Experiment N0. 8

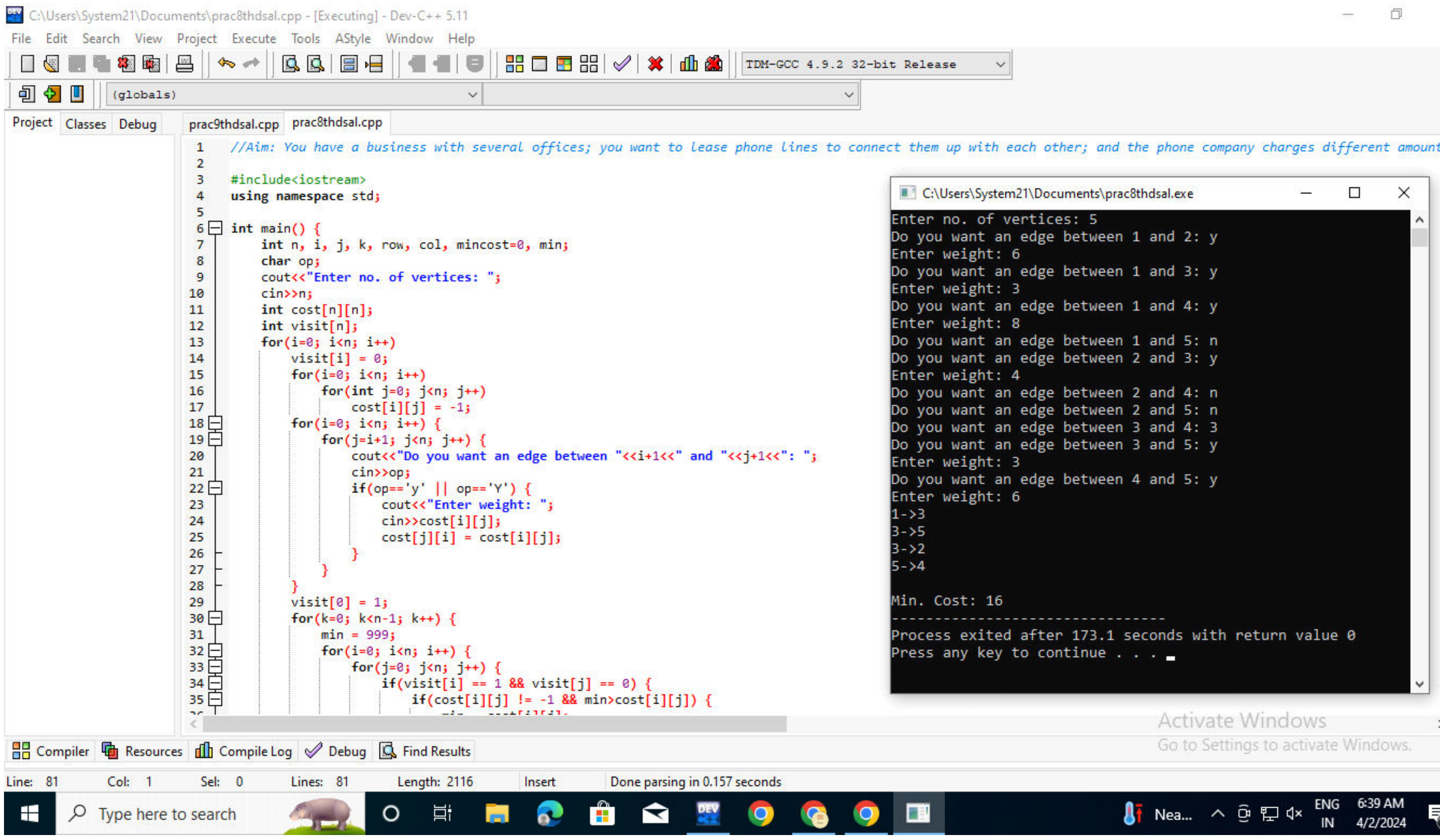
Aim : You have a business with several offices; you want to lease phone lines to connect them up with each other; and the phone company charges different amounts of money to connect different pairs of cities. You want a set of lines that connects all your offices with a minimum total cost. Solve the problem by suggesting appropriate data structures.

Code :

```
#include<iostream>
using namespace std;

int main() {
        int n, i, j, k, row, col, mincost=0, min;
        char op;
        cout<<"Enter no. of vertices: ";
        cin>>n;
        int cost[n][n];
        int visit[n];
        for(i=0; i<n; i++)
                visit[i] = 0;
                for(i=0; i<n; i++)
                        for(int j=0; j<n; j++)
                                cost[i][j] = -1;
                for(i=0; i<n; i++) {
                        for(j=i+1; j<n; j++) {
                                cout<<"Do you want an edge between "<<i+1<<" and "<<j+1<<": ";
                                cin>>op;
                                if(op=='y' || op=='Y') {
                                        cout<<"Enter weight: ";
                                        cin>>cost[i][j];
                                        cost[j][i] = cost[i][j];
                                }
                        }
                }
                visit[0] = 1;
                for(k=0; k<n-1; k++) {
                        min = 999;
                        for(i=0; i<n; i++) {
                                for(j=0; j<n; j++) {
                                        if(visit[i] == 1 && visit[j] == 0) {
                                                if(cost[i][j] != -1 && min>cost[i][j]) {
                                                        min = cost[i][j];
                                                        row = i;
                                                        col = j;
                                                }
                                        }
                                }
                        }
                        mincost += min;
                        visit[col] = 1;
                        cost[row][col] = cost[col][row] = -1;
                        cout<<row+1<<"->"<<col+1<<endl;
                }
                cout<<"\nMin. Cost: "<<mincost;
        return 0;
}
```

Output :



```
//Aim: You have a business with several offices; you want to lease phone lines to connect them up with each other; and the phone company charges different amount

#include<iostream>
using namespace std;

int main() {
    int n, i, j, k, row, col, mincost=0, min;
    char op;
    cout<<"Enter no. of vertices: ";
    cin>>n;
    int cost[n][n];
    int visit[n];
    for(i=0; i<n; i++)
        visit[i] = 0;
        for(i=0; i<n; i++)
            for(int j=0; j<n; j++)
                cost[i][j] = -1;
        for(i=0; i<n; i++) {
            for(j=i+1; j<n; j++) {
                cout<<"Do you want an edge between "<<i+1<<" and "<<j+1<<": ";
                cin>>op;
                if(op=='y' || op=='Y') {
                    cout<<"Enter weight: ";
                    cin>>cost[i][j];
                    cost[j][i] = cost[i][j];
                }
            }
        }
        visit[0] = 1;
        for(k=0; k<n-1; k++) {
            min = 999;
            for(i=0; i<n; i++) {
                for(j=0; j<n; j++) {
                    if(visit[i] == 1 && visit[j] == 0) {
                        if(cost[i][j] != -1 && min>cost[i][j]) {
```

```
Enter no. of vertices: 5
Do you want an edge between 1 and 2: y
Enter weight: 6
Do you want an edge between 1 and 3: y
Enter weight: 3
Do you want an edge between 1 and 4: y
Enter weight: 8
Do you want an edge between 1 and 5: n
Do you want an edge between 2 and 3: y
Enter weight: 4
Do you want an edge between 2 and 4: n
Do you want an edge between 2 and 5: n
Do you want an edge between 3 and 4: 3
Do you want an edge between 3 and 5: y
Enter weight: 3
Do you want an edge between 4 and 5: y
Enter weight: 6
1->3
3->5
3->2
5->4

Min. Cost: 16
--------------------------------
Process exited after 173.1 seconds with return value 0
Press any key to continue . . .
```