Assignment no 6

```
  /*There are flight paths between cities. If there is a flight between city A and city B

then there isan edge between the cities. The cost of the edge can be the time that flight
takes to reach cityB from A, or the amount of fuel used for the journey. Represent this as
a graph. The node canbe represented by airport name or name of the city. Use adjacency
MATRIX representation of the graph.*/
```

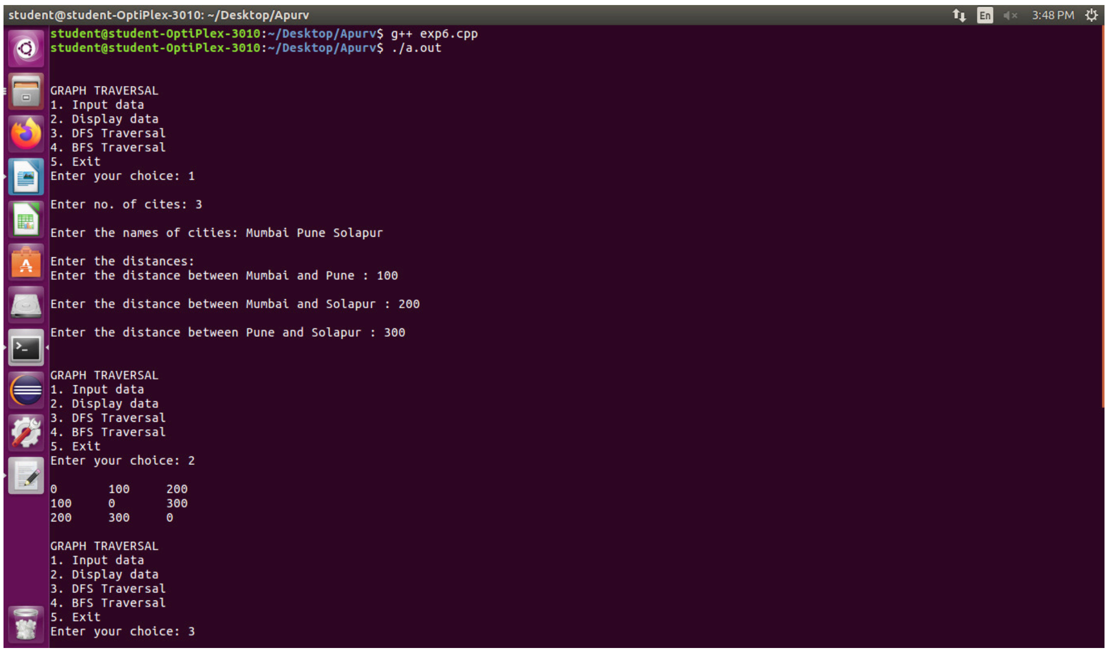
```
#include<iostream>
#include<queue>
#include<stack>
usingnamespacestd;

classGraph
{
    string city[10];
int a[10][10];
int n;
public:
voidinput();
voiddisplay();
voidBFS();
voidDFS();
};

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

cout<<"\nEnter the distances: ";
for(inti=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];
        }
}
```

```
voidGraph::display()
{

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

voidGraph::BFS()
{
cout<<"\n\nBFS Traversal: ";
    queue<int> q;
int visit[n];
for(inti=0 ; i<n ; i++)
        visit[i] = 0;
    string start;
intindex;
cout<<"\nEnter starting city: ";
cin>>start;
for(inti=0 ; i<n ; i++)
       if(start == city[i])
               index =i;

    visit[index] = 1;
cout<<city[index]<<" -> ";
int current = index;
while(1)
    {
for(inti=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();
        }
    }
}

voidGraph::DFS()
{
```

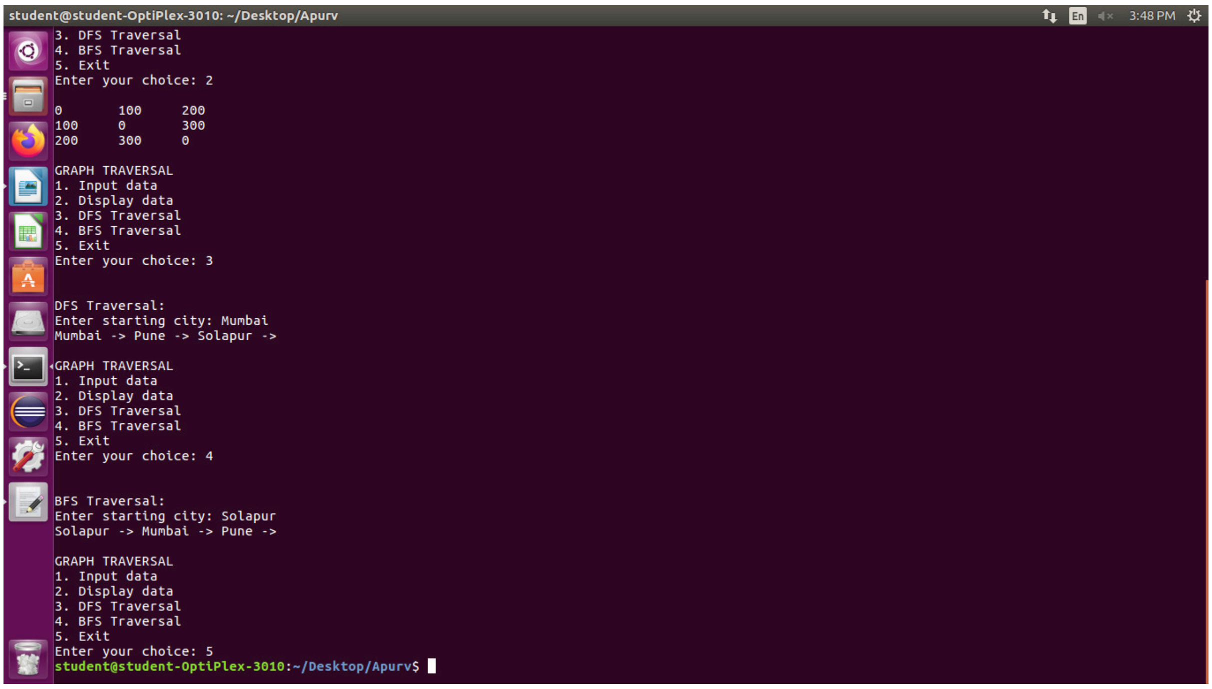
```
cout<<"\n\nDFS Traversal: ";
    stack<int> s;
int visit[n];
for(inti=0 ; i<n ; i++)
        visit[i] = 0;
    string start;
intindex;
cout<<"\nEnter starting city: ";
cin>>start;
for(inti=0 ; i<n ; i++)
       if(start == city[i])
              index =i;
s.push(index);
    visit[index] = 1;
int current = index;
cout<< city[index]<<" -> ";
while(1)
    {
for(inti=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();
        }
    }
}
intmain()
{
    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)
    {
case1:
       g1.input();
```

```
            break;
case2:
            g1.display();
            break;
case3:
            g1.DFS();
            break;
case4:
            g1.BFS();
            break;
case5:
            return0;
default:
            cout<<"\nInvalidchoice.Try again!";
    }
if(choice != 5)
            goto MENU;
return0;
}
```

Output:



```
student@student-OptiPlex-3010: ~/Desktop/Apurv
student@student-OptiPlex-3010:~/Desktop/Apurv$ g++ exp6.cpp
student@student-OptiPlex-3010:~/Desktop/Apurv$ ./a.out


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: Mumbai Pune Solapur

Enter the distances:
Enter the distance between Mumbai and Pune : 100

Enter the distance between Mumbai and Solapur : 200

Enter the distance between Pune and Solapur : 300


GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 2

0       100     200
100     0       300
200     300     0

GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 3
```



```
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 2

0       100     200
100     0       300
200     300     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: Mumbai
Mumbai -> Pune -> Solapur ->

GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 4


BFS Traversal:
Enter starting city: Solapur
Solapur -> Mumbai -> Pune ->

GRAPH TRAVERSAL
1. Input data
2. Display data
3. DFS Traversal
4. BFS Traversal
5. Exit
Enter your choice: 5
student@student-OptiPlex-3010:~/Desktop/Apurv$ 
```