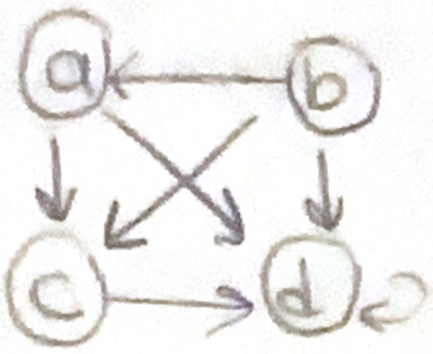
Adjacency List (Cont'd.)

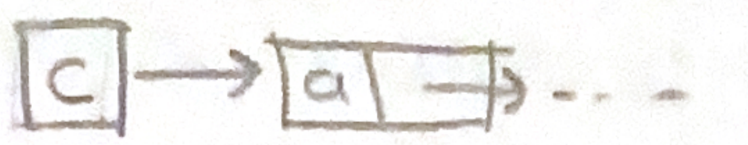
Time Complexity



Check if there's an edge between c & a:

1) Go through the array part first.
   O(1)

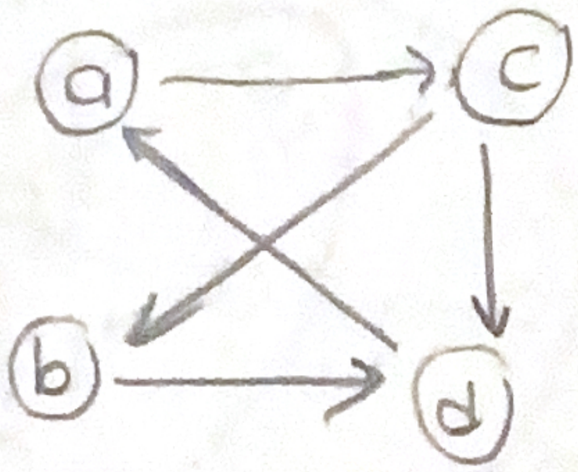
2) Check if linked list contains a.



there can be at most |V| items.
(O|V|)

O(|V|) for directed graphs

Adjacency Matrix



	a	b	c	d
a	0	0	1	0
b	0	0	0	1
c	0	1	0	0
d	1	0	0	0

} |V|

Space Complexity = $O(|V|^2)$

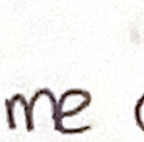
Growth Rate (Time Comp) of Drawing the Graph = $O(|V|^2)$
↳ list was better

Checking the Edge = O(1)
↳ matrix is better

★ But it's not wise to compare $|V|^2$ to $|V|+|E|$ we need to know how V relates to E.

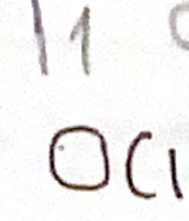
Sparse Graphs vs Dense Graphs

- Vertices & edges are linearly related



- $|V| \sim |E|$
- Number of edges can be at most $|V|-1$

- Edges are related to (vertices)^2



↳6

$|E| = \frac{|V|(|V|-1)}{2}$ ↳ at most

$|E| \sim O(|V|^2)$
↓
worst case