| S.No: 17 | Exp. Name: ***Program to find minimum spanning tree of a given undirected graph using Prim's Algorithm*** | Date: |
|---|---|---|



**Aim:**

Program to find minimum spanning tree of a given undirected graph using Prim's Algorithm

**Source Code:**

primsAlgorithm.c

```
#include<stdio.h>
int a,b,u,v,n,i,j,ne=1,temp;
int visited[10]= {0},min,mincost=0,cost[10][10];
void main() {
   printf("To compute the spanning tree from the adjacency matrix\n");
printf("How many nodes :");
scanf("%d",&n);
printf("Enter the adjacency matrix :");
for (i=1;i<=n;i++)
for (j=1;j<=n;j++) {
   scanf("%d",&cost[i][j]);
   if(cost[i][j]==0)
   cost[i][j]=999;
   }
   printf("The entered adjacency matrix :\n");
   for(i=1;i<=n;i++){
      for(j=1;j<=n;j++){
         if(cost[i][j]==999)
         temp=0;
         else
         temp=cost[i][j];
         printf("%d  ",temp);
         }
         printf("\n");
         }
         visited[1]=1;
         printf("The nodes to be connected in spanning tree are : ");
         while(ne<n) {
            for (i=1,min=999;i<=n;i++){
               for (j=1;j<=n;j++){
                  if(cost[i][j]<min)
                  if(visited[i]!=0)
                  {
                     min=cost[i][j];
                     a=u=i;
                     b=v=j;
                     }
                     }
                     }
                     if(visited[u]==0 || visited[v]==0)
                     {
                        printf("(%d,%d);",a,b);
                        ne++;
                        mincost+=min;
                        visited[b]=1;
                        }
                        cost[a][b]=cost[b][a]=999;
                        }
                        printf("\nThe cost of Minimum Spanning Tree is :%d",mincost);
}
```

Execution Results - All test cases have succeeded!

| Test Case - 1 |
| --- |
| **User Output** |
| To compute the spanning tree from the adjacency matrix 5 |
| How many nodes : 5 |
| Enter the adjacency matrix : 0 2 0 6 0 2 0 3 8 5 0 3 0 0 7 6 8 0 0 9 0 5 7 9 0 |
| The entered adjacency matrix : |
| 0 2 0 6 0 |
| 2 0 3 8 5 |
| 0 3 0 0 7 |
| 6 8 0 0 9 |
| 0 5 7 9 0 |
| The nodes to be connected in spanning tree are : (1,2);(2,3);(2,5);(1,4); |
| The cost of Minimum Spanning Tree is :16 |

| Test Case - 2 |
| --- |
| **User Output** |
| To compute the spanning tree from the adjacency matrix 4 |
| How many nodes : 4 |
| Enter the adjacency matrix : 0 2 0 6 2 0 3 8 0 3 0 0 6 8 0 0 |
| The entered adjacency matrix : |
| 0 2 0 6 |
| 2 0 3 8 |
| 0 3 0 0 |
| 6 8 0 0 |
| The nodes to be connected in spanning tree are : (1,2);(2,3);(1,4); |
| The cost of Minimum Spanning Tree is :11 |