

Lecture 12

CSE 331

Feb 21, 2020

Mini Project group due next Friday!

CSE 331 Mini project choices

Spring 2020

Please check the table below before submitting your mini 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.

124 of you still need to do this!

Group	Chosen Algorithm	Case Study	Links
Tiffany Tate, Joyce Sommer, Robbie Wilkowski (Team TJR)	Predictive Text Algorithm	Predictive text algorithms are a class of algorithms used to autocomplete/finish words and sentences (e.g. Smart Compose on Gmail).	Link 1 , Link 2 , Link 3 , Link 4
John Tantillo, Joe Brown, Jacob Snyderman (Fingerprinty thingy mabob)	NGI Algorithms with a focus in the AFIT algorithm	Identifying fingerprints and matching them to fingerprints on file	Link 1 , Link 2 , Link 3 , Link 4
Steven Jiang, Yang Wenxuan, Steven Quan (od grease)	Facial Recognition Algorithm	Security, Face ID, Camera Focus, Spying	Link 1 , Link 2 , Link 3 , Link 4
Jason Britto, Michael Carlow, Eliza Koster (Codeville)	Pagerank	Pagerank is used to rank webpages on the google search engine	Link 1 , Link 2 , Link 3 , Link 4
Victoria Dib, Tyler Anatole, Nicholas MacRae (DefinitelyNotBiased)	COMPAS recidivism Algorithm	COMPAS Algorithm, is a case management and decision support tool used by U.S. courts to assess the likelihood of a defendant becoming a recidivist.	Link 1 , Link 2 , Link 3 , Link 4
Yangtao Chen, Zhiwei Qu, Liang Dong (Hands On The Wheel !)	image recognition algorithm	Uber self-driving vehicles algorithm	Link 1 , Link 2 , Link 3 , Link 4
Alex Wojewoda, Daeyoung Jeong, Aiden Xie (AJAX)	Item-to-Item Collaborative Filtering	Amazon recommendations are based on a customer's previous history	Link 1 , Link 2 , Link 3 , Link 4

Connectivity Problem

Input: Graph $G = (V, E)$ and s in V

Output: All t connected to s in G

Breadth First Search (BFS)

Build layers of vertices connected to s

$$L_0 = \{s\}$$

Assume L_0, \dots, L_j have been constructed

L_{j+1} is the set of vertices not chosen yet but are connected by an edge to L_j

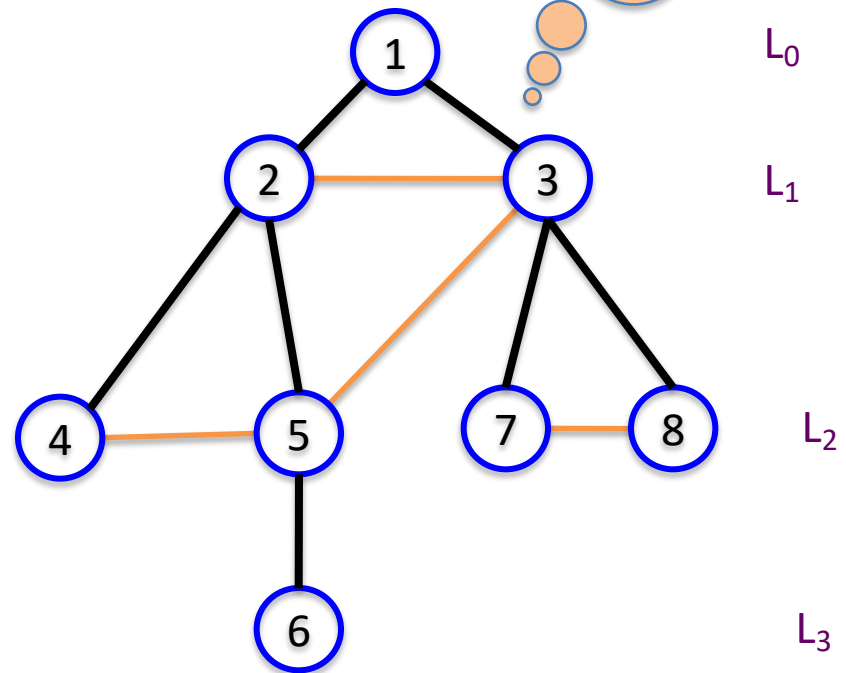
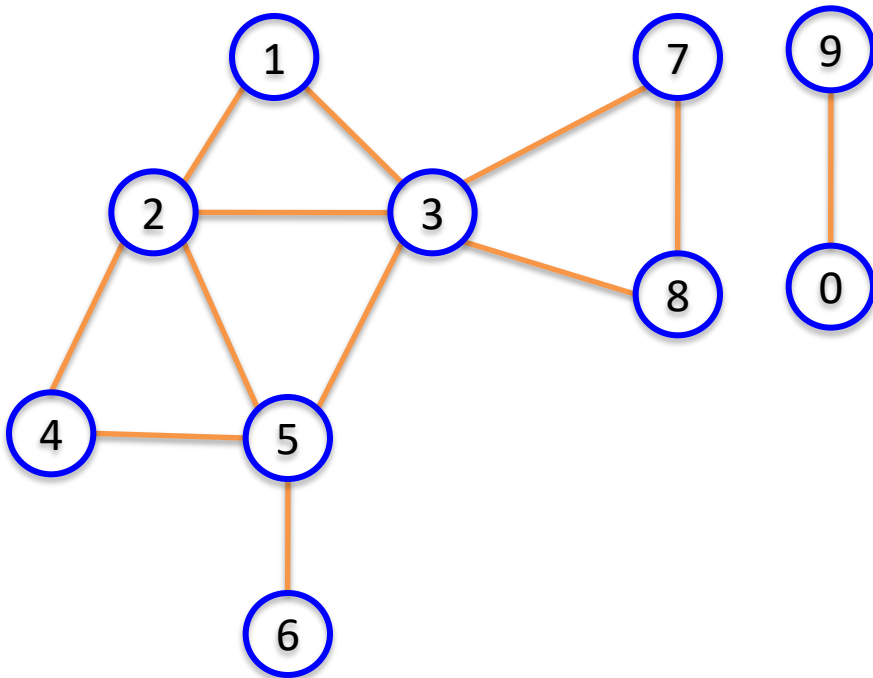
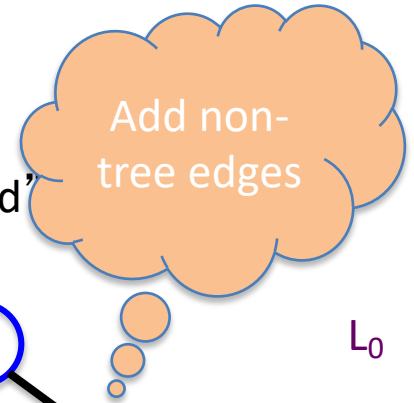
Stop when new layer is empty

BFS Tree

BFS naturally defines a tree rooted at s

L_j forms the j th “level” in the tree

u in L_{j+1} is child of v in L_j from which it was “discovered”



Two facts about BFS trees

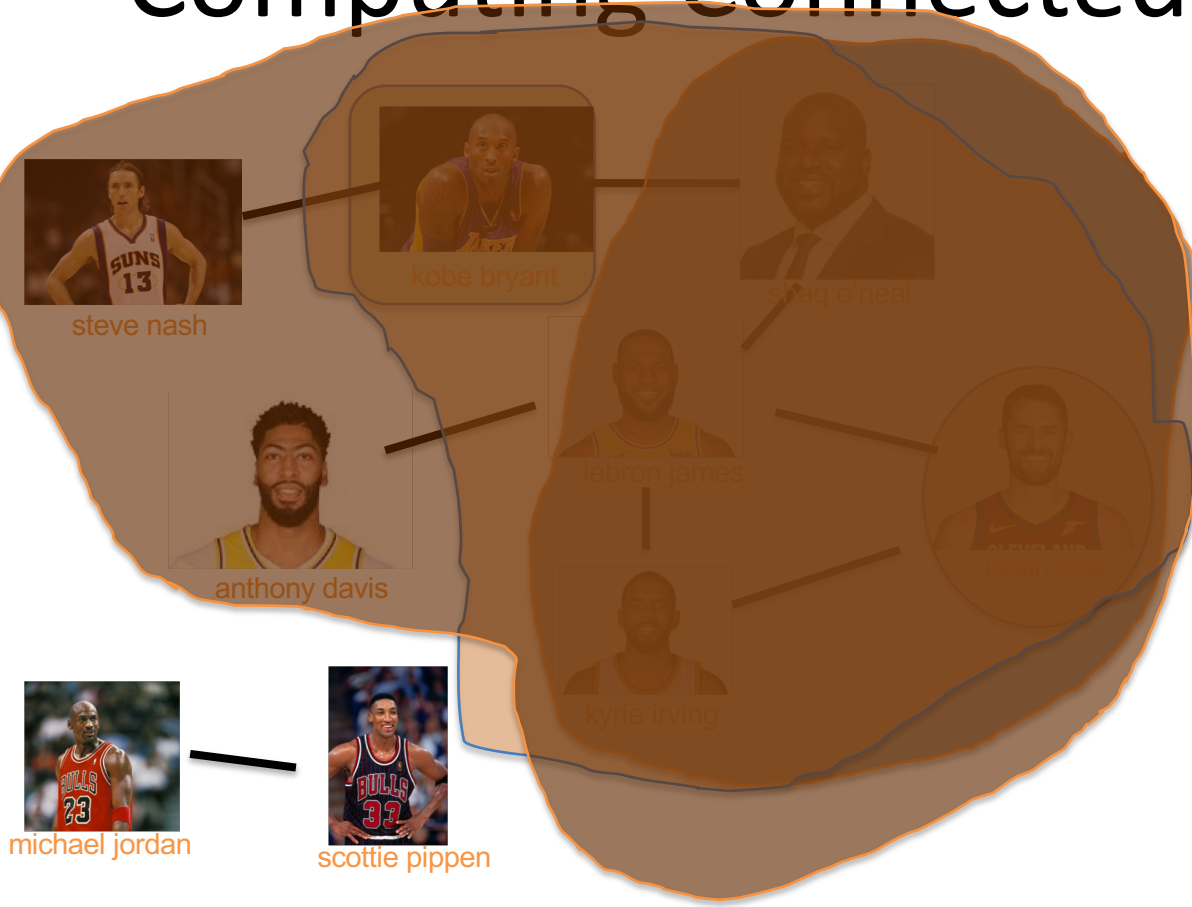
All non-tree edges are in the same or consecutive layer

If u is in L_i then $\text{dist}(s,u) = i$

Today's agenda

Computing Connected component

Computing Connected Component



Explore(s)

Start with $R = \{s\}$

While there is an edge (u,v) where u in R and v not in R

 Add v to R

Output $R^* = R$

Questions?