Lecture 13

CSE 331

Mar 1, 2021

Video Project group due this Friday!

CSE 331 Video project choices

Spring 2021

Please check the table below before submitting your video project team composition to make sure your case study is not being used by another group. Case studies are assigned on a first come first serve basis.

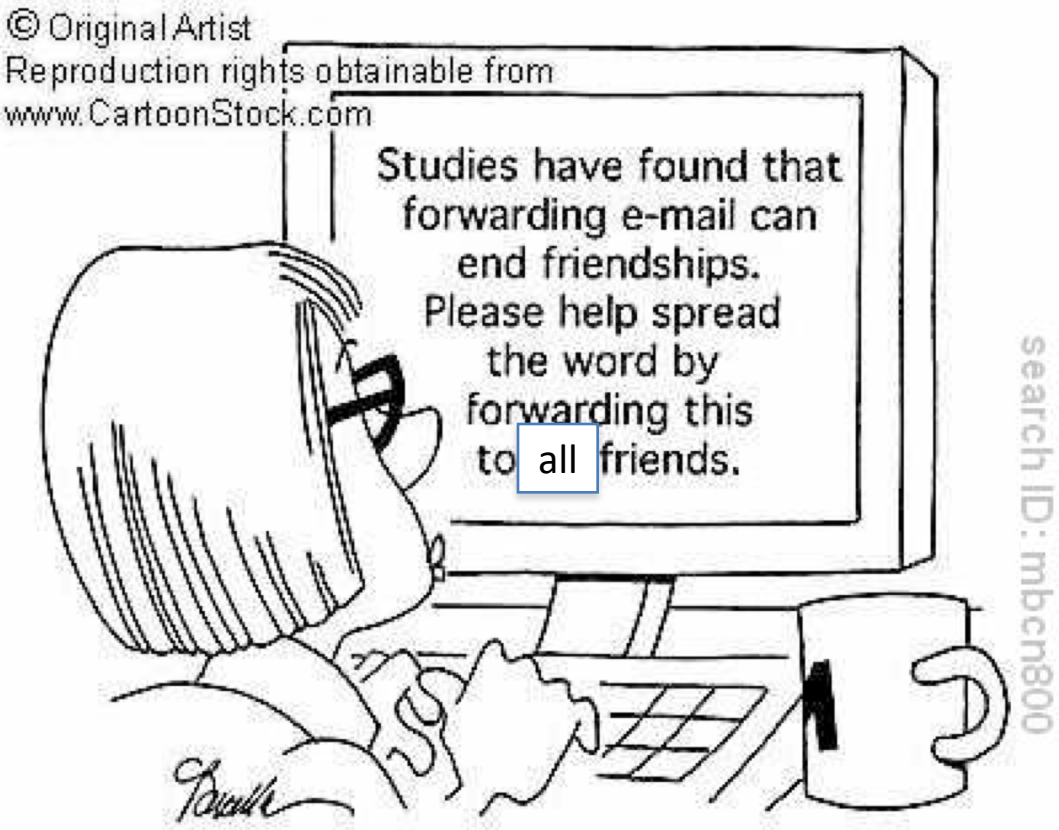
Only 99 students submitted!

Group	Chosen Algorithm	Case Study	Links
Thomas Westpfal, Joyce He, Alex Wang (CodeMonke)	UK's A-Level Grading Algorithm	Ofqual student grading algorithm created to remove grading bias introduced grading bias.	Link 1, Link 2, Link 3, Link 4
Lila Tan, Justin Chan, Alex Yan (crewmates)	Boyer-Moore	How the Boyer-Moore algorithm is used to block ads on the internet but also affects businesses that depend on advertising.	Link 1, Link 2, Link 3, Link 4
Joshua Caskie, Katherine Stock, Hannah Wilcox (Al Gore Rhythms)	US News College Ranking Algorithm	The US News college ranking algorithm was created to rank colleges based on certain characteristics.	Link 1, Link 2, Link 3, Link 4
Doohan Ryan, Zimmermann Shawn, Neppalli Chandra (T-Series)	Youtube Algorithm's	Recommendation of content or videos to viewers based on what the user is consuming on Youtube.	Link 1, Link 2, Link 3, Link 4

Homeworks

- Read carefully!
  - **Unnecessary wordings are deliberate**
  - You should understand the problem first!!
- Start early!
  - **If you started on Thu night, you're doing it wrong!!**
  - At least read the questions over the weekend
    - And check the recitation notes
- Attend recitations!
  - **We (almost) give answers for Q1.a and Q2.a**
  - So that you can go for Q1.b and Q2.b
- Discuss with your friends!
  - Only Q1 and Q2 (Only proof ideas)
- ASK!
  - I had no one in my OH last Wed!!
- Submit pdf to AutoLab
  - Not .doc, .docx, .txt …
  - And make sure AutoLab displays it correctly

BFS


© Original Artist
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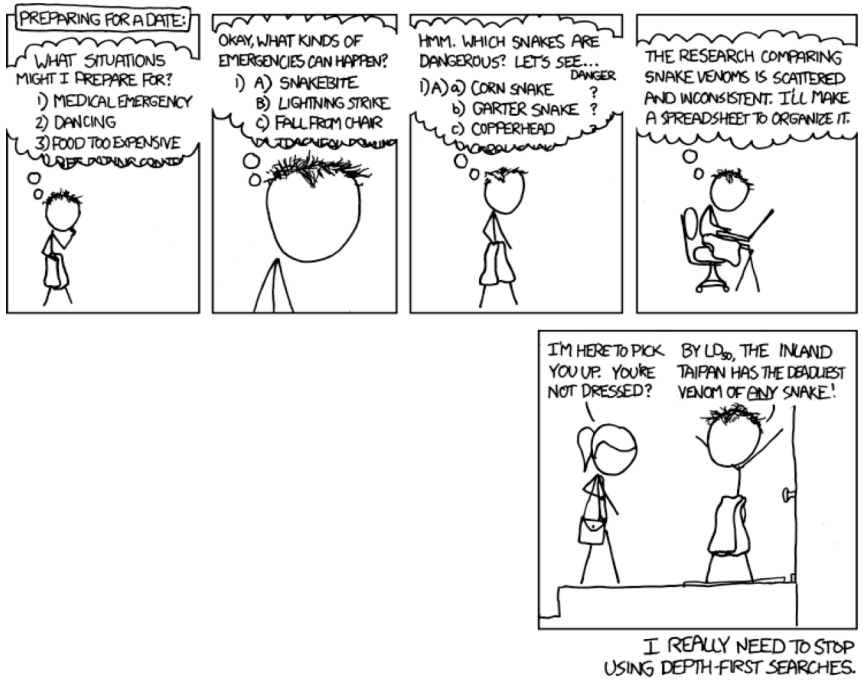
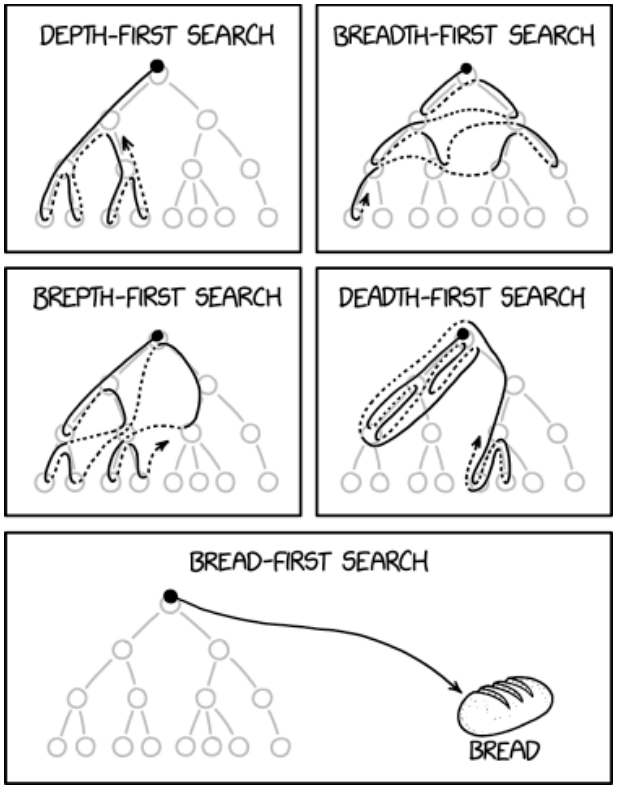
www.CartoonStock.com
Studies have found that forwarding e-mail can end friendships. Please help spread the word by forwarding this to all friends.
search ID: mbcn800

Depth First Search (DFS)





http://xkcd.com/761/

http://xkcd.com/2407/

DFS(u)

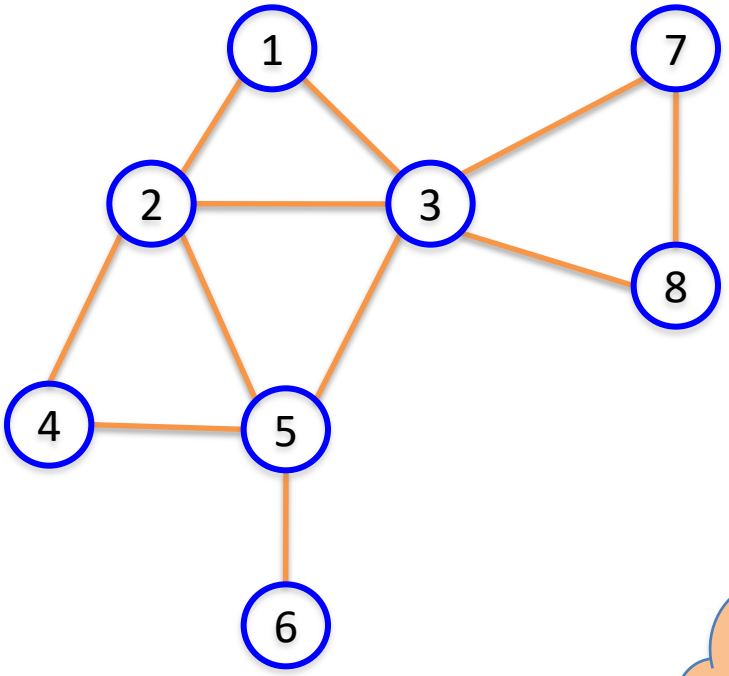
Mark u as explored and add u to R

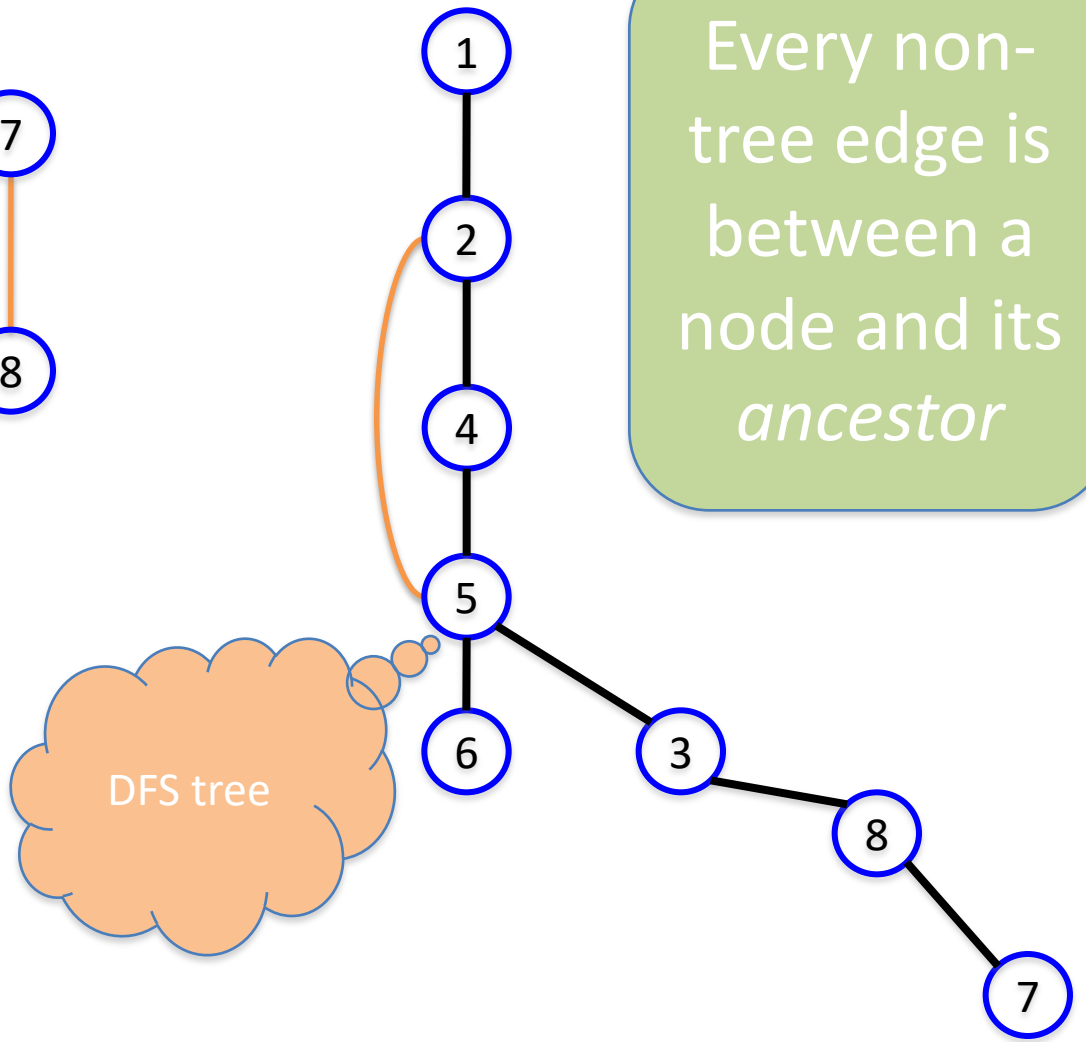
For each edge (u,v)

If v is not explored then DFS(v)

Why is DFS a special case of Explore? (Convince yourself)

A DFS run





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

Questions?

Connected components are disjoint

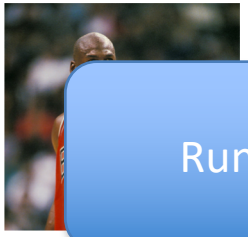
steve nash

kobe bryant

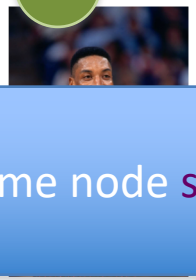
shaq o'neal

Algorithm to compute **ALL** the connected components?

Can run Explore instead of BFS



michael jordan

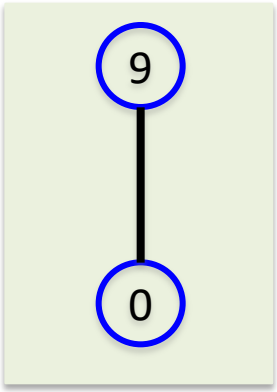


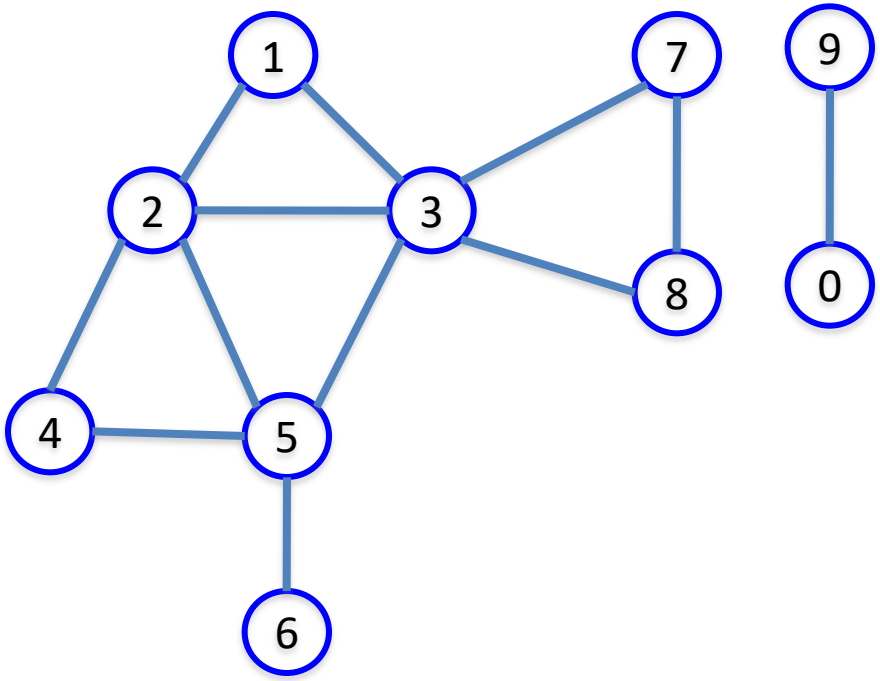
scottie pippen

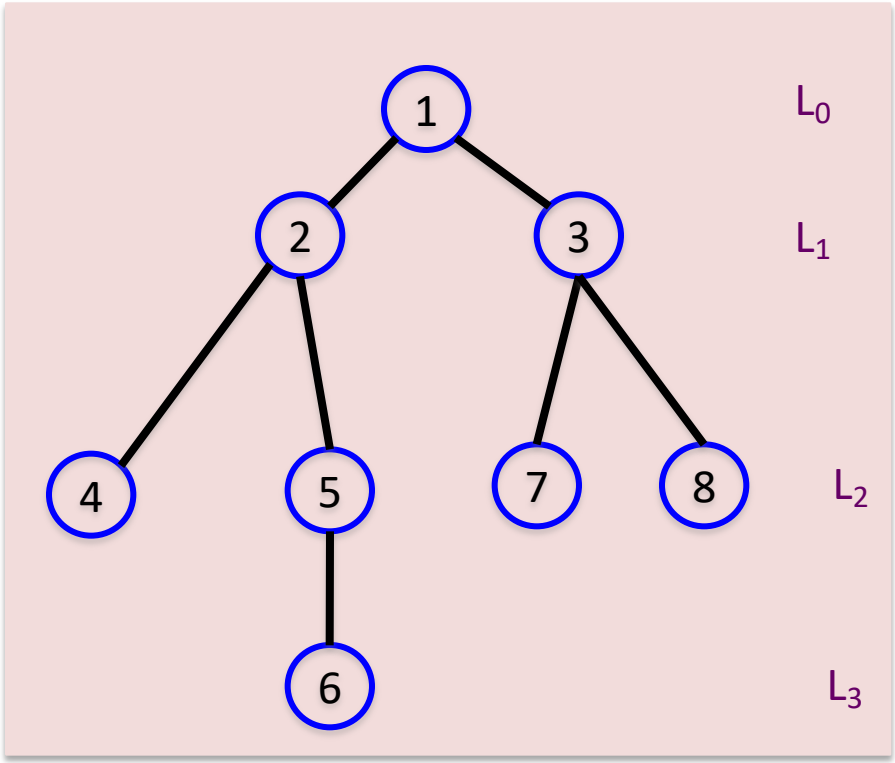
kyrie irvi

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

Computing all CCs







Questions?

Today's agenda

Run-time analysis of BFS (DFS)

Stacks and Queues

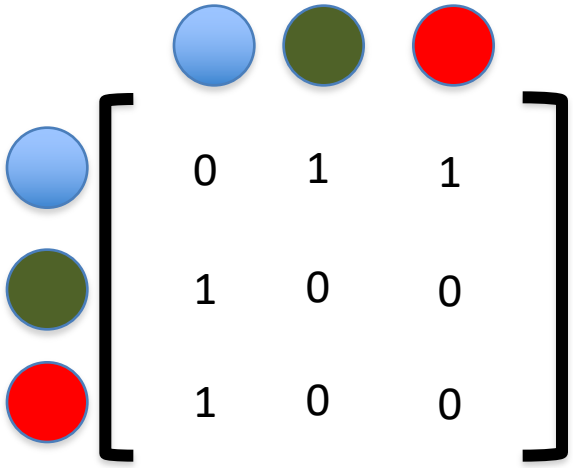
Last in First out

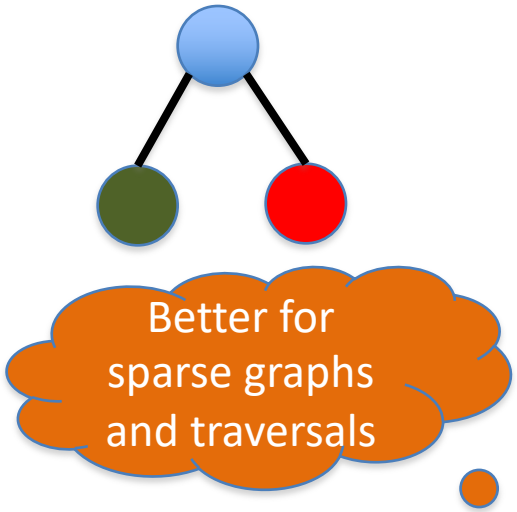
First in First out

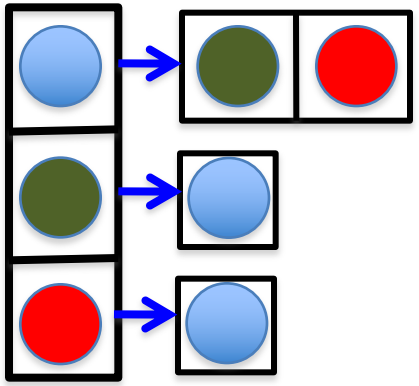
But first…

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?	$O(m+n)$

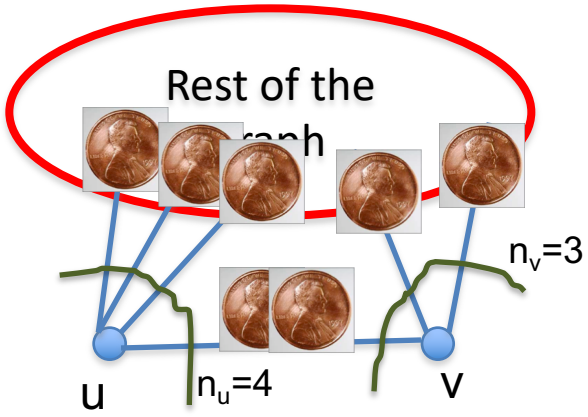
Questions?

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