TASK:1

Implementation of Graph search algorithms (**Breadth first search and Depth First Search**) using following constraints.

Aim: To Implement of Graph search algorithms (Breadth first search and Depth First Search) using Python.

Task 1A :

Algorithm:

BFS

Step 1: Start by putting any one of the graph's vertices at the back of the queue.

Step 2: Now take the front item of the queue and add it to the visited list.

Step 3: Create a list of that vertex's adjacent nodes. Add those which are not within the visited list to the rear of the queue.

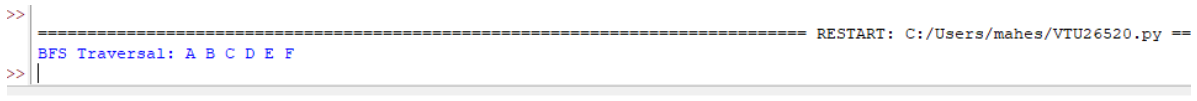
Step 4: Keep continuing steps two and three till the queue is empty.

Program:

```
 from collections import
deque def bfs(graph, start):

   queue = deque([start])

visited = set()     print("BFS:",

end=" ")     while queue:

       node = queue.popleft()

if node not in visited:

print(node, end=" ")

visited.add(node)

            # Add neighbors not visited yet

  queue.extend(neighbor for neighbor in graph[node] if neighbor not in visited)

print()
```

```
# Example graph graph

= {

    'A': ['B', 'C'],

    'B': ['A', 'D', 'E'],

    'C': ['A', 'F'],

    'D': ['B'],

    'E': ['B', 'F'],

    'F': ['C', 'E']

} bfs(graph,

'A')
```

OUTPUT:



```
>>
   ============================================================================== RESTART: C:/Users/mahes/VTU26520.py ==
   BFS Traversal: A B C D E F
>> |
```

Task1 b

Algorithm

DFS –

Step 1: Declare a queue and insert the starting Vertex.

Step 2: Initialize a visited array and mark the starting Vertex as visited.

Step3: Remove the First vertex of queue.

Step 4: Mark that vertex as visited

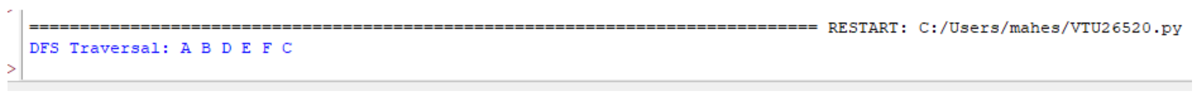
Step 5: Insert all the unvisited neighbors of the vertex into queue.

Step 6: stop.

Program

```
def dfs(graph, start):
stack = [start]     visited
= set()     print("DFS:",
end=" ")

    while stack:
        node = stack.pop()
if node not in visited:
print(node, end=" ")
visited.add(node)
            # Add neighbors in reverse order so they are processed in original order
stack.extend(reversed([neighbor for neighbor in graph[node] if neighbor not in visited]))    print()

# Example graph graph
= {
    'A': ['B', 'C'],
    'B': ['A', 'D', 'E'],
    'C': ['A', 'F'],
    'D': ['B'],
    'E': ['B', 'F'],
    'F': ['C', 'E']
}

dfs(graph, 'A')
```

Output:



```
============================================================================== RESTART: C:/Users/mahes/VTU26520.py
DFS Traversal: A B D E F C
>
```

Result:

Thus the Implementation of Graph search algorithms (Breadth first search and Depth First Search) using Python was successfully executed and output was verified.