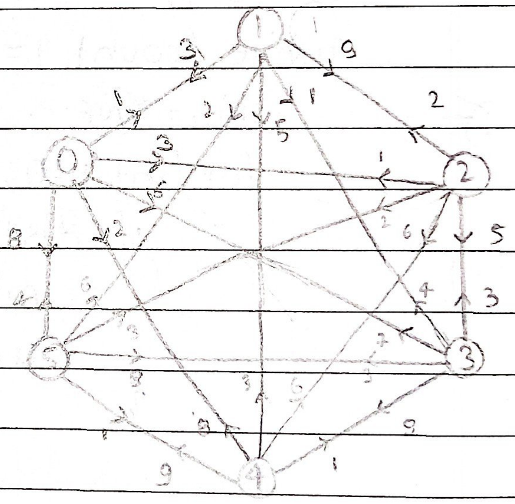
LAB-10

① Dijkshtra Algorithm (Shortest Path)

```
#include <stdio.h>
# define INF 9999
# define MAX 10
void dijkstra(int c[MAX][MAX],int n, int src]{
    int dist[MAX],vis[MAX],count, min, u;
    for(int j=0;j<n;j++){
        dist[j] = c[src][j];
        vis[j] = 0;
    }
    dist[src] =0;
    vis[src]=1;
    count=1;
    while (count != n){
        min= INF;
        for (int j =0; j<n;j++){
            if (dist[j] <min && vis[j] !=1){
                min = dist[j];
                u=j;
            }
        }
        vis[u]=1;
        count++;
        for(int j=0;j<n;j++) {
            if (min+c[u][j] < dist[j] && vis[j] !=1){
                dist[j] = min + c[u][j];
            }
        }
    }
    printf("Shortest distances are: \n");
    for (int j=0; j<n ; j++){
        printf("From %d to %d: %d\n", src, j, dist[j]);
        }
}
int main(){
        int c[MAX][MAX],n,src;
        printf("Enter no. of nodes:");
        scanf("%d",&n);
        printf("Enter the cost matrix:\n");
        for(int i=0; i<n; i++){
                for(int j=0; j<n; j++){
                        scanf("%d", &c[i][j]);
                }
        }
}
```

```
O/P:- Enter the no. of nodes=6.
Enter the cost matrix:
0  1  3  6  2  8
3  0  9  1  5  2
1  2  0  5  6  2
7  4  3  0  8  3
8  3  6  1  0  9
4  6  3  8  1  0
Enter the source node:1
From 1 to 0:3
From 1 to 1:0
From 1 to 2:4
From 1 to 3:1
From 1 to 4:3
From 1 to 5:2
```

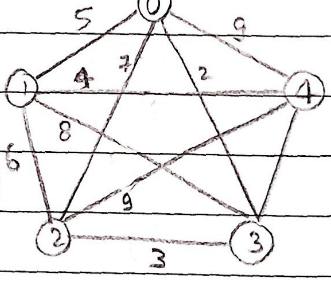


② Krushkal Algorithm

```
#include <stdio.h>.
int find (int parent[], int i){
        while (parent [i]! =0){
                i= parent [i];
        }
        return i;
}
void  unionSets (int parent [], int u, int v){
        parent[v]=u;
}
void  krushkal(int c[MAX][MAX], int n){
        int  parent [MAX], ne=0;
        int  mincost =0;
        for (int i=0; i<n; i++){
                parent [i] =0;
        }
        printf("Edges in the minimum spanning tree are:\n");
        while (ne<n-1){
                int min= INF;
                int a=-1, b=-1, u=-1, v=-1;
                for (int i=0; i<n; i++){
                        for (int j=0;j<n;j++){
                                if (c[i][j] <min){
                                        min = c [i][j];
                                        a =u=i;
                                        b=v=j;
                                }
                        }
                }
                u= find (parent ,u);
                v= find (parent, v);
                if (u!=v){
                        printf ("%d-%d:%d\n", a,b, min);
                unionSets(parent,u,v);
                ne++;
                mincost += min;
            }
            c[a][b] = c[b][a] = INF;
        }
        printf("Minimum cost = %d\n", mincost);
}
int main(){
    int c[MAX][MAX],n;
    printf("Enter the no. of nodes:");
    scanf("%d", &n);
    printf("Enter the cost matrix:\n");
    for (int i=0; i<n; i++){
        for(int j=0; j<n; j++){
            scanf("%d", &c[i][j]);
            if (c[i] cj] = =0 ){
                c[i][j] = INF;
            }
        }
    }
    Krushkal (c, n);
    return 0;
}
```

O/P:- Enter the no. of nodes = 5.
Enter the cost matrin:

```
0 5 7 2 9
5 0 6 8 4
7 6 0 3 9
2 8 3 0 4
9 4 9 4 0
```



Edges in the minimum spanning tree are:
0 - 3 : 2
2 - 3 : 3
1 - 4 : 4
3 - 4 : 4

Minimum cost = 13