# Strongly, Unilaterally and Weakly connected Graph

Strongly Connected:

A graph is said to be **strongly connected** if every pair of vertices(u, v) in the graph contains a path between each other. In an unweighted directed graph G, every pair of vertices u and v should have a path in each direction between them i.e., bidirectional path. The elements of the path matrix of such a graph will contain all **1's**.
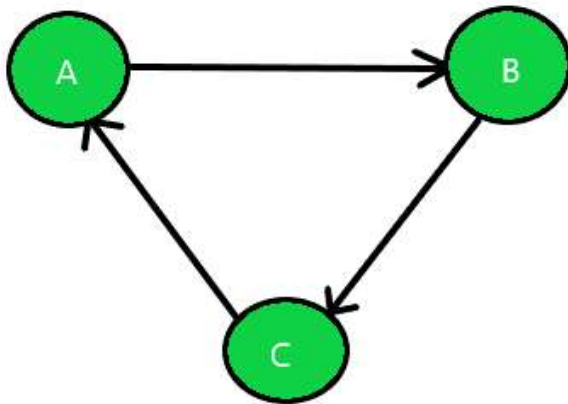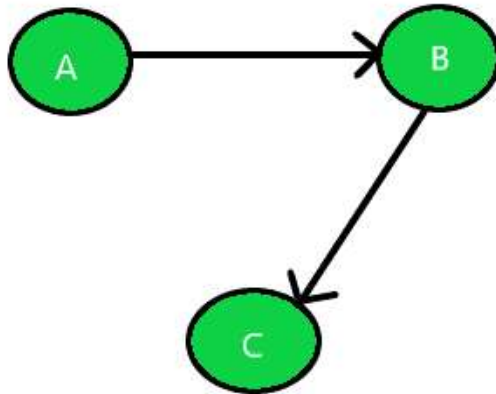
Path Matrix :   A B C
                A 1 1 1
                B 1 1 1
                C 1 1 1
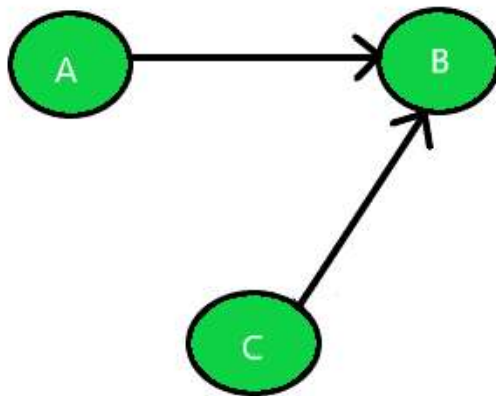
Unilaterally Connected:

A graph is said to be **unilaterally connected** if it contains a directed path from u to v OR a directed path from v to u for every pair of vertices u, v. Hence, at least for any pair of vertices, one vertex should be reachable form the other. Such a path matrix would rather have upper triangle elements containing **1's** OR lower triangle elements containing **1's**.

```
Path Matrix :   A B C
                A 0 1 1
                B 0 0 1
                C 0 0 0
```

Weakly Connected:

A graph is said to be **weakly connected** if there doesn't exist any path between any two pairs of vertices. Hence, if a graph G doesn't contain a directed path (from u to v or from v to u for every pair of vertices u, v) then it is weakly connected. The elements of such a path matrix of this graph would be random.


```
Path Matrix :   A B C
                A  0 1 0
                B  0 0 0
                C  0 1 0
```