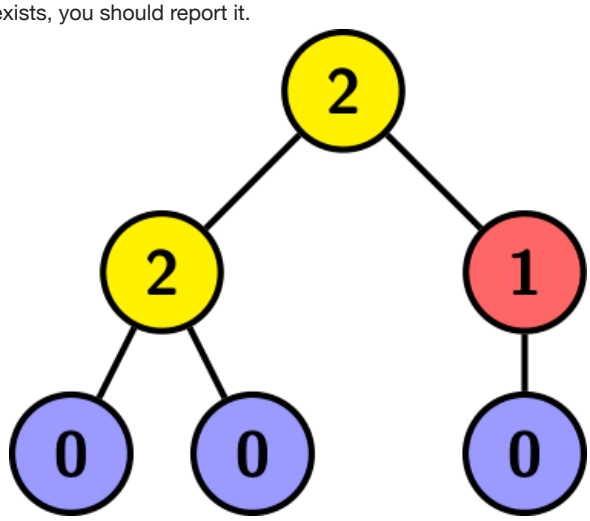
F. 0, 1, 2, Tree!

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 ($1 \le t \le 10^4$) — the number of test cases.

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

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

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

```
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.