**COP 3503 Assignment #5: Backtracking**

**Assigned: Wednesday, November 17, 2010**

**Due: Monday, December 6, 2010 11:59pm**

**Tentaizu** is a Japanese game meaning “celestial map.” Some people will try to tell you this game is the same as Minesweeper. These people are incorrect.

The game is played on a 7x7 board. Exactly 10 of the 49 squares are each hiding a star. Your task is to determine which squares are hiding the stars. Other squares in the board provide clues: A number in a square indicates how many stars lie next to the square—in other words, how many adjacent squares (including diagonally adjacent squares) contain stars. No square with a number in it contains a star, but a star may appear in a square with no adjacent numbers.

Figure 1 is an example of an initial game board, and Figure 2 is the solution.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **1** |  |  |  |  | **3** |  |  | **1** | **\*** |  |  | **\*** | **3** | **\*** |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  | **\*** |
|  | **1** |  |  | **0** |  |  |  |  | **1** |  |  | **0** |  |  |
|  |  |  | **2** |  |  |  |  |  |  | **\*** | **2** |  |  | **\*** |
|  | **3** |  |  |  |  | **3** |  |  | **3** | **\*** |  |  | **\*** | **3** |
|  |  |  |  | **1** |  |  |  |  |  | **\*** |  | **1** |  | **\*** |
|  |  |  | **1** |  |  | **1** |  |  |  |  | **1** |  |  | **1** |

Figure 1 Figure 2

**The Problem:**

Given the description of a 7x7 Tentaizu board, your task is to find the squares containing the 10 hidden stars. You are guaranteed that each given Tentaizu board will have a unique solution.

**The Input:**

There will be multiple Tentaizu boards in the input file. The first input line contains a positive integer *t*, indicating the number of Tentaizu boards to be processed. This will be followed by *t* Tentaizu boards. Each Tentaizu board will contain 7 lines, and each line will contain exactly 7 characters. Each character will be a digit from ‘0’-‘8’ or a ‘.’ to indicate an empty square (which may be hiding a star). Each Tentaizu board will be separated by a single blank line.

**The Output:**

At the beginning of each test case, output the line “Tentaizu Board #x:”, where x is the board number (starting from 1). Then print the solved Tentaizu board in the same format as the input, but with a ‘\*’ at each of the 10 star locations. Leave a blank line after the output of each test case.

**Files to turn in:**

tentaizu.java

**Input File Name:**

tentaizu.in

**Sample Input:**

2

1....3.

.......

.1..0..

...2...

.3....3

....1..

...1..1

...1.3.

12....2

.2.1...

...31..

......3

..1....

.......

**Sample Output:**

Tentaizu Board #1:

1\*..\*3\*

......\*

.1..0..

..\*2..\*

.3\*..\*3

..\*.1.\*

...1..1

Tentaizu Board #2:

...1\*3\*

12...\*2

\*2\*1...

...31.\*

..\*2\*.3

..1..\*\*

.......