DSA through C++

Graph traversing

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Agenda

1. Traversing Graph
2. BFS
3. Logic for BFS
4. Example
5. DFS
6. Logic for DFS
7. Example

Traversing

There are two standard way of traversing a graph.

1. BFS — Breadth First Search
2. DFS — Depth First Search

BFS

Traversing graph has only issue that graph may have cycle. You may revisit a node.

To avoid processing a node more than once, we divide the vertices into two categories:

1. visited
2. Not visited

A boolean visited array is used to mark the visited vertices

BFS (Breadth First Search) uses a queue data structure for traversal.

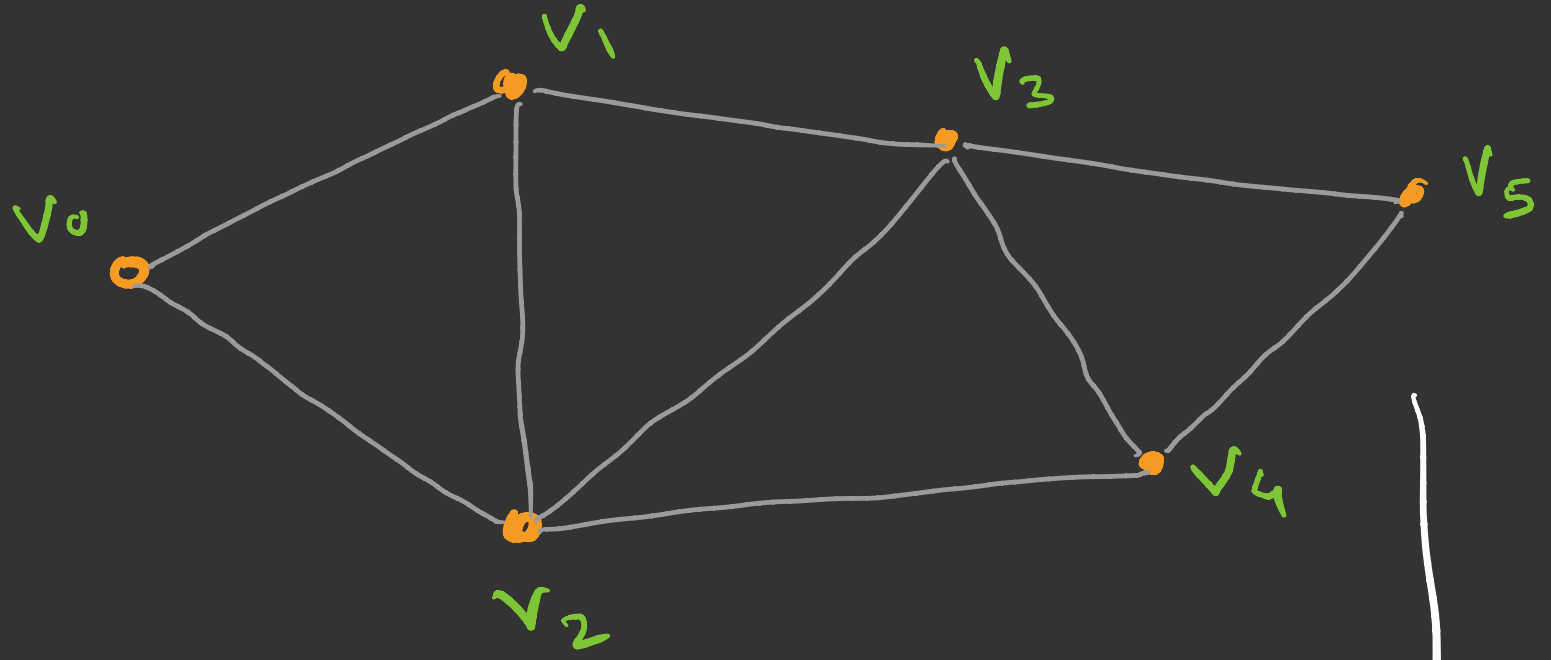
Traversing begin from a node called source node.

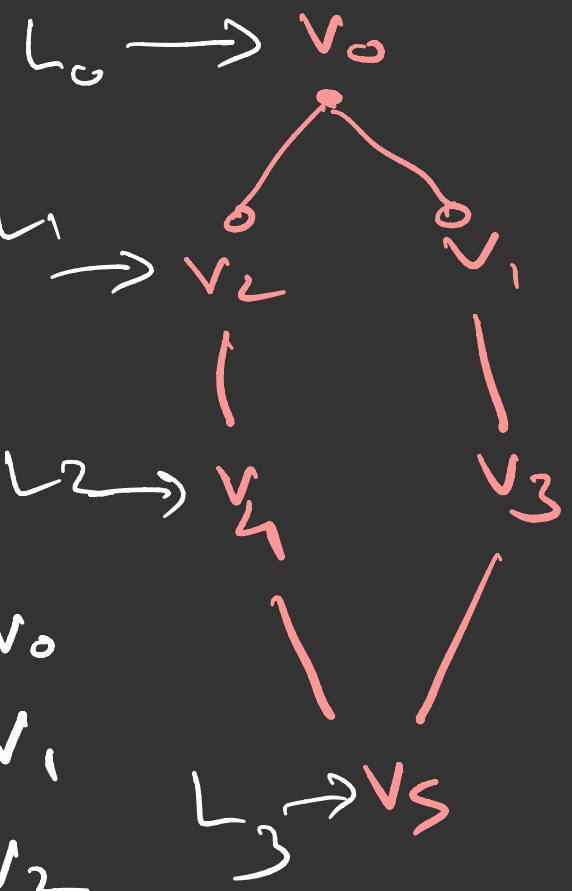
Logic for BFS

```
BFS(G, s)
    Let Q be the queue
    Q.insert(s);
    v[s] = true;

    while (!Q.isEmpty())
    {
        n= Q.getFront();
        Q.del();
        for all the neighbors u of n
            if v[u] == false
                Q.insert(u);
                v[u] = true;

    }
```

Example

Source = v_0





Q

n =

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

v_0
v_1
v_2
v_3
v_4
v_5

DFS

DFS is Depth first Search.

The main defference between BFS and Dfs is that the DFS uses Stack in place of Queue.

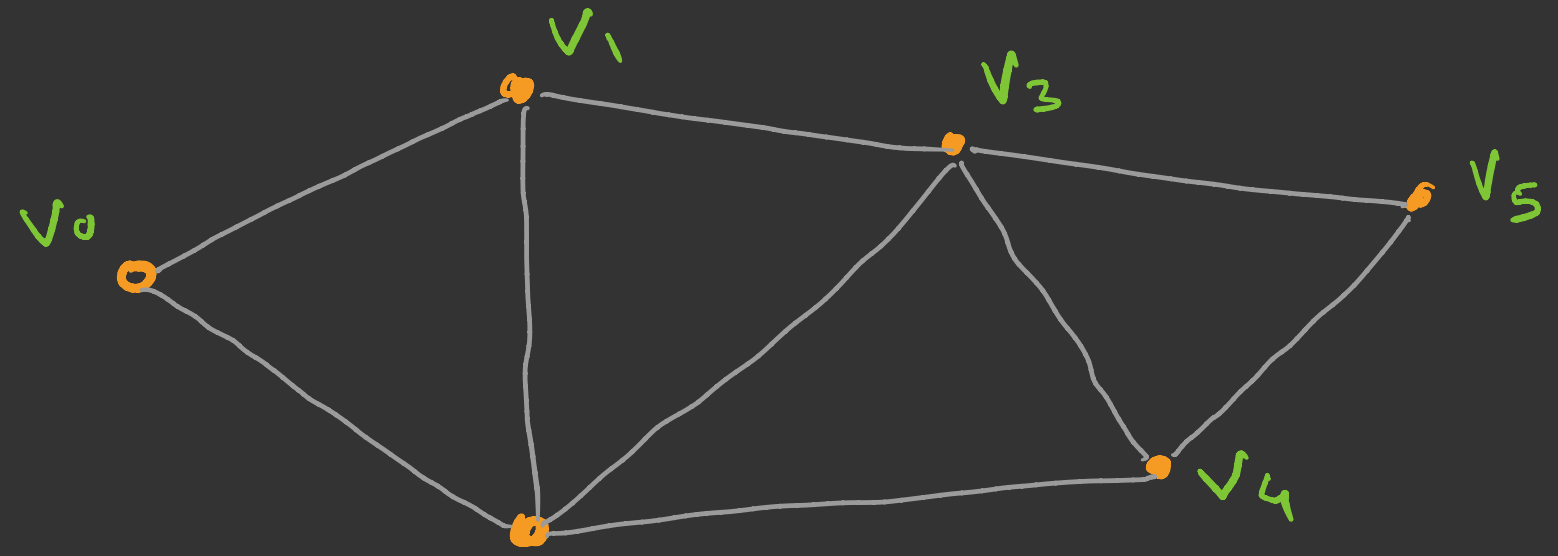
Logic for DFS

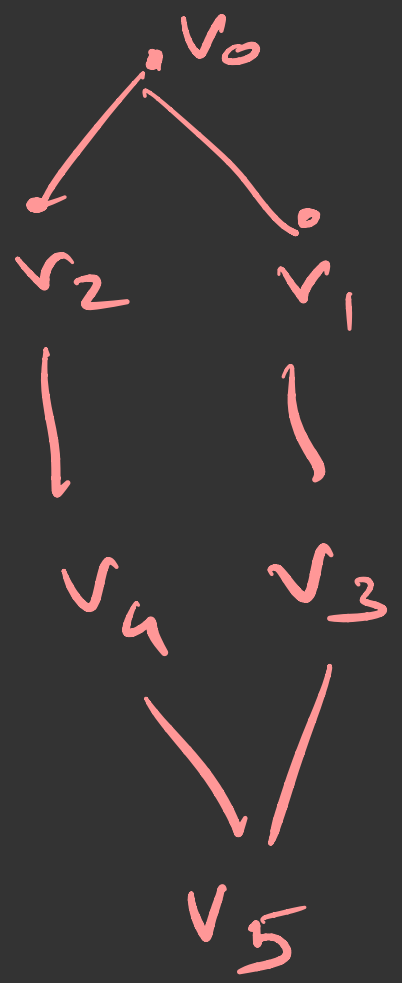
DFS (G, S)

```
Let stack be the stack
stack.push(S)
v[S] = true;
while ( !stack.isEmpty() )
{
    n= stack.peek();
    stack.pop();
    for all the neighbors u of n
        if v[u] == false
            stack.push(u);
            v[u] = true;
}
```

Example

Source = V_0





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

DFS

V_0
V_2
V_4
V_5
V_3
V_1