Given a non-empty 2D array grid of 0's and 1's, an **island** is a group of 1's (representing land) connected 4-directionally (horizontal or vertical.) You may assume all four edges of the grid are surrounded by water.

Count the number of **distinct** islands. An island is considered to be the same as another if and only if one island can be translated (and not rotated or reflected) to equal the other.

**Example 1:**

11000

11000

00011

00011

Given the above grid map, return 1.

**Example 2:**

11011

10000

00001

11011

Given the above grid map, return 3.  
  
Notice that:

11

1

and

1

11

are considered different island shapes, because we do not consider reflection / rotation.

**Note:** The length of each dimension in the given grid does not exceed 50.