Problem F. Find a Square

Input file:	`standard input`
Output file:	`standard output`
Time limit:	6 seconds
Memory limit:	512 megabytes

Frank likes square numbers. That is numbers, which are the product of some integer with itself. Also Frank likes quadratic polynomials. He even has his favorite one: $p(x) = a \cdot x^2 + b \cdot x + c$.

This morning Frank evaluated his favorite quadratic polynomial for n consecutive integer arguments starting from 0 and multiplied all the numbers he got.

If the resulting product is a square, his day is just perfect, but that might be not the case. So he asks you to find the largest square number which is a divisor of the resulting product.

Input

The only line of the input contains 4 integers a, b, c, n ($1 \le a, b, c, n \le 600\,000$).

Output

Find the largest square divisor of $\prod_{i=0}^{n-1} p(i)$. As this number could be very large, output a single integer — its remainder modulo $10^9 + 7$.

Examples

standard input	standard output
1 1 1 10	74529
1 2 1 10	189347824

Note

In the first example, the product is equal to $1 \cdot 3 \cdot 7 \cdot 13 \cdot 21 \cdot 31 \cdot 43 \cdot 57 \cdot 73 \cdot 91 = 2893684641939 = 38826291 \cdot 273^2$.