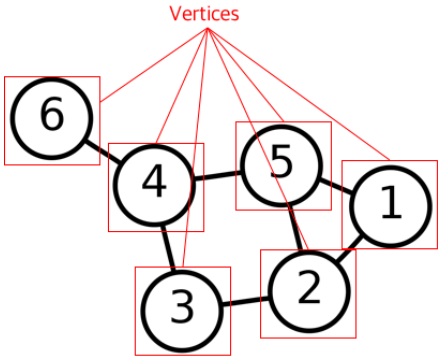
CSC373 Worksheet 4 Solution

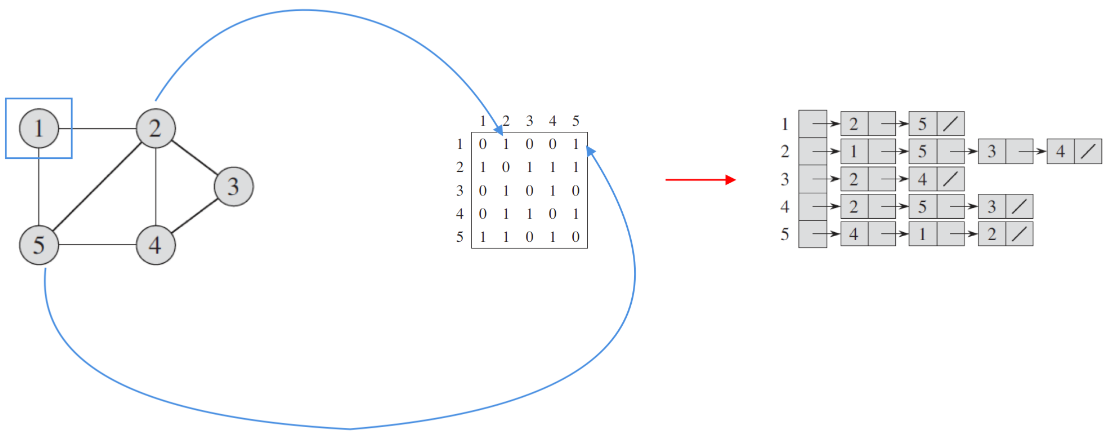
August 3, 2020

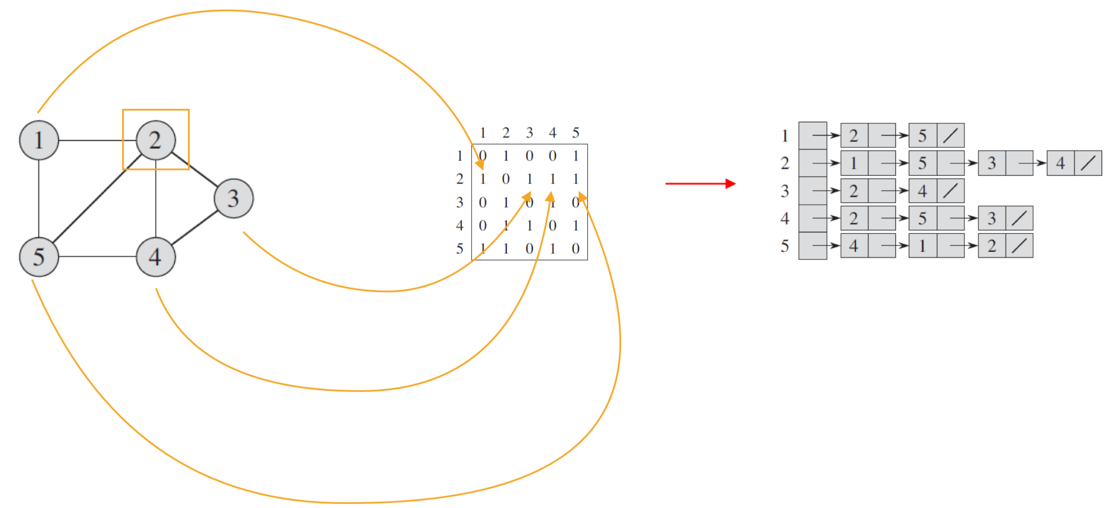
1. **Notes:**

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



- **Adjacency-list Representation**
  - Associates each vertax 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 vertax v
    - $|Adj[v]|$ means the total number of outdegree of vertax v


1 2 3 4 5
1 0 1 0 0 1
2 1 0 1 1 1
3 0 1 0 1 0
4 0 1 1 0 1
5 1 1 0 1 0


1 2 3 4 5
1 0 1 0 0 1
2 1 0 1 1 1
3 0 1 0 1 0
4 0 1 1 0 1
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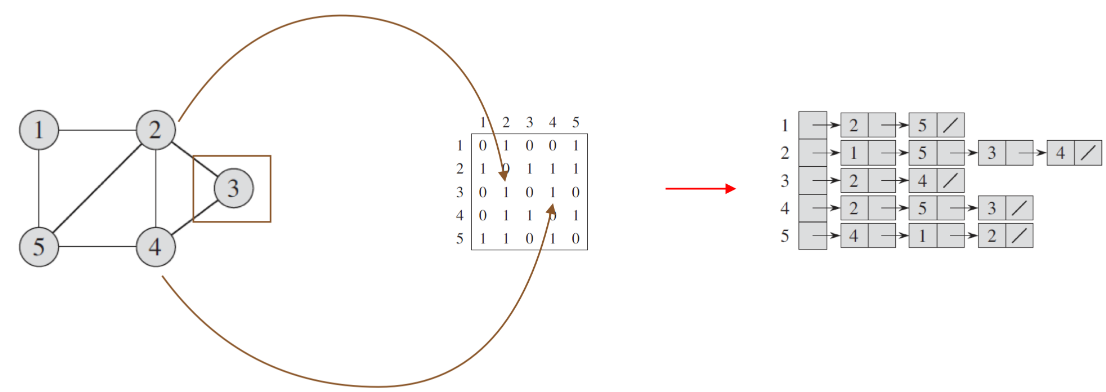
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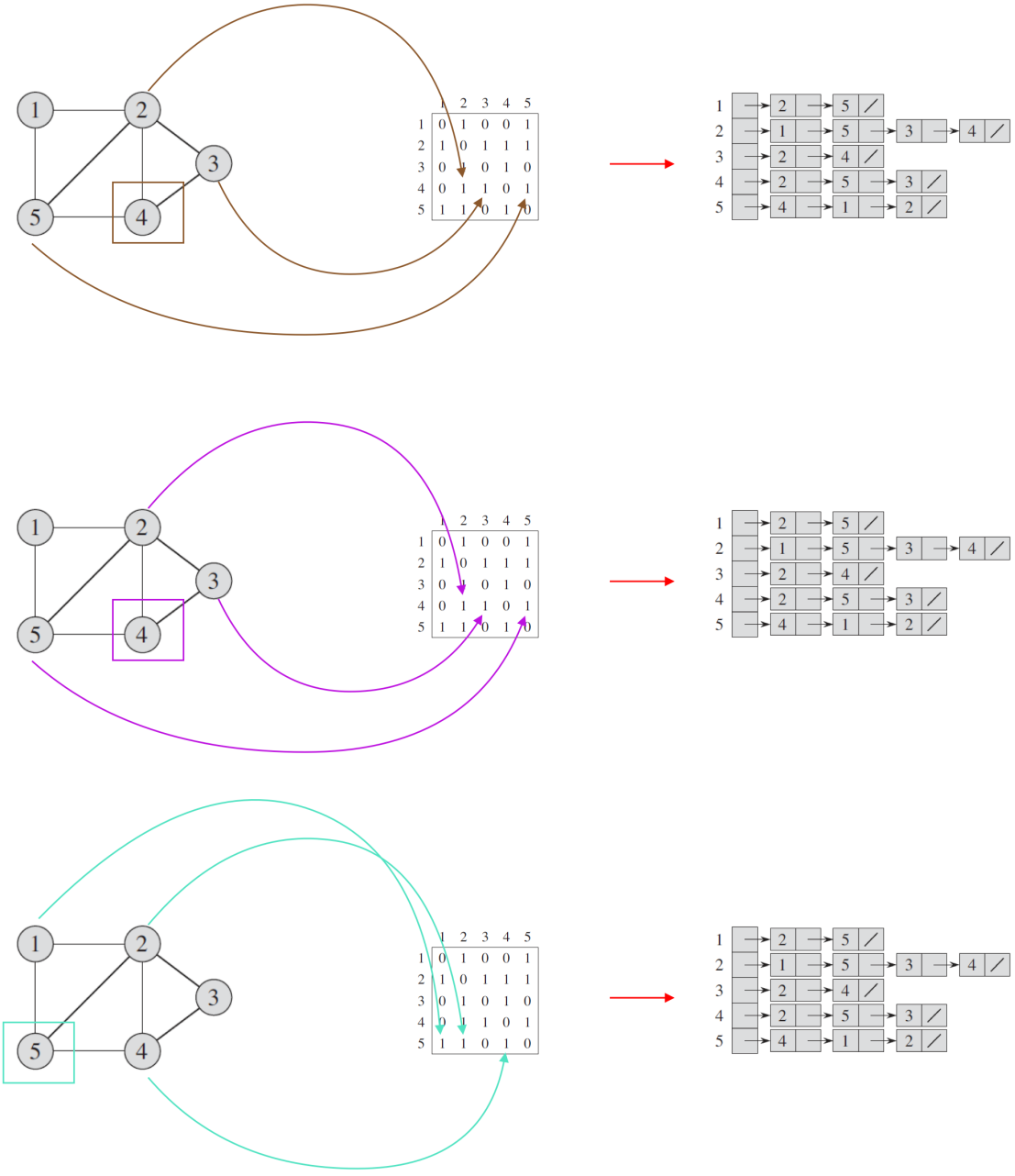
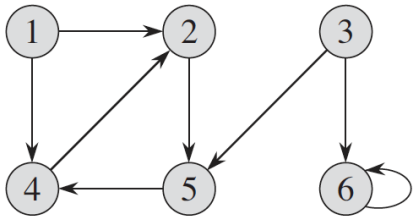
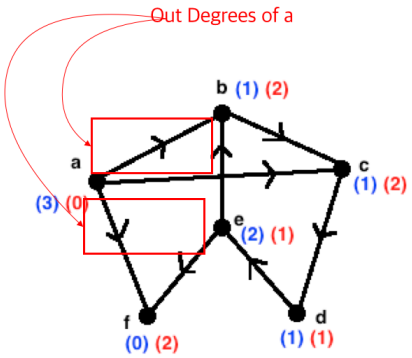


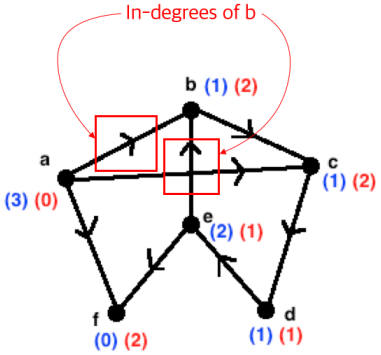
- **Directed graph**
  - Is a graph that is made up of a set of vertices connected by edges, where the edges have a direction associated with them



- **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.

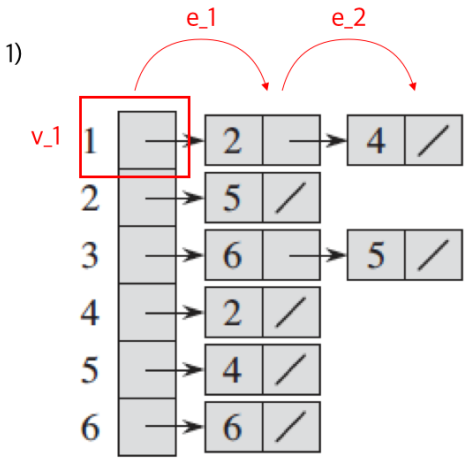


- **In-degrees**
  - For a directed graph $G = (V(G), E(G))$ and a vertex $x_1 \in V(G)$, the In-Degree of x_1 refers to the number of arcs incident to x_1. That is, the number of arcs directed towards the vertex x_1.



- Computing the outdegree of every vertex using adjacency list

1)



(v_1) + (e_1 + e_2)