E. Secret Box

time limit per test: 1 second
memory limit per test: 256 megabytes
input: standard input
output: standard output

Ntarsis has a box B with side lengths x, y, and z. It lies in the 3D coordinate plane, extending from $(0,0,0)$ to (x,y,z).

Ntarsis has a secret box S. He wants to choose its dimensions such that all side lengths are positive integers, and the volume of S is k. He can place S somewhere within B such that:

- S is parallel to all axes.
- every corner of S lies on an integer coordinate.

S is magical, so when placed at an integer location inside B, it will not fall to the ground.

Among all possible ways to choose the dimensions of S, determine the **maximum** number of distinct locations he can choose to place his secret box S inside B. Ntarsis does not rotate S once its side lengths are selected.

Input

The first line consists of an integer t, the number of test cases ($1 \leq t \leq 2000$). The description of the test cases follows.

The first and only line of each test case contains four integers x, y, z and k ($1 \leq x, y, z \leq 2000, 1 \leq k \leq x \cdot y \cdot z$).

It is guaranteed the sum of all x, sum of all y, and sum of all z do not exceed 2000 over all test cases.

Note that k may not fit in a standard 32-bit integer data type.

Output

For each test case, output the answer as an integer on a new line. If there is no way to select the dimensions of S so it fits in B, output 0.

Example

input Copy

```
7
3 3 3 8
3 3 3 18
5 1 1 1
2 2 2 7
3 4 2 12
4 3 1 6
1800 1800 1800 4913000000
```

output Copy

```
8
2
5
0
4
4
1030301
```

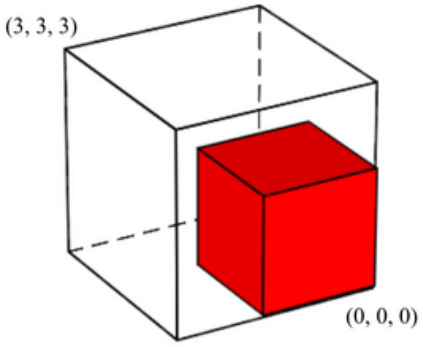
Note

For the first test case, it is optimal to choose S with side lengths 2, 2, and 2, which has a volume of $2 \cdot 2 \cdot 2 = 8$. It can be shown there are 8 ways to put S inside B.

The coordinate with the least x, y, and z values for each possible arrangement of S are:

1. $(0, 0, 0)$
2. $(1, 0, 0)$
3. $(0, 1, 0)$
4. $(0, 0, 1)$
5. $(1, 0, 1)$
6. $(1, 1, 0)$
7. $(0, 1, 1)$
8. $(1, 1, 1)$

The arrangement of S with a coordinate of $(0, 0, 0)$ is depicted below:



For the second test case, S with side lengths 2, 3, and 3 are optimal.