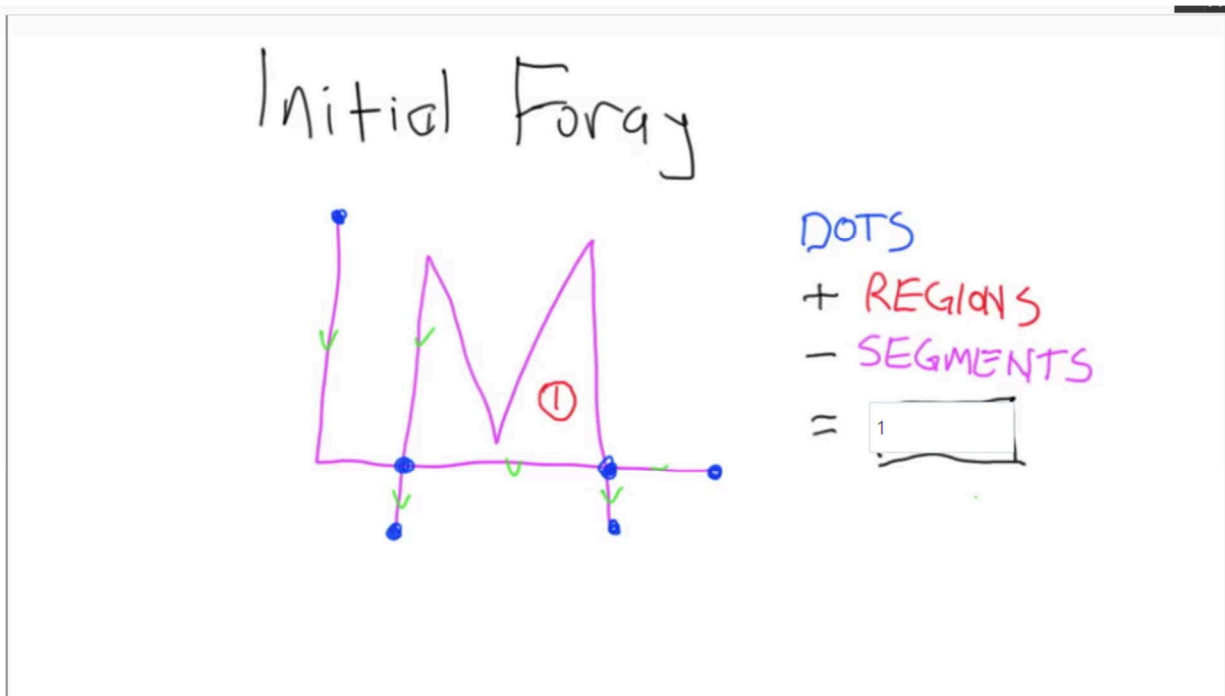


## Initial Foray

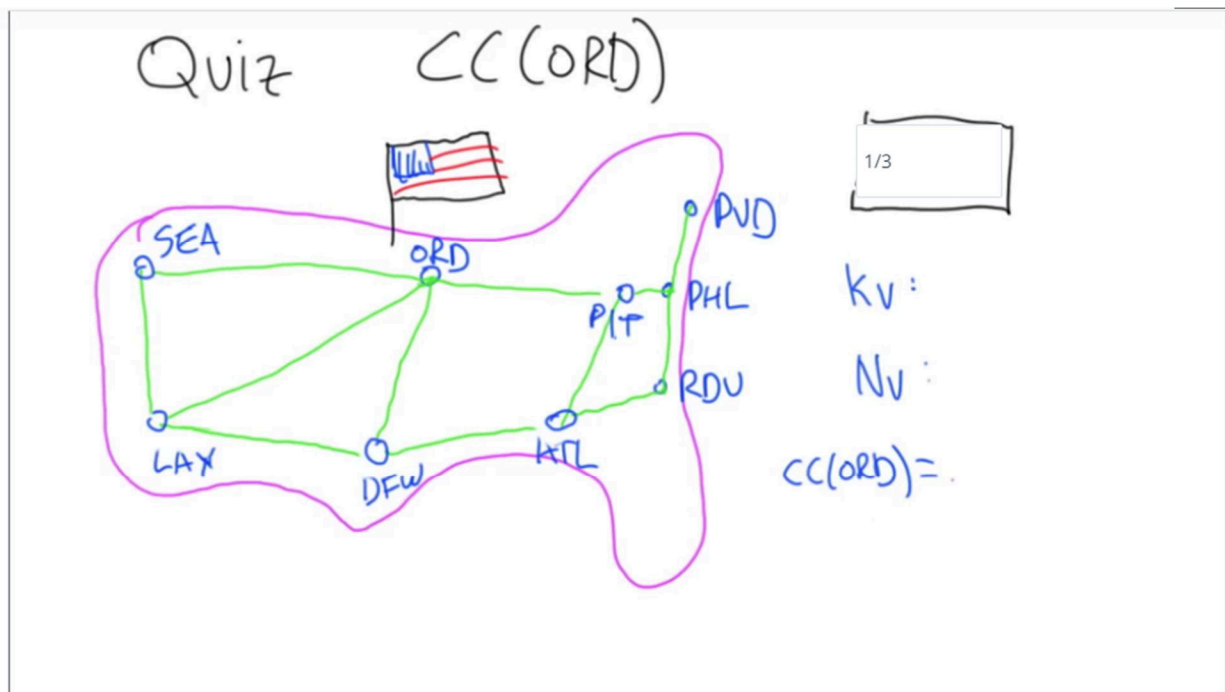


## Properties of Social Networks

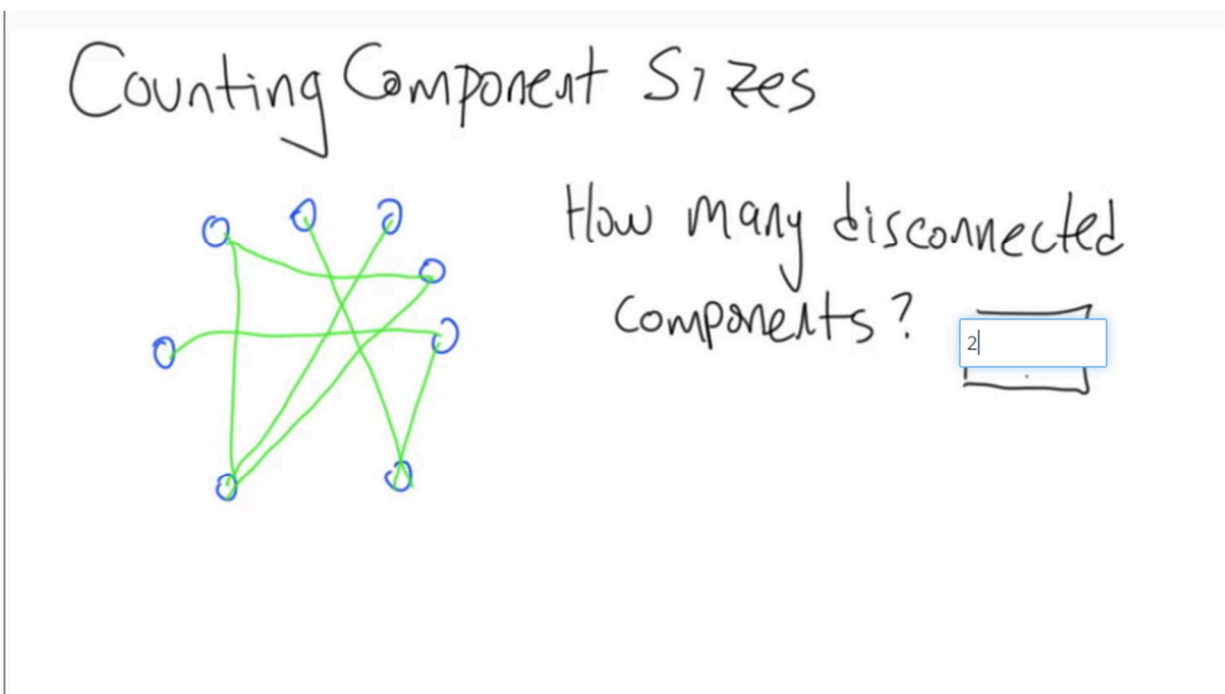
QUIZ : Degree & Paths in Graphs

	clique	ring	balanced tree	hypercube
	degree	degree	degree	degree
	path	path	path	path
$\Theta(1)$				
$\Theta(\log n)$				
$\Theta(n)$				

## Clustering Coefficient Quiz



## Connected Components

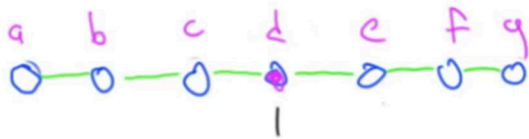


## Checking Pairwise Connectivity

```
2 def check_connection(G, v1, v2):  
3     marked = {}  
4     mark_component (G,v1,marked)  
5     return v2 in marked
```

## Depth First without Recursion

### Depth First without recursion



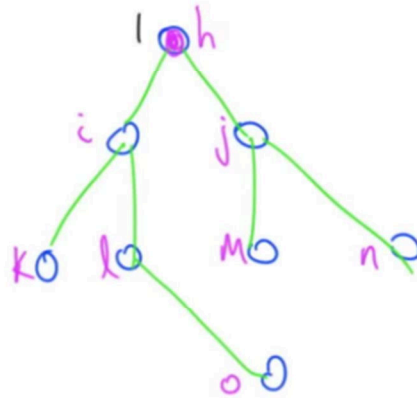
- Grab last element of open list
- mark any unmarked neighbors and add to open list
- repeat until nothing open

OPEN LIST: d  
(TO DO LIST)

$$a + g = \boxed{12}$$

## Searching a Tree

When Expanded?



Starting from h  
and using breadth  
first search, when  
will node o be  
added to the open list?



## Single Source Shortest Paths

All targets in one shot

How can we find all distances from  
 $v_i$  to the rest of the graph faster?

$\Theta(n^2 + nm)$

- ⦿ You can't. Deal with it.
- ⦿ Use a smaller graph
- ⦿ Search for something that's not there
- ⦿ Do the searches backwards