

Gopu and Counting Bitwise Prime Numbers

A positive integer is said to be bitwise prime if the sum of all the bits in its binary representation is a prime number.

You are given two integers a and b . You have to output number of bitwise prime numbers between a and b (inclusive).

Input

First line contains T : number of test cases. ($1 \leq T \leq 10^5$)

For next T lines, each test case contains two space separated integers a and b . ($a \leq b$). $1 \leq a, b \leq 10^{19}$.

Output

For each test case, print the number of bitwise prime numbers between a and b (inclusive).

Example

Input:

```
2
1 2
1 3
```

Output:

```
0
1
```