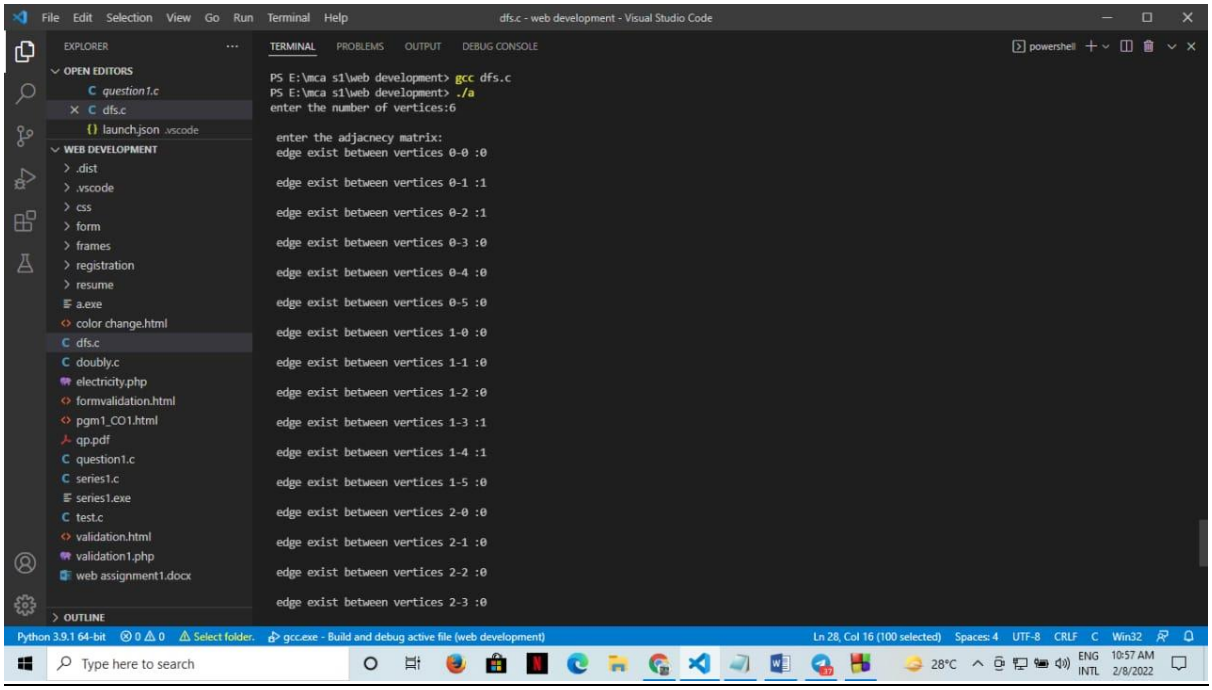
**PROGRAM-1**

**AIM: Write a program to perform DFS**

```
#include<stdio.h>
void dfs(int);
int g[10][10],visited[10], n;
void main()
{
int i, j;
printf ("enter the number of vertices:");
scanf ("%d", &n);
printf ("\n enter the adjacnecy matrix:");
for(i = 0; i < n; ++i)
{
for(j = 0; j < n; ++j)
{
printf("\n edge exist between vertices %d-%d :", i, j);
scanf("%d", &g[i][j]);
}
}
for(i = 0; i < n; ++i)
{
visited[i] = 0;
}
dfs(0);
}
void dfs(int i)
{
int j;
printf ("\n %d", i);
visited[i] = 1;
for (j = 0; j < n; j++)
```

```
{
if(!visited[j] && g[i][j] == 1)
{
dfs(j);
}
}
}
```

**OUTPUT:**



```
edge exist between vertices 2-3 :0
edge exist between vertices 2-4 :0
edge exist between vertices 2-5 :1
edge exist between vertices 3-0 :0
edge exist between vertices 3-1 :0
edge exist between vertices 3-2 :0
edge exist between vertices 3-3 :0
edge exist between vertices 3-4 :0
edge exist between vertices 3-5 :0
edge exist between vertices 4-0 :0
edge exist between vertices 4-1 :0
edge exist between vertices 4-2 :0
edge exist between vertices 4-3 :0
edge exist between vertices 4-4 :0
edge exist between vertices 4-5 :0
edge exist between vertices 5-0 :0
edge exist between vertices 5-1 :0
edge exist between vertices 5-2 :0
```

```
edge exist between vertices 3-3 :0
edge exist between vertices 3-4 :0
edge exist between vertices 3-5 :0
edge exist between vertices 4-0 :0
edge exist between vertices 4-1 :0
edge exist between vertices 4-2 :0
edge exist between vertices 4-3 :0
edge exist between vertices 4-4 :0
edge exist between vertices 4-5 :0
edge exist between vertices 5-0 :0
edge exist between vertices 5-1 :0
edge exist between vertices 5-2 :0
edge exist between vertices 5-3 :0
edge exist between vertices 5-4 :0
edge exist between vertices 5-5 :0

0
1
3
4
2
5
PS E:\mca s1\web development>
```

**PROGRAM-2**

**AIM: Write a program to perform BFS**

```
#include<stdio.h>
int a[20][20],q[20],visited[20],n,i,j,f=0,r=-1;
void bfs(int v);
void main() {
        int v; //call the value of starting vertex
        printf("\n Enter the number of vertices:");
        scanf("%d",&n);
        printf("enter the adjecency matrix");
        for (i=0;i<n;i++)
        {
          for (j=0;j<n;j++)
          {
           scanf("%d",&a[i][j]);
          }
        }
        printf("\n Enter the starting vertex:");
        scanf("%d",&v);
        for (i=0;i<n;i++)
        {
                q[i]=0;
                visited[i]=0;
        }
        bfs(v);
        printf("\n The node which are reachable are:\n");
        for (i=1;i<=n;i++)
        {
          if(visited[i])
          {
```

```
            printf("%d\t",i);
           }
         }
}

void bfs(int v)
{
         for (i=0;i<n;i++)
         {
           if(a[v][i] && !visited[i])
            q[++r]=i;
         }
         if(f<=r)
         {
                  visited[q[f]]=1;
                  bfs(q[f++]);
         }
}
```

**OUTPUT:**

```
 Enter the number of vertices:4
enter the adjecency matrix  0 1 0 1
1 0 1 0
0 1 0 1
1 0 1 0

 Enter the starting vertex:0

 The node which are reachable are:
1       2       3
```

**PROGRAM-3**

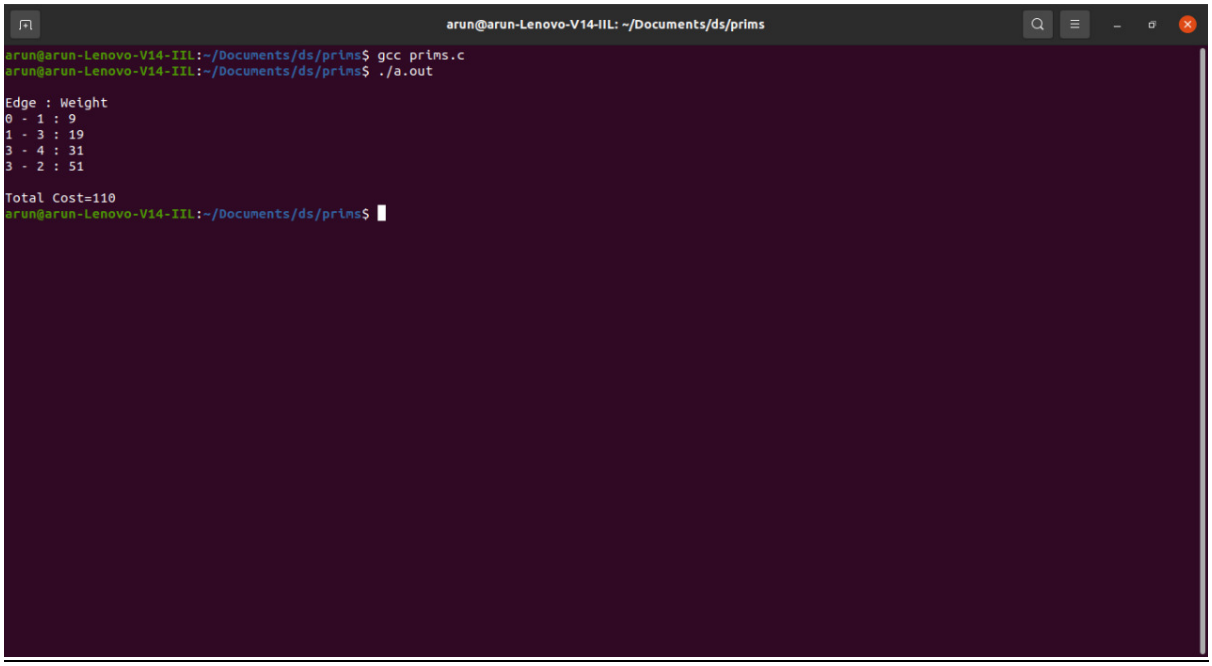
**AIM: Write a program to implement PRIMS**

```
#include<stdio.h>

#include<stdbool.h>

#define infinity 1000

//#define v 5


int graph[20][20];

int v;

/*int graph[v][v] = {

        {0, 9, 75, 0, 0},

        {9, 0, 95, 19, 42},

        {75, 95, 0, 51, 66},

        {0, 19, 51, 0, 31},

        {0, 42, 66, 31, 0}};

        */

/*void display(){

        for(int i=0;i<v;i++){

                for(int j=0;j<v;j++){

                        printf("%d",graph[i][j]);

                }

        }

}*/


void mst(bool span[]){


        int edge_count=0,total=0,x,y;


        span[0]=1;

        printf("\nEdge : Weight\n");

        while(edge_count<v-1){
```

```
		int cost=infinity;
		for(int i=0;i<v;i++){
			if(span[i]){
				for(int j=0;j<v;j++){
					if(!span[j] && graph[i][j]){
						if(graph[i][j] < cost){
							cost=graph[i][j];
							x=i;
							y=j;
						}
					}
				}
			}
		}
		printf("%d - %d : %d\n", x, y, graph[x][y]);
		total+=graph[x][y];
		span[y]=1;
		edge_count++;
	}
	printf("\nTotal Cost=%d\n",total);
}

void main(){
	printf("\nEnter the number of vertices ");
	scanf("%d",&v);
	printf("\nEnter the Adjacency Matrix \n");
	for(int i=0;i<v;i++){
		for(int j=0;j<v;j++){
			printf("Enter the edge weight of %d to %d ",i,j);
			scanf("%d",&graph[i][j]);
		}
```

```
        }

        for(int i=0;i<v;i++){
                graph[i][i]=0;
        }

        bool span[v];
        for(int i=0;i<v;i++){
                span[i]=0;
        }

        mst(span);

}
```

**OUTPUT:**



**PROGRAM-4**

**AIM: Write a program to implement KRUSKALS**

```
#include<stdio.h>
#include<conio.h>
#include<stdlib.h>
/*int graph[v][v] ={{0,2,3,0},
                {2,0,2,1},
                {3,2,0,4},
                {0,1,4,0}}
*/
int i,j,a,b,u,v,n,ne=1;
int min,cost=0,graph[9][9],parent[9];
int find(int);
int uni(int,int);
void main()
{
        printf("\nEnter the no. of vertices:");
        scanf("%d",&n);
        printf("\nEnter the cost adjacency matrix:\n");
        for(i=1;i<=n;i++)
        {
                for(j=1;j<=n;j++)
                {
                   printf("Enter the edge weight of %d to %d ",i,j);
                        scanf("%d",&graph[i][j]);
                        if(graph[i][j]==0)
                                graph[i][j]=999;
                }
```

```
        }
        printf("The edges of Minimum cost Spanning Tree are\n");
        while(ne < n)
        {
           min=999;
                for(i=1;i<=n;i++)
                {
                        for(j=1;j<=n;j++)
                        {
                                if(graph[i][j] < min)
                                {
                                        min=graph[i][j];
                                        a=u=i;
                                        b=v=j;
                                }
                        }
                }
                u=find(u);
                v=find(v);
                if(uni(u,v))
                {
                        printf("edge (%d,%d) =%d\n",a,b,min);
                        cost +=min;
                        ne++;
                }
                graph[a][b]=graph[b][a]=999;
        }
        printf("\nMinimum cost = %d\n",cost);
}
```

```
int find(int i)
{
        while(parent[i])
        {
           i=parent[i];
        }
        return i;
}
int uni(int i,int j)
{
        if(i!=j)
        {
                parent[j]=i;
                return 1;
        }
        return 0;
}
```

**OUTPUT:**

```
Enter the no. of vertices:4

Enter the cost adjacency matrix:
Enter the edge weight of 1 to 1 0
Enter the edge weight of 1 to 2 2
Enter the edge weight of 1 to 3 3
Enter the edge weight of 1 to 4 0
Enter the edge weight of 2 to 1 2
Enter the edge weight of 2 to 2 0
Enter the edge weight of 2 to 3 2
Enter the edge weight of 2 to 4 1
Enter the edge weight of 3 to 1 3
Enter the edge weight of 3 to 2 2
Enter the edge weight of 3 to 3 0
Enter the edge weight of 3 to 4 4
Enter the edge weight of 4 to 1 0
Enter the edge weight of 4 to 2 1
Enter the edge weight of 4 to 3 4
Enter the edge weight of 4 to 4 0
The edges of Minimum cost Spanning Tree are
edge (2,4) =1
edge (1,2) =2
edge (2,3) =2

Minimum cost = 5
```

**PROGRAM-5**

**AIM: Write a program to implement Topological Sorting**

```
#include <stdio.h>
void main()
{
  int n = 0;
  printf("enter how many vertex are there - ");
  scanf("%d", & n);
  int a[n][n], tp[n], f[n], x = 0;
  printf("\nEnter 1 if an edge exits or otherwise\n");
  for (int i = 1; i <= n; i++) {
    f[i - 1] = 0;
    for (int j = 1; j <= n; j++) {
      printf("Does an edge exists from %d to %d - ", i, j);
      scanf("%d", & a[i - 1][j - 1]);
    }
  }
  while (x < n) {
    int in = 0, ind[n];
    for (int i = 0; i < n; i++) {
      for (int j = 0; j < n; j++) {
        if (a[j][i] == 1) {
          in ++;
        }
      }
      ind[i] = in ; in = 0;
    }
    int t = 0;
    for (t = 0; t < n; t++) {
      if (ind[t] == 0 && f[t] == 0) {
```

```
      f[t] = 1;
      printf("%d ", t + 1);
      break;
    }
  }
  printf("\n");
  for (int i = 0; i < n; i++) {
    if (a[t][i] == 1) {
      a[t][i] = 0;
    }
  }
  x++;
 }
}
```

**OUTPUT:**

```
enter how many vertex are there - 4

Enter 1 if an edge exits or otherwise
Does an edge exists from 1 to 1 - 0
Does an edge exists from 1 to 2 - 1
Does an edge exists from 1 to 3 - 1
Does an edge exists from 1 to 4 - 0
Does an edge exists from 2 to 1 - 0
Does an edge exists from 2 to 2 - 0
Does an edge exists from 2 to 3 - 0
Does an edge exists from 2 to 4 - 1
Does an edge exists from 3 to 1 - 0
Does an edge exists from 3 to 2 - 0
Does an edge exists from 3 to 3 - 0
Does an edge exists from 3 to 4 - 1
Does an edge exists from 4 to 1 - 0
Does an edge exists from 4 to 2 - 0
Does an edge exists from 4 to 3 - 0
Does an edge exists from 4 to 4 - 0
Topological Sort : -
1
2
3
4
```