

PROGRAM CODE

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#include <stdio.h>
#include <limits.h>

struct node {
    int dist[100];
    int from[100];
};

int path(int src, int i, int from[]) {
    int temp;

    while(1) {
        temp = i;
        i = from[i];

        if(temp == i)
            break;
    }

    return temp;
}

void main() {
    int nodes;

    printf("Enter the number of nodes: ");
    scanf("%d", &nodes);
    int costmat[nodes][nodes];

    struct node rt[nodes];

    printf("\nEnter the cost matrix:\n");

    for(int i = 0; i < nodes; i++) {
        for(int j = 0; j < nodes; j++) {
            scanf("%d", &costmat[i][j]);

            if(costmat[i][j] == -1)
                costmat[i][j] = SHRT_MAX;

            rt[i].dist[j] = costmat[i][j];
            rt[i].from[j] = j;
        }

        costmat[i][i] = 0;
    }

    int count;

    do {
        count = 0;

        for(int i = 0; i < nodes; i++)
            for(int j = 0; j < nodes; j++)
                for(int k = 0; k < nodes; k++)
                    if(rt[i].dist[j] > costmat[i][k] + rt[k].dist[j])
                    {
                        rt[i].dist[j] = rt[i].dist[k] +
rt[k].dist[j];
                        rt[i].from[j] = k;
                        count++;
                    }
    } while(count > 0);
}
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    } while(count != 0);
}

for(int i = 0; i < nodes; i++) {
    printf("\nFor router %d\n", i + 1);

    for(int j = 0; j < nodes; j++) {
        printf("\nShortest distance to router %d is %d via %d", j + 1,
rt[i].dist[j], path(i, j, rt[i].from) + 1);
    }

    printf("\n");
}
}
}

```

OUTPUT

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amal@amal-TUF-Gaming-FX705DT-FX705DT:~/ktu_labs/cnlab/expt1$ ./a.out
Enter the number of nodes: 4
Enter the cost matrix:
0 3 23 -1
3 0 2 -1
23 2 0 5
-1 -1 5 0
For router 1
Shortest distance to router 1 is 0 via 1
Shortest distance to router 2 is 3 via 2
Shortest distance to router 3 is 5 via 2
Shortest distance to router 4 is 10 via 2
For router 2
Shortest distance to router 1 is 3 via 1
Shortest distance to router 2 is 0 via 2
Shortest distance to router 3 is 2 via 3
Shortest distance to router 4 is 7 via 3
For router 3
Shortest distance to router 1 is 5 via 2
Shortest distance to router 2 is 2 via 2
Shortest distance to router 3 is 0 via 3
Shortest distance to router 4 is 5 via 4
For router 4
Shortest distance to router 1 is 10 via 3
Shortest distance to router 2 is 7 via 3
Shortest distance to router 3 is 5 via 3
Shortest distance to router 4 is 0 via 4
amal@amal-TUF-Gaming-FX705DT-FX705DT:~/ktu_labs/cnlab/expt1$

```