# Programming Assignment 4

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## 1 Deadline

11/12/2020 at 5 PM

## 2 Maze Similarity

In some places, there are large, square $n \times n$ hedge mazes that people like to walk around in and explore. The people that construct these mazes want them to be substantially different so that each exploration is as unique an experience as possible. There are rules to exploring mazes:

1. All movements within the maze occur one cell at a time.

2. All explorations begin at the northwest corner of the maze.

3. If you have an option to move in more than one direction, then your movement preferences will be in the following order: north, south, west, and east. In other words, given the option of moving, you will choose to move north first. If you can't move north, you'll try to move south. If you can't move south, you'll move west, and so on. (This will operate as a DFS.)

It is guaranteed that no maze will ever contain a loop.

The measure of similarity of two mazes is defined to be the longest number of movements that appear in order the same way in the exploration of both mazes. Note that the movements need not be consecutive. For example, if, when exploring one maze, you move south, north, east, north, west, and in another maze, you move north, north, east, south, west, then the longest number of nonconsecutive movements in common is north, north, west.

Given a set of mazes, your goal is to determine the two mazes that are *least* alike. In other words, which of the pairs of the mazes that you are given has the smallest longest number of exploration movements in common.

The mazes are numbered starting from 0. On a single line, output the numbers of the two mazes that are the least alike.

## 2.1 Input and output

The input (input.txt) will begin with two integers, each on a separate line. The first will be the total number of mazes and the second will be the number $n$.

The maze will then be written out cell by cell in the following order: (north-west)(0,0), (0,1), ..., (0, n-1), (1,0), (1,1), ... , (1, n-1), ... , (n-1,0), ..., (n-1,n-1)(southeast). 4 characters fully describe any particular cell of the maze. They will be listed in the following order: north, south, west, east. If the character is 1, you should imagine a hedge in that particular direction. If there is a 0, you should imagine an open space.

For example, the following is a maze where $n = 4$:

1011111010001001
0011101100110111
0010000000001001
0111011101110111

A visualization of this maze is as follows:
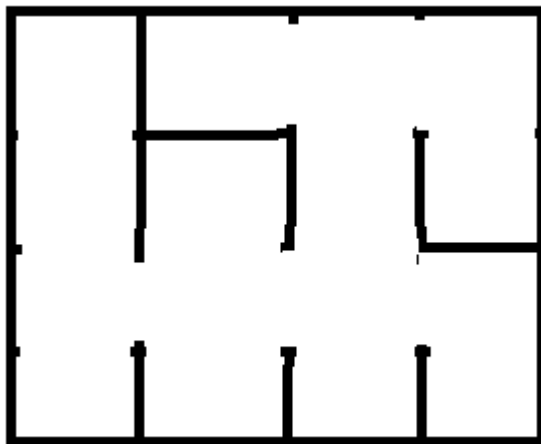


The output (output.txt) should be a single line with two integers separated by a space. Samples have been uploaded to Beachboard.