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# G - Balls and Boxes

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Time Limit: 2 sec / Memory Limit: 1024 MiB

Score : 575 points

## Problem Statement

You are given positive integers  $A, B, C, N$ .

Solve Problems 1 and 2. (The differences between the problems are indicated in bold.)

### Problem 1

There are  $N$  balls. **The balls are indistinguishable from each other.** Also, there are boxes 1, 2, and 3.

Find the number, modulo 998244353, of ways to put all balls into the boxes satisfying the following conditions.

- The number of balls in box 1 is a multiple of  $A$ .
- The number of balls in box 2 is a multiple of  $B$ .
- The number of balls in box 3 is a multiple of  $C$ .

Here, two ways of putting balls are counted separately **when there exists a box where the number of balls differs between the two ways.**

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## Problem 2

There are  $N$  balls numbered from 1 to  $N$ . The balls are distinguishable from each other. Also, there are boxes 1, 2, and 3.

Find the number, modulo 998244353, of ways to put all balls into the boxes satisfying the following conditions.

- The number of balls in box 1 is a multiple of  $A$ .
- The number of balls in box 2 is a multiple of  $B$ .
- The number of balls in box 3 is a multiple of  $C$ .

Here, two ways of putting balls are counted separately when there exists a ball whose box differs between the two ways.

## Constraints

- $1 \leq N \leq 3 \times 10^5$
- $1 \leq A \leq 3 \times 10^5$
- $1 \leq B \leq 3 \times 10^5$
- $1 \leq C \leq 3 \times 10^5$
- All input values are integers.

## Input

The input is given from Standard Input in the following format:

```
 $N$   $A$   $B$   $C$ 
```

## Output

Output two lines. On the  $i$ -th line, output the answer to Problem  $i$ .

### Sample Input 1

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```
3 1 2 3
```

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### Sample Output 1

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```
3
5
```

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In Problem 1, the ways of putting balls that satisfy the condition are the following three ways:

- Put 3 balls in box 1.
- Put 1 ball in box 1 and 2 balls in box 2.
- Put 3 balls in box 3.

In Problem 2, the ways of putting balls that satisfy the condition are the following five ways:

- Put balls 1, 2, 3 in box 1.
- Put ball 1 in box 1 and balls 2, 3 in box 2.
- Put ball 2 in box 1 and balls 1, 3 in box 2.
- Put ball 3 in box 1 and balls 1, 2 in box 2.
- Put balls 1, 2, 3 in box 3.

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## Sample Input 2

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```
1234 56 7 89
```

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## Sample Output 2

[Copy](#)

```
15
535248725
```

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## Sample Input 3

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```
300000 6 490 420
```

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## Sample Output 3

[Copy](#)

```
73339
760083042
```

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## Sample Input 4

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```
12345 67 89 123456
```

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## Sample Output 4

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2  
150951502

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'#telegram)

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