E: From Peaks to Pits

Cartographers create maps. One important type of map shows elevations, as across a mountain range. The raw data can be in the form of a grid of numbers representing the elevations at evenly spaced intervals covering the range. One can generally assume that if a given number is higher than all neighboring (up to 8) points, then we are looking at a peak. Similarly, if the number is lower than all neighboring points, then we are looking at a low point, possible where a lake has formed. Mountains may also form ridges (valleys) which can be identified as a line of numbers, all being higher (lower) than neigbors on either side. This is what you are to determine.

Input

There may be multiple cases to consider. The number of cases will be given on the first line. Each case is represented by a grid of 9 points at which elevations have been measured. A case is prsented on three lines by three elevations (real numbers) each.

Output

For each case present the case number followed by the word *peak* if this middle value of the grid is larger than all the others, *lake* if this middle value is smaller than all the others, *ridge* if any row of three that includes the middle value are all higher than all the others (but the middle is not a peak), *valley* if the row of three that includes the middle value are all lower than all the others (but the middle is not a lake), or *other* if none of these apply.

Sample Input

```
4
10 10 10
10 20 5
5  10 10
10 10 10
10 1 5
5 10 10
-32 -4 -13
-7 -3 -8
-1 -8 -8
7 9 22
13 8 15
64 30 4
```

Sample Output

```
Case 1: peak
Case 2: lake
Case 3: other
Case 4: valley
```