#include<iostream>

using namespace std;

class tree

{

int a[20][20],l,u,w,i,j,v,e,visited[20];

public:

void input();

void display();

void minimum();

};

void tree::input()

{

cout<<"Enter the no. of branches: ";

cin>>v;

for(i=0;i<v;i++)

{

visited[i]=0;

for(j=0;j<v;j++)

{

a[i][j]=999;

}

}

cout<<"\nEnter the no. of connections: ";

cin>>e;

for(i=0;i<e;i++)

{

cout<<"Enter the end branches of connections: "<<endl;

cin>>l>>u;

cout<<"Enter the phone company charges for this connection: ";

cin>>w;

a[l-1][u-1]=a[u-1][l-1]=w;

}

}

void tree::display()

{

cout<<"\nAdjacency matrix:";

for(i=0;i<v;i++)

{

cout<<endl;

for(j=0;j<v;j++)

{

cout<<a[i][j]<<" ";

}

cout<<endl;

}

}

void tree::minimum()

{

int p=0,q=0,total=0,min;

visited[0]=1;

for(int count=0;count<(v-1);count++)

{

min=999;

for(i=0;i<v;i++)

{

if(visited[i]==1)

{

for(j=0;j<v;j++)

{

if(visited[j]!=1)

{

if(min > a[i][j])

{

min=a[i][j];

p=i;

q=j;

}

}

}

}

}

visited[p]=1;

visited[q]=1;

total=total+min;

cout<<"Minimum cost connection is"<<(p+1)<<" -> "<<(q+1)<<" with charge : "<<min<< endl;

}

cout<<"The minimum total cost of connections of all branches is: "<<total<<endl;

}

int main()

{

int ch;

tree t;

do

{

cout<<"==========PRIM'S ALGORITHM================="<<endl;

cout<<"\n1.INPUT\n \n2.DISPLAY\n \n3.MINIMUM\n"<<endl;

cout<<"Enter your choice :"<<endl;

cin>>ch;

switch(ch)

{

case 1: cout<<"\*\*\*\*\*\*\*INPUT YOUR VALUES\*\*\*\*\*\*\*"<<endl;

t.input();

break;

case 2: cout<<"\*\*\*\*\*\*\*DISPLAY THE CONTENTS\*\*\*\*\*\*\*\*"<<endl;

t.display();

break;

case 3: cout<<"\*\*\*\*\*\*\*\*\*MINIMUM\*\*\*\*\*\*\*\*\*\*\*\*"<<endl;

t.minimum();

break;

}

}while(ch!=4);

return 0;

}