

```
1 //日期: 2018/ 时间:
2 #include <stdio.h>
3 #include <stdlib.h>
4 #include <algorithm>
5 #include <cstring>
6 using namespace std;
7
8 const int maxv = 510;
9 const int INF = 1000000000;
10
11 int n,m,G[maxv][maxv],cost[maxv][maxv];
12 int pre[maxv]; //路径
13 bool vis[maxv] = {false};
14 int d[maxv],c[maxv],num[maxv]; //距离, 花费, 路径数量
15
16 void Dijkstra(int s){
17     fill(c,c+maxv,INF);
18     memset(num,0,sizeof(num));
19     fill(d,d+maxv,INF);
20     for(int i=0;i<maxv;i++) pre[i]=i;
21     d[s] = 0;
22     c[s] = 0;
23     num[s] = 1;
24
25     for(int i=0;i<n;i++){
26         int u = -1,MIN = INF;
27         for(int j=0;j<n;j++){
28             if(vis[j] == false && d[j] < MIN){
29                 u = j;
30                 MIN = d[j];
31             }
32         }
33
34         if(u == -1) return;
35
36         vis[u] = true;
37         for(int v=0;v<n;v++){
38             if(vis[v] == false && G[u][v] != INF){
39                 if(d[u] + G[u][v] < d[v]){
40                     c[v] = cost[u][v] + c[u];
41                     d[v] = d[u] + G[u][v];
42                     num[v] = num[u];
43                     pre[v] = u;
44                 }else if(d[u] + G[u][v] == d[v]){
45                     if(cost[u][v] + c[u] < c[v]){
46                         c[v] = cost[u][v] + c[u];
47                         pre[v] = u;
48                     }
49                     num[v] += num[u];
50                 }
51             }
52         }
53     }
54 }
55
56
```

```
57 void DFS(int s,int v){
58     if(s == v) {
59         printf("%d ",v);
60         return;
61     }
62     DFS(s,pre[v]);
63     printf("%d ",v);
64 }
65
66 int main(){
67     int c1,c2;
68     scanf("%d%d%d%d",&n,&m,&c1,&c2);
69     fill(G[0],G[0]+maxv*maxv,INF);
70     fill(cost[0],cost[0]+maxv*maxv,INF);
71
72     for(int i=0;i<m;i++){
73         int v1,v2,t1,t2;
74         scanf("%d%d%d%d",&v1,&v2,&t1,&t2);
75         G[v1][v2] = t1;
76         cost[v1][v2]=t2;
77         G[v2][v1] = t1;
78         cost[v2][v1]=t2;
79     }
80     Dijkstra(c1);
81
82     DFS(c1,c2);
83     printf("%d %d",d[c2],c[c2]);
84
85     return 0;
86 }
87
88
```