CS69011: Computing Lab-1
Assignment 3: Graph (Part - B)

August 23, 2023

==========Instructions==========

1. In the case of user input, assume only valid values will be passed as input. 2. Regarding submission: Create separate C file : <RollNo>_Q1.c <RollNo>_Q2.c <RollNo>_Q3.c
3. Create a zip file of all these C files in the name: <RollNo>_A3_Part_B.zip and submit it to Moodle.

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Q1. A cinema hall is a grid of N rows and M columns in which each cell is represented by two values 0 and 1 where 0 represents the empty seat and 1 represents the occupied. A person is treated in the group with others if he/she is horizontally, vertically and diagonally adjacent seated to others. Assuming people are watching movies in the groups. Find the Number of groups of people watching movies in the Hall.

Input:
First Line contains N and M
Occupancy Matrix of cinema hall

Output:
Number of groups

Sample Input and Output:
3 4
1 0 0 1
0 0 0 1
1 0 0 0

Output: 3

Q2. You are living in a city that has **n** bus stops numbered from **0** to **n - 1** with bi-directional roads between some bus stops. The inputs are provided such that you can reach any bus stop from any other bus stop and that there is at most one road between any two bus stops. You want to know in how many ways you can travel from bus stop **0** to bus stop **n - 1** in the shortest amount of time.

Print the number of ways you can arrive at your destination in the shortest amount of time and the shortest time to reach your destination.

Input:
First line will be n
Next lines will be Matrix M of n x n where M[u][v] cell represents the time minutes to travel from u bus stop to v bus stop.
Output: total ways from src to dest and minimum time from src to dest

Sample Input and Output:
Input:
7
0 1 2 1 0 0 0
1 0 0 0 2 0 0
2 0 0 0 1 0 4
1 0 0 0 2 1 0
0 2 1 2 0 0 2
0 0 0 1 0 0 3
0 0 0 0 2 3 0

Output:
4 5

Q3. In an Engineering college there are **n** number of hostels. We have to connect all hostels by roads in such a way that we can reach from one hostel to any other hostel by road. The cost of roads between any two hostels is proportional to the distance between them. Road cost is calculated by Road cost = 5000 * distance in meters. What will be the total minimum cost of constructing roads.

Input:

First Line will be Number of vertices n
Next n lines will be adjacency matrix

3
0 1 5
1 0 3
5 3 0

Output:

20000