CS5103/MC5101: Assignment 7 Date: 11/09/24

Q1. You are given a 2D matrix `friends` of size `N x N` that represents a friendship graph. If `friends[i][j] = 1`, it means that person `i` and person `j` are direct friends. If `friends[i][j] = 0`, they are not direct friends. Friendship is transitive, meaning that if person `i` is friends with person `j`, and person `j` is friends with person `k`, then person `i` is indirectly friends with person `k`. A friend circle is a group of people who are directly or indirectly connected as friends.

Write a function `findFriendCircles(friends)` that takes this matrix as input and returns the number of distinct friend circles.

Input: A matrix `friends` of size `N x N` where `friends[i][j]` is either `1` (direct friends) or `0` (not direct friends).

Output: An integer representing the number of distinct friend circles.

Example:

Input:
Enter the number of people (N): 3
Enter the friendship matrix:
1 1 0
1 1 0
0 0 1

Output:
Number of friend circles: 2

Q2. You are given a square grid of size N x N representing a field. There is a drone that can move in specific patterns across the grid, and you need to determine the minimum number of steps the drone needs to reach a specific target location. The drone can only make moves in one of the following ways:

- 2 steps north and 1 step east
- 2 steps north and 1 step west
- 2 steps south and 1 step east
- 2 steps south and 1 step west
- 1 step north and 2 steps east
- 1 step north and 2 steps west
- 1 step south and 2 steps east
- 1 step south and 2 steps west

Given the drone's starting position and the target position on the grid, calculate the minimum number of steps required for the drone to reach the target.

Input:

An integer N representing the size of the grid (N x N).
A pair of integers (startX, startY) representing the starting position of the drone.
A pair of integers (targetX, targetY) representing the target position of the drone.

Output:

An integer representing the minimum number of steps the drone needs to reach the target position.

Example:

Input:

8
1 3
5 0

Output:

3

Explanation:

The drone takes 3 steps to reach from (1, 3) to (5, 0) using the following moves:
(1, 3) -> (3, 4) -> (4, 2) -> (5, 0)