Power Search

Computer Science Society
Programming Contest
Spring 2011

Given two positive numbers $a \geqslant 1$ and $b \geqslant 2$, there is exactly one $i \geqslant 0$ such that

$$a \leqslant b^i < a \cdot b.$$

In this problem, we try to find it.

Input Format

Each line of input contains two positive number $a \geqslant 1$ and $b \geqslant 2$, separated by blanks. Note that there is no bound on the length of a and b.

Output Format

For each line of input, compute and report the number $i \geqslant 0$ such that

$$a \leqslant b^i < a \cdot b,$$

as shown in the output sample below.

Input Sample

```
1 2
10 2
81 3
23 6
2537857295 19
34271891003654321 1267253
```

Output Sample

```
1 <= 2^0 = 1 < 1*2 = 2
10 <= 2^4 = 16 < 10*2 = 20
81 <= 3^4 = 81 < 81*3 = 243
23 <= 6^2 = 36 < 23*6 = 138
2537857295 <= 19^8 = 16983563041 < 2537857295*19 = 48219288605
34271891003654321 <= 1267253^3 = 2035119820665403277 < 34271891003654321*1267253 = 43431156690053949250213
```