

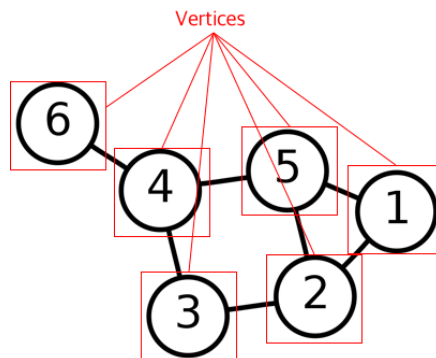
CSC373 Worksheet 4 Solution

August 3, 2020

1. Notes:

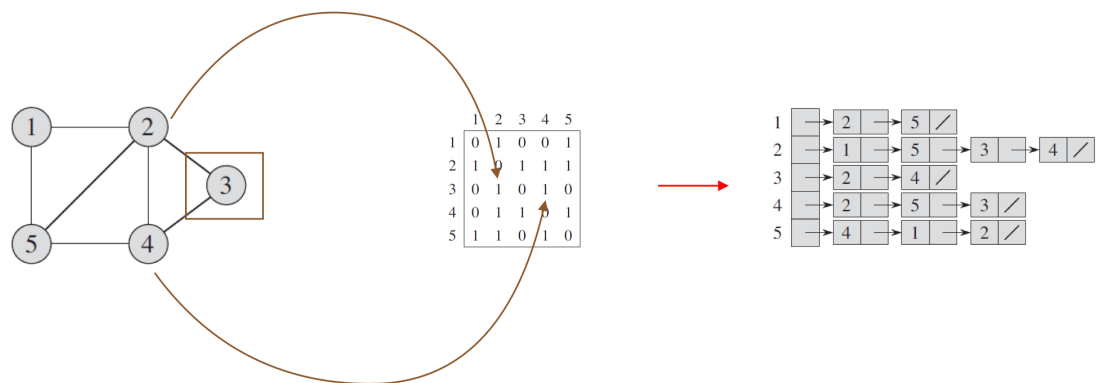
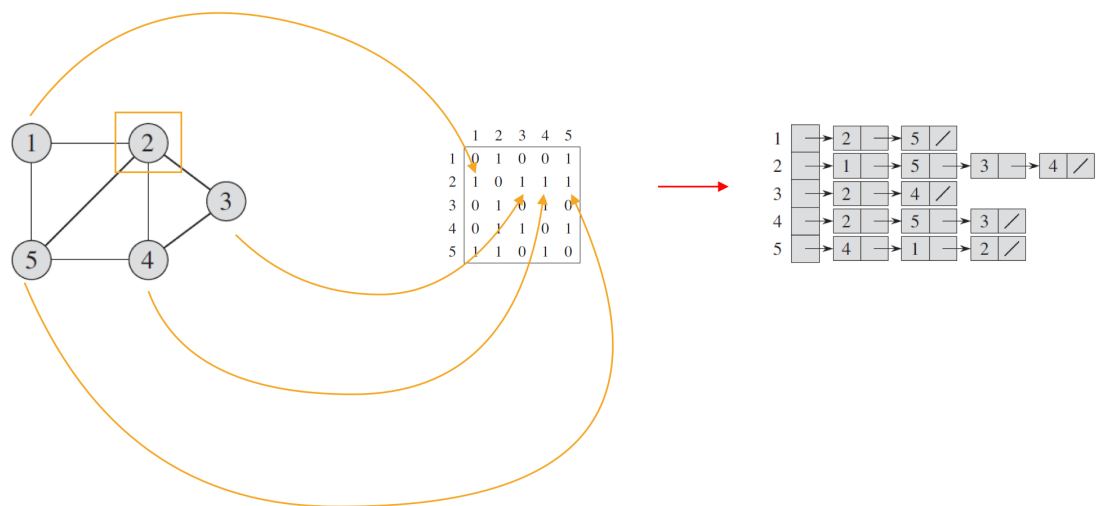
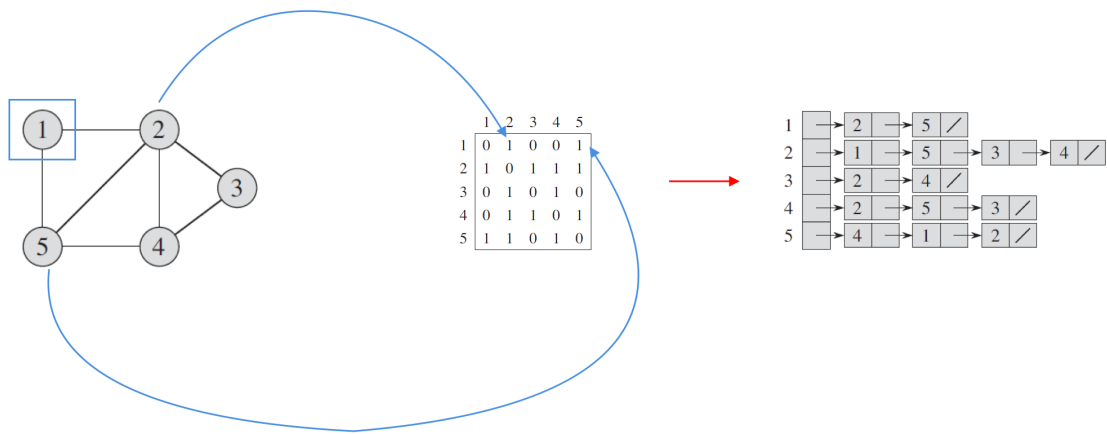
• Vertex

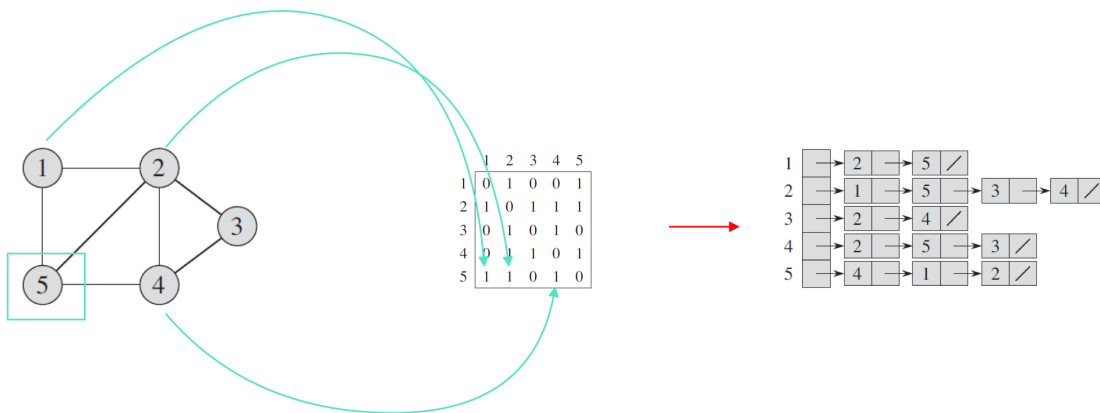
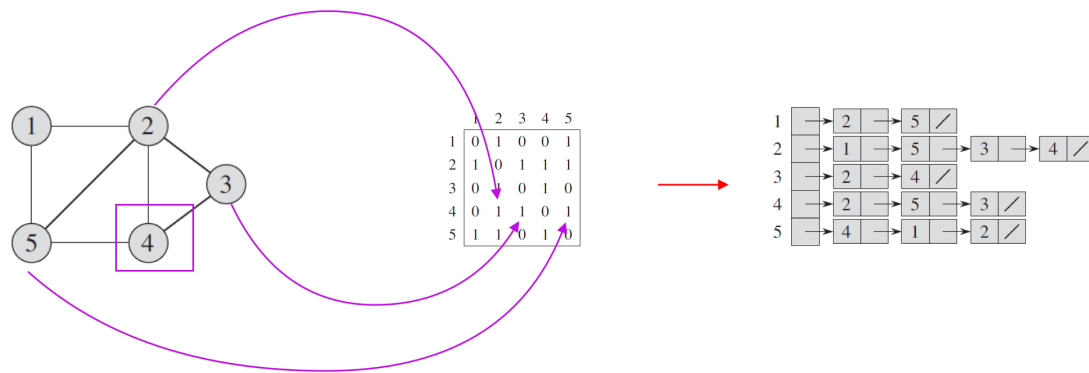
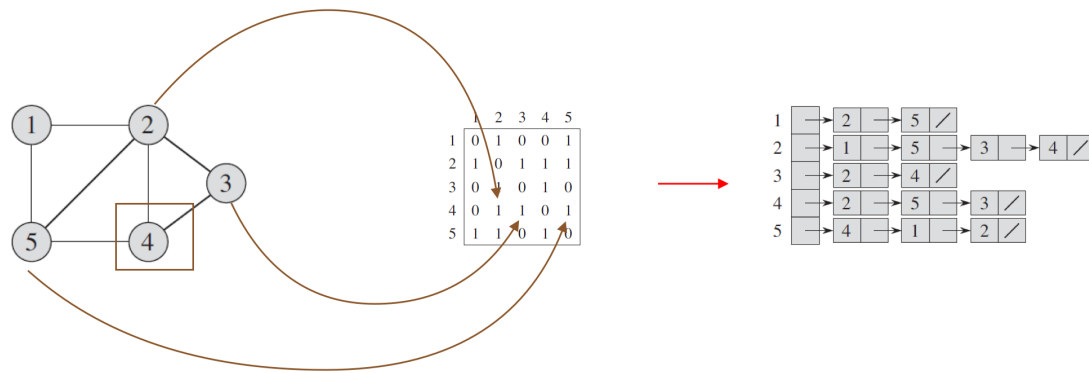
- Is a fundamental unit of which graphs are formed
- Also means node



• Adjacency-list Representation

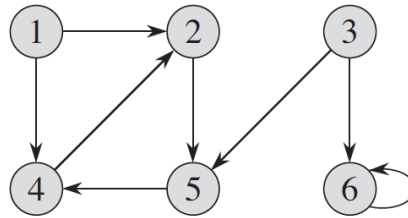
- Associates each vertex in a graph with the collection of its neighbouring vertices or edges
- Is represented by $Adj[v]$
 - * Means all vertices that are neighbour to vertex v
 - * In a directed graph, $Adj[v]$ are all out-degree vertices of vertex v
 - * $|Adj[v]|$ means the total number of outdegree of vertex v





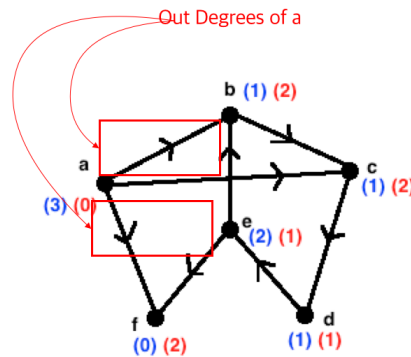
- **Directed graph**

- Is a graph that is made up of a set of vertices connected by edges, where the edges have a direction associated with them



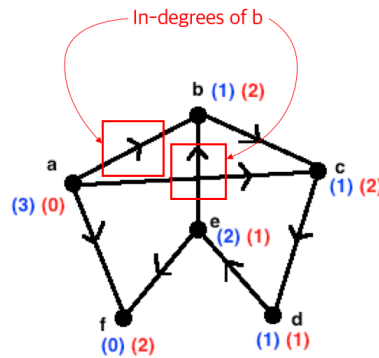
- **Out-degrees**

- For a directed graph $G = (V(G), E(G))$ and a vertex $x_1 \in V(G)$, the Out-Degree of x_1 refers to the number of arcs incident from x_1 . That is, the number of arcs directed away from the vertex x_1 .

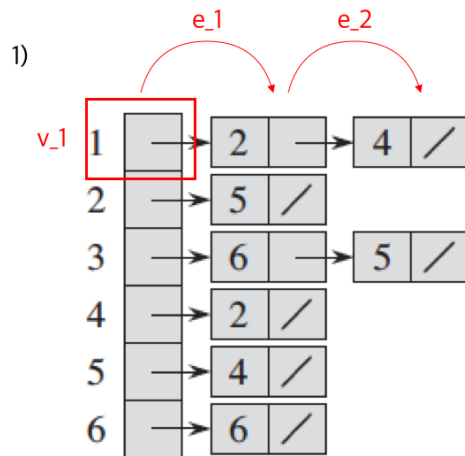


- **In-degrees**

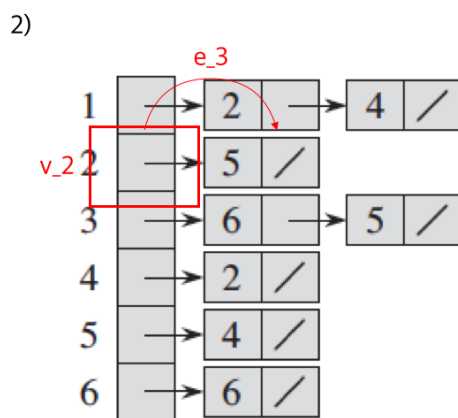
- For a directed graph $G = (V(G), E(G))$ and a vertex $x_1 \in V(G)$, the In-Degree of x_1 refers to the number of arcs incident to x_1 . That is, the number of arcs directed towards the vertex x_1 .



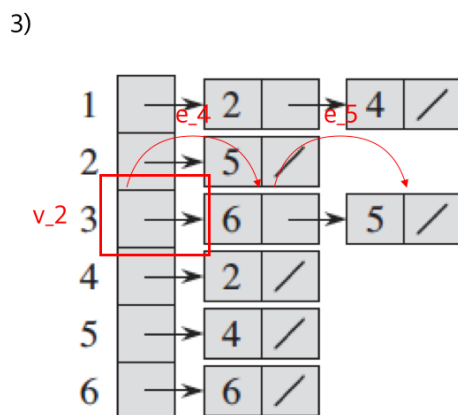
- Computing the outdegree of every vertex using adjacency list



$$(v_1) + (e_1 + e_2)$$

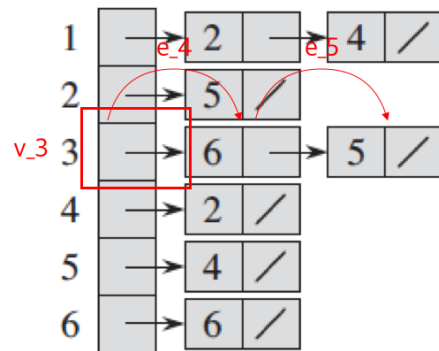


$$(v_1 + v_2) + (e_1 + e_2 + e_3)$$



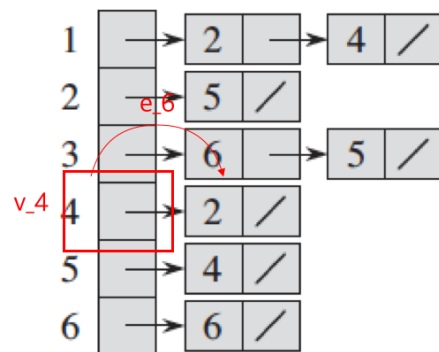
$$(v_1 + v_2 + v_3) + (e_1 + e_2 + e_3 + e_4 + e_5)$$

3)



$$(v_1 + v_2 + v_3) + (e_1 + e_2 + e_3 + e_4 + e_5)$$

4)



$$(v_1 + v_2 + v_3 + v_4) + (e_1 + e_2 + e_3 + e_4 + e_5)$$