

# Lecture 16

CSE 331

Oct 6, 2021

# Please have a face mask on

## Masking requirement



*UR 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>

# Quiz 1 this FRIDAY

note @220 stop following 33 views

## Quiz 1 on Friday, Oct 8

The first quiz will be from 10:20-10:30am in class on Friday, October 8. We will have a 5 mins break after the quiz and the lecture will start at 10:35am.

We will hand out the quiz paper at 10:15am but you will **NOT** be allowed to open the quiz to see the actual questions till 10:20am. However, you can use those 5 minutes to go over the instructions and get yourself in the zone.

There will be two T/F with justification questions (like those in the sample mid term 1: [@197](#).) Also quiz 1 will cover all topics we cover in class till Friday, Oct 4.

Also like the mid-term y'all can bring in one letter sized cheat-sheet (you can use both sides). But other than cheatsheet and writing implements nothing else is allowed.

[edit](#) good note Updated 2 hours ago by Adri Flutts

# Extra Office Hours

note @254    stop following **63** views

## Extra office hours

In anticipation of the upcoming mid-term exams, the TAs will have some extra office hours. Note that these are in **addition** to the usually scheduled OH @48. If the office hour is virtual, please see @11 for the zoom link.

(Note: We anticipate few more extra OH slots to be added till Thursday.)

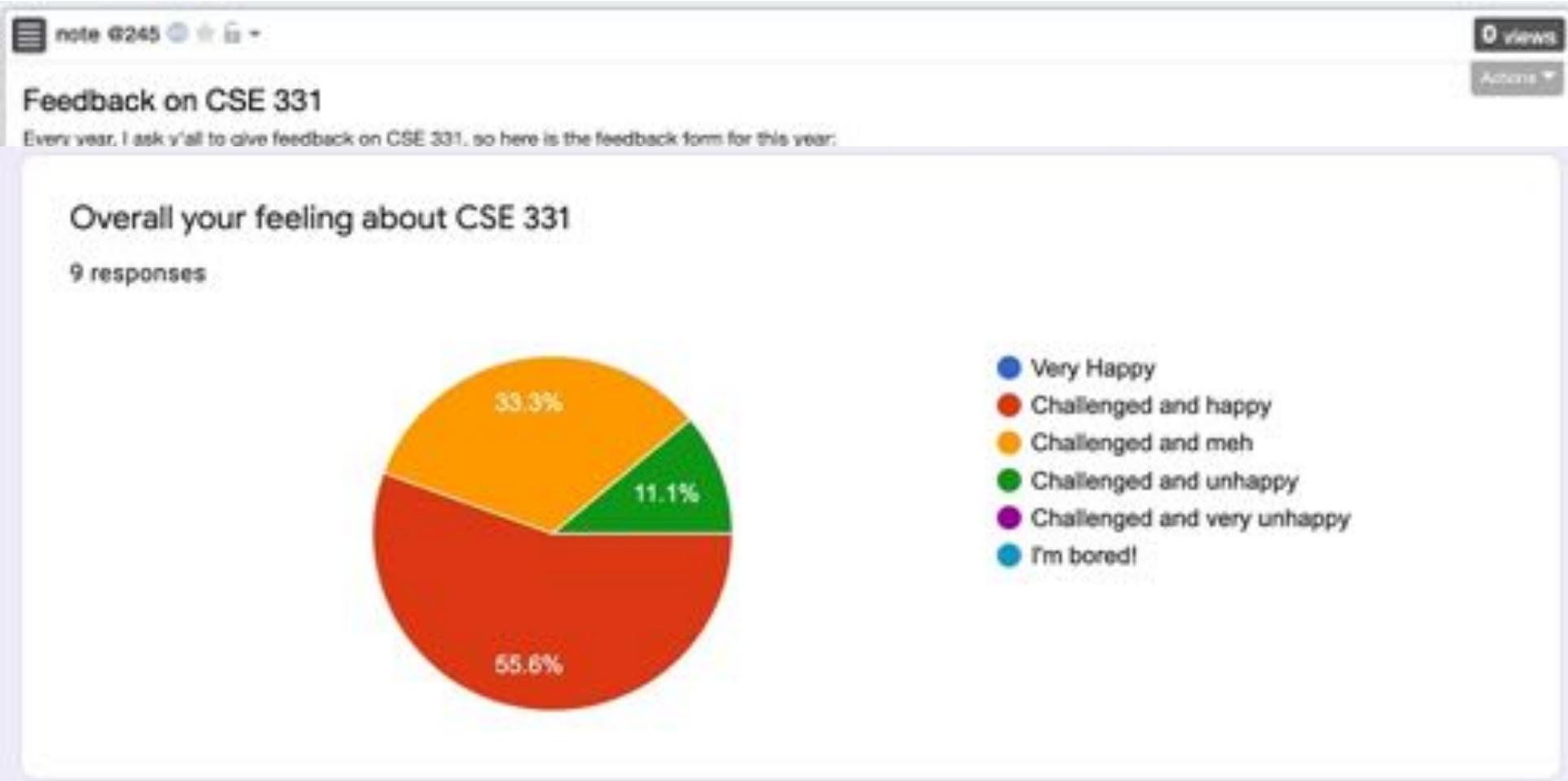
- Monday, Oct 11
  - 11:30-12:20pm: **Aman** (virtual)
    - Note this is will be in parallel with Connor's usual in-person OH
- Tuesday, Oct 12
  - 3-3:50pm: **Megan** (virtual)
    - Note this will in parallel with Joseph's usual in-person OH
  - 4-4:50pm: **Connor** (virtual)
    - Note that this will be in parallel with Joseph's usual in-person OH

[office\\_hours](#)

[edit](#) [good note](#) 0

Updated 1 day ago by Adri Rudra

# Please do fill in the feedback



# HW 3 solutions are out

note @268   

stop following **1** views

## HW 3 solutions

are up: <https://buffalo.box.com/s/m8ec238e8bmam9yziwp3y6ekf94e8h6n>

As usual, please do not share this link with anyone else.

homework3

 good note 

Updated 40 seconds ago by Atri Rudra

# Project groups finalized

note @258   stop following **65** views 

## Project groups (final confirmation)

As a headsup, over the next few minutes I'll be sending confirmation of your 331 project groups. I'll post again when this process is done.

At this point you should fall in one of the following three categories (assuming you signed up):

- If you had signed up as a group of size 3 by Sep 29, then you should have received a confirmation by email on Sep 29 or 30.
- If you signed up individually, look out for an email with no body and the subject line being the names of your (randomly assigned) group members and group name (which should be Random Group #x for some x between 0 and 8) and nothing else [apologies for the badly formatted email]
  - There is one group of size two, sorry!
- If you signed up as a group Sep 30 or later look out for an email with no body and the subject line being the names of your group members and group name (if y'all chose one) and nothing else [apologies for the badly formatted email]

If any of the information that you receive is not correct, please contact me ASAP!

If you think you signed up but did not receive an email with a group assignment (either in this cycle or the previous one), please let me know as well!

  good note 

Updated 20 hours ago by Neil Rudra

# Project released

note @263

stop following 0 views

## 331 project released

Alrighty, the 331 project details are now out:

<http://www-student.ces.buffalo.edu/~atri/cse331/fall21/project/index.html>

(You can also access the page from the "Project" dropdown menu on the top navbar.)

Autolab will start accepting submissions from 9am tomorrow (there are ten deadlines spread over the rest of the semester).

There is a lot of details in the project pages so I would recommend that y'all read through very carefully as a group. I would like to point out something that might not be as intuitive:

### **YOU NEED TO FORM GROUPS 10(TEN)!!!! TIMES ON AUTOLAB**

Your group will have 10 problems to submit on Autolab (five coding problems and five reflection questions). However, you will need to form your group for EACH submission separately.

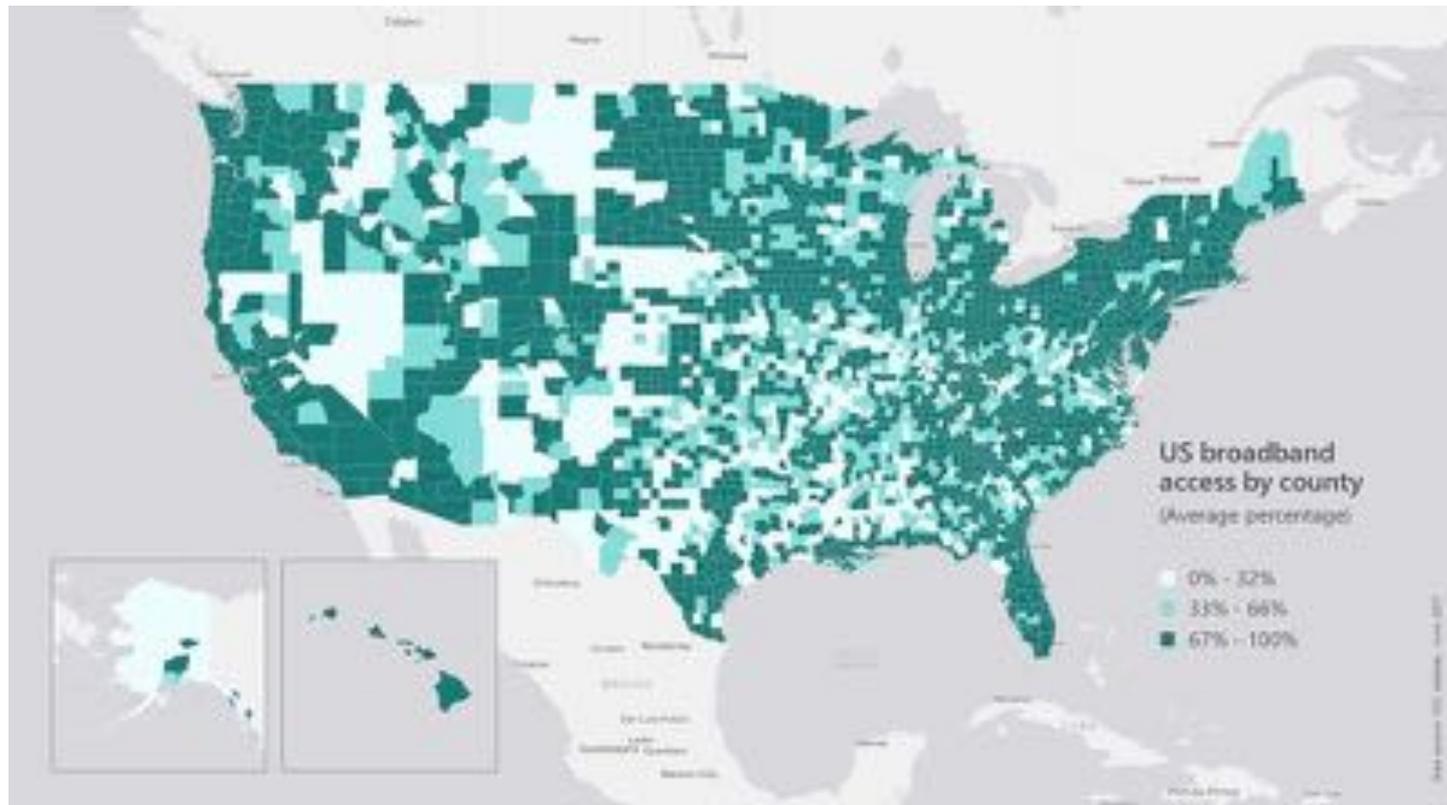
project

edit

good note | 0

Updated just now by Ari Rubin

# Broadband access



<https://assets.bwbx.io/images/users/iqjWHBFdfxIU/iZSjibxE1KJs/v1/800x-1.jpg>

# Lawsuit against Spectrum

**FILED: NEW YORK COUNTY CLERK 02/01/2017 12:05 AM**

NYSCEF DOC. NO. 1

INDEX NO. 450318/2017

RECEIVED NYSCEF: 02/01/2017

**SUPREME COURT OF THE STATE OF NEW YORK  
COUNTY OF NEW YORK**

-----X  
**THE PEOPLE OF THE STATE OF NEW YORK,  
by ERIC T. SCHNEIDERMAN, Attorney General of the  
State of New York,**

**Plaintiff,**

**SUMMONS**

**-against-**

**Index No.: 450318/2017**

**Plaintiff designates New  
York County as the Place  
of Trial**

**CHARTER COMMUNICATIONS, INC. and SPECTRUM  
MANAGEMENT HOLDING COMPANY, LLC  
(f/k/a TIME WARNER CABLE, INC.),**

# Five coding problems

## Coding Problems for Project

*Problem 1 (Coding) due at 11:59pm, Friday, October 29, 2021.*

*Problem 2 (Coding) due at 11:59pm, Friday, November 5, 2021.*

*Problem 3 (Coding) due at 11:59pm, Friday, December 3, 2021.*

*Problems 4 and 5 (Coding) due at 11:59pm, Friday, December 10, 2021.*

All submissions should be done via [Autolab](#).

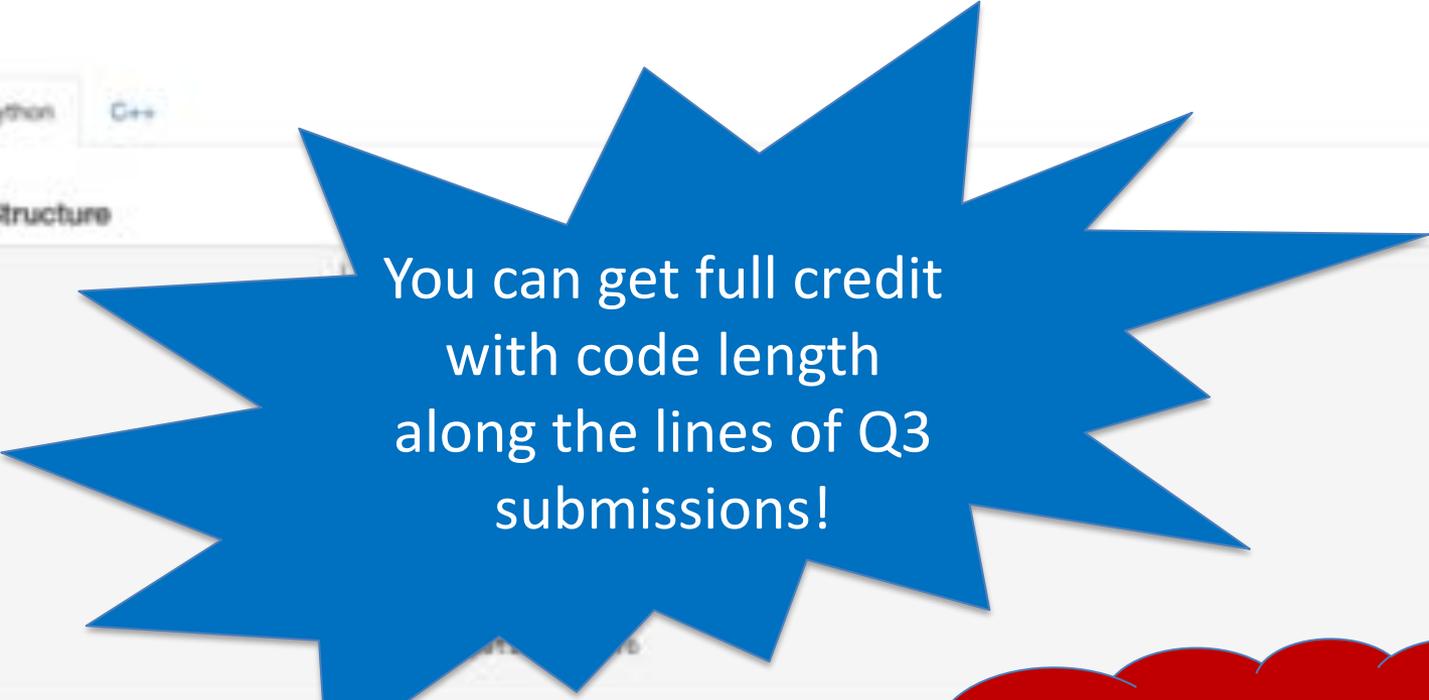
### Acknowledgment

The development of the project was supported by a [Mozilla Responsible Computer Science award](#). The support is gratefully acknowledged.

## Some Suggestions and Warnings

While this coding part of the project is somewhat similar to Question 3s on the homework, there are some crucial differences and we wanted to highlight few things for y'all upfront:

# Each like a HW Q3



You can get full credit  
with code length  
along the lines of Q3  
submissions!



More work to  
UNDERSTAND the  
problem

- `problem`, which simply contains the problem number of the current template as a member variable on the `Solution` class. You DO NOT need to worry about this variable.
- `isp`, which is the ID of the ISP node. Note that this is the same as content provider or  $i$  as mentioned in the problem description.
- `graph`, which is the input graph  $G$  in the adjacency list representation that you are familiar with. The key is a node ID (not client, there are nodes that may not be clients) and

# Five reflection problems

## Reflection Problems for Project

Problem 1 **Reflection** due at 11:59pm, Monday, November 1, 2021.

Problem 2 **Reflection** due at 11:59pm, Monday, November 8, 2021.

Problem 3 **Reflection** due at 11:59pm, Monday, December 6, 2021.

Problems 4 and 5 **Reflection** due at 11:59pm, Monday, December 13, 2021.

All submissions should be done via [Autolab](#).

### Acknowledgment

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

## Some Suggestions and Warnings

While this coding part of the project is somewhat similar to Question 3s on the homework, there are some crucial differences and we wanted to highlight few things for y'all upfront:

# Reflect on your design choices

## Algorithm idea (2 points)

In one paragraph, state the algorithm idea behind the code that you submitted for the second coding problem. This would be similar to a usual algorithm idea submission in a homework.

## Whom does your algorithm work best for? (2 points)

What clients does your algorithm try to make their  $profit_c$  value to be 0? I.e. for which clients  $c$  does your algorithm try to make sure to try get the  $profit_c$  revenue from them? Show how your answer follows from the algorithm idea above.

## Whom doesn't your algorithm work well for? (2 points)

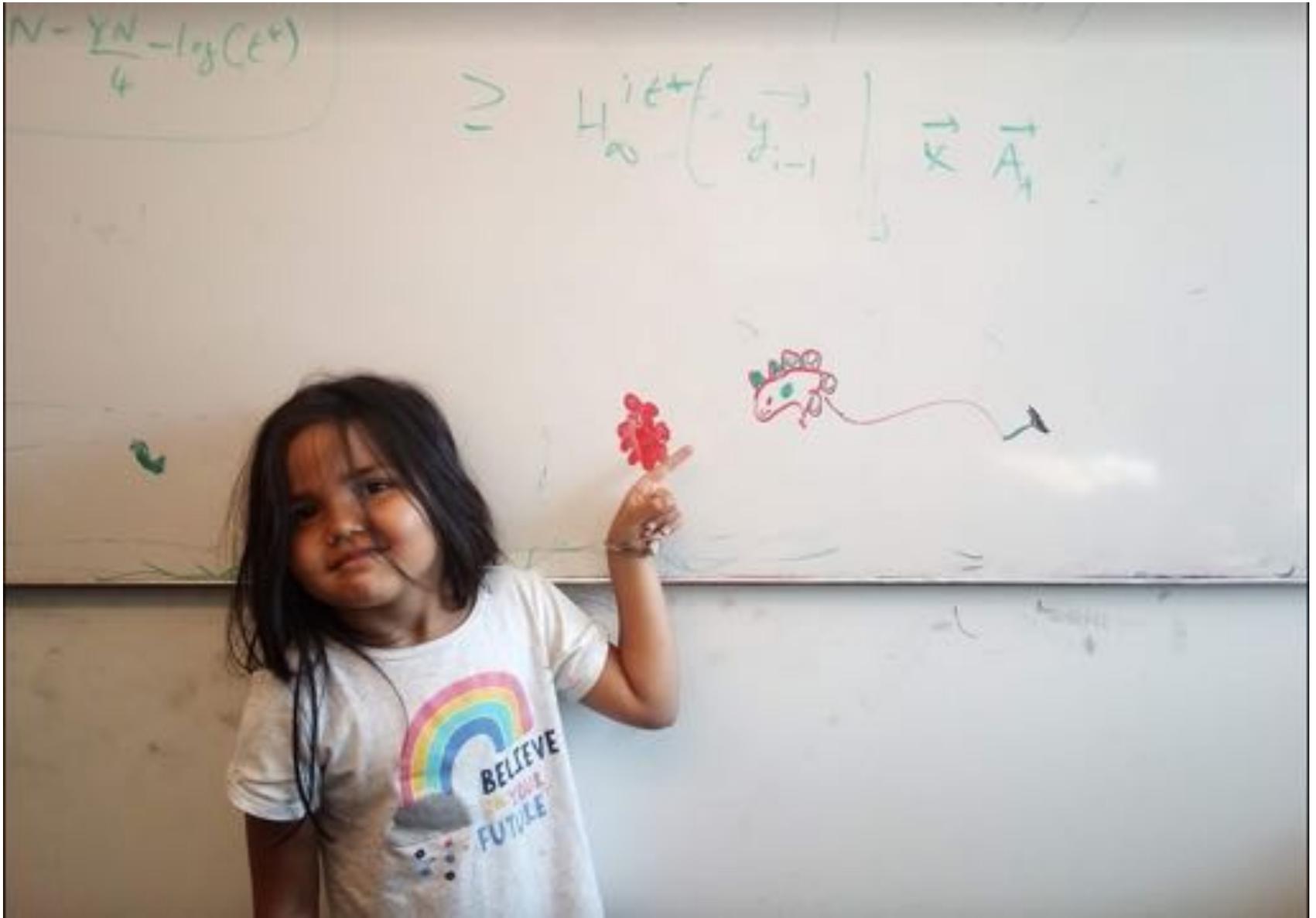
What clients does your algorithm not try (actively) to make their  $profit_c$  value to be 0? I.e. for which clients  $c$  does your algorithm not mind to get a revenue of  $c$  from them? Show how your answer follows from the algorithm idea above.

## How fair is your algorithm? (4 points)

How fair was the decision that your group made in the algorithm design to favor one group of customers (those identified in the second question above) over another (those identified in the third question above)? **Justify** your answer.

If some of your customers are not as well served as others, are there ways for you to address this unfairness that might result in a more ethical distribution of services?

# Questions/Comments?



# Interval Scheduling Problem

**Input:**  $n$  intervals  $[s(i), f(i))$  for  $1 \leq i \leq n$

**Output:** A schedule  $S$  of the  $n$  intervals

No two intervals in  $S$  conflict

$|S|$  is maximized

# Analyzing the algorithm

$R$ : set of requests

Set  $S$  to be the empty set

While  $R$  is not empty

    Choose  $i$  in  $R$  with the earliest finish time

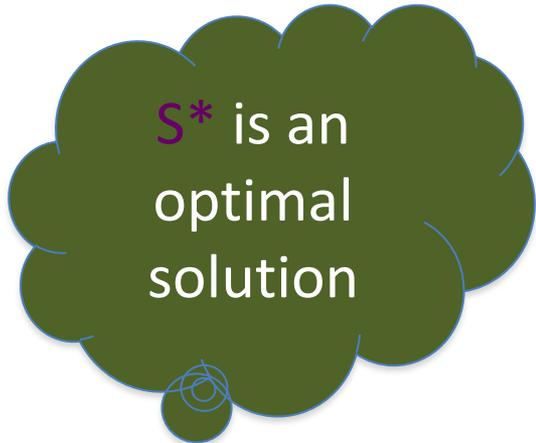
    Add  $i$  to  $S$

    Remove all requests that conflict with  $i$  from  $R$

Return  $S^* = S$



$S^*$  has no conflicts



$S^*$  is an optimal solution

# Greedy “stays ahead”



# Today's agenda

Prove the correctness

Analyze run-time of the greedy algorithm

# Argue correctness on the board...

