

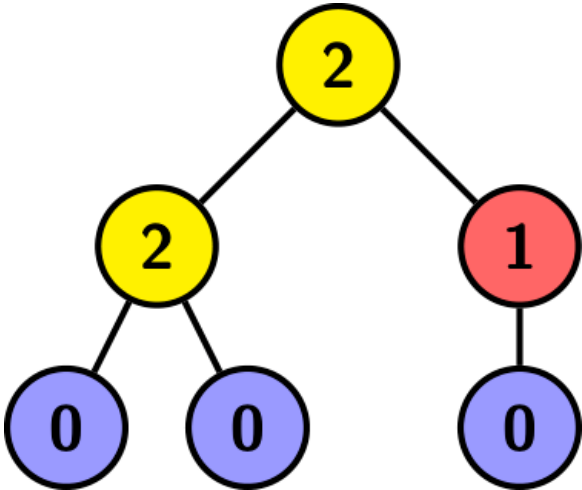
F. 0, 1, 2, Tree!

time limit per test: 2 seconds
memory limit per test: 256 megabytes
input: standard input
output: standard output

Find the minimum height of a rooted tree[†] with $a + b + c$ vertices that satisfies the following conditions:

- a vertices have exactly 2 children,
- b vertices have exactly 1 child, and
- c vertices have exactly 0 children.

If no such tree exists, you should report it.



The tree above is rooted at the top vertex, and each vertex is labeled with the number of children it has. Here $a = 2, b = 1, c = 3$, and the height is 2.

[†] A *rooted tree* is a connected graph without cycles, with a special vertex called the *root*. In a rooted tree, among any two vertices connected by an edge, one vertex is a parent (the one closer to the root), and the other one is a child.

The *distance* between two vertices in a tree is the number of edges in the shortest path between them. The *height* of a rooted tree is the maximum distance from a vertex to the root.

Input

The first line contains an integer t ($1 \leq t \leq 10^4$) — the number of test cases.

The only line of each test case contains three integers a, b , and c ($0 \leq a, b, c \leq 10^5$; $1 \leq a + b + c$).

The sum of $a + b + c$ over all test cases does not exceed $3 \cdot 10^5$.

Output

For each test case, if no such tree exists, output -1 . Otherwise, output one integer — the minimum height of a tree satisfying the conditions in the statement.

Example

input

Copy

```
10
2 1 3
0 0 1
0 1 1
1 0 2
1 1 3
3 1 4
```

Codeforces Round 937 (Div. 4)

Finished

Practice?

Want to solve the contest problems after the official contest ends? Just register for practice and you will be able to submit solutions.

Register for 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

Problem tags

bitmasksbruteforcegreedyimplementationtrees

No tag edit access

Contest materials

Announcement(en)Tutorial(en)

```
8 17 9
24 36 48
1 0 0
0 3 1
```

output[Copy](#)

```
2
0
1
1
-1
3
6
-1
-1
3
```

Note

The first test case is pictured in the statement. It can be proven that you can't get a height smaller than 2.

In the second test case, you can form a tree with a single vertex and no edges. It has height 0, which is clearly optimal.

In the third test case, you can form a tree with two vertices joined by a single edge. It has height 1, which is clearly optimal.

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