

G. Microbes in the incubator (round 2)

Input: standard input (from the keyboard)

Output: standard output (to the screen)

Time limit: 1 seconds

Memory limit: 256 Mb

Problem

The incubator with microbes is a parallelepiped and consists of $M \times N \times L$ unit cubes. Each of such cubes can be either empty or occupied by one microbe. Microbes cannot live near borders of the incubator. It means, if a microbe lives in a cube with coordinates (i, j, k) then $1 < i < N, 1 < j < M, 1 < k < L$.

The scientists made the following records: for each part of the incubator of size $2 \times 2 \times 2$ they wrote number of microbes, which lived in the part (in such a part can live from 0 to 8 microbes). One day, the lighting struck into the lab and destroyed some of records. Remained only the coordinates of the cubes of $2 \times 2 \times 2$, in which lived an odd number of microbes. And, it is unknown how many microbes exactly lived there.

Help the scientists find out the total number of microbes in the incubator, if you know that there was no more than $2 \cdot 10^9$.

Input

In the first line of the input there are 4 natural numbers: N, M, L – linear sizes of the incubator ($3 \leq N, M, L \leq 2 \cdot 10^9$), and C – the number of cubes of size $2 \times 2 \times 2$, in which an odd number of microbes lived ($0 \leq C \leq 10000$). Each of next C lines of the input contains 3 natural numbers: i, j, k – the coordinates of a cube of $2 \times 2 \times 2$, in which lived an odd number of microbes ($1 \leq i < N, 1 \leq j < M, 1 \leq k < L$). Coordinates of a cube of $2 \times 2 \times 2$ are the the smallest coordinates of unit cubes which it contains (so, cube of $2 \times 2 \times 2$ (i, j, k) contains unit cubes with coordinates $(i, j, k), (i+1, j, k), (i, j+1, k), (i, j, k+1), (i+1, j+1, k), (i+1, j, k+1), (i, j+1, k+1), (i+1, j+1, k+1)$).

Output

The output should contain one integer – the number of microbes that lived in an incubator (for the input data is guaranteed, that this number can be calculated, and it does not exceed $2 \cdot 10^9$).

Example

Input	Output
10 10 10 0	0
10 10 10 16 1 1 1 1 2 1 2 1 1 2 3 1 3 2 1 3 3 1 1 1 2 3 1 2 1 3 2 3 3 2 1 2 3 1 3 3 2 1 3 2 3 3 3 1 3 3 2 3	4