

Assignment No : 6

```
#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<<"\n Enter No. of cities :";
    cin>>n;
    cout<<"\n Enter 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=0; j<n; j++)
        {
            if(i==j)
            {
                a[i][j] = 0;
                continue;
            }

            cout<<"\n Enter the dinstance between"<<city[i]<<"\t"<<"and"<<"\t"<<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\n BFS Traversal :";
```

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queue<int>q;
int visit[n];
for(int i=0; i<n; i++)
    visit[i] = 0;
string start;
int index;
cout<<"\n Enter 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)
{
    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();
    }
}
}

```

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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<<"\n Enter 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++)
        {

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        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;
}

```

```

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

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

void Graph::input()
{
    cout<<"\n";
    cin>>n;
    cout<<"\n";
    for(int i=0; i<n; i++)
    {
        for(int j=0; j<n; j++)
        {
            if(i==j)
                a[i][j]=0;
            else
            {
                cout<<"Enter the distance between " <i>i</i> <i>j</i> : ";
                cin>>a[i][j];
            }
        }
    }
}

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

void Graph::BFS()
{
    cout<<"\n";
    cout<<"Enter your choice : 1";
    int choice;
    cin>>choice;
    if(choice==1)
    {
        cout<<"\n";
        cout<<"Enter the names of cities : ";
        for(int i=0; i<n; i++)
        {
            cout<<cit[i]<<" ";
        }
        cout<<"\n";
        cout<<"Enter the distances : ";
        for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
            {
                cout<<a[i][j]<<" ";
            }
            cout<<"\n";
        }
    }
}

void Graph::DFS()
{
    cout<<"\n";
    cout<<"Enter your choice : 2";
    int choice;
    cin>>choice;
    if(choice==2)
    {
        cout<<"\n";
        cout<<"Enter the names of cities : ";
        for(int i=0; i<n; i++)
        {
            cout<<cit[i]<<" ";
        }
        cout<<"\n";
        cout<<"Enter the distances : ";
        for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
            {
                cout<<a[i][j]<<" ";
            }
            cout<<"\n";
        }
    }
}

```

```

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

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

void Graph::input()
{
    cout<<"\n";
    cin>>n;
    cout<<"\n";
    for(int i=0; i<n; i++)
    {
        for(int j=0; j<n; j++)
        {
            if(i==j)
                a[i][j]=0;
            else
            {
                cout<<"Enter the distance between " <i>i</i> <i>j</i> : ";
                cin>>a[i][j];
            }
        }
    }
}

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

void Graph::BFS()
{
    cout<<"\n";
    cout<<"Enter your choice : 1";
    int choice;
    cin>>choice;
    if(choice==1)
    {
        cout<<"\n";
        cout<<"Enter the names of cities : ";
        for(int i=0; i<n; i++)
        {
            cout<<cit[i]<<" ";
        }
        cout<<"\n";
        cout<<"Enter the distances : ";
        for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
            {
                cout<<a[i][j]<<" ";
            }
            cout<<"\n";
        }
    }
}

void Graph::DFS()
{
    cout<<"\n";
    cout<<"Enter your choice : 2";
    int choice;
    cin>>choice;
    if(choice==2)
    {
        cout<<"\n";
        cout<<"Enter the names of cities : ";
        for(int i=0; i<n; i++)
        {
            cout<<cit[i]<<" ";
        }
        cout<<"\n";
        cout<<"Enter the distances : ";
        for(int i=0; i<n; i++)
        {
            for(int j=0; j<n; j++)
            {
                cout<<a[i][j]<<" ";
            }
            cout<<"\n";
        }
    }
}

```