Big Bang Theory

Description

Do you know The Big Bang Theory? It is an American television sitcom created by Chuck Lorre and Bill Prady, both of whom served as executive producers on the series, along with Steven Molaro.

The show originally centered on five characters living in Pasadena, California: Leonard Hofstadter and Sheldon Cooper, both physicists at Caltech, who share an apartment; Penny, a waitress and aspiring actress who lives across the hall; and Leonard and Sheldon's similarly geeky and socially awkward friends and co-workers, aerospace engineer Howard Wolowitz and astrophysicist Raj Koothrappali. Over time, supporting characters were promoted to starring roles, including neuroscientist Amy Farrah Fowler, microbiologist Bernadette Rostenkowski, experimental physicist Leslie Winkle, and comic book store owner Stuart Bloom.

However, we will focus on the character, Sheldon Cooper, who is a senior theoretical physicist at The California Institute of Technology (Caltech). He has a genius-level IQ (in Young Sheldon his mother says that he has the same IQ as Albert Einstein and Stephen Hawking), but displays a fundamental lack of social skills, a tenuous understanding of humor, and difficulty recognizing irony and sarcasm in other people, although he himself often employs them. He exhibits highly idiosyncratic behavior and a general lack of humility, empathy, and toleration.

In the first ten seasons of The Big Bang Theory, Sheldon shares an apartment with his colleague and best friend, Leonard Hofstadter (Johnny Galecki). Today, Sheldon find out a interested problem, and use this question to test Johnny. The problem shows as follows:

How many ways to select exactly K positive integers from L to R, you can select the same number more than once, satisfying the greatest common factor of these K numbers is N.

Can you help Johnny to solve this problem?

If you can not solve, it is ok. You can watch The Big Bang Theory! I highly recommend you to watch this series!

Input

The first line of the input contains four integers L, R, K, N, these numbers have the same meaning as above.

- $1 \leq L, R, K, N \leq 10^9$
- $R - L \leq 10^5$

Output

Output an integer, which is the number of ways for this problem, in a line. Since the answer may be very large, please modulo $10^9 + 7$.

Sample Input 1

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6 12 3 3
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Sample Output 1

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18
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Sample Input 2

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10 100000 7 20
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Sample Output 2

378874965