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Practical No. 7

```
#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;
}
```

Output:

```
==========PRIM'S ALGORITHM================

1.INPUT
2.DISPLAY
3.MINIMUM
Enter your choice :
1
*******INPUT YOUR VALUES*******
Enter the no. of branches: 2

Enter the no. of connections: 3
Enter the end branches of connections:
2
3
Enter the phone company charges for this connection:  3
Enter the end branches of connections:
3
3
Enter the phone company charges for this connection:  45
Enter the end branches of connections:
2
4
Enter the phone company charges for this connection:  2
==========PRIM'S ALGORITHM================

1.INPUT
2.DISPLAY
3.MINIMUM
Enter your choice :
2
*******DISPLAY THE CONTENTS********

Adjacency matrix:
999   999

999   999
==========PRIM'S ALGORITHM================

1.INPUT

2.DISPLAY

3.MINIMUM

Enter your choice :
```

3
*********MINIMUM**********
Minimum cost connection is1 -> 1 with charge : 999
The minimum total cost of connections of all branches is: 999
==========PRIM'S ALGORITHM================

1.INPUT

2.DISPLAY

3.MINIMUM

Enter your choice :