#include<iostream>

using namespace std;

class Office

{

int n;

int a[10][10];

string office[10];

public:

void input(){

cout<<"\nEnter no. of offices: ";

cin>>n;

cout<<"\nEnter the names of offices: ";

for(int i=0 ; i<n ; i++)

cin >> office[i];

cout<<"\nEnter the cost to connect the offices: ";

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 cost to connect " << office[i] <<" and " << office[j]<< " : ";

cin >> a[i][j];

a[j][i] = a[i][j];

}

}

void display(){

for(int i=0 ; i<n ; i++){

cout<<"\n";

for(int j=0 ; j<n ; j++){

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

}

}

}

void Prims(){

int visit[n], minCost=0, count=1, minIndex, cost=0;

for(int i=0 ; i<n ; i++)

visit[i] = 0;

cout<<"\n\nShortest path: ";

visit[0]=1;

cout<<office[0] << " -> ";

while(1){

minCost = 10000;

for(int i=0 ; i<n ; i++){

for(int j=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;

}

};

int main()

{

Office o1;

int choice;

MENU:

cout<<"\n\nMINIMUM SPANNING TREE";

cout<<"\n1. Input data";

cout<<"\n2. Display data";

cout<<"\n3. Calculate minimum cost";

cout<<"\n4. Exit";

cout<<"\nEnter your choice: ";

cin >> choice;

switch(choice)

{

case 1:

o1.input();

break;

case 2:

o1.display();

break;

case 3:

o1.Prims();

break;

case 4:

return 0;

default:

cout<<"\nInvalid choice.Try again!";

}

if(choice != 5)

goto MENU;

return 0;

}