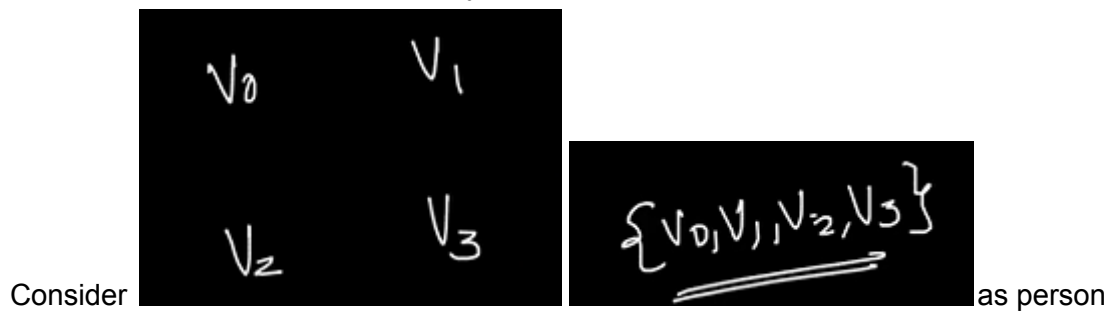


Celebrity Problem

- Here a Person is said to be celebrity



$\left\{ \begin{array}{l} \checkmark V_3 \text{ is a celebrity if } V_0, V_1, V_2 \\ \text{all of them know } V_3 \\ \checkmark V_3 \text{ does not know } V_0, V_1, \& V_2 \end{array} \right.$

- Lets build a knowing matrix

(Q)

	0	1	2	3
0	0	1	1	1
1	0	0	0	1
2	0	0	0	1
3	0	0	0	0

= Know

here v_0 knows v_1, v_2 and v_3and v_1 knows only v_3 and v_2 knows only v_3 ..and v_3 does not know anyone

- Now given this matrix..we have to find the celebrities

Task: Find the celebrity if he/she

input (Q)

(A)

0	0	1	2	3
1	0	1	0	1
2	0	0	0	0
3	0	0	0	0

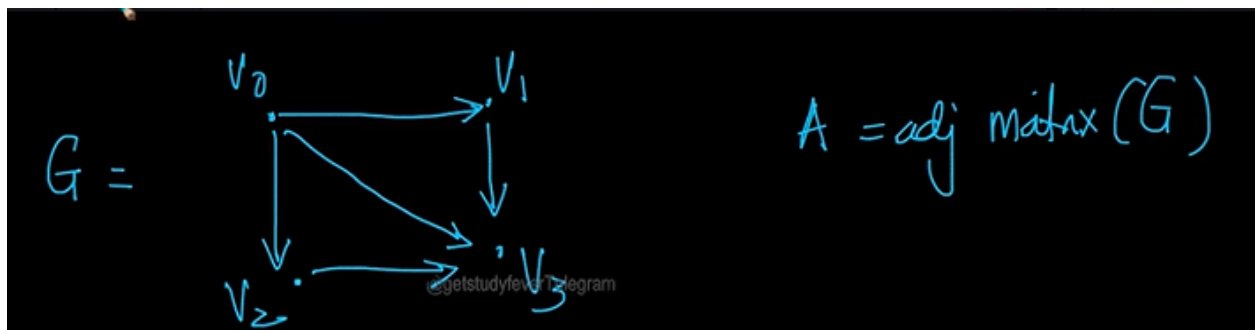
4x4

= Know

$$A_{ij} = \begin{cases} 1 & \text{if } v_i \text{ knows } v_j \\ 0 & \text{otherwise} \end{cases}$$

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- Here we can think problem as a adjacency matrix
- Now we'll represent this info as graph



Brute force approach

- Here in the brute force approach v_i is a celeb if

v_i is a celeb if

- ✓ v_i 'th col is all ones except A_{ii}
- ✓ v_i 'th row is all zeros

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2. But the time complexity here is $O(n^2)$..and its not the optimal solution

The left diagram shows an $n \times n$ matrix with columns indexed 0, 1, 2, 3. Row 3 is circled, and column 4 is highlighted. The matrix contains values 0 and 1. The right diagram shows an $n \times n$ matrix with row i and column i highlighted. The matrix contains values 0 and 1. Below the diagrams, the text $O(n^2)$ is written. To the right, a list of conditions for V_i is given: V_i is a celeb if $\checkmark V_i$ 'th col is all ones except A_{ii} and $\checkmark V_i$ 'th row is all zeros.

$O(n^2)$

V_i is a celeb if

- $\checkmark V_i$ 'th col is all ones except A_{ii}
- $\checkmark V_i$ 'th row is all zeros

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- 3.