$\{p_1, \ldots, p_k : p_1 < p_2 < \ldots < p_k\}$ is called a prime k-tuple of distance s if $p_1, p_2, \ldots, p_k$ are consecutive prime numbers and $p_k - p_1 = s$. For example, with $k = 4$, $s = 8$, $\{11, 13, 17, 19\}$ is a prime 4-tuple of distance 8.

Given an interval $[a, b]$, k, and s, your task is to write a program to find the number of prime k-tuples of distance s in the interval $[a, b]$.

Input

The input file consists of several data sets. The first line of the input file contains the number of data sets which is a positive integer and is not bigger than 20. The following lines describe the data sets.

For each data set, there is only one line containing 4 numbers, a, b, k and s ($a, b < 2 * 10^9$, $k < 10$, $s < 40$).

Output

For each test case, write in one line the numbers of prime k-tuples of distance s.

Sample Input

```
1
100 200 4 8
```

Sample Output

```
2
```