

# THE DARK KNIGHT

Before you read any further- this problem is not about Batman and the Joker. Sorry to have disappointed you. It's about black knight pieces on a chess board.

The knight moves in a most unusual manner among chess pieces. When it moves, it can move two squares horizontally and one square vertically, or two squares vertically and one square horizontally. The complete move therefore looks like the letter 'L'. The knight 'captures' an enemy piece by moving into its square. The knight can also jump over other chess pieces.

So, the problem is this. Given a chess board configuration of  $n \times n$  with only knights on it, you need to figure out whether the configuration is *knight-valid*. A configuration is *knight-valid* if none of the knights can capture any of the other knights.

## **Input:**

The first line consists of a single positive integer indicating the number of test cases. The first line of each test case consists of a single positive integer  $n$  ( $0 < n < 20$ ) which denotes the chess board size. The following  $n$  lines consist of strings of length  $n$  denoting the rows of a chess board. The strings are made up of 0s and 1s. A '0' indicates an empty square, and a '1' indicates a square with a black knight in it.

## **Output:**

For each test case, output a single line containing the word 'VALID' if the board configuration is knight-valid, else 'INVALID'.

## **Sample:**

### **Input:**

```
2
4
0000
0010
0000
0100
6
100000
000000
100001
000000
000001
010000
```

### **Output:**

```
INVALID
VALID
```