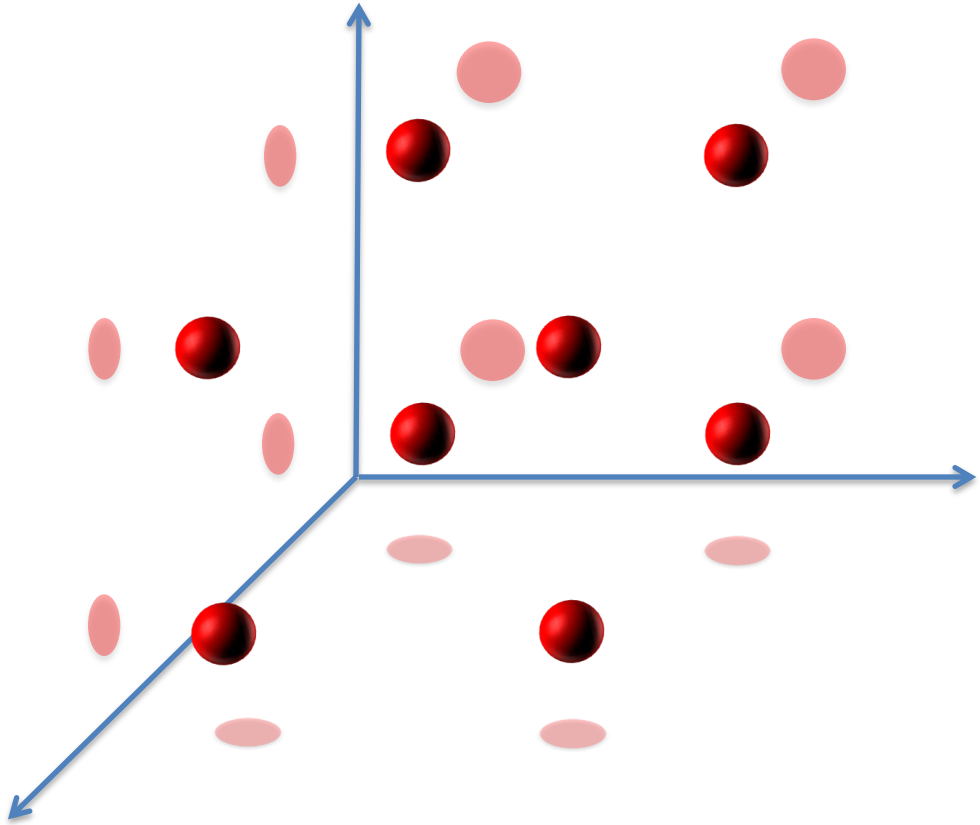
Dato GraphLab

LogicBlox

SNAP

Better algorithm with little hacking will beat a worse algorithm with tons of hacking

The key technical problem



Highly trivial: $4^3 = 64$

Still trivial: $4^2 = 16$

Correct answer: $4^{1.5} = 8$

If detecting communities is not for you

From someone who got a Google job

“You can let your algorithms class know that the phone interviews are essentially like **a difficult algorithms test**.

Lots of data structures, specifying the algorithm, analyzing the run time and space requirements... And all on the phone and **you're supposed to talk through your thought process**.”

Coding jobs will be done by AI

stacksort

In a recent xkcd's alt text, Randall Munroe suggested **stacksort**, a sort that searches StackOverflow for sorting functions and runs them until it returns the correct answer. So, I made it. If you like running arbitrary code in your browser, try it out.

Like (or hate) it? Comment on HackerNews

stackoverflow_sort(
Try a list of numbers, a string, a list of words or json.

[8,6,7,5,3,0,9]

);

Sort

var output =
Output from the function.

;

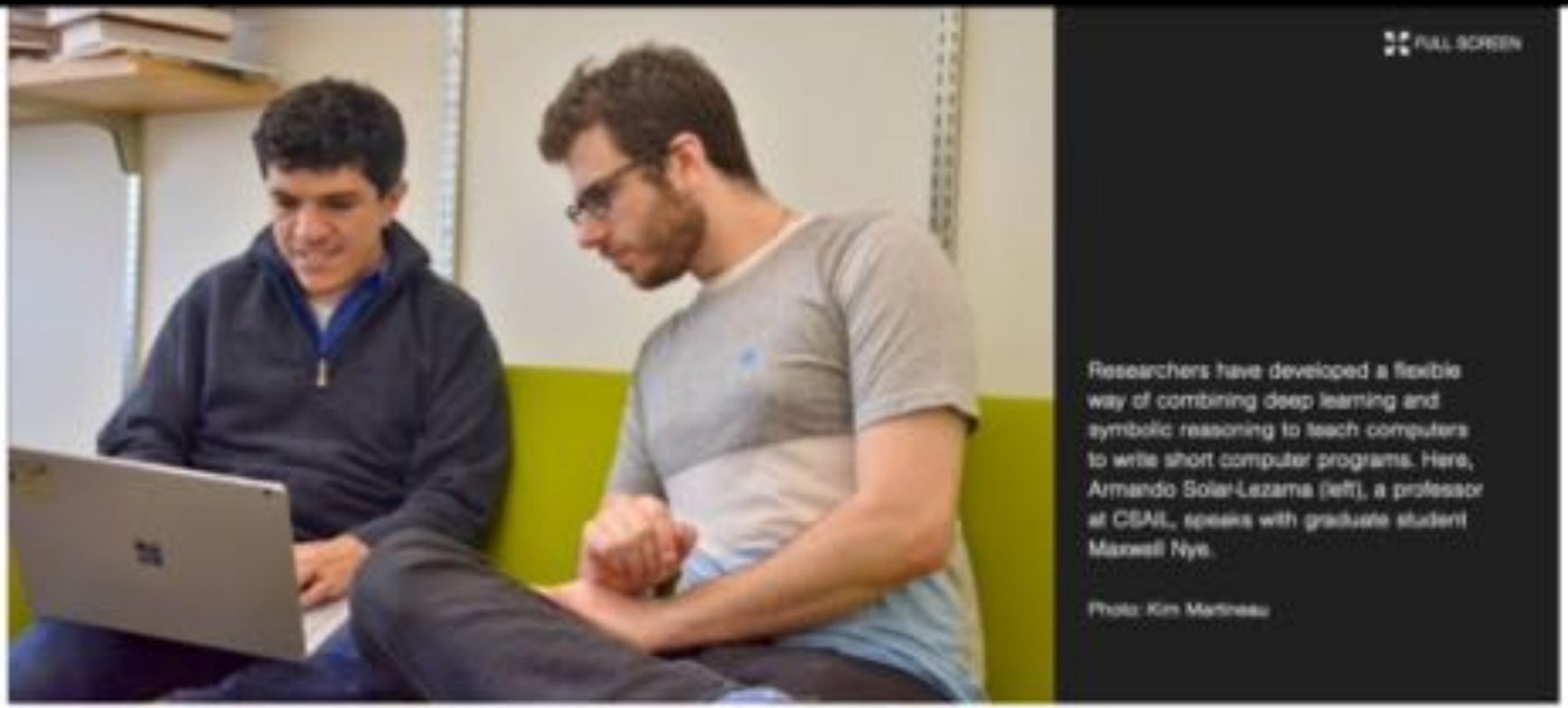
output console

Coding jobs will be done by AI

MIT News

ON CAMPUS AND AROUND THE WORLD

Browse or Search



Toward artificial intelligence that learns to write code

Researchers combine deep learning and symbolic reasoning for a more flexible way

So am I doomed?

There will still be room for high level *algorithmic* thinking!

Today, programming is generally equated with coding. It's hard to convince students who want to write code that they should learn to think mathematically, above the code level, about what they're doing. Perhaps the following observation will give them pause. ***It's quite likely that during their lifetime, machine learning will completely change the nature of programming. The programming languages they are now using will seem as quaint as Cobol, and the coding skills they are learning will be of little use. But mathematics will remain the queen of science, and the ability to think mathematically will always be useful.***

Questions/Comments?