

Non-Powered Numbers

Input file: **standard input**
Output file: **standard output**
Time limit: 1 second
Memory limit: 256 megabytes

A positive integer a is called **powered** if it can be expressed as $a = b^x$, where b and x are positive integers and $x \geq 2$. For example, 8 and 1728 are powered numbers since $8 = 2^3$ and $1728 = 12^3$, but 7 and 18 are not.

You are given Q queries. Each query consists of two positive integers l and r . For each query, count how many integers between l and r are not powered numbers.

Input

The input consists of several test cases. The first line of input contains an integer Q ($1 \leq Q \leq 1000$), the number of queries.

Each of the next Q lines contains a query. The i -th line contains two integers l_i and r_i ($1 \leq l_i \leq r_i \leq 10^{18}$), the lower bound and upper bound of the integer range in the i -th query.

Output

Print Q lines. The i -th line contains the answer to the i -th query: the number of integers between l_i and r_i that are not powered numbers.

Scoring

This problem is divided into the following subtasks.

Subtask	Points	Additional Restrictions
0	0	Example test cases
1	18	$r_i \leq 10^3$,
2	25	$r_i \leq 10^6$
3	32	$r_i \leq 10^{12}$
4	25	No additional restrictions

Example

standard input	standard output
4 1 10 100 987 27 27 238058 835980	6 860 0 597458

Note

In the first query, the non-powered numbers between 1 and 10 are 2, 3, 5, 6, 7, and 10.