


[HOME](#) [TOP](#) [CATALOG](#) [CONTESTS](#) [GYM](#) [PROBLEMSET](#) [GROUPS](#) [RATING](#) [EDU](#) [API](#) [CALENDAR](#) [HELP](#)
[PROBLEMS](#) [SUBMIT CODE](#) [MY SUBMISSIONS](#) [STATUS](#) [HACKS](#) [STANDINGS](#) [CUSTOM INVOCATION](#)

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 491300000
```

output

Copy

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

Codeforces Round 952 (Div. 4)

Finished

Practice



→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, wi)

Choose file: Choose File No file chosen

Submit

→ Problem tags

brute force combinatorics math

No tag edit access

→ Contest materials

- Announcement (en)
- Tutorial (en)

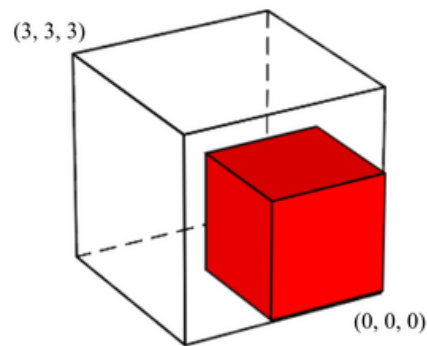
**Note**

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.

[Codeforces](#) (c) Copyright 2010-2024 Mike Mirzayanov
The only programming contests Web 2.0 platform
Server time: Jun/20/2024 10:29:17^{UTC+6} (k1).
Desktop version, switch to [mobile version](#).
[Privacy Policy](#)

Supported by



ITMO UNIVERSITY