

Program :

```
#include <stdio.h>

#include <stdlib.h>

int Bellman_Ford(int G[20][20], int V, int E, int edge[20][2]) {

    int i, u, v, k, distance[20], parent[20], S, flag;

    for (i = 0; i < V; i++) {

        distance[i] = 1000;

        parent[i] = -1;

    }

    printf("Enter source: ");

    scanf("%d", &S);

    distance[S - 1] = 0;

    for (i = 0; i < V - 1; i++) {

        for (k = 0; k < E; k++) {

            u = edge[k][0], v = edge[k][1];

            if (distance[u] + G[u][v] < distance[v]) {

                distance[v] = distance[u] + G[u][v];

                parent[v] = u;

            }

        }

    }

    flag = 1;

    for (k = 0; k < E; k++) {

        u = edge[k][0], v = edge[k][1];

        if (distance[u] + G[u][v] < distance[v]) {

            flag = 0;

            break;

        }

    }

    for (i = 0; i < V; i++) {

        printf("Vertex %d -> cost: %d, parent: %d\n", i + 1, distance[i], parent[i] + 1);

    }

    return flag;

}

int main() {

    int V, E = 0, edge[20][2], G[20][20], i, j;
```

```

printf("BELLMAN FORD\n");

printf("Enter number of vertices: ");

scanf("%d", &V);

printf("Enter graph in matrix form:\n");

for (i = 0; i < V; i++) {

    for (j = 0; j < V; j++) {

        scanf("%d", &G[i][j]);

        if (G[i][j] != 0) {

            edge[E][0] = i;

            edge[E][1] = j;

            E++;

        }

    }

}

if (Bellman_Ford(G, V, E, edge)) {

    printf("\nNo negative weight cycle\n");

} else {

    printf("\nNegative weight cycle exists\n");

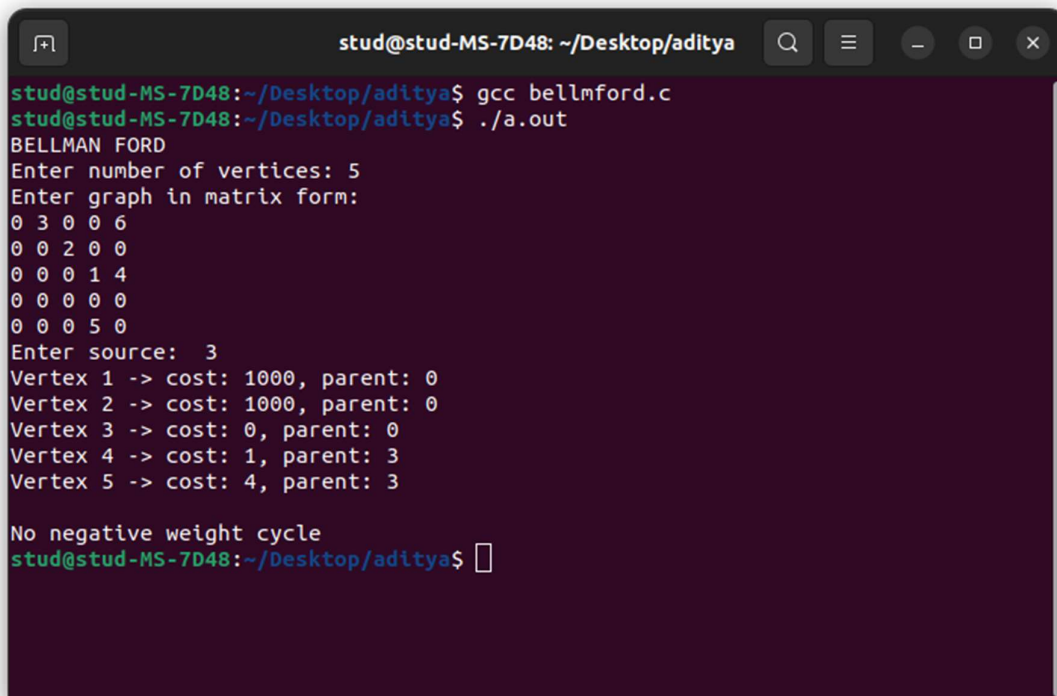
}

return 0;

}

```

Output :



```

stud@stud-MS-7D48: ~/Desktop/aditya
stud@stud-MS-7D48:~/Desktop/aditya$ gcc bellmford.c
stud@stud-MS-7D48:~/Desktop/aditya$ ./a.out
BELLMAN FORD
Enter number of vertices: 5
Enter graph in matrix form:
0 3 0 0 6
0 0 2 0 0
0 0 0 1 4
0 0 0 0 0
0 0 0 5 0
Enter source: 3
Vertex 1 -> cost: 1000, parent: 0
Vertex 2 -> cost: 1000, parent: 0
Vertex 3 -> cost: 0, parent: 0
Vertex 4 -> cost: 1, parent: 3
Vertex 5 -> cost: 4, parent: 3

No negative weight cycle
stud@stud-MS-7D48:~/Desktop/aditya$

```