Assignment No. 6

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Programme:

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

class Graph
{
   string city[10];
   int a[10][10];
   int n;
public:
   void input();
   void display();
   void BFS();
   void DFS();
};

void Graph::input()
{
   cout<<"\nEnter no. of cites: ";
   cin>>n;
   cout<<"\nEnter the names of cities: ";
   for(int i=0 ; i<n ; i++)
      cin >> city[i];
```

```
    cout<<"\nEnter the distances: ";
    for(int i=0 ; i<n ; i++)
        for(int j=i ; j<n ; j++)
        {
            if(i==j)
            {
                a[i][j] = 0;
                continue;
            }

            cout<<"\nEnter the distance between " << city[i] <<" and " << city[j]<< " : ";
            cin >> a[i][j];
            a[j][i] = a[i][j];
        }
}

void Graph::display()
{

    for(int i=0 ; i<n ; i++)
    {
        cout<<"\n";
        for(int j=0 ; j<n ; j++)
        {
            cout<<a[i][j] << "\t";
        }
   }
}

void Graph::BFS()
{
    cout<<"\n\nBFS Traversal: ";
    queue<int> q;
```

```
int visit[n];
for(int i=0 ; i<n ; i++)
   visit[i] = 0;
string start;
int index;
cout<<"\nEnter starting city: ";
cin>>start;
for(int i=0 ; i<n ; i++)
   if(start == city[i])
      index =i;

visit[index] = 1;
cout<<city[index]<<" -> ";
int current = index;
while(1)
{5
   for(int i=0 ; i<n ; i++)
   {
      if(a[current][i]!=0 && visit[i] == 0)
      {
         visit[i] = 1;
         q.push(i);
         cout<<city[i]<<" -> ";
      }

   }

   if(q.empty()!=0)
      break;

   else
   {
      current = q.front();
```

```
            q.pop();
        }
    }
}

void Graph::DFS()
{
    cout<<"\n\nDFS Traversal: ";
    stack<int> s;
    int visit[n];
    for(int i=0 ; i<n ; i++)
        visit[i] = 0;
    string start;
    int index;
    cout<<"\nEnter starting city: ";
    cin>>start;
    for(int i=0 ; i<n ; i++)
        if(start == city[i])
            index =i;
    s.push(index);
    visit[index] = 1;
    int current = index;
    cout << city[index]<<" -> ";
    while(1)
    {
        for(int i=0 ; i<n ; i++)
        {
            if(a[current][i]!=0 && visit[i]==0)
            {
                s.push(i);
                cout<<city[i]<<" -> ";
                visit[i] = 1;
                current = i;
```

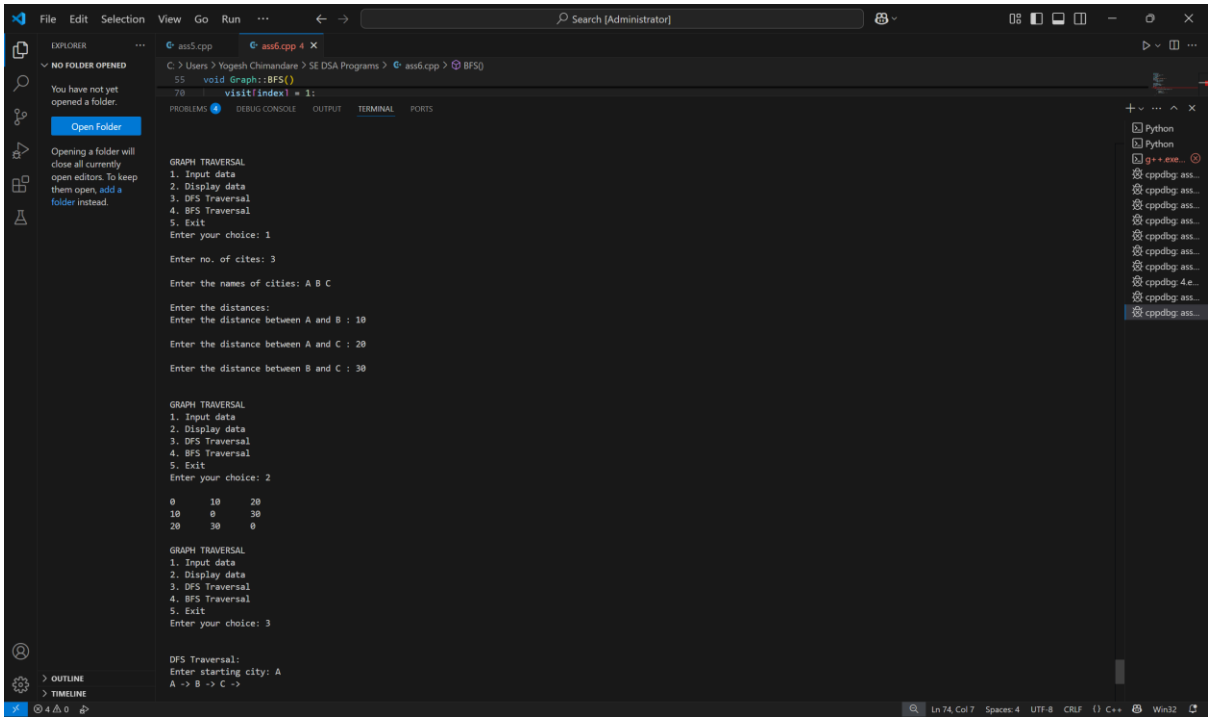
```
            i=0;
          }
       }

       if(s.empty()!=0)
          break;

       else
       {
          current = s.top();
          s.pop();
       }
    }
}
int main()
{
   Graph g1;
   int choice;
MENU:
   cout<<"\n\nGRAPH TRAVERSAL";
   cout<<"\n1. Input data";
   cout<<"\n2. Display data";
   cout<<"\n3. DFS Traversal";
   cout<<"\n4. BFS Traversal";
   cout<<"\n5. Exit";
   cout<<"\nEnter your choice: ";
   cin >> choice;
   switch(choice)
   {
   case 1:
      g1.input();
      break;
   case 2:
```

```
        g1.display();
        break;
    case 3:
        g1.DFS();
        break;
    case 4:
        g1.BFS();
        break;
    case 5:
        return 0;
    default:
        cout<<"\nInvalid choice.Try again!";
    }
    if(choice != 5)
        goto MENU;
    return 0;
}
```

Output:


File Edit Selection View Go Run
Search [Administrator]
EXPLORER
NO FOLDER OPENED
You have not yet opened a folder.
Open Folder
Opening a folder will close all currently open editors. To keep them open, add a folder instead.
ass5.cpp
ass6.cpp 4
C: > Users > Yogesh Chimandare > SE DSA Programs > ass6.cpp > BFS()
55 void Graph::BFS()
70 visit[index] = 1;
PROBLEMS 4 DEBUG CONSOLE OUTPUT TERMINAL PORTS
GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 1
Enter no. of cites: 3
Enter the names of cities: A B C
Enter the distances:
Enter the distance between A and B : 10
Enter the distance between A and C : 20
Enter the distance between B and C : 30
GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 2
0 10 20
10 0 30
20 30 0
GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 3
DFS Traversal:
Enter starting city: A
A -> B -> C ->
Python
Python
g++.exe...
cppdbg: ass...
OUTLINE
TIMELINE
Ln 74, Col 7 Spaces: 4 UTF-8 CRLF C++ Win32