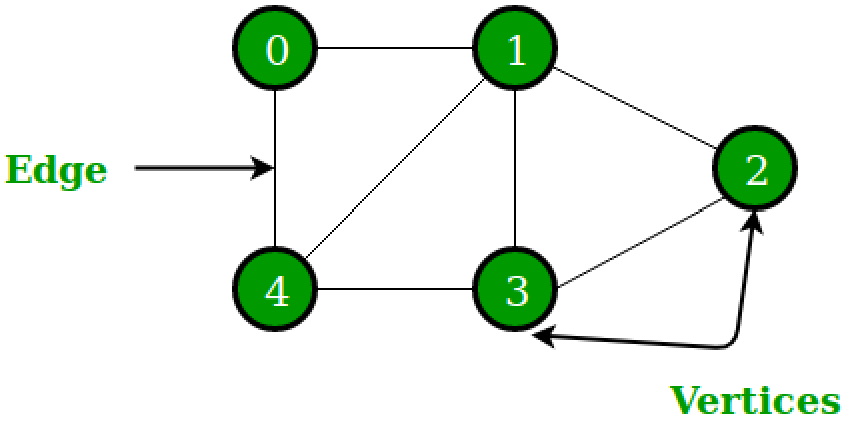
Experiment No.9

Aim: Graph Traversal

Techniques Theory:

Graph

A graph can be defined as a group of vertices and edges that are used to connect these vertices. A graph can be seen as a cyclic tree, where the vertices (Nodes) maintain any complex relationship among them instead of having parent-child relationship.



In the above Graph, the set of vertices V = {0,1,2,3,4} and the set of edges E = {01, 12, 23, 34, 04, 14, 13}.

Graph Traversals:

BFS:Breadth First Search

Breadth-First Traversal (or Search) for a graph is similar to Breadth-First Traversal of a tree. The only catch here is, unlike trees, graphs may contain cycles, so we may come to the same node again. To avoid processing a node more than once, we use a boolean visited array. For simplicity, it is assumed that all vertices are reachable from the starting vertex.

```
procedure BFS(G, root) is
    let Q be a queue
    label root as explored
    Q.enqueue(root)
    while Q is not empty do
        v := Q.dequeue()
        if v is the goal then
            return v
        for all edges from v to w in G.adjacentEdges(v) do
            if w is not labeled as explored then
```

```
    label w as explored
    Q.enqueue(w)
```

DFS:Depth First Search

Depth First Traversal (or Search) for a graph is similar to Depth First Traversal of a tree. The only catch here is, unlike trees, graphs may contain cycles, a node may be visited twice. To avoid processing a node more than once, use a boolean visited array.

```
procedure DFS(G, v) is
    label v as discovered
    for all directed edges from v to w that are in G.adjacentEdges(v)
do
        if vertex w is not labeled as discovered then
            recursively call DFS(G, w)
```

Conclusion: (Students write conclusion in your own words. U have to describe what u you understood from the experiment and the concept of the experiment. **Conclusion carry 4 marks out of 10**)