Name: Abdulmuiz Khalid Shaikh
Roll no.:2101062
Subject: Data Structure and Algorithm Laboratory
Assignment No.7

```
#include<iostream>
usingnamespacestd;
classOffice
{
intn;
inta[10][10];
stringoffice[10];
public:
voidinput();
voiddisplay();
voidPrims();
};
voidOffice::input()
{
cout<<"\nEnterno.ofoffices:";
cin>>n;
cout<<"\nEnterthenamesofoffices:";
for(inti=0;i<n;i++)
cin>>office[i];
cout<<"\nEnterthecosttoconnecttheoffices:";
for(inti=0;i<n;i++)
for(intj=i;j<n;j++)
{
if(i==j)
{
a[i][j]=0;
continue;
}
cout<<"\nEnterthecosttoconnect"<<office[i]<<"and"<<office[j]<<":";
cin>>a[i][j];
a[j][i]=a[i][j];
}
}
voidOffice::display()
{
for(inti=0;i<n;i++)
{
cout<<"\n";
for(intj=0;j<n;j++)
{
cout<<a[i][j]<<"\t";
}
}
}
voidOffice::Prims()
{
intvisit[n],minCost=0,count=1,minIndex,cost=0;
for(inti=0;i<n;i++)
visit[i]=0;
cout<<"\n\nShortestpath:";
visit[0]=1;
cout<<office[0]<<"->";
while(1)
{
```

```
minCost=10000;
for(inti=0;i<n;i++)
{
for(intj=0;j<n;j++)
{
if(visit[i]==1&&a[i][j]!=0&&a[i][j]<minCost&&visit[j]==0)
{
minCost=a[i][j];
minIndex=j;
}
}
}
visit[minIndex]=1;
cout<<office[minIndex]<<"->";
cost=cost+minCost;
count++;
if(count==n)
break;
}
cout<<"\nMinimum cost:"<<cost;
}
intmain()
{
Officeo1;
intchoice;
MENU:
cout<<"\n\nMINIMUMSPANNINGTREE";
cout<<"\n1.Inputdata";
cout<<"\n2.Displaydata";
cout<<"\n3.Calculateminimum cost";
cout<<"\n4.Exit";
cout<<"\nEnteryourchoice:";
cin>>choice;
switch(choice)
{
case1:
o1.input();
break;
case2:
o1.display();
break;
case3:
o1.Prims();
break;
case4:
return0;
default:
cout<<"\nInvalidchoice.Tryagain!";
}
if(choice!=5)
gotoMENU;
return0;
}


/*MINIMUMSPANNINGTREE
1.Inputdata
2.Displaydata
3.Calculateminimum cost
4.Exit
```

Enteryourchoice:1
Enterno.ofoffices:7
Enterthenamesofoffices:A
B
C
D
E
F
G
Enterthecosttoconnecttheoffices:
EnterthecosttoconnectAandB:2
EnterthecosttoconnectAandC:3
EnterthecosttoconnectAandD:0
EnterthecosttoconnectAandE:1
EnterthecosttoconnectAandF:6
EnterthecosttoconnectAandG:5
EnterthecosttoconnectBandC:2
EnterthecosttoconnectBandD:6
EnterthecosttoconnectBandE:8
EnterthecosttoconnectBandF:2
EnterthecosttoconnectBandG:3
EnterthecosttoconnectCandD:1
EnterthecosttoconnectCandE:6
EnterthecosttoconnectCandF:0
EnterthecosttoconnectCandG:3
EnterthecosttoconnectDandE:1
EnterthecosttoconnectDandF:6
EnterthecosttoconnectDandG:3
EnterthecosttoconnectEandF:8
EnterthecosttoconnectEandG:0
EnterthecosttoconnectFandG:3
MINIMUMSPANNINGTREE
1.Inputdata
2.Displaydata
3.Calculateminimum cost
4.Exit
Enteryourchoice:2
0 2 3 0 1 6 5
2 0 2 6 8 2 3
3 2 0 1 6 0 3
0 6 1 0 1 6 3
1 8 6 1 0 8 0
6 2 0 6 8 0 3
5 3 3 3 0 3 0
MINIMUMSPANNINGTREE
1.Inputdata
2.Displaydata
3.Calculateminimum cost
4.Exit
Enteryourchoice:3
Shortestpath:A->E->D->C->B->F->G->
Minimum cost:10
MINIMUMSPANNINGTREE
1.Inputdata
2.Displaydata
3.Calculateminimum cost
4.Exit
Enteryourchoice:44
Invalidchoice.Tryagain!
MINIMUMSPANNINGTREE

1.Inputdata
2.Displaydata
3.Calculateminimum cost
4.Exit
Enteryourchoice:4
*/