

Bit count

Count the number of ones in bit representation of number.

Generate N number using formula $(a*i+b)\%c$ for all $1 \leq i \leq n$

limit: $1 \leq N \leq 1000000$

$0 \leq a * N, b * N < 2^{64}$

$1 \leq c < 2^{64}$

Input

N

a b c

Output

[N numbers]

c1

c2

..

cn

Example

Input:

5

5 6 7

Output:

1

1

0

2

2

Explanation

Generated numbers are 4, 2, 0, 5, 3 and bit counts are 1, 1, 0, 2, 2 respectively

hints:

use unsigned long long