Project Euler #134: Prime pair connection

This problem is a programming version of Problem 134 from projecteuler.net

Consider the consecutive primes $p_1 = 19$ and $p_2 = 23$. It can be verified that 1219 is the smallest number such that the last digits are formed by p_1 whilst also being divisible by p_2.

In fact, with the exception of $p_1 = 3$ and $p_2 = 5$, for every pair of consecutive primes, $p_2 > p_1$, there exist values of n for which the last digits are formed by p_1 and n is divisible by p_2. Let S be the smallest of these values of n.

Given L and R, find $\sum S$ for every pair of consecutive primes with $L \le p_1 \le R$.

Input Format

The first line of input contains T, the number of test cases.

Each test case consists of one line containing two integers, L and R.

Constraints

$1 \le T \le 10$
$5 \le L \le R \le 10^9$
$|R - L| \le 10^6$

But in test cases worth 50% of the total points, $R \le 10^6$.

Output Format

For each test case, output a single line containing a single integer, the answer for that test case.

Sample Input

```
1
5 20
```

Sample Output

```
4272
```

Explanation

The following are the relevant values in the range $5 \le p_1 \le 20$:

- $p_1 = 5, p_2 = 7, S = 35$

- $p_1 = 7, p_2 = 11, S = 77$
- $p_1 = 11, p_2 = 13, S = 611$
- $p_1 = 13, p_2 = 17, S = 1513$
- $p_1 = 17, p_2 = 19, S = 817$
- $p_1 = 19, p_2 = 23, S = 1219$

Thus, $\sum S = 35 + 77 + 611 + 1513 + 817 + 1219 = 4272$