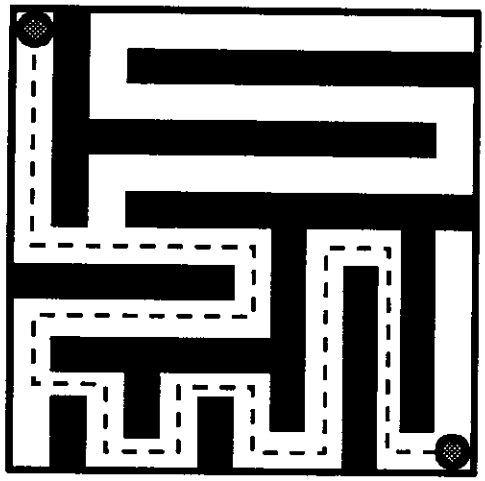
1992 ACM MID-CENTRAL REGIONAL

PROGRAMMING CONTEST

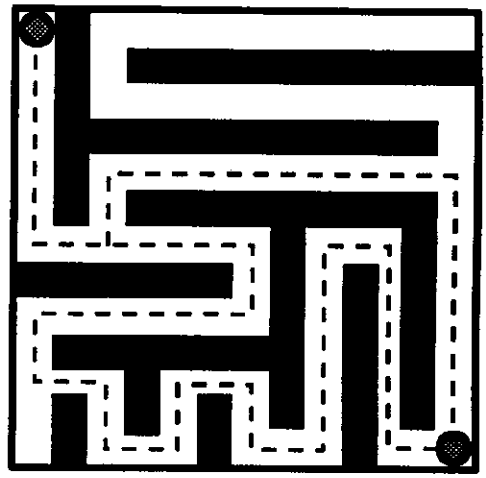
Problem #7 - Amazing Similarities

Program File: **AMAZING.PAS** or **AMAZING.C**
Input File: **AMAZING.IN**
Output File: **AMAZING.OUT**

A maze is called *simple* if there is one and only one path from any location in the maze to any other location. For example, maze (a) shown below is simple, but maze (b) is not.

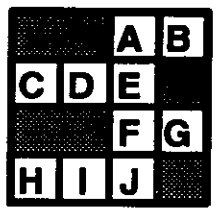


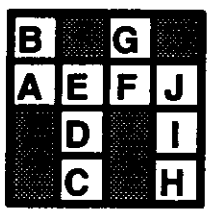
(a)

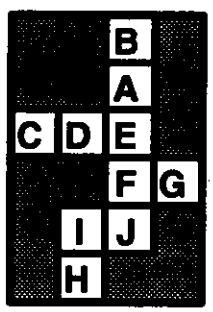


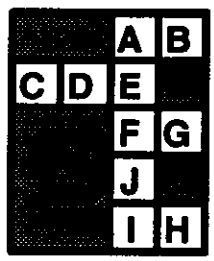
(b)

Two simple mazes are said to be *homogeneous* if the squares (the locations) of each maze can be labeled with the same set of letters, such that each letter is adjacent to the same set of letters in both mazes. For example, all four of the mazes shown below are homogeneous.









The notation A-{B,E} reads "A is adjacent to B and E". Using this notation, the adjacencies of all four mazes shown above can be listed as follows: A-{B,E}, B-{A}, C-{D}, D-{C,E}, E-{A,D,F}, F-{E,G,J}, G-{F}, H-{I}, I-{H,J}, and J-{F,I}.

The problem you must solve is to write a computer program which determines if two simple mazes are homogeneous. The input file contains several pairs of mazes to be tested.

The first line of the input file contains two integers followed by a character string. The first integer is the number of rows in the first maze, and the second integer is the number of columns (the maximum dimensions of a maze are 10 by 10). The character string is the "name" of the maze and is to be used when referencing the maze in the output. The following lines contain the rows and columns of the maze, with period "." characters representing the paths of the maze, and uppercase "X" characters representing "walls". Immediately following the data for the first maze is a line containing the dimensions and name of the second maze, which is followed by the data for the second maze.

The input file may contain an unspecified number of pairs of mazes. A maze with a dimension of zero by zero marks the end of the input file (the last line of the input file will always be "0 0 0").

Your program should read the pairs of mazes and report to the output file whether or not they are homogeneous. An example input file follows.

```
4 4 Sample 1, Maze 1
XX..
...X
XX..
...X
4 4 Sample 1, Maze 2
.X.X
....
X.X.
X.X.
1 4 Sample 2, Maze 1
....
2 3 Sample 2, Maze 2
...
XX.
2 2 Sample 3, Maze 1
X.
..
2 2 Sample 3, Maze 2
..
XX
0 0 0
```

The output for this sample file should be:

```
"Sample 1, Maze 1" and "Sample 1, Maze 2" ARE homogeneous
"Sample 2, Maze 1" and "Sample 2, Maze 2" ARE homogeneous
"Sample 3, Maze 1" and "Sample 3, Maze 2" ARE NOT homogeneous
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