C. Sad powers

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

You're given Q queries of the form (L, R).

For each query you have to find the number of such x that $L \le x \le R$ and there exist integer numbers $a > 0, p > 1$ such that $x = a^p$.

Input

The first line contains the number of queries Q $(1 \le Q \le 10^5)$.

The next Q lines contains two integers L, R each $(1 \le L \le R \le 10^{18})$.

Output

Output Q lines — the answers to the queries.

Example

input
6 1 4 9 9 5 7 12 29 137 591 1 1000000

output
2 1 0 3 17 1111

Note

In query one the suitable numbers are 1 and 4.