Lecture 14

CSE 331

Sep 30, 2022

If you need it, ask for help

Project groups due TONIGHT!

Deadline: Friday, Sep 30, 11:59pm

CSE 331 | Syllabus | Piazza | Schedule | Homeworks | Autolab | Project | Support Pages | channel | Sample Exams

Project Overview

Group signup form

Forming groups

You form groups of size **exactly three (3)** for the project. Below are the various logis

- You have two choices in forming your group:
  1. You can form your group on your own: i.e. you can submit the list of EXACTLY three (3) groups members in your group.

     </> Note

     Note that if you pick this option, your group needs to have **exactly THREE (3)** members. In particular, if your group has only two members you cannot submit as a group of size two. If you do not know many people in class, feel free to use piazza to look for the third group member.

     Also, if you form a group of size three, please make only **one submission per group**.

  2. You can submit *just your* name, and you will be assigned a random group *among all students who take this second option.* However, **note that if you pick this option you could end up in a group of size** 2. There will be at most two groups of size 2.

     </> Potential risk

     Note that if you pick the option of being assigned a random group, you take on the risk that a assigned group might not "pull their weight." We unfortunately cannot help with such aspects of group dynamics. (Of course if a group member is being abusive, please do let Atri know.) Please note that a group member who does not do much work will get penalized on the individual component of the project grade.

- **Submitting your group composition**

  Use this Google form to submit your group composition (the form will allow you to pick one of the two options above).

- You need to fill in the form for group composition by **11:59pm on Friday, September 30**.

- **</> Deadline is strict!**

  e form for group composition by the deadline, then you get a **zero for the entire project**.

ri/cse331/fall22/project/overview.html#

About ~25 have not signed up

note @206 stop following 6 views

Actions

Project singup confirmations

~~As a headsup, over the next hour or so (it is 8:20pm now) I'll be sending confirmation of your 331 project signups. I'll post again when this process is done. [So please wait until I send the confirmation before emailing me :-)]~~

~~As a headsup, here is what to expect:~~

- ~~If you signed up individually, you should get a (reasonably properly formatted) email~~
- ~~If you signed up as a group you should get 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]~~

I have sent confirmations for the project signups that I hav (until 6:40pm on Thur day)

- If you signed up individually, you should a (reasonably prope tte
- If you signed up as a group look out for an email with no body a f your group members and group name (if y'all chose one) and nothing else [apologies for the badly forma

If any of the information that you receive is not correct, please cont

Also the confirmation is only if you signed by before 6:40pm on Th, Sep 2 then but did not receive an email, please let me know as well!

No more confirmations until AFTER the deadline

Quiz 1 in a week

note @183 stop following 78 views

Actions

Quiz 1 on Friday, Oct 7

The first quiz will be from **11:00-11:10am in class** on **Friday, October 7**. 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 10:55am but you will **NOT** be allowed to open the quiz to see the actual questions till 11:00am. 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: @182.) Also quiz 1 will cover all topics we cover in class till Friday, Sep 30.

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.

quiz1

Edit good note 0

Updated 2 days ago by Atri Rudra

Mid-term post

note @192 stop following 42 views Actions

The mid-term post

First, midterm-I is on **Monday, Oct 10** and midterm-II is on **Wednesday, Oct 12** during the usual class timings (i.e. 11:00-11:50am in Hoch 114). Below are some comments that might be helpful to prepare for the mid-term.

(Thoughts on what to do *during* the exam here: @193)

- Work through the sample mid-term exams (@182). Do **not** use the sample mid-term to deduce **anything** about the relative coverage of different topics. (See points below for more on the coverage.) The sample mid-terms are meant for you to see the format of the questions. The *actual mid term exams will be harder than the sample mid term exams*. The actual mid-terms will follow the exact same format for the sample midterms: i.e. first mid-term will be only T/F while the second ones will be longer ones.
- I encourage you to not look at the solutions to the sample mid-terms before you have spent some quality time by yourself on the mid-term questions first.
- Use the quiz on Oct 7 (@183) to get some practice in solving T/F questions under some time pressure. Also review the T/F polls (@81) for more examples of such T/F questions.
- Review the HW problems/solutions. HW solutions are here: @140.
- You **will** be under (a bit of) time pressure in the mid-term exams-- it might be useful for you to use the sample mid-term to decide on how much time you are going to spend on each question. Also read the instructions on the first page and keep them in mind during the exam (the instructions will of course be repeated on the exam sheet).
- If you need help attend the usual recitation, office hours.
- The exam will be closed book and closed notes. However, you can bring in **one** 8.5" X 11" review sheet. (If you prefer you can bring in different review sheets for the two mid-term exams.) You can write anything that you want on the sheet as long as it is one sheet (you can use both sides). It can hand-written or typed up doesn't matter-- however, you are not allowed to bring in a magnifying glass. The review sheet is to make sure you do not spend time

Questions?

Breadth First Search (BFS)

Build layers of vertices connected to s

$L_0 = \{s\}$

Assume $L_0,..,L_j$ have been constructed

L_{j+1} set of vertices not chosen yet but are connected to L_j

Stop when new layer is empty

Use linked lists

Use CC[v] array

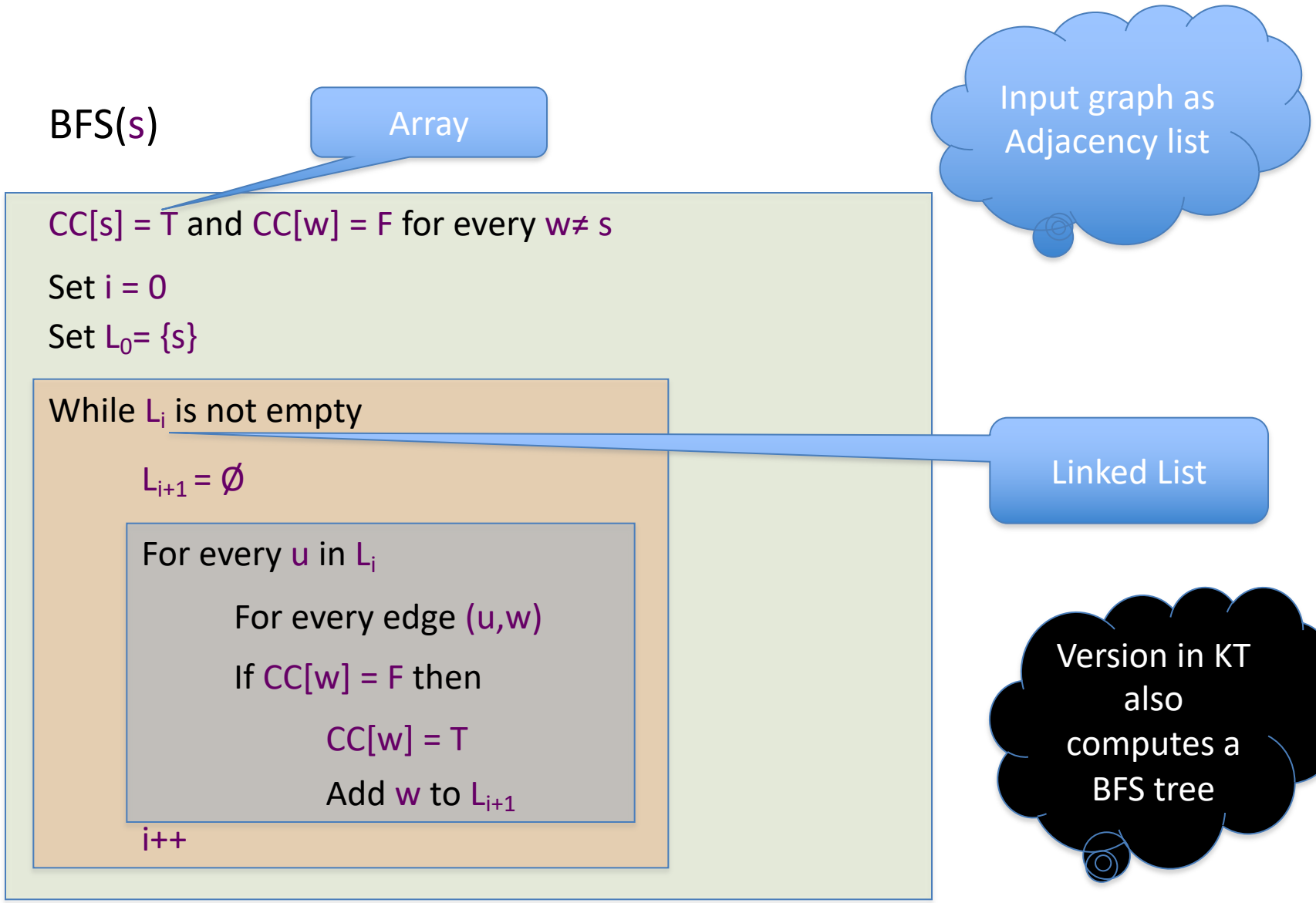
Rest of Today's agenda

Quick run time analysis for BFS

Quick run time analysis for DFS (and Queue version of BFS)

Helping you schedule your activities for the day

O(m+n) BFS Implementation



All the layers as one

BFS(s)

CC[s] = T and CC[w] = F for every w≠ s

Set i = 0

Set L_0= {s}

While L_i is not empty

L_{i+1} = Ø

For every u in L_i

For every edge (u,w)

If CC[w] = F then

CC[w] = T

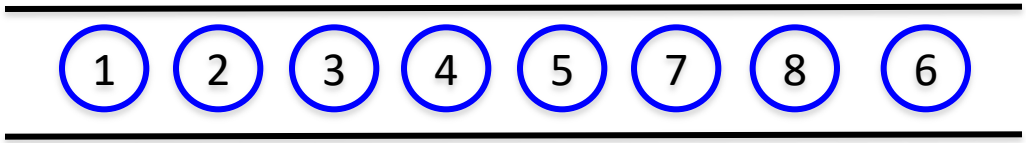
Add w to L_{i+1}

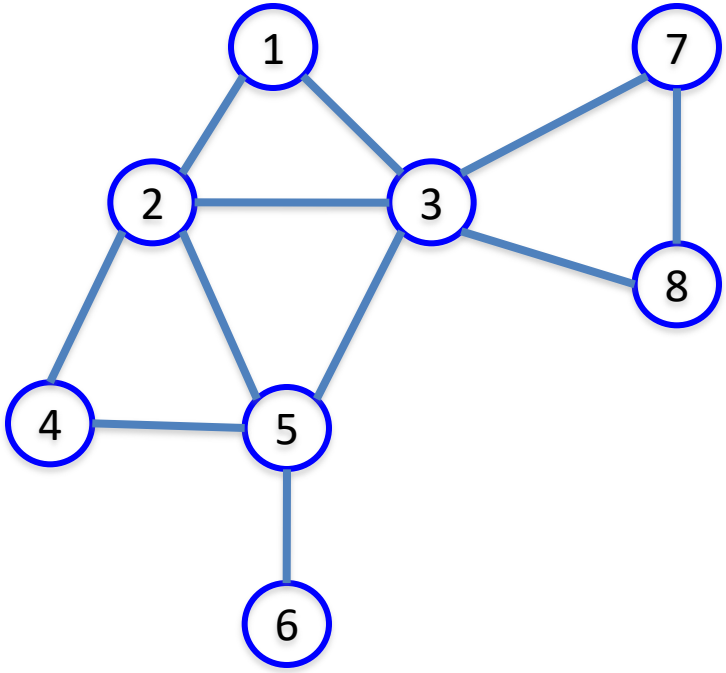
i++

All layers are considered in first-in-first-out order

Can combine all layers into one queue: all the children of a node are added to the end of the queue

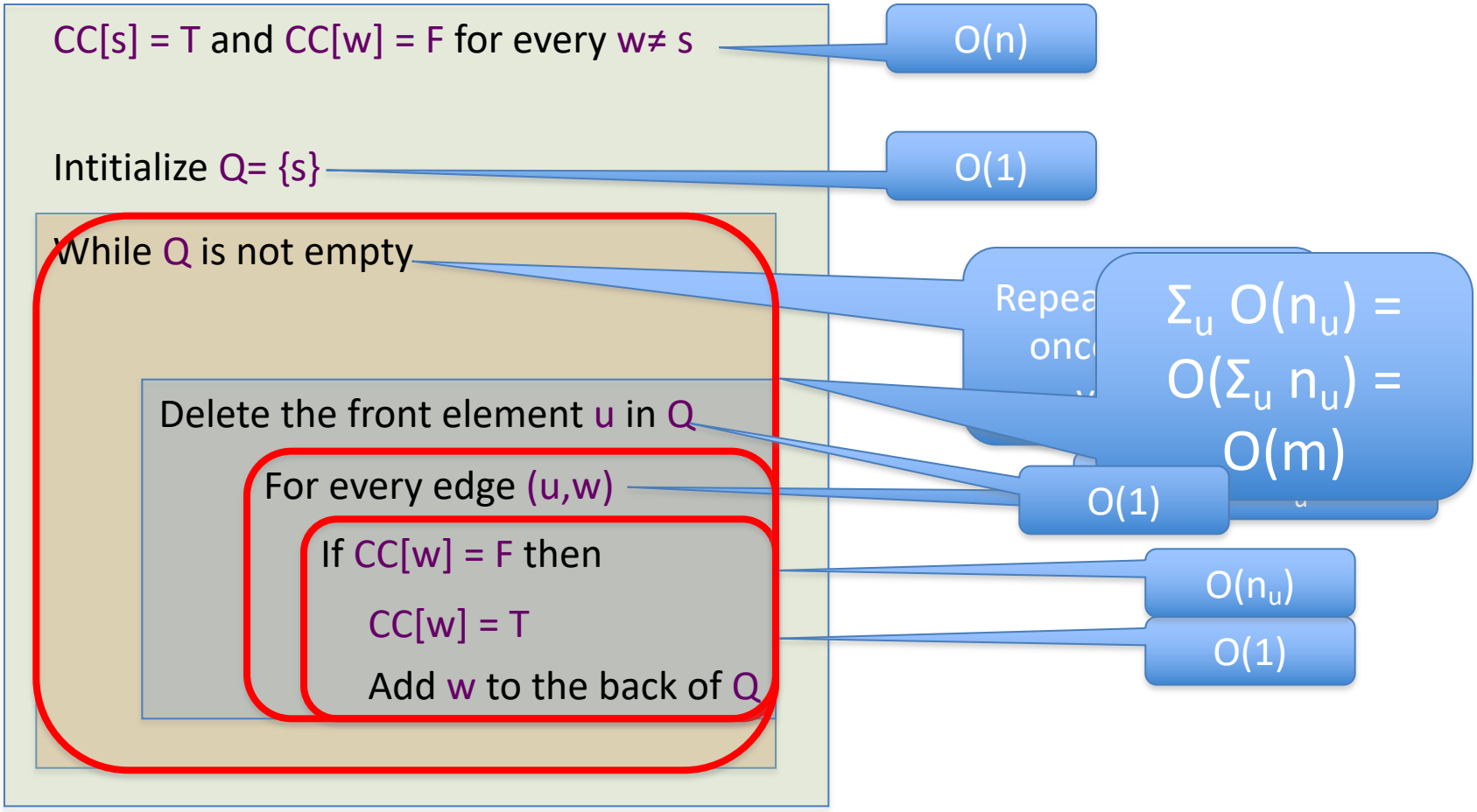
An illustration



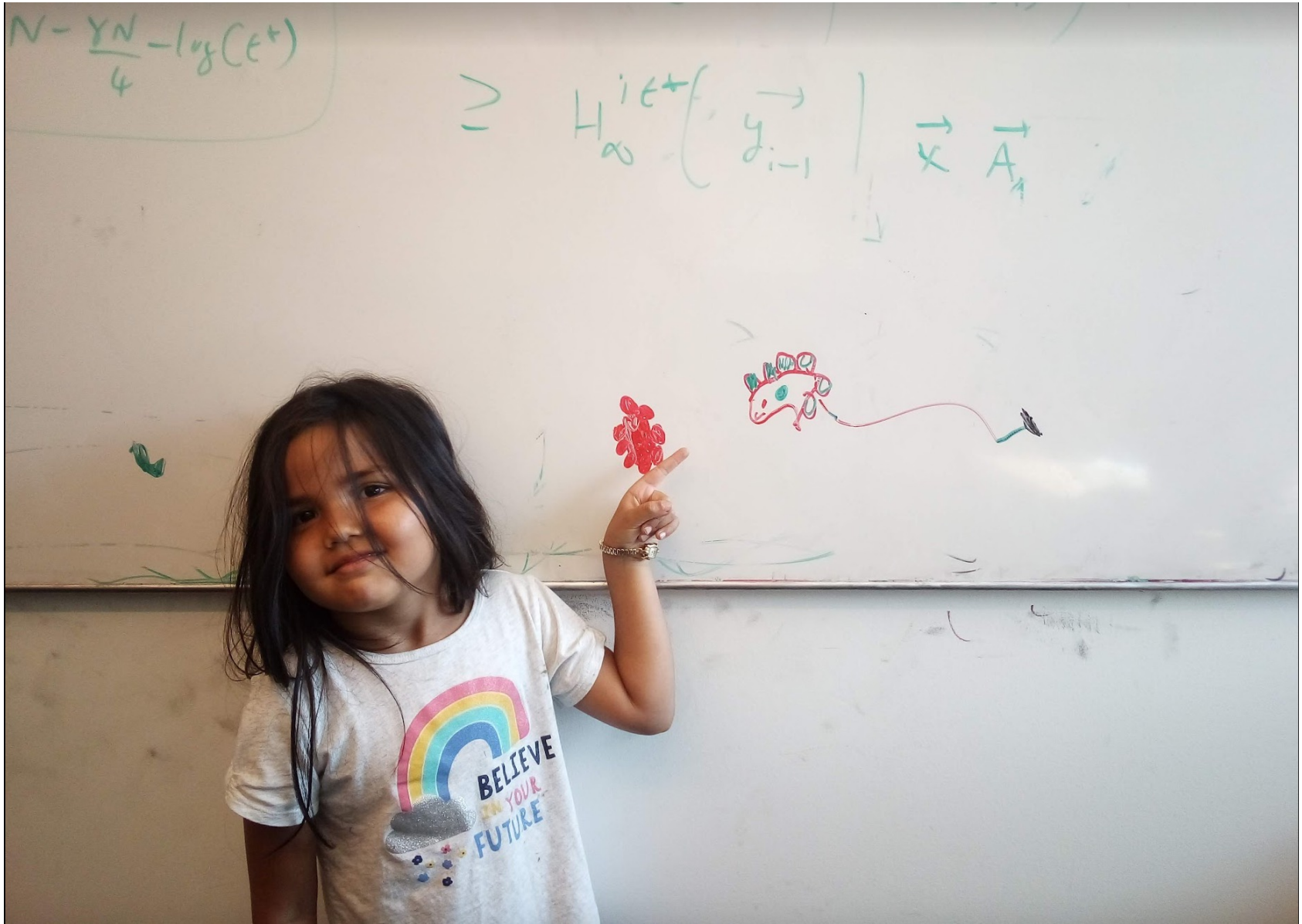


Queue O(m+n) implementation

BFS(s)



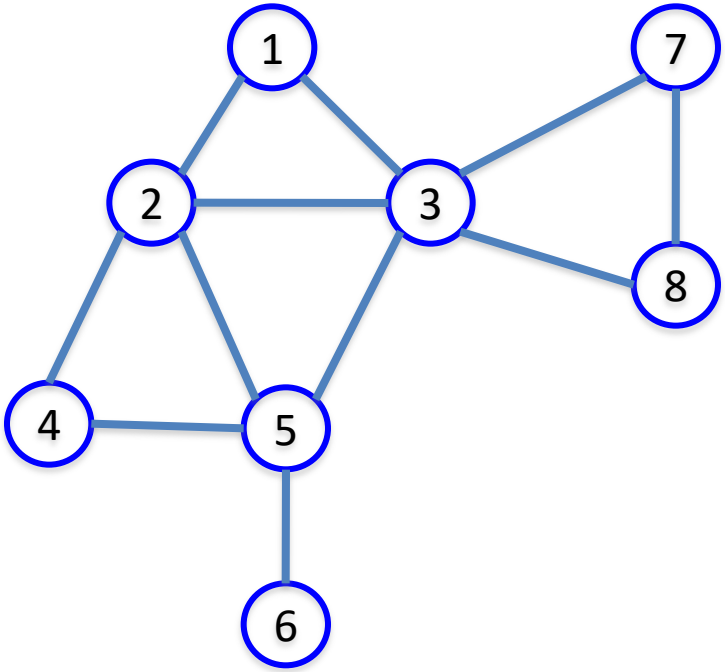
Questions/Comments?

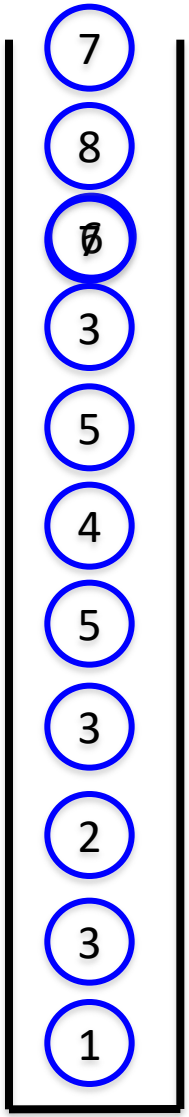


Implementing DFS in O(m+n) time

Same as BFS except stack instead of a queue

A DFS run using an explicit stack





DFS stack implementation

DFS(s)

CC[s] = T and CC[w] = F for every w≠ s

Intitialize $\hat{S}$ = {s}

While $\hat{S}$ is not empty

Pop the top element u in $\hat{S}$

If CC[u] = F then

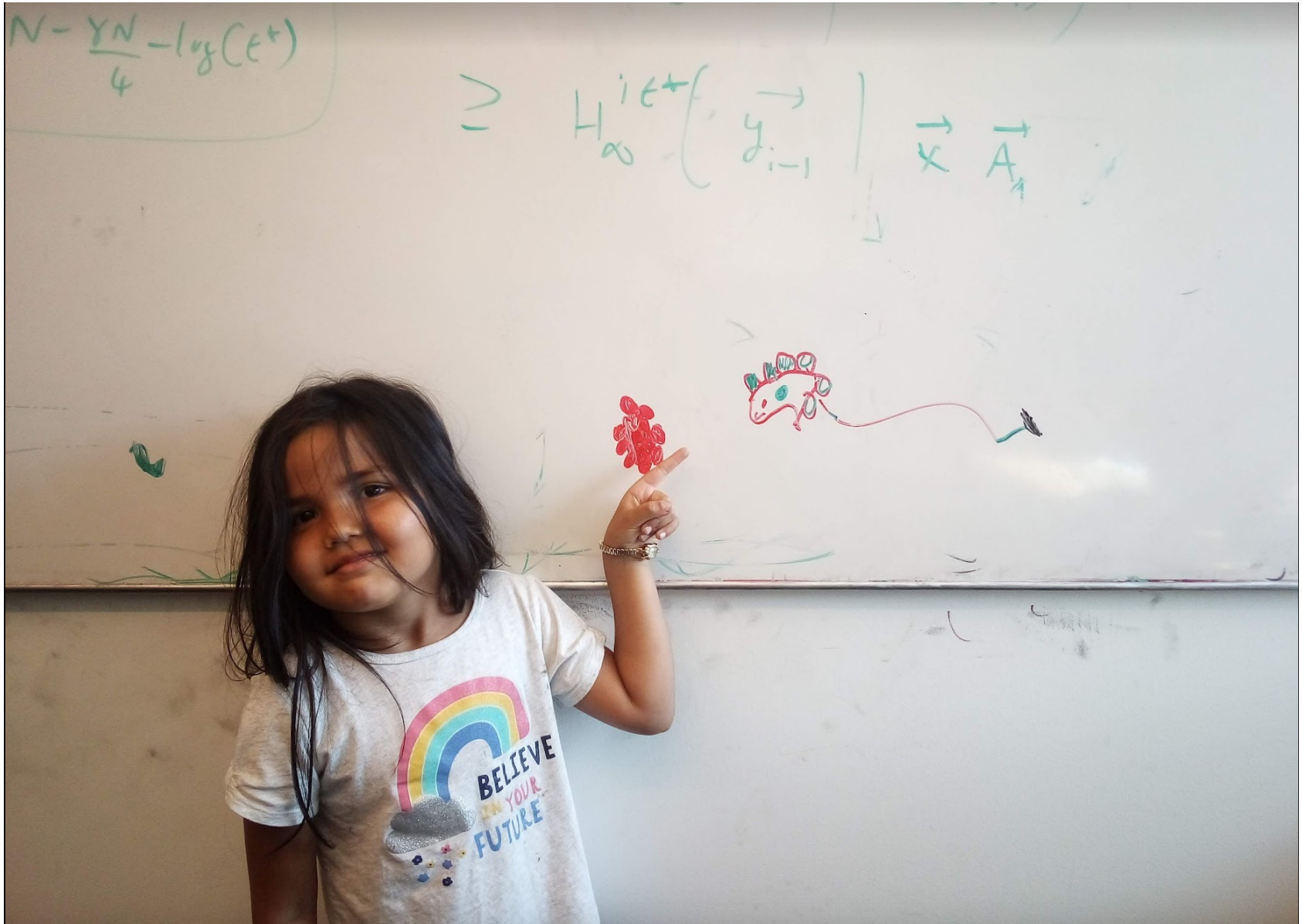
CC[w] = T

For every edge (u,w)

Push w to the top of $\hat{S}$

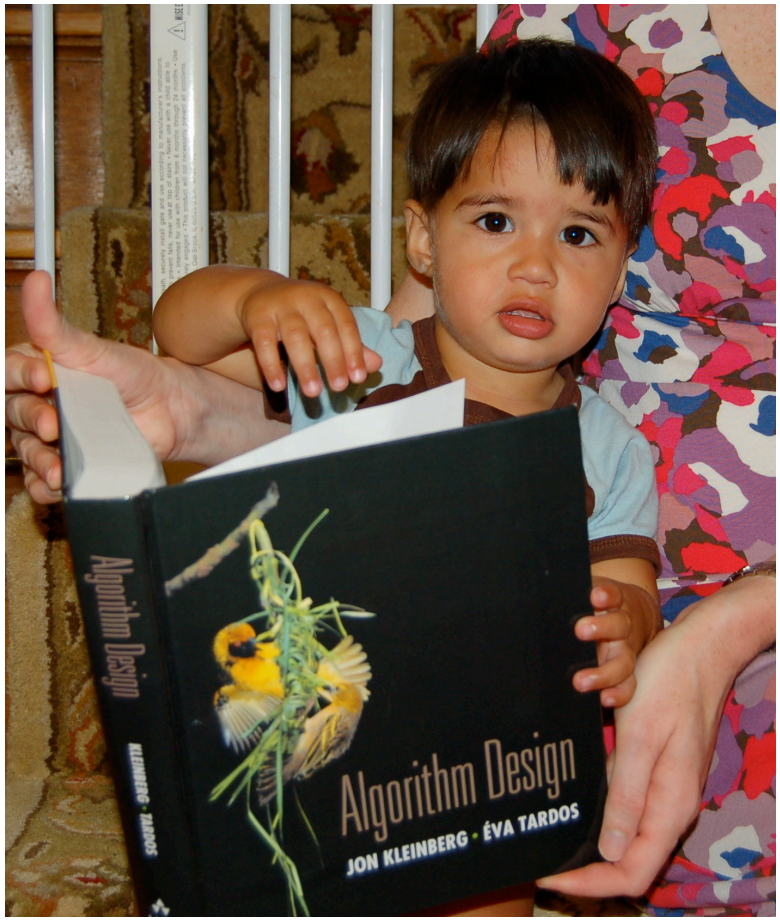
Same O(m+n) run time analysis as for BFS

Questions/Comments?



Reading Assignment

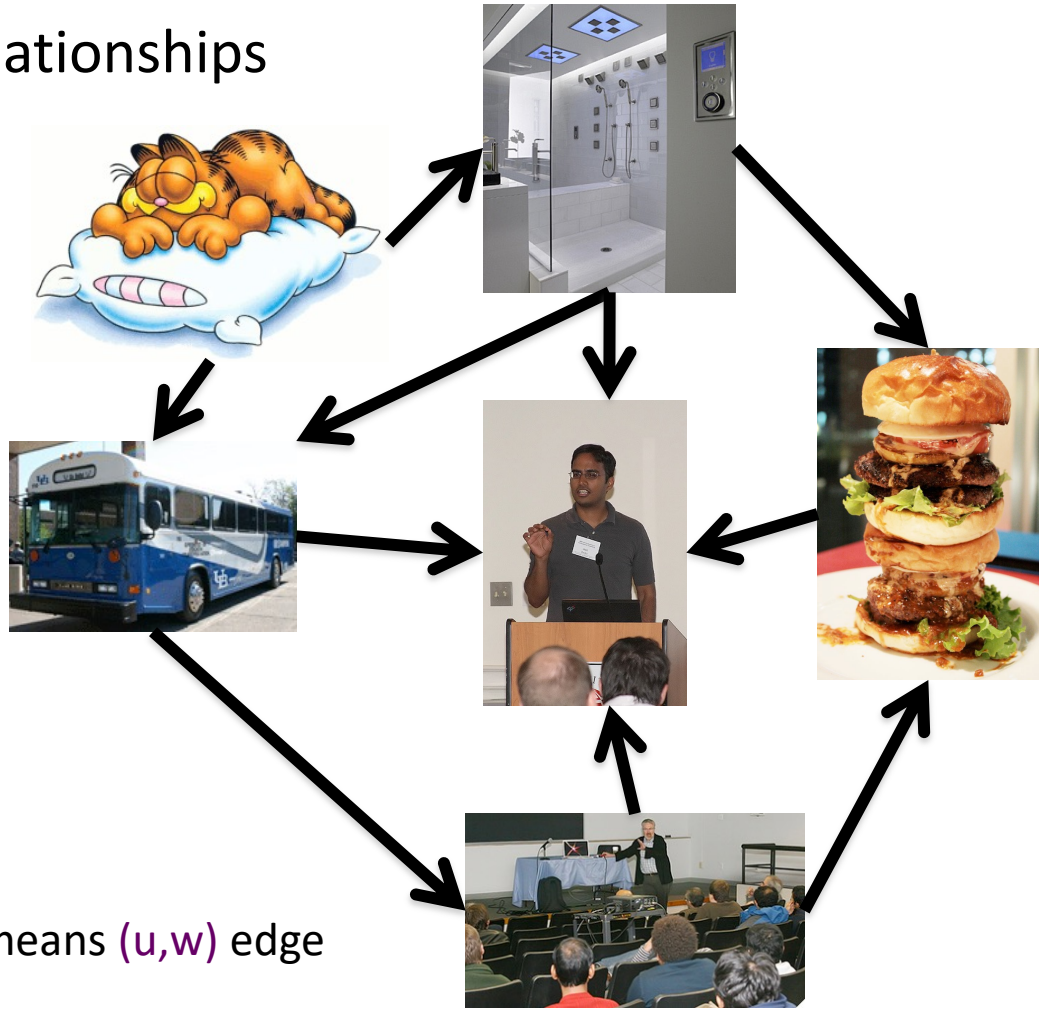
Sec 3.3, 3.4, 3.5 and 3.6 of [KT]



Directed graphs

Model asymmetric relationships

Precedence relationships

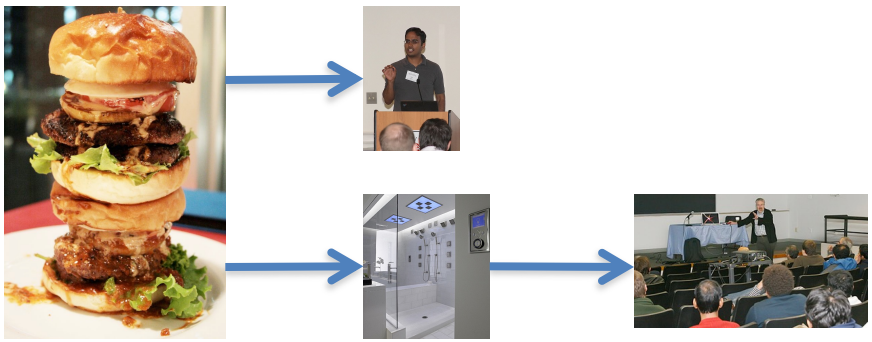


u needs to be done before w means (u,w) edge

Directed graphs

Adjacency matrix is not symmetric

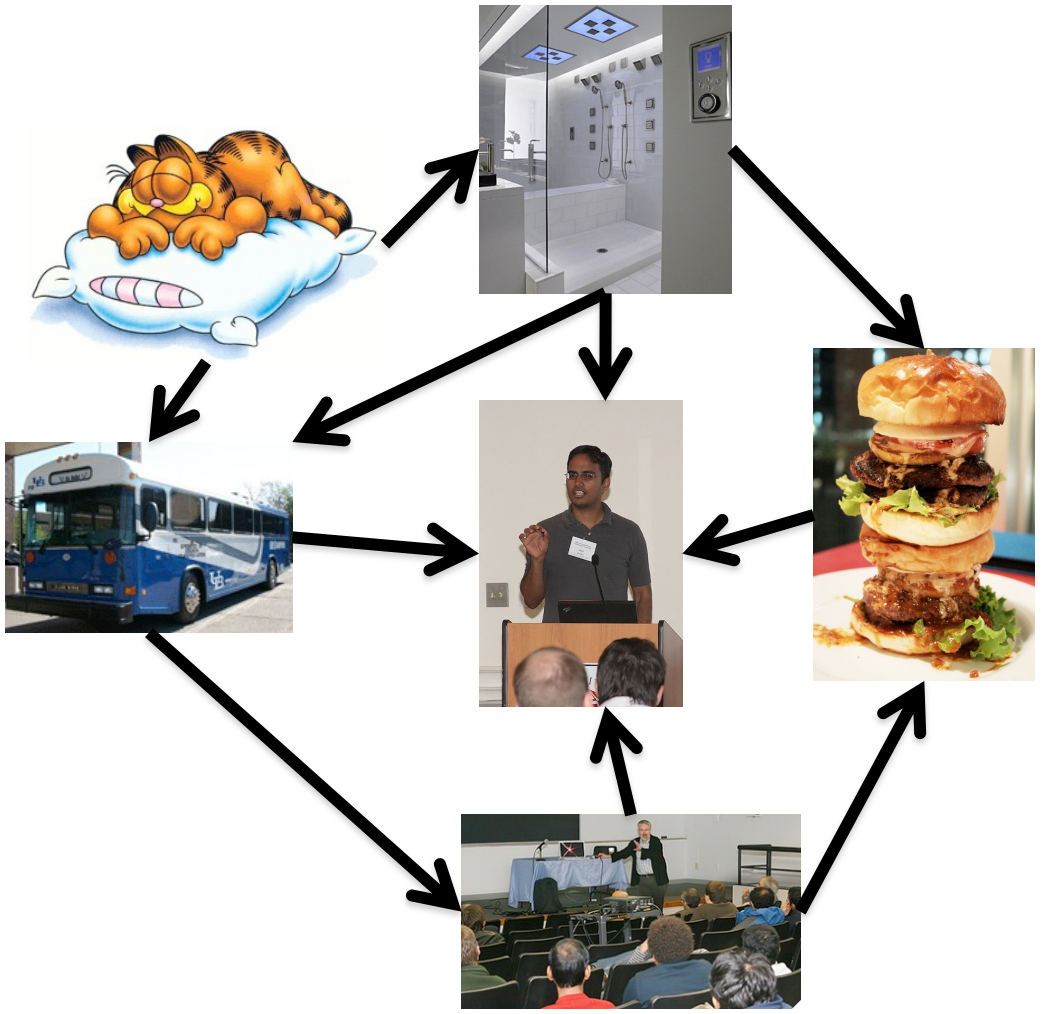
Each vertex has two lists in Adj. list rep.



Directed Acyclic Graph (DAG)

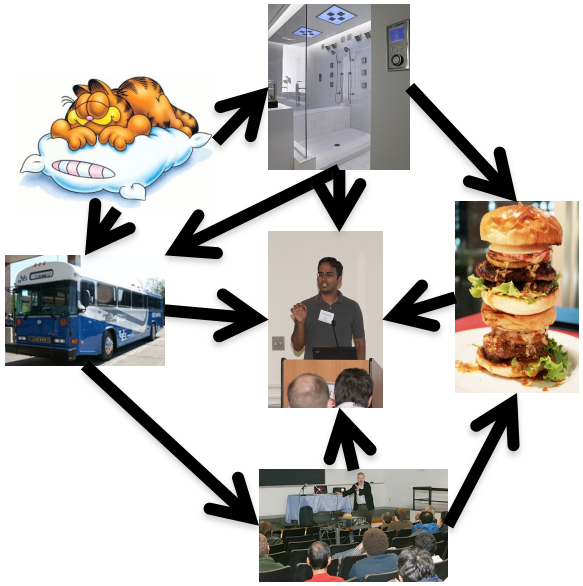
No directed cycles

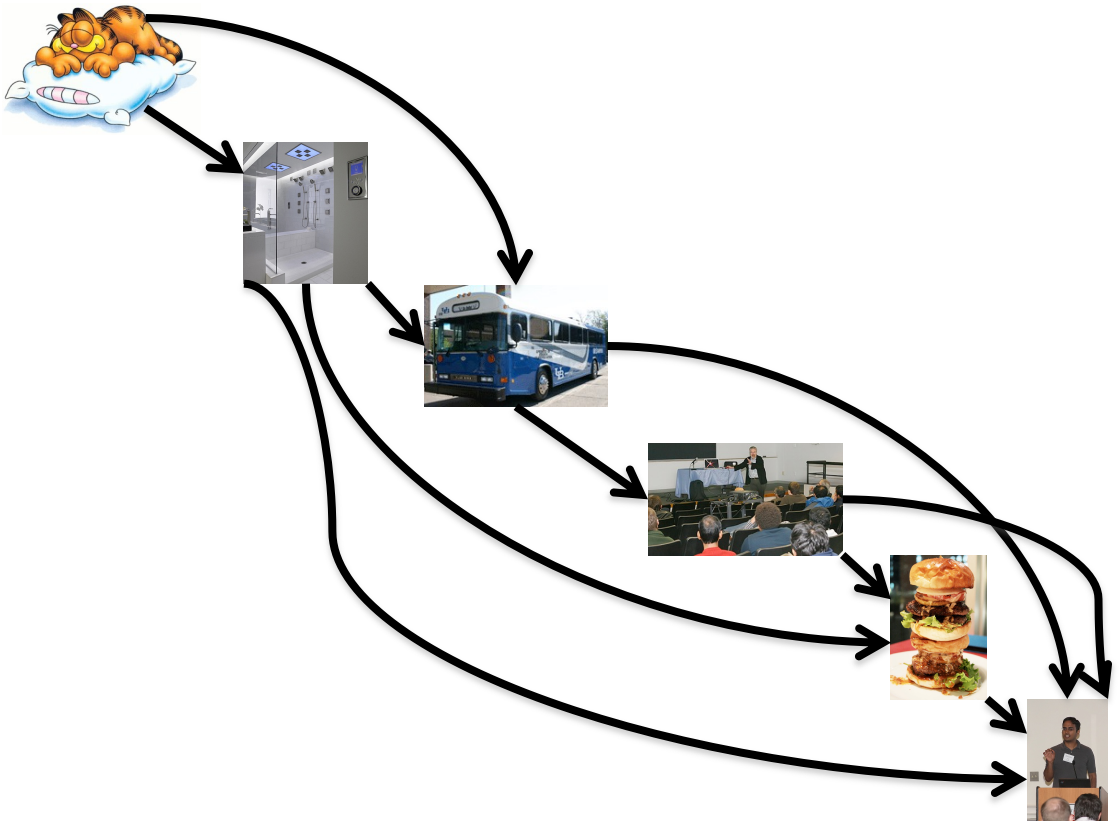
Precedence relationships are consistent



Topological Sorting of a DAG

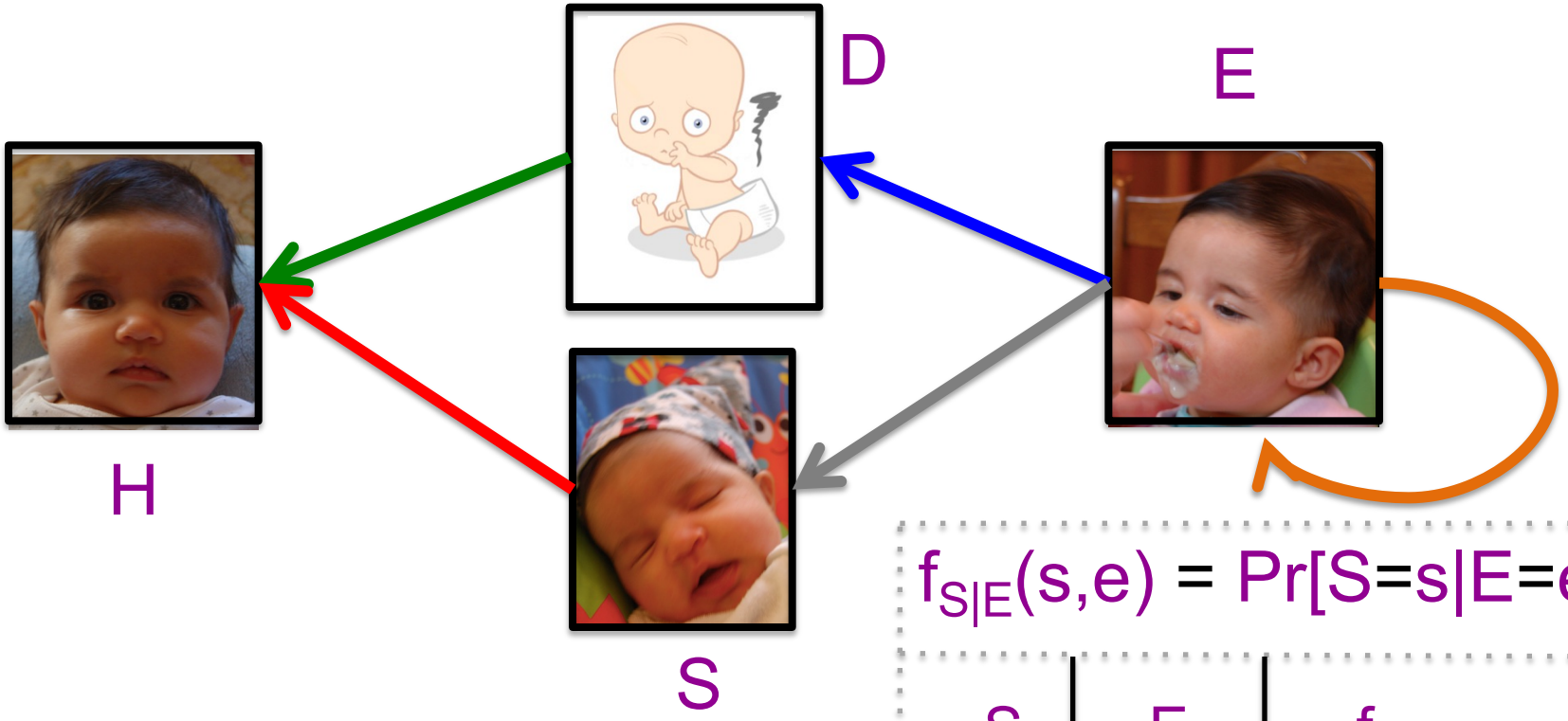
Order the vertices so that all edges go “forward”





Probabilistic Graphical Models (PGMs)

http://ginaskokopelli.com/wp-content/uploads/2013/01/DiaperDealsLogo.jpg



$$f_{S|E}(s,e) = Pr[S=s|E=e]$$

S	E	$f_{S\|E}$
1	1	0.8
1	0	0.3
0	1	0.2
0	0	0.7

$$\varphi(h) = \sum_{d,s,e} f_{H|D,S}(h,d,s) \times f_{S|E}(s,e) \times f_{D|E}(d,e) \times f_E(e)$$

More details on Topological sort

Topological Ordering

This page collects material from previous incarnations of CSE 331 on topological ordering.

Where does the textbook talk about this?

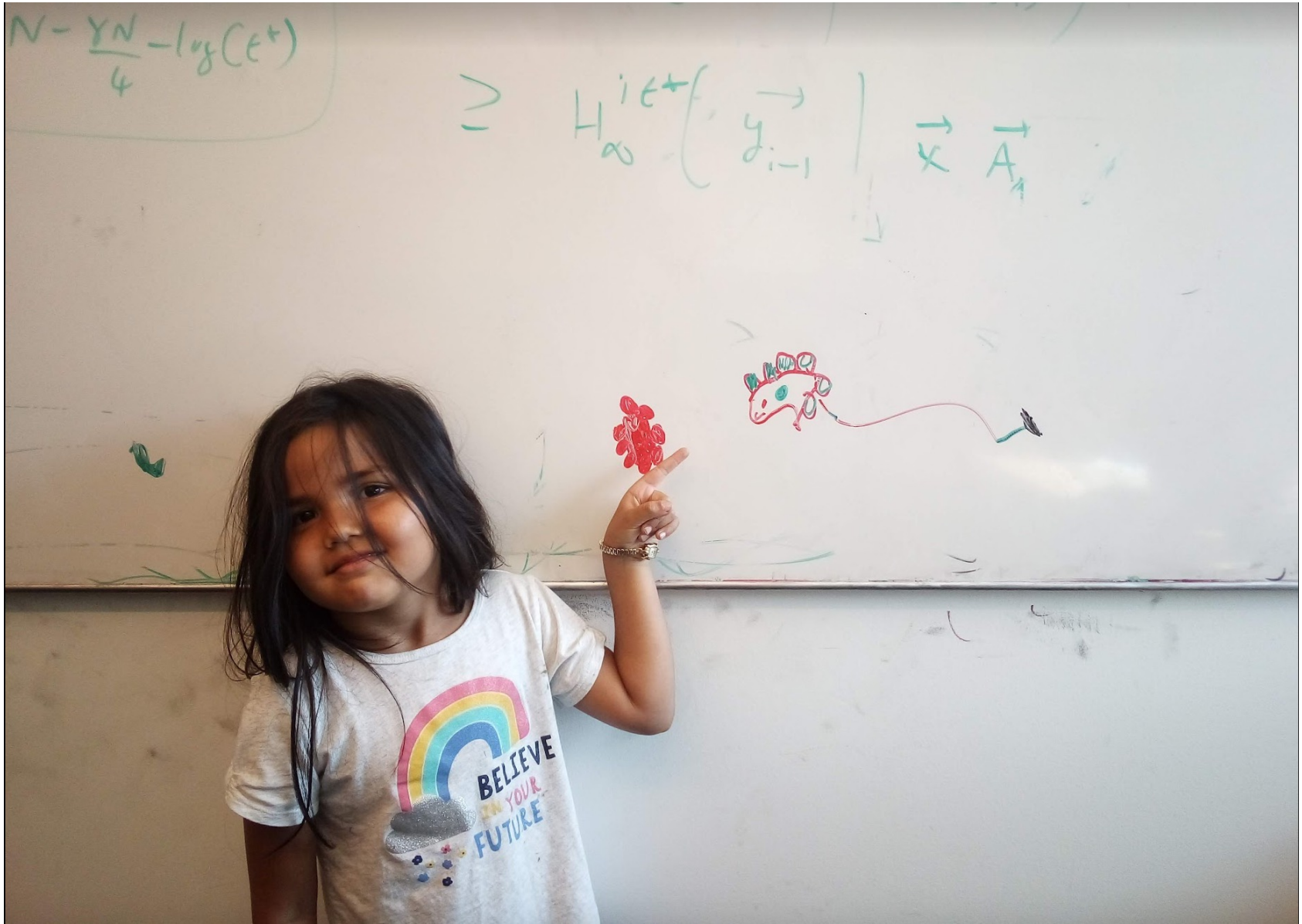
`Section 3.6` in the textbook has the lowdown on topological ordering.

Fall 2018 material

First lecture

Here is the lecture video:

Questions/Comments?



Mid-term material until here