|  |  |  |
| --- | --- | --- |
|  | In-Degree | Out-Degree |
| Nusrath | 2 | 0 |
| Rayona | 1 | 4 |
| Joel | 1 | 0 |
| Jonathan | 1 | 1 |
| Zanif | 2 | 2 |
| Daniel | 1 | 2 |
| Rasheed | 1 | 0 |

Nusrath

Jonathan

Zanif

Nusrath

Rayona =>

Nusrath

Zanif =>

Rayona

Jonathan =>

1. Given the ***adjacency-list*** representation of a ***directed graph***:  
   a. how would you compute the out-degree of a vertex *v*? (explain the process or algorithm) How long would that take (big-O notation)?

Answer = The out degree of any vertex V can be found as traversing the complete list for that vertex and counting the number of nodes since a maximum of v-1 (v is number of vertex) nodes can be there in a list Hence O(v).

b. how would you compute the out-degree of ALL vertices? (explain the process or algorithm) How long would that take (big-O notation)?

Answer = The out degree of all vertices can be found by traversing the complete list for that vertex and counting the number of nodes since a maximum of v-1 (v is number of vertex) nodes can be there And for all v nodes we have to traverse the list Hence O(v^2)

c. How would you compute the in-degree of a vertex *v*? (explain the process or algorithm) How long would that take (big-O notation)?

Answer = The in degree of any vertex V can be found as traversing the lists for the remaining vertices and tracking the nodes which contain V in its list to traverse n-1 lists with a maximum of v-1 (v is number of vertex) nodes in a list Hence O(v^2).

d. How would you compute the in-degree of ALL vertices? (explain the process or algorithm) How long would that take (big-O notation)?

Answer = The in degree of any vertex V can be found as traversing the lists for the remaining vertices and tracking the nodes which contain V in its list to traverse n-1 lists with a maximum of v-1 (v is number of vertex) nodes in a list Hence O(v^2).

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Nusrath | Rayona | Zanif | Jonathan |
| Nusrath | 0 | 0 | 0 | 0 |
| Rayona | 1 | 1 | 1 | 1 |
| Zanif | 1 | 0 | 0 | 0 |
| Jonathan | 0 | 1 | 0 | 0 |

4.