Diceline

Computer Science Society
Programming Contest
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A *die* is a cube whose six faces are marked with 1, 2, 3, 4, 5 and 6 spots, respectively. The sum of the number of spots on opposite faces of a die is 7; that is, 1 and 6 appear on opposite faces, 2 and 5 appear on opposite faces, and 3 and 4 appear on opposite faces. This implies that it's possible to simultaneously see faces numbered 1, 2 and 3 by looking at one of corners; some dice arrange the faces numbered 1, 2, and 3 *clockwise* about their common corner, others arrange them *counterclockwise* about their common corner. Both clockwise and counterclockwise arrangements may occur here. In this problem, there are *dicelines*—collections of dice placed on a table and aligned from left to right by packing them as tightly as possible in a straight line. Each die has a face pointing north (`N`), a face pointing east (`E`), a face pointing south (`S`), a face pointing west (`W`), a face pointing up (`U`), and a face pointing down (`D`).

Input Format

The input contains one or more dicelines, each described by some successive nonempty lines followed by an empty line. The first line of a diceline contains a positive integer n giving the number of dice in the diceline. The individual dice in a diceline are referred to as die 0, die 1, die 2, ..., die $n-1$. Each of the remaining input lines of a diceline reveal some information about numbers facing a direction; specifically, each line contains a direction $d \in \{\texttt{N}, \texttt{E}, \texttt{S}, \texttt{W}, \texttt{U}, \texttt{D}\}$, a colon (`:`), and n numbers $\in \{0, 1, 2, 3, 4, 5, 6\}$ separated by commas (`,`) describing the numbers on die 0, die 1, die 2, ..., die $n-1$ facing direction d. If the number `0` is given for a face of die i, then no information is given about the number on that face.

Output Format

For each diceline in the input, the numbers given for faces of die i either give too little information to determine the numbers facing each direction (i.e. `unknown`), give enough information to uniquely determine the numbers facing each direction (i.e. `known`), or give inconsistent information that is physically impossible to realize on a clockwise or counterclockwise die (i.e. `inconsistent`). For each die in the diceline, report whether the die is `unknown`, `known`, or `inconsistent` as shown in the output sample.

Input Sample

```
1
U:1
S:2
W:3

10
N:3,4,5,0,1,0,0,1,1,6
E:0,2,0,0,5,2,1,4,2,0
U:1,6,2,0,0,4,0,5,3,5
W:0,5,0,0,3,5,6,0,0,4
```

Output Sample

```
die 0 is known

die 0 is unknown
die 1 is known
die 2 is inconsistent
die 3 is unknown
die 4 is inconsistent
die 5 is unknown
die 6 is unknown
die 7 is known
die 8 is known
die 9 is known
```