Problem H

Exploding CPU

source: cpu.*

The well known hardware manufacturing company *Processors for Professors* is about to release a highly specialized CPU with exceptional functionality in, amongst other areas, number theory. It has, for example, an instruction PFACT that takes one parameter and returns all prime factors of that parameter, with an outstanding execution speed. It has, however, one considerable problem. The scientists at the testing lab has just found out that the PFACT instruction for some special input values freaks out and makes the entire processor explode. Even though this could be an amusing effect, it is not the way it was intended to work. The skilled mathematicians have, by trial and error, found that the explosive numbers all share the same interesting number theoretic properties, which might be of help when troubleshooting.

An explosive number is a number $x = p_0 p_1 p_2 \ldots p_n$ where all p_is are distinct prime numbers such that $p_i = A p_{i-1} + B$ for $i = 1, 2, \ldots, n$. $n \geq 3$, $p_0 \equiv 1$. A and B are always integers, and might be different for different explosive numbers.

For example, the processor will explode when factorizing the number 4505, because $4505 = 1 \cdot 5 \cdot 17 \cdot 53$ and $5 = 3 \cdot 1 + 2$, $17 = 3 \cdot 5 + 2$ and $53 = 3 \cdot 17 + 2$ and the numbers 5, 17 and 53 are all prime numbers. In this case $A = 3$ and $B = 2$.

You are kindly asked to write a computer program that will aid this company in estimating the impact of the errors, by calculating the amount of explosive numbers that exists within a given range of integers.

Input specifications

The input starts with a row containing the number $0 \leq N \leq 100$ of test cases that will follow. For each test case, there will be one row containing two integers, x_L and x_H separated by a single space. These numbers are such that $0 \leq x_L \leq x_H \leq 2,000,000,000$.

Output specifications

For each test case, output the number of explosive numbers that exist in the range $x_L \leq x \leq x_H$.

Sample input

```
2
4505 4505
0 5000
```

Output for sample input

```
1
5
```