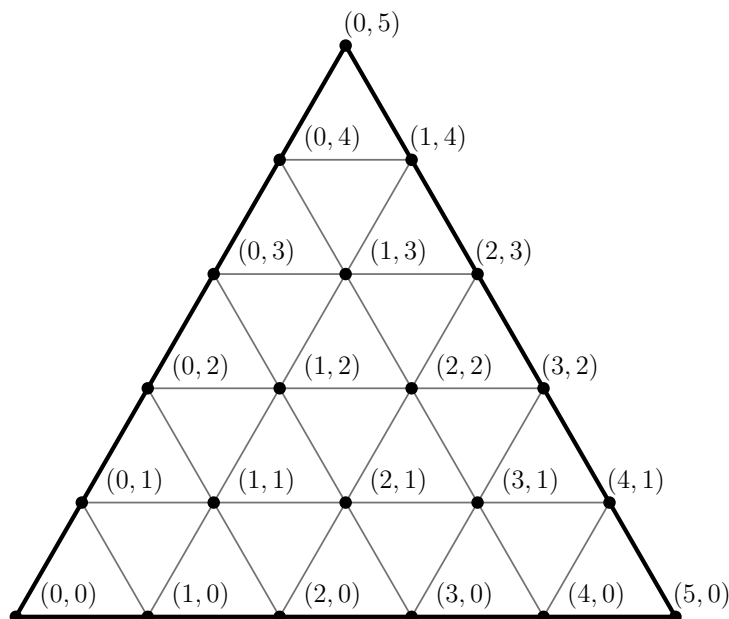




Triangular Rainfall

The country of JOI is an equilateral triangle with side length L whose vertices are points A , B , and C . Here, L is a positive integer. Side AB connects vertices A and B in the east-west direction, and vertex A is the westernmost point of the country of JOI, while vertex B is the easternmost point. Vertex C is the northernmost point of the country of JOI.

The country of JOI is divided into L^2 **regions**, each of which is an equilateral triangle with side length 1. A point that is a vertex of some region is called a **lattice point**. For integers x, y satisfying $0 \leq y \leq L$ and $0 \leq x \leq L - y$, the lattice point that is the $(1 + y)$ -st from the south and the $(1 + x)$ -st from the west is denoted by (x, y) . In particular, A , B , and C are denoted by $(0, 0)$, $(L, 0)$, and $(0, L)$, respectively. For example, the following figure shows the regions and the lattice points when $L = 5$.



In the country of JOI, weather forecasts for the next N days have been announced. On day i , rain is forecast to fall in the triangular region T_i whose vertices are lattice points (X_i, Y_i) , $(X_i + Z_i, Y_i)$, and $(X_i, Y_i + Z_i)$. An region is said to be forecast to receive rain on day i if the entire region is contained in T_i .

In order to prepare for disasters caused by rainfall, it is necessary to determine, for each $k = 1, 2, \dots, K$, the number of regions that are forecast to receive rain on at least k days.

Given the size of the country of JOI, the weather forecasts, and K , write a program which, for each $k = 1, 2, \dots, K$, computes the number of regions that are forecast to receive rain on at least k days.



Input

Input is given from Standard Input in the following format:

```
 $L N K$   
 $X_1 Y_1 Z_1$   
 $X_2 Y_2 Z_2$   
 $\vdots$   
 $X_N Y_N Z_N$ 
```

Output

Print K lines to Standard Output. The k -th line ($1 \leq k \leq K$) should contain the number of regions that are forecast to receive rain on at least k days.



Constraints

- $2 \leq L \leq 10^9$.
- $2 \leq N \leq 200\,000$.
- $1 \leq K \leq 5$.
- $0 \leq X_i \leq L$ ($1 \leq i \leq N$).
- $0 \leq Y_i \leq L$ ($1 \leq i \leq N$).
- $1 \leq Z_i \leq L$ ($1 \leq i \leq N$).
- $X_i + Y_i + Z_i \leq L$ ($1 \leq i \leq N$).
- All input values are integers.

Subtasks

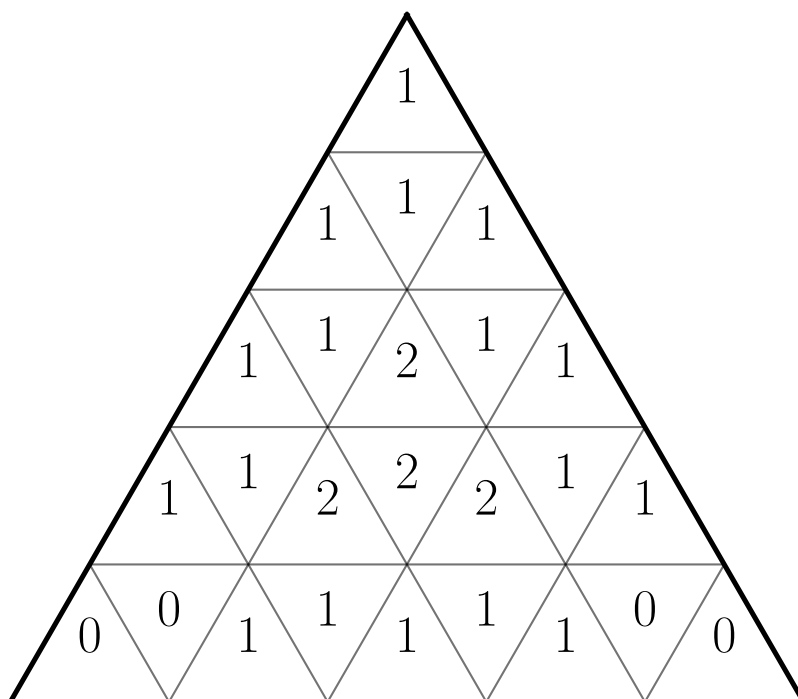
1. (4 points) $N = 2$, $K = 2$.
2. (5 points) $L \leq 100$, $N \leq 100$.
3. (5 points) $L \leq 1\,000$.
4. (7 points) $N \leq 2\,000$.
5. (10 points) $X_i = 0$ ($1 \leq i \leq N$), $K = 1$.
6. (10 points) $X_i = 0$ ($1 \leq i \leq N$).
7. (23 points) $K = 1$.
8. (18 points) $K \leq 2$.
9. (18 points) There are no additional constraints.



Sample Input and Output

Sample Input 1	Sample Output 1
5 2 2	21
1 0 3	4
0 1 4	

If we illustrate, for each region, the number of days on which rain is forecast to fall, we obtain the following figure.

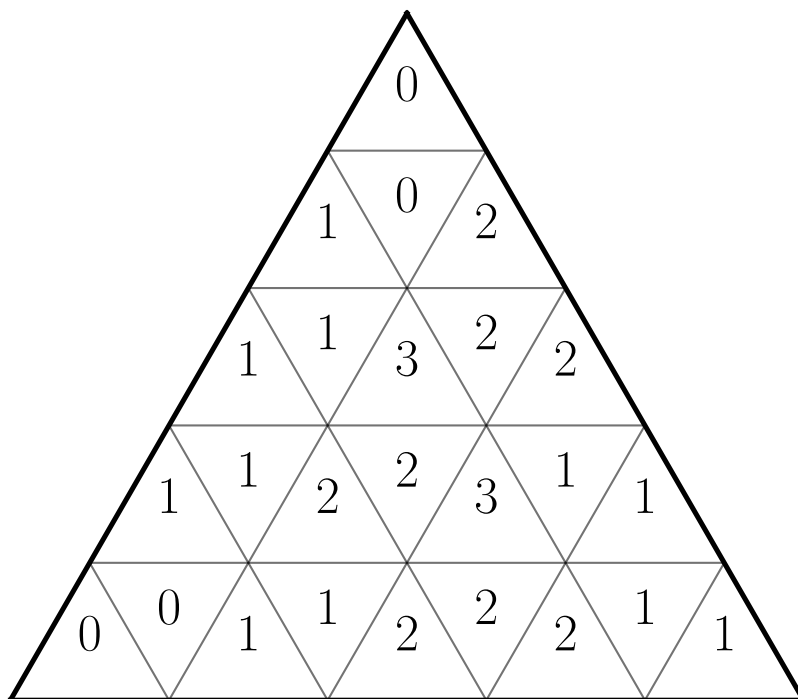


This sample input satisfies the constraints for Subtasks 1, 2, 3, 4, 8, and 9.



Sample Input 2	Sample Output 2
5 4 5	21
1 0 4	10
0 1 3	2
2 0 2	0
1 2 2	0

If we illustrate, for each region, the number of days on which rain is forecast to fall, we obtain the following figure.



This sample input satisfies the constraints for Subtasks 2, 3, 4, and 9.