Given a boolean 2D matrix grid of size n * m where a group of connected 1s (horizontally or vertically) forms an island. Input.txt contains the matrices separated by an empty line. You have to do the following task in any coding language you prefer:

1. Calculate the total number of islands in the matrix.
2. Find the number of distinct islands Two islands are considered to be distinct if and only if one island is not equal to another (not rotated or reflected).
3. Find the number of closed islands. A closed island is an island whose none of the 1s lie on the edges of the matrix.

Explanation for Part 2

Input:
grid[][] = {{1, 1, 0, 1, 1},
{1, 0, 0, 0, 0},
{0, 0, 0, 0, 1},
{1, 1, 0, 1, 1}}
Output: 3
Explanation:
grid[][] = {{1, 1, 0, 1, 1},
{1, 0, 0, 0, 0},
{0, 0, 0, 0, 1},
{1, 1, 0, 1, 1}}
We have 4 islands, but 2 of them are equal, So we have 3 distinct islands.