# Project Euler #198: Ambiguous Numbers

This problem is a programming version of Problem 198 from projecteuler.net

A best approximation to a real number $x$ for the denominator bound $d$ is a rational number $r/s$ (in reduced form) with $s \leq d$, so that any rational number $p/q$ which is closer to $x$ than $r/s$ has $q > d$.

Usually the best approximation to a real number is uniquely determined for all denominator bounds. However, there are some exceptions, e.g. $9/40$ has the two best approximations $1/4$ and $1/5$ for the denominator bound $6$. We shall call a real number $x$ *ambiguous*, if there is at least one denominator bound for which $x$ possesses two best approximations. Clearly, an ambiguous number is necessarily rational.

How many ambiguous numbers $x = p/q$, $a/b < x < c/d$, are there whose denominator $q$ does not exceed $N$?

**Input Format**

The only line of each test case contains exactly five space-separated integers: $a$, $b$, $c$, $d$ and $N$.

**Constraints**

- $a/b < c/d \leq 10^3$
- $0 \leq a, c \leq N$
- $0 < b, d \leq N$
- $1 < N \leq 2 \times 10^9$

**Output Format**

On a single line print the answer modulo $10^9 + 7$.

**Sample Input 0**

```
1 4 1 2 25
```

**Sample Output 0**

```
3
```

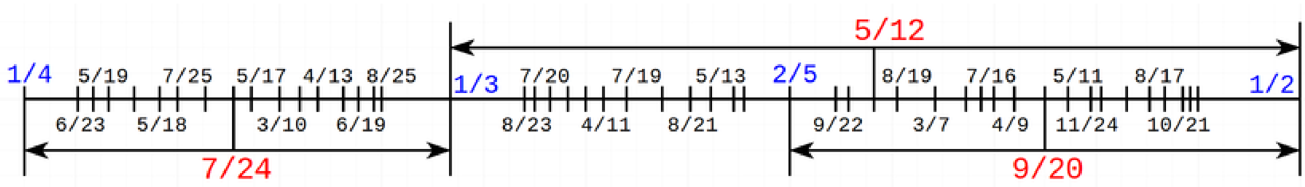
**Explanation 0**

There are $49$ rational numbers between $1/4$ and $1/2$ with the denominator no greater than $25$:

$6/23$, $5/19$, $4/15$, $3/11$, $5/18$, $7/25$, $2/7$, $7/24$, $5/17$, $3/10$,
$7/23$, $4/13$, $5/16$, $6/19$, $7/22$, $8/25$, $1/3$, $8/23$, $7/20$, $6/17$,
$5/14$, $9/25$, $4/11$, $7/19$, $3/8$, $8/21$, $5/13$, $7/18$, $9/23$, $2/5$,
$9/22$, $7/17$, $5/12$, $8/19$, $3/7$, $10/23$, $7/16$, $11/25$, $4/9$, $9/20$,
$5/11$, $11/24$, $6/13$, $7/15$, $8/17$, $9/19$, $10/21$, $11/23$ and $12/25$.

Only three of them are *ambiguous* numbers: $7/24$, $5/12$ and $9/20$

- $1/3$ and $1/4$ are the two best approximations of $7/24$ for the denominator bound $5$;
- $1/2$ and $1/3$ are the two best approximations of $5/12$ for the denominator bound $4$;
- $1/2$ and $2/5$ are the two best approximations of $9/20$ for the denominator bound $6$.




Therefore the answer is $3$.