Arithmetic derivative — P86263_en

Vintè Concurs de Programació de la UPC - Semifinal (2021-06-15)

Given a natural number n, its arithmetic derivative $d(n)$ is defined as follows:

- $d(0) = d(1) = 0$.
- If n is prime, then $d(n) = 1$.
- Let $n = x \cdot y$, with $1 < x, y < n$. Then $d(n) = x \cdot d(y) + y \cdot d(x)$.

For instance, $d(4) = 2d(2) + 2d(2) = 2 + 2 = 4$, and $d(6) = 3d(2) + 2d(3) = 3 + 2 = 5$. It can be proven that this definition is consistent. For example, $d(12) = 4d(3) + 3d(4) = 4 + 12 = 16$, and also $d(12) = 6d(2) + 2d(6) = 6 + 10 = 16$.

We say that f is a fixed point of $d(n)$ if $d(f) = f$. For instance, 0 and 4 are fixed points. Given ℓ and r, can you compute the number of fixed points of $d(n)$ in $[\ell..r]$?

Input

Input consists of several cases, each one with ℓ and r, with $0 \le \ell \le r \le 10^{18}$.

Output

For each case, print the number of fixed points of $d(n)$ in $[\ell..r]$.

Sample input

```
0 4
1 20
4 4
5 23
900000000000000000 1000000000000000000
```

Sample output

```
2
1
1
0
0
```

Problem information

Author : Salvador Roura
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