[D] The Great Escape

Time limit: 2 second
Memory limit: 65535 kBytes

Description You're a tiny, adventurous guppy named Gill, living in a vibrant, three-dimensional aquarium. This isn't your average glass box; it's a massive, cuboid structure with special "water zones" that have different energy costs to swim through.

Your journey starts at the origin of the aquarium, at coordinates **(0, 0, 0)**. Your goal is to reach your favorite hiding spot, a cozy little coral at coordinates **(N-1, M-1, P-1)**.

The aquarium's dimensions are **N x M x P**. The energy cost for each zone varies depending on its coordinates **(x, y, z)**, the dimensions of the aquarium, and an aquarium constant **K**. It's calculated using a mysterious formula:

$$\textbf{Cost}(x, y, z) = (x \cdot y \cdot z + N + M + P) \pmod{K},$$

$$\text{where } 0 \le x < N,\ 0 \le y < M,\ 0 \le z < P$$

Being a guppy, you can only swim in three specific directions from your current location **(x, y, z)**:

- **Move forward:** to **(x+1, y, z)**
- **Move to the side:** to **(x, y+1, z)**
- **Move upward:** to **(x, y, z+1)**

Task

Your task is to find a path from **(0, 0, 0)** to **(N-1, M-1, P-1)** that minimizes the total energy cost (sum for all visited cells, including both the start and the destination). This means you need to navigate through the aquarium's grid, accumulating the minimum possible cost.

Input

The input consists of a single line containing four integers: `N M P K`.

Output

Print a single integer representing the total minimum energy cost required for the journey.

Constraints

- $1 \leq N, M, P \leq 100$
- $1 \leq K \leq 1,000,000$

Example

Input	Output
2 2 2 100	25
2 2 2 4	9
13 17 19 23	175