Lecture 13

CSE 331

Sep 28, 2016

Mini Project Pitch due in a week

note ☆ stop following 59 views

Actions

Mini Project pitch can now be submitted

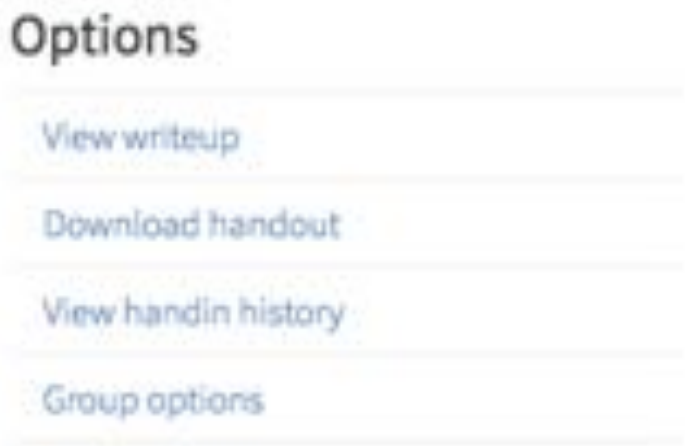
You can now submit your mini project pitches on Autolab. The deadline is 11:59pm on Wed, Oct 5. More details on the mini project page:

http://www-student.cse.buffalo.edu/~atri/cse331/fall16/mini-project/index.html

The case studies will be assigned on a first come first serve basis. So once your pitch is ready for grading, send me an email. I plan to grade them on a rolling basis.

Important: Since this will be a group submission, things will work a bit differently than for the current submissions that are done individually. In particular, you should form your group **before** submitting your pitch. To create your group do the following:

1. One person in your group has to create it first. To do this, click on the "Group Options":



T/F polls up on piazza

poll ☆ stop following 16 views Actions

The first true/false question

I was originally working having a weekly True/false question on piazza but I got distracted with the programming questions. The idea with these questions is so that you guys have more experience with T/F questions that'll be there in the quizzes and exams.I will be posting five such questions over the rest of the evening.

Going forward, every Wednesday (or so) I will post a statement in a poll and ask you guys to vote True or False. (Please just vote and do not post your justification: yet.) Then after two days, I will give the correct answer (and we will see how well crowd-sourcing works in this context) and then ask for you guys to construct the correct justification. Note that this is to give you guys more practice for the true/false questions on the exams. So try and work on these on your own so that you gain some practice.

Anyhow, here is the **question for this week**. Is the following statement **True** or **False**?

Given n numbers $a_1, \ldots, a_n$ such that for every $i \in [n]$ (we will use $[n]$ to denote the set of integers $\{1, \ldots, n\}$) we have $a_i \in \{0, 1\}$. That is, we are given n numbers each of which is a bit. Then we can sort these n numbers in $O(n)$ time.

- ○ True
- ○ False

#pin

Submit

You have **not yet** voted.

Today's agenda

Computing Connected component (with DFS)

DFS(u)

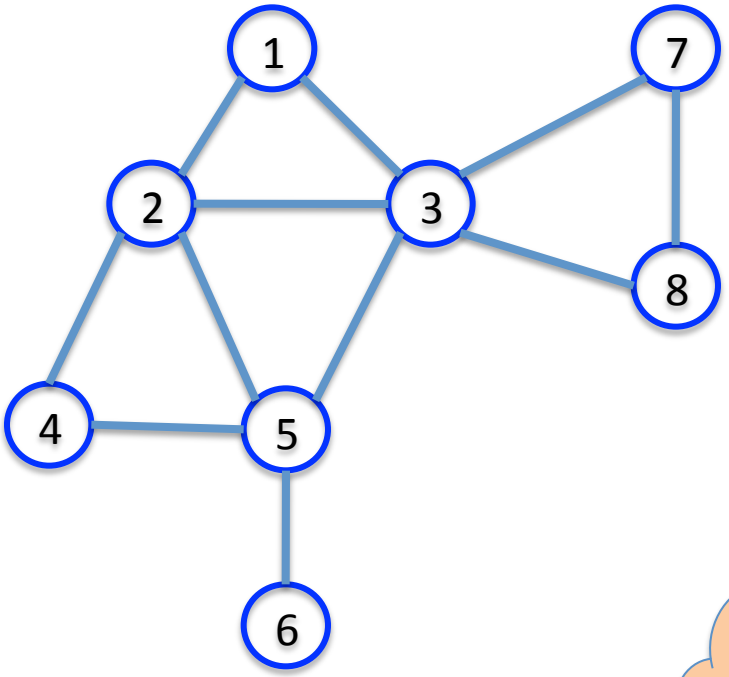
Mark u as explored and add u to R

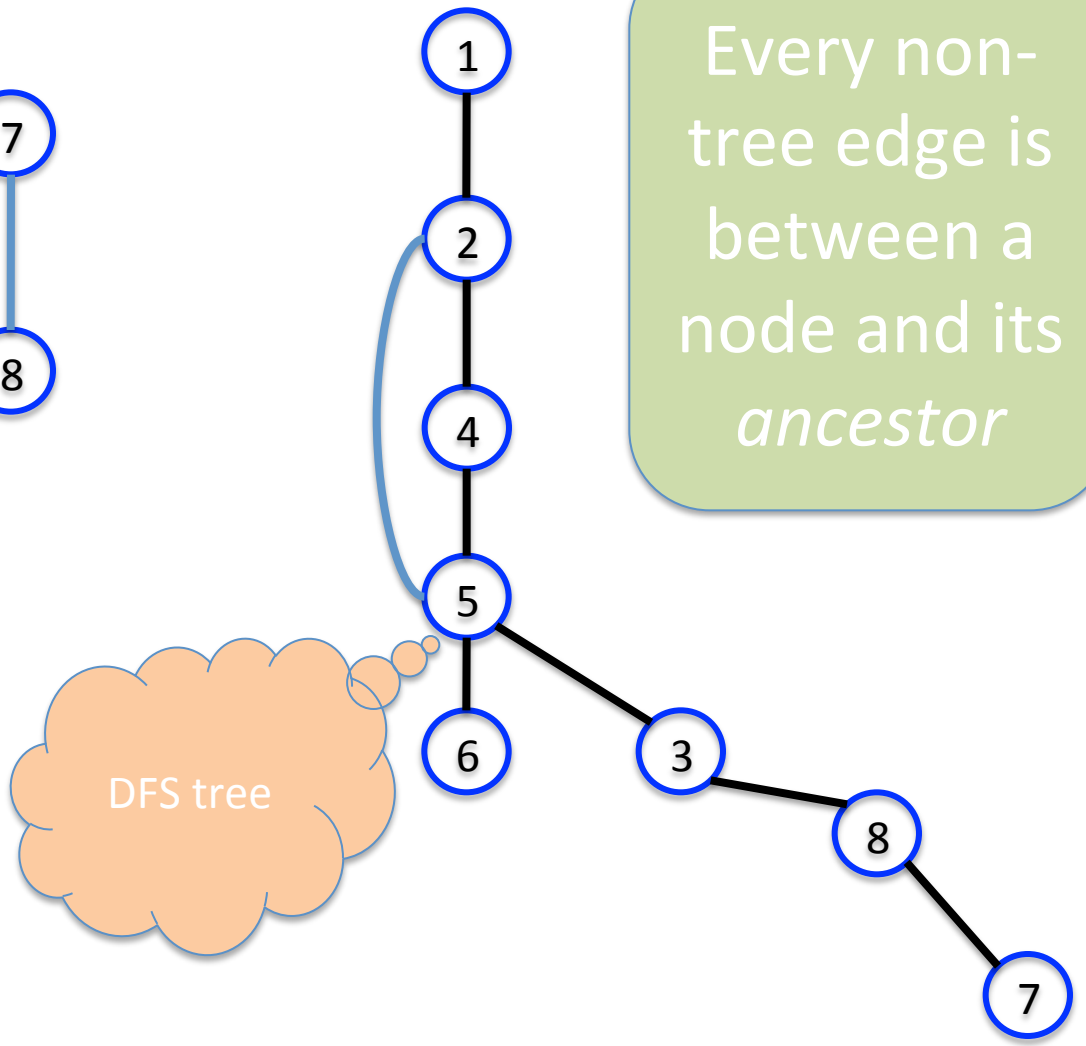
For each edge (u,v)

If v is not explored then DFS(v)

Why is DFS a special case of Explore?

A DFS run



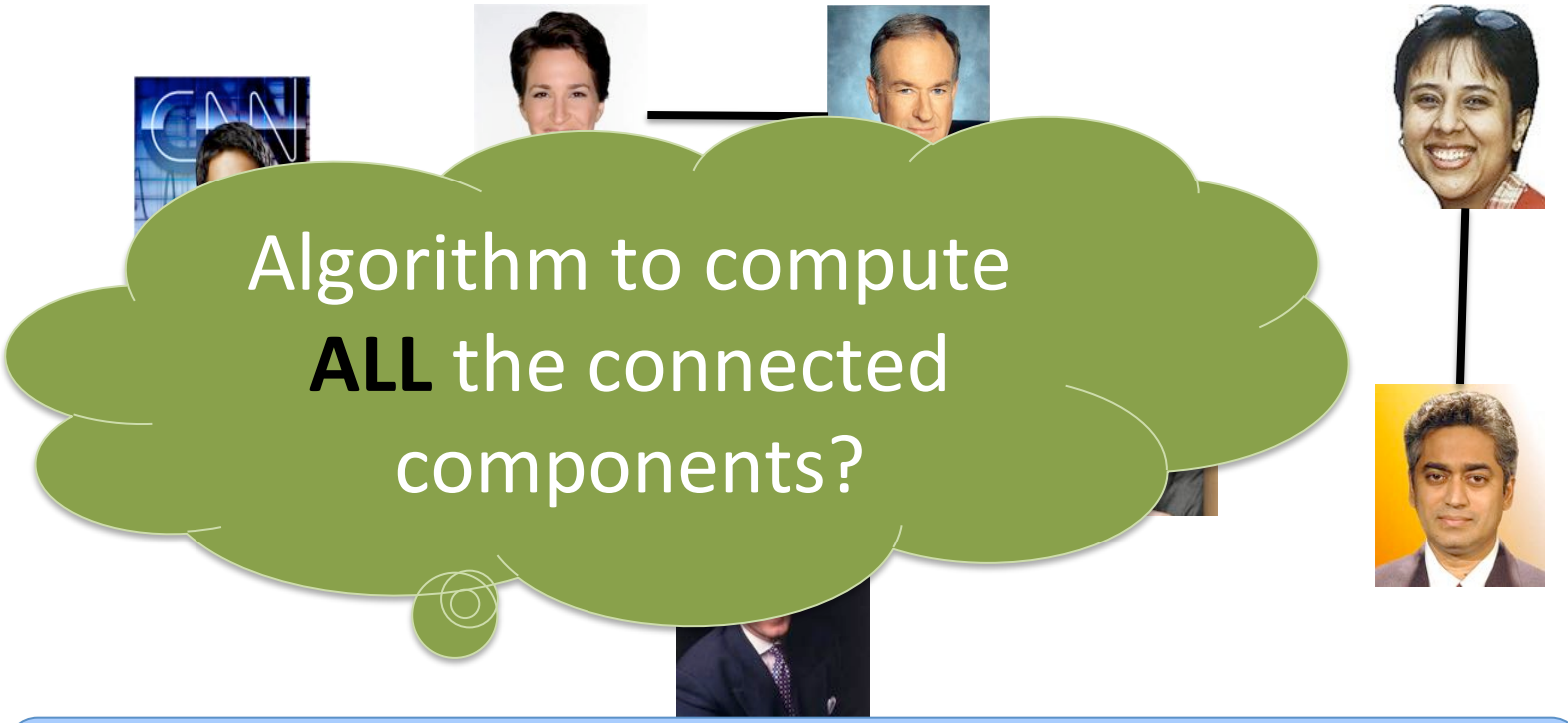


Every non-tree edge is between a node and its *ancestor*

Questions?

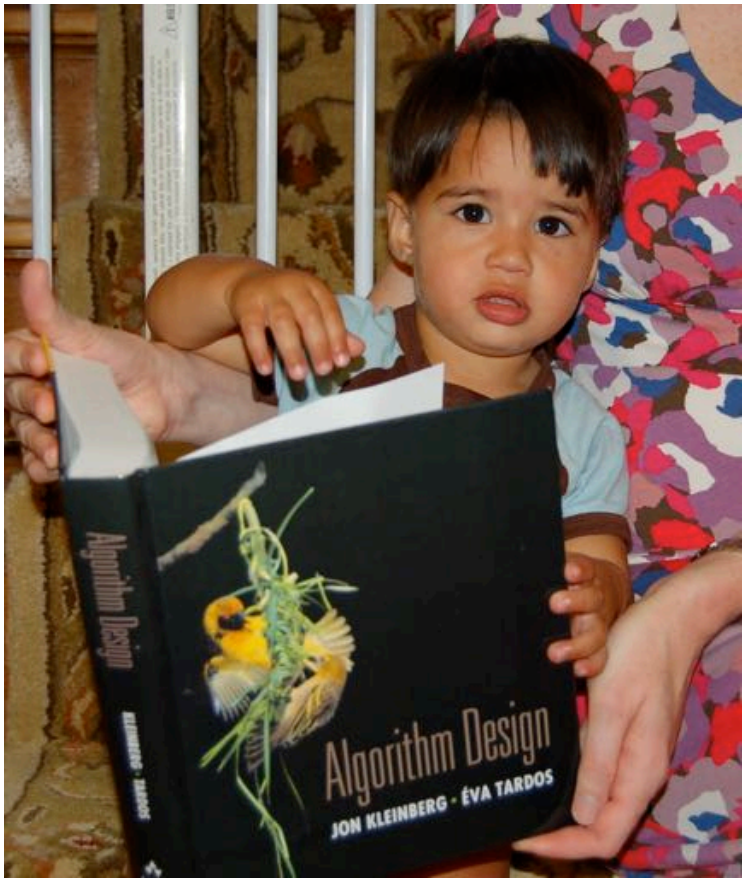
Connected components are disjoint

Either Connected components of s and t are the same or are disjoint



Run BFS on some node s. Then run BFS on t that is not connected to s

Reading Assignment



Sec 3.2 in [KT]

Rest of today's agenda

Run-time analysis of BFS (DFS)

Stacks and Queues

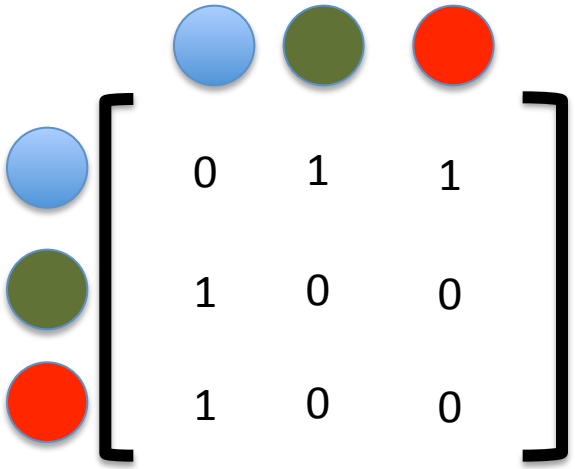
Last in First out

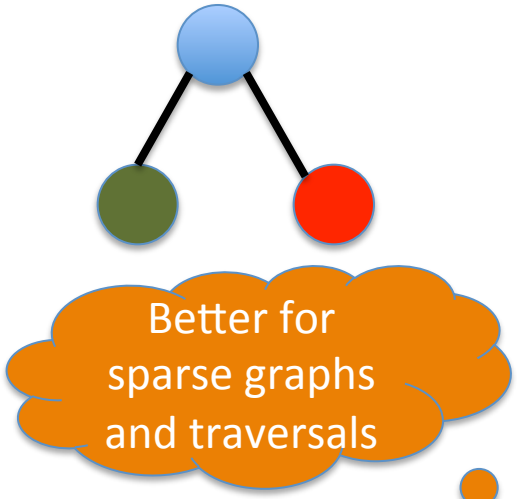
First in First out

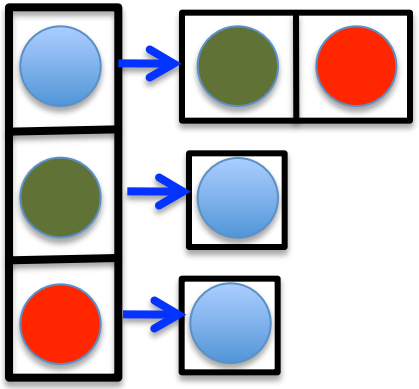
But first…

How do we represent graphs?

Graph representations







Adjacency matrix		Adjacency List
O(1)	(u,v) in E?	O(n) [$O(n_v)$]
O(n)	All neighbors of u?	$O(n_u)$
$O(n^2)$	Space?	O(m+n)

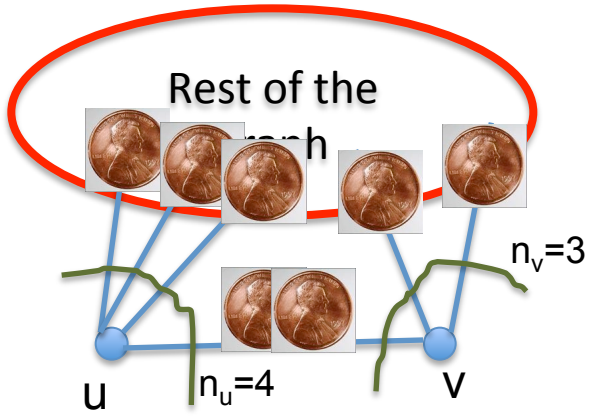
Questions?

2·# edges = sum of # neighbors

$$2m = \Sigma_{u \text{ in } V} n_u$$

Give 2 pennies to each edge

Total # of pennies = 2m



Each edges gives one penny to its end points

# of pennies u receives = n_u

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

An illustration