

NAME – RAJDEEP JAISWAL

DATE – 14 NOV 2021

BRANCH – BTECH CSE

SEC = 608 - A

UID -20BCS2761

Subject – DATA STRUCTURE Lab

1. Aim/Overview of the practical:

Write a program for BFS and DFS.

Solution –

CODE IN TEXT-

```
#include<iostream>
#include<vector>
#include<queue>
#include<stack>
using namespace std;

void edge(vector<int>adj[],int u,int v){

adj[u].push_back(v);
}

void bfs(int s,vector<int>adj[],bool visit[]){

queue<int>q;

q.push(s);
```

```
visit[s]=true;

while(!q.empty()){

int u=q.front();

cout<<u<<" ";

q.pop();

for(int i=0;i<adj[u].size();i++){

if(!visit[adj[u][i]]){

q.push(adj[u][i]);

visit[adj[u][i]]=true;

}

}

}

}

}

void dfs(int s,vector<int>adj[],bool visit[]){
```

```
stack<int>stk;

stk.push(s);

visit[s]=true;

while(!stk.empty()){

int u=stk.top();

cout<<u<<" ";

stk.pop();

for(int i=0;i<adj[u].size();i++){

if(!visit[adj[u][i]]){

stk.push(adj[u][i]);

visit[adj[u][i]]=true;

}

}

}
```

```
}

int main(){

vector<int>adj[5];

bool visit[5];

for(int i=0;i<5;i++){

visit[i]=false;

}

edge(adj,0,2);

edge(adj,0,1);

edge(adj,1,3);

edge(adj,2,0);

edge(adj,2,3);

edge(adj,2,4);

cout<<"BFS traversal is"<<" ";
```

```
bfs(0,adj,visit);

cout<<endl;

for(int i=0;i<5;i++){

visit[i]=false;

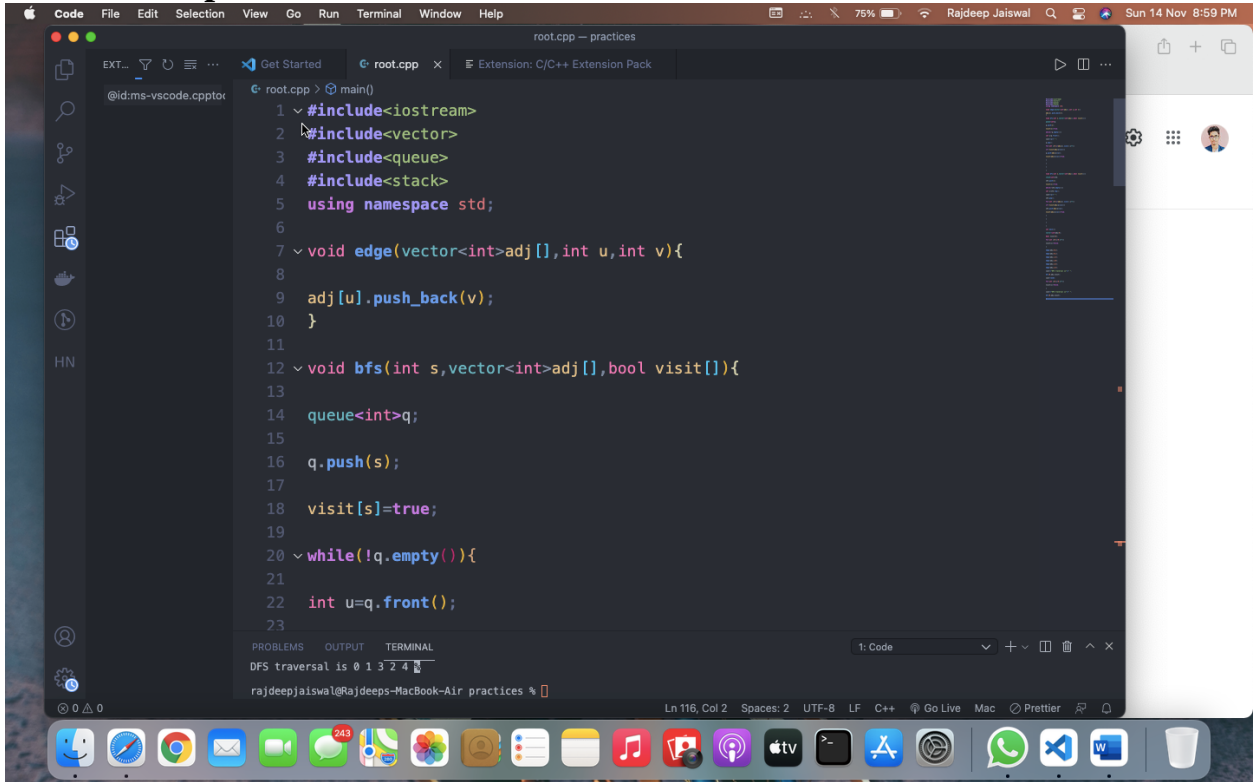
}

cout<<"DFS traversal is"<<" ";

dfs(0,adj,visit);

}
```

Code in compiler -



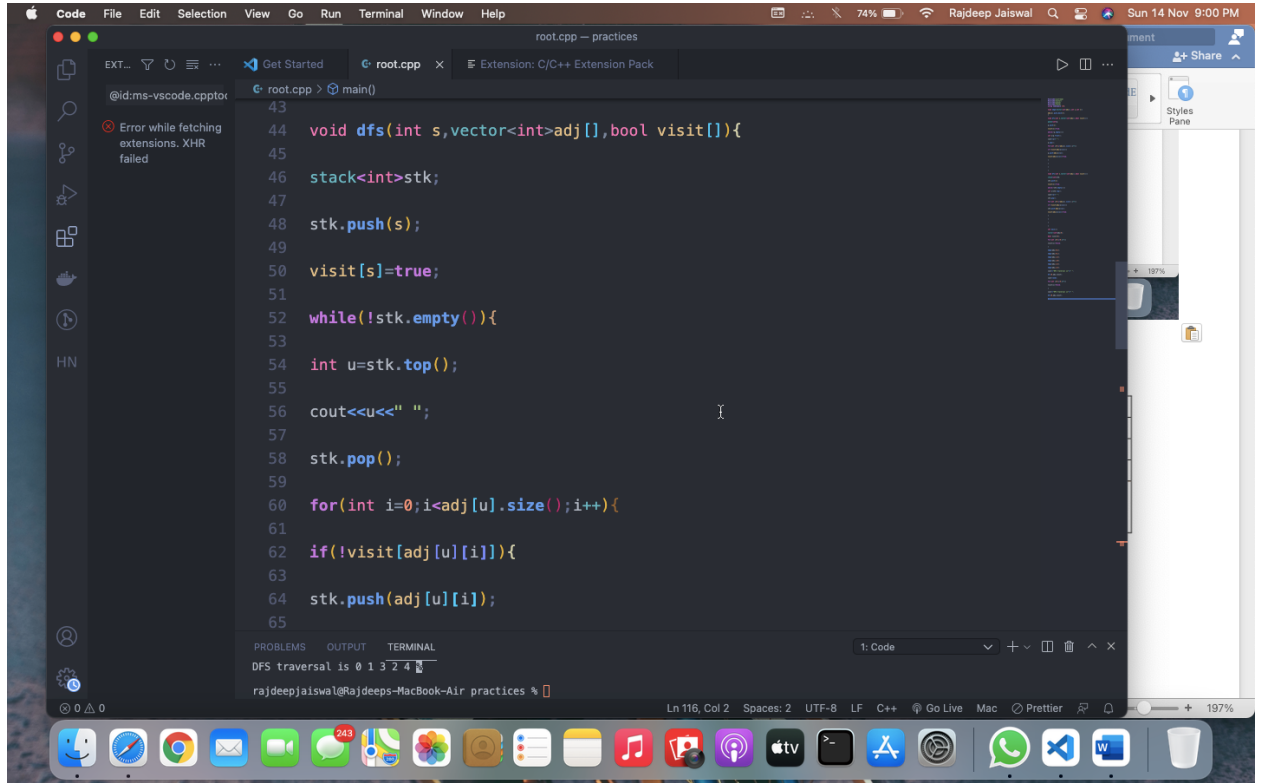
The image shows a screenshot of a code editor (Visual Studio Code) displaying C++ code for a Depth-First Search (DFS) traversal. The code is as follows:

```
1 #include<iostream>
2 #include<vector>
3 #include<queue>
4 #include<stack>
5 using namespace std;
6
7 void edge(vector<int>adj[],int u,int v){
8
9     adj[u].push_back(v);
10 }
11
12 void bfs(int s,vector<int>adj[],bool visit[]){
13
14     queue<int>q;
15
16     q.push(s);
17
18     visit[s]=true;
19
20 while(!q.empty()){
21
22     int u=q.front();
23 }
```

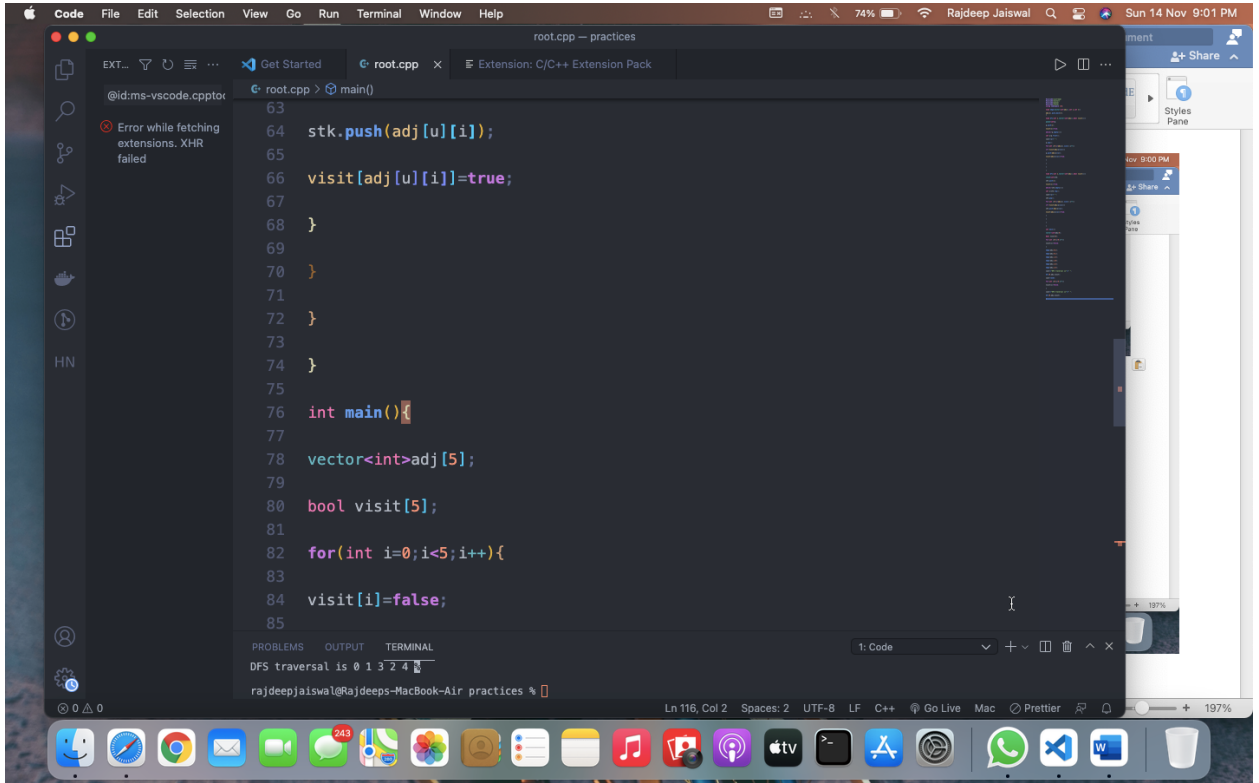
The terminal output at the bottom shows: `DFS traversal is 0 1 3 2 4`. The editor interface includes a menu bar (Code, File, Edit, Selection, View, Go, Run, Terminal, Window, Help), a toolbar, and a sidebar with icons for Explorer, Search, Source Control, Run and Debug, and Extensions. The status bar at the bottom indicates the current file is `root.cpp` and the cursor is at `Ln 116, Col 2`.



```
root.cpp — practices  
@id:ms-vscode.cpptoc...  
Error while fetching  
extensions. XHR  
failed  
HN  
root.cpp > main()  
20 while(!q.empty()){  
21  
22 int u=q.front();  
23  
24 cout<<u<<" ";  
25  
26 q.pop();  
27  
28 for(int i=0;i<adj[u].size();i++){  
29  
30 if(!visit[adj[u][i]]){  
31  
32 q.push(adj[u][i]);  
33  
34 visit[adj[u][i]]=true;  
35  
36 }  
37  
38 }  
39  
40 }  
41  
42 }  
PROBLEMS OUTPUT TERMINAL  
DFS traversal is 0 1 3 2 4  
rajdeepjaiswal@Rajdeeps-MacBook-Air practices %
```



```
Code File Edit Selection View Go Run Terminal Window Help
root.cpp -- practices
EXT... Get Started root.cpp x Extension: C/C++ Extension Pack
@id:ms-vscode.cpptor
Error while fetching
extensions. XHR
failed
HN
root.cpp > main()
43
44 void dfs(int s,vector<int>adj[],bool visit[]){
45
46 stack<int>stk;
47
48 stk.push(s);
49
50 visit[s]=true;
51
52 while(!stk.empty()){
53
54 int u=stk.top();
55
56 cout<<u<<" ";
57
58 stk.pop();
59
60 for(int i=0;i<adj[u].size();i++){
61
62 if(!visit[adj[u][i]]){
63
64 stk.push(adj[u][i]);
65
PROBLEMS OUTPUT TERMINAL
DFS traversal is 0 1 3 2 4
rajdeepjaiswal@Rajdeeps-MacBook-Air practices %
```

```
root.cpp -- practices
@id:ms-vscode.cpptor
Error while fetching
extensions. XHR
failed
HN
PROBLEMS OUTPUT TERMINAL
DFS traversal is 0 1 3 2 4
rajdeepjaiswal@Rajdeeps-MacBook-Air practices %
```

```
63
64     stk.push(adj[u][i]);
65
66     visit[adj[u][i]]=true;
67
68 }
69
70 }
71
72 }
73
74 }
75
76 int main(){
77
78     vector<int>adj[5];
79
80     bool visit[5];
81
82     for(int i=0;i<5;i++){
83
84         visit[i]=false;
85
```

```
83  
84 visit[i]=false;  
85  
86 }  
87  
88 edge(adj,0,2);  
89  
90 edge(adj,0,1);  
91  
92 edge(adj,1,3);  
93  
94 edge(adj,2,0);  
95  
96 edge(adj,2,3);  
97  
98 edge(adj,2,4);  
99  
100 cout<<"BFS traversal is"<<" ";  
101  
102 bfs(0,adj,visit);  
103  
104 cout<<endl;
```

PROBLEMS OUTPUT TERMINAL
DFS traversal is 0 1 3 2 4

The screenshot shows the Visual Studio Code editor with a C++ file named 'root.cpp' open. The code implements a Depth-First Search (DFS) algorithm. The code is as follows:

```
104 cout<<endl;
105
106 for(int i=0;i<5;i++){
107
108 visit[i]=false;
109
110 }
111
112 cout<<"DFS traversal is"<<" ";
113
114 dfs(0,adj,visit);
115
116
```

The terminal output at the bottom of the editor shows the result of the program execution:

```
DFS traversal is 0 1 3 2 4
```

OUTPUT -

The screenshot shows the terminal output of the C++ program. The command used to compile and run the program is:

```
cd "/Users/rajdeepjaiswal/Desktop/Codes/practices/" && g++ root.cpp -o root && "/Users/rajdeepjaiswal/Desktop/Codes/practices/"root
```

The output of the program is:

```
DFS traversal is 0 2 1 3 4
DFS traversal is 0 1 3 2 4
```

Evaluation Grid (To be created as per the SOP and Assessment guidelines by the faculty):

| Sr. No. | Parameters | Marks Obtained | Maximum Marks |
|---------|------------|----------------|---------------|
| 1. | | | |
| 2. | | | |
| 3. | | | |
| | | | |