Lecture 12

CSE 331

Feb 26, 2021

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 $L_0,..,L_j$ have been constructed

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

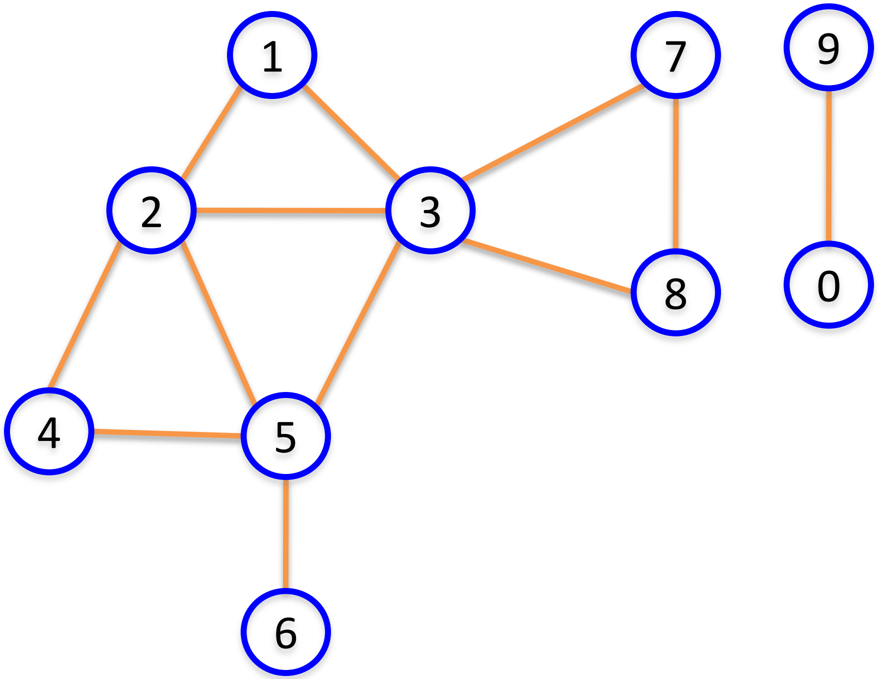
Stop when new layer is empty

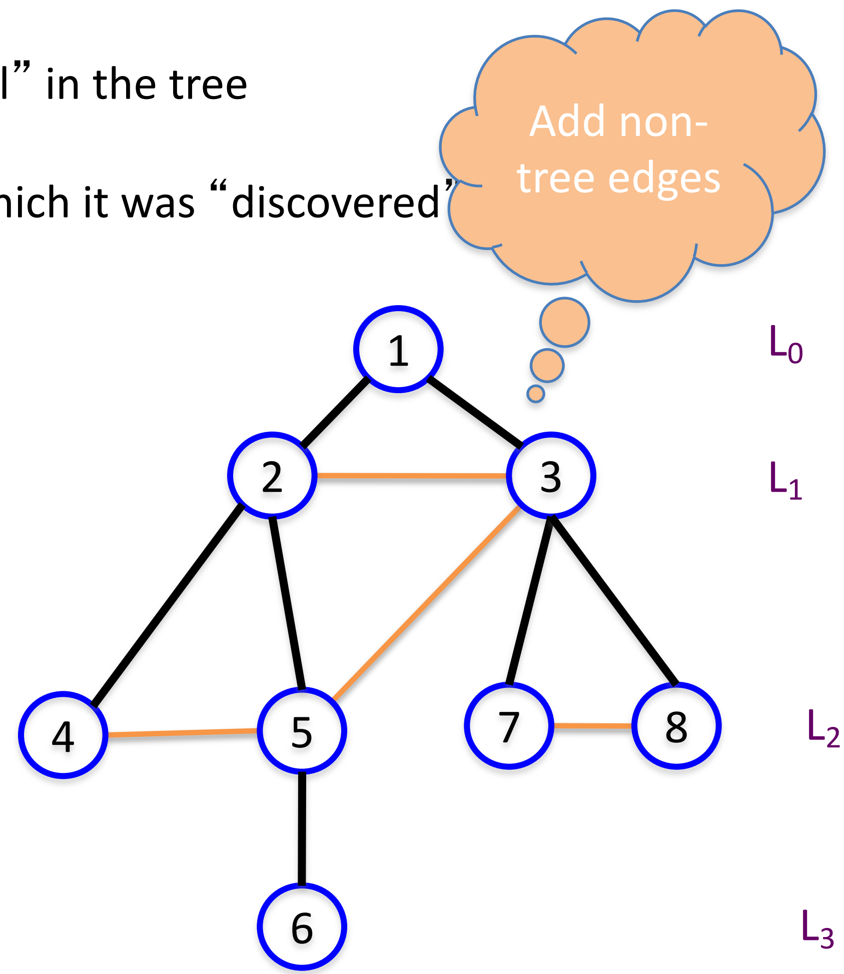
BFS Tree

BFS naturally defines a tree rooted at s

L_j forms the jth "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

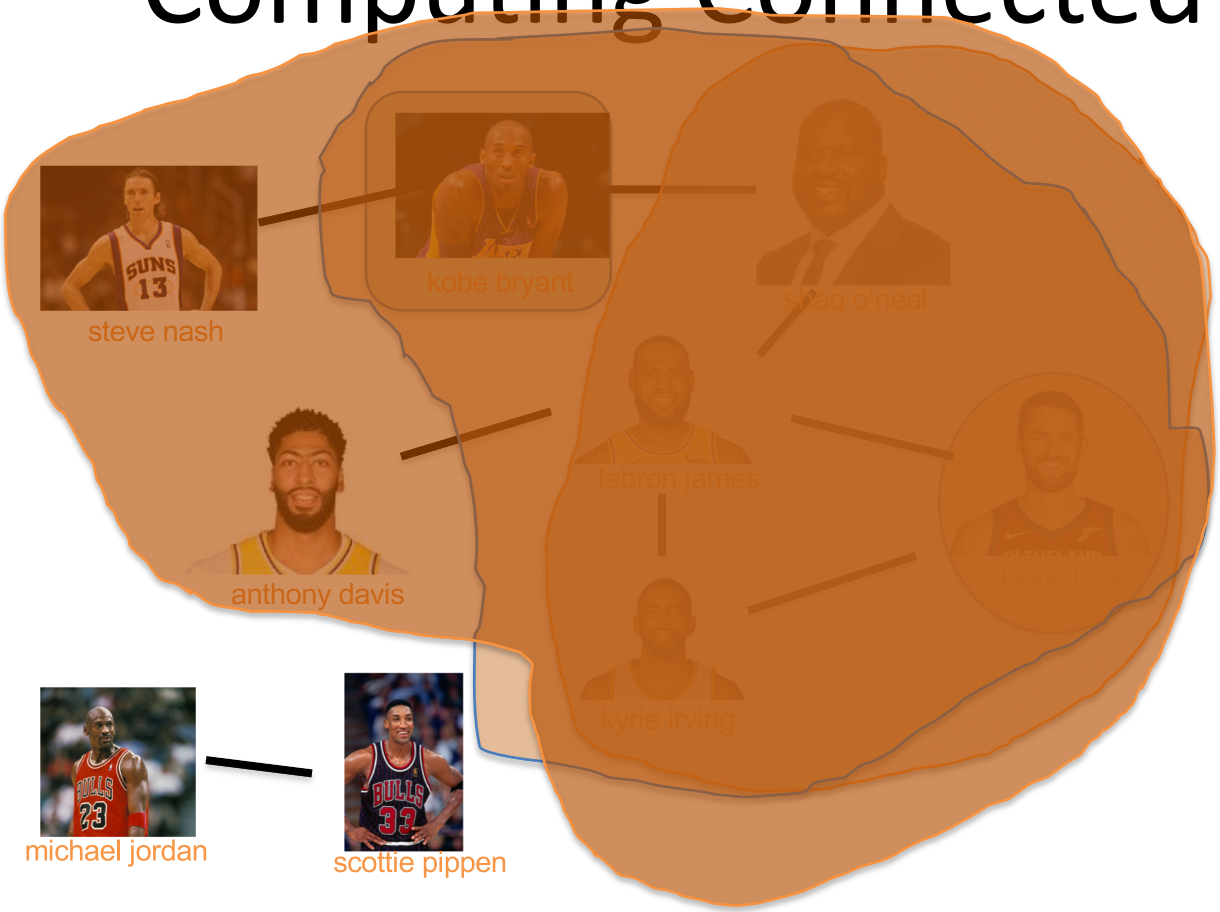
All non-tree edges are in the same or consecutive layer

If u is in L_i then 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?