Google Code Jam '13 Qualification Round Problem D - Fair and Square

Time limit: 30.0s **Memory limit:** 1G

Little John likes palindromes, and thinks them to be fair (which is a fancy word for nice). A *palindrome* is just an integer that reads the same backwards and forwards - so 6, 11 and 121 are all palindromes, while 10, 12, 223 and 2244 are not (even though 010=10, we don't consider leading zeroes when determining whether a number is a palindrome).

He recently became interested in squares as well, and formed the definition of a *fair and square* number - it is a number that is a palindrome **and** the *square of a palindrome* at the same time. For instance, 1, 9 and 121 are fair and square (being palindromes and squares, respectively, of 1, 3 and 11), while 16, 22 and 676 are **not** fair and square: 16 is not a palindrome, 22 is not a square, and while 676 is a palindrome and a square number, it is the square of 26, which is not a palindrome.

Now he wants to search for bigger fair and square numbers. Your task is, given an interval Little John is searching through, to tell him how many fair and square numbers are there in the interval, so he knows when he has found them all.

Input Specification

The first line of the input gives the number of test cases, T. T lines follow. Each line contains two integers, A and B - the endpoints of the interval Little John is looking at.

Output Specification

For each test case, output one line containing `Case #x: y`, where x is the case number (starting from 1) and y is the number of fair and square numbers greater than or equal to A and smaller than or equal to B.

Limits

Time limit: 30 seconds per test set.

Memory limit: 1GB.

Small dataset

$1 \leq T \leq 100$.

$1 \leq A \leq B \leq 1\,000$.

First large dataset

$1 \leq T \leq 10\,000$.

$1 \leq A \leq B \leq 10^{14}$.

Second large dataset

$1 \leq T \leq 1\,000$.

$1 \leq A \leq B \leq 10^{100}$.

Sample Input

```
3
1 4
10 120
100 1000
```

Sample Output

```
Case #1: 2
Case #2: 0
Case #3: 2
```