

35.write a c program to implement single shortest distance?

**PROGRAM:**

```
#include<stdio.h>

int a,b,u,v,n,i,j,ne=1;

int visited[10]={0},min,mincost=0,cost[10][10];

void main()
{
    printf("\nEnter the number of nodes:");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix:\n");
    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;
    }
    visited[1]=1;
    printf("\n");
    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("\n Edge %d:(%d %d) cost:%d",ne++,a,b,min);

        mincost+=min;

        visited[b]=1;

    }

    cost[a][b]=cost[b][a]=999;

}

printf("\n Minimun cost=%d",mincost);

getch();

}

```

## OUTPUT:

The screenshot displays a C++ IDE with the source code for a minimum cost spanning tree algorithm. The code prompts the user to enter the number of nodes (6) and the adjacency matrix. It then calculates the minimum cost by iterating through edges and selecting those that do not create a cycle. The output window shows the selected edges and their costs, resulting in a minimum cost of 13.

```

C:\Users\sasir\OneDrive\Documents\36.cpp - [Executing] - Embarcadero Dev-C++ 6.3
File Edit Search View Project Execute Tools AStyle Window Help
Project Classes 36.cpp
2 int a,b,u,v,n,i,j,ne=1;
3 int visited[10]={0},min,mincost=0,cost[10][10];
4 int main()
5 {
6     printf("\nEnter the number of nodes:");
7     scanf("%d",&n);
8     printf("\nEnter the adjacency matrix:\n");
9     for(i=1;i<=n;i++)
10        for(j=1;j<=n;j++)
11        {
12            scanf("%d",&cost[i][j]);
13            if(cost[i][j]==0)
14                cost[i][j]=999;
15        }
16        visited[1]=1;
17        printf("\n");
18        while(ne < n)
19        {
20            for(i=1,min=999;i<=n;i++)
21            {
22                for(j=i+1;j<=n;j++)
23                {
24                    if(cost[i][j]< min)
25                    {
26                        min=cost[i][j];
27                        a=i;
28                        b=j;
29                    }
30                }
31                if(visited[u]==0 || visited[v]==0)
32                {
33                    printf("\n Edge %d:(%d %d) cost:%d",ne++,a,b,min);
34                    mincost+=min;
35                    visited[b]=1;
36                }
37                cost[a][b]=cost[b][a]=999;
38            }
39            printf("\n Minimun cost=%d",mincost);
40            return 0;
41        }
42    }

```

```

Enter the number of nodes:6
Enter the adjacency matrix:
0 3 1 6 0 0
3 0 5 0 3 0
1 5 0 5 6 4
0 0 5 0 0 2
0 3 6 0 0 6
0 0 4 2 6 0

Edge 1:(1 3) cost:1
Edge 2:(1 2) cost:3
Edge 3:(2 5) cost:3
Edge 4:(3 6) cost:4
Edge 5:(6 4) cost:2
Minimun cost=13
-----
Process exited after 69.32 seconds with return value 0
Press any key to continue . . .

```

Compilation results...

- Errors: 0
- Warnings: 0
- Output Filename: C:\Users\sasir\OneDrive\Documents\36.exe
- Output Size: 324,335,9375 KiB
- Compilation Time: 0.70s

Line: 39 Col: 5 Sel: 0 Lines: 40 Length: 759 Insert Done parsing in 0.078 seconds

36.write a c program to implement minimum spanning tree using PRIM'S?

**PROGRAM:**

```
#include<stdio.h>

int a,b,u,v,n,i,j,ne=1;

int visited[10]={0},min,mincost=0,cost[10][10];

int main()
{
    printf("\nEnter the number of nodes:");
    scanf("%d",&n);
    printf("\nEnter the adjacency matrix:\n");
    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;
    }
    visited[1]=1;
    printf("\n");
    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("\n Edge %d:(%d %d) cost:%d",ne++,a,b,min);

        mincost+=min;

        visited[b]=1;

    }

    cost[a][b]=cost[b][a]=999;

}

printf("\n Minimun cost=%d",mincost);

return 0

;

}

```

## OUTPUT:

The screenshot shows a C++ IDE with the following components:

- Code Editor:** Displays the source code for `ds35.cpp`. The code implements Dijkstra's algorithm to find the minimum cost path between nodes. It includes a `main` function that reads an adjacency matrix and a starting node, and a `dijkstra` function that calculates the shortest path.
- Console Window:** Shows the output of the program. It prompts the user to enter the adjacency matrix and the starting node. The output displays the distance of each node from the starting node (0) and the path taken to reach each node. The program exits after 67.11 seconds with a return value of 0.
- Compiler Output:** Shows a warning message: "Warning: no return statement in function returning non-void [-Wreturn-type]".
- Taskbar:** Displays the Windows taskbar with various application icons and the system clock showing 09:46 on 12-08-2023.

38.write a c program to implement depth first search?

**PROGRAM:**

```
#include<stdio.h>

int dfs(int);

int g[10][10],visited[10],n;

int main()
{
    int i,j;

    printf("enter the number of vertices:");

    scanf("%d",&n);

    printf("\n enter the adjacency matrix of the graph");

    for(i=0;i<n;i++)
    for(j=0;j<n;j++)
    scanf("%d",&g[i][j]);

    for(i=0;i<n;i++)
    visited[i]=0;

    dfs(0);
}

int 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:

The screenshot shows a C++ IDE with the file `ds38.cpp` open. The code implements a Depth-First Search (DFS) algorithm on a graph. The console window shows the execution output, including the number of vertices (8) and the adjacency matrix of the graph.

```
1 #include <stdio.h>
2 int dfs(int i);
3 int g[10][10], visited[10];
4 int main()
5 {
6     int i, j;
7     printf("enter the number of vertices:");
8     scanf("%d", &n);
9     printf("enter the adjacency matrix of the graph");
10    for(i=0; i<n; i++)
11        for(j=0; j<n; j++)
12            scanf("%d", &g[i][j]);
13    for(i=0; i<n; i++)
14        visited[i]=0;
15    dfs(0);
16 }
17
18 int dfs(int i)
19 {
20     int j;
21     printf("%d\n", i);
22     visited[i]=1;
23     for(j=0; j<n; j++)
24         if(!visited[j] && g[i][j]==1)
25             dfs(j);
26 }
```

Console Output:

```
enter the number of vertices:8
enter the adjacency matrix of the graph
0 1 1 1 0 0 0 0
1 0 0 0 1 0 0 0
1 0 0 0 0 1 0 0
0 1 1 0 0 0 1 0
0 1 1 0 0 0 0 1
0 1 1 0 0 0 0 1
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```

39.write a c program to implement breadth first search?

**PROGRAM:**

```
#include<stdio.h>

int a[20][20],q[20],visited[20],n,i,j,f=0,r=-1;

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

int main() {
    int v;

    printf("\n Enter the number of vertices:");
    scanf("%d",&n);
    for (i=1;i<=n;i++) {
        q[i]=0;
        visited[i]=0;
    }
    printf("\n Enter graph data in matrix form:\n");
    for (i=1;i<=n;i++)
        for (j=1;j<=n;j++)
            scanf("%d",&a[i][j]);
    printf("\n Enter the starting vertex:");
    scanf("%d",&v);
    bfs(v);
    printf("\n The node which are reachable are:\n");
    for (i=1;i<=n;i++)
        if(visited[i])
```

```

printf("%d\t",i); else

printf("\n Bfs is not possible");

return 0;

}

```

## OUTPUT:

The screenshot shows an IDE with the following components:

- Editor:** Displays the C++ code for a Breadth-First Search (BFS) algorithm. The code includes a header file, a graph representation using an adjacency list, and a BFS function that returns the number of reachable nodes or -1 if not possible.
- Console:** Shows the program's execution. It prompts the user to enter the number of vertices (4), the graph data in matrix form (a 4x4 matrix), and the starting vertex (1). The output shows the reachable nodes (1, 2, 3, 4) and the process exit time (25.89 seconds).
- Compiler Messages:** A warning is displayed: "[Warning] no return statement in function returning non-void [-Wreturn-type]".
- Taskbar:** Shows the Windows taskbar with various application icons and the system clock (10:58, 12-08-2023).

S