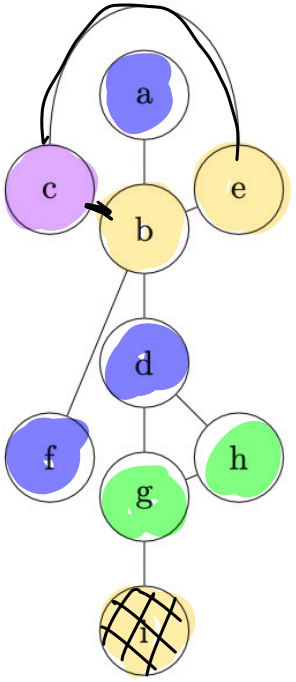
3. (4 points) Given the graph below, what are the layers traced out by breadth first search starting from node c? Also, notice that there is one more question on the next page!



$L_0 = \{$ c $\}$

$L_1 = \{$ b, e $\}$

$L_2 = \{$ a, f, d $\}$

$L_3 = \{$ g, h $\}$

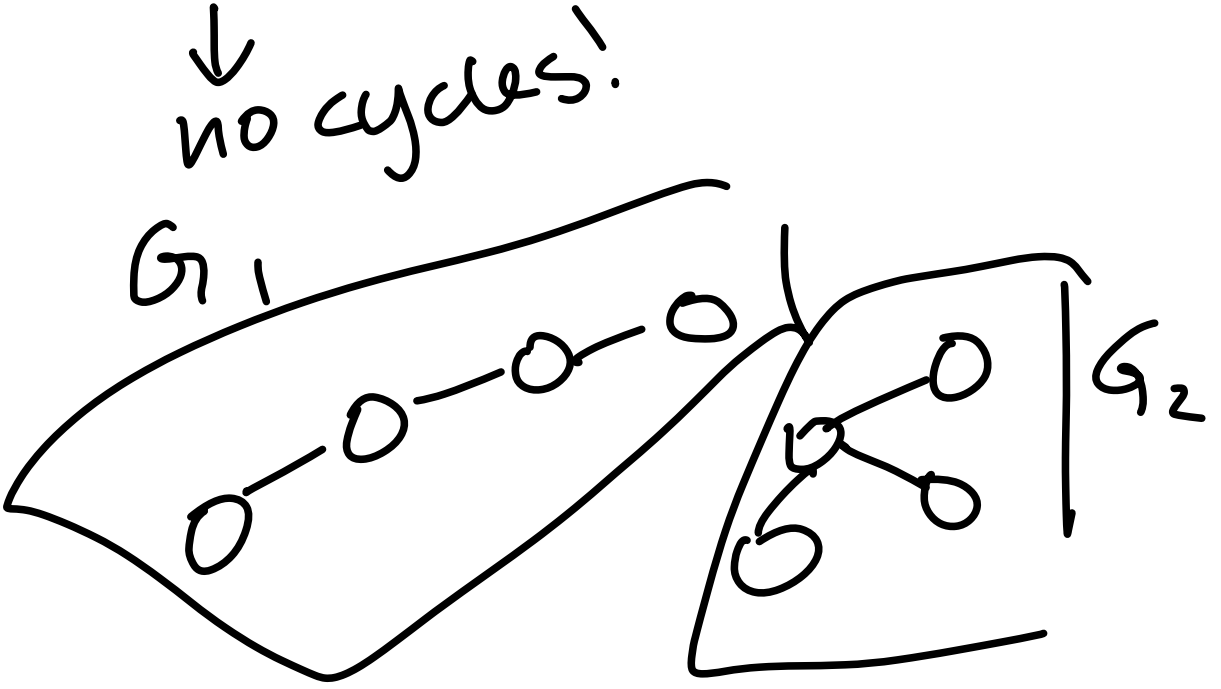
$L_4 = \{$ i $\}$

sets: { }

order doesn't matter

no repeats

2. (2 points) Draw a connected tree with at least 4 nodes.



f is $O(g)$ $f \leq g$

1. (6 points) Let $f(n) = 2n^3 + 3n^2 + 100n$. Circle all true statements below.

- $f(n)$ is $O(n^4)$.
- $f(n)$ is $\Omega(n^4)$.
- $f(n)$ is $\Theta(n^4)$.
- $f(n)$ is $O(n^3)$.
- $f(n)$ is $\Omega(n^3)$.
- $f(n)$ is $\Theta(n^3)$.
- $f(n)$ is $O(n^2)$.
- $f(n)$ is $\Omega(n^2)$.
- $f(n)$ is $\Theta(n^2)$.
- $f(n)$ is $O(n \log n)$.
- $f(n)$ is $\Omega(n \log n)$.
- $f(n)$ is $\Theta(n \log n)$.

f is $\Omega(g)$ $f \geq g$

f is $\Theta(g)$ $f = g$

stable matching

alg. analysis

graphs

Stable matching

Gale-Shapley alg

What is an unstable pair?

Variations of stable match

- what does stability mean here?
- is there always a stable matching?

Properties of a stable matching

Alg analysis

big O, Ω, Θ — applying
- mathematical defs
- intuitive defs
- ordering functions

avg case / best case / worst case

counting primitive operations

given an alg, give big Θ runtime

log and exp rules 2^{2n} $\log 2n$ $\log 8$

Graphs

- dfs — tree, cycle, path
- BFS — runtime
  - applications

4 may have no other stable matching... feel free to move on