



Level 5



Asteroids may rotate at constant angular velocity in three dimensions.

From now on we consider asteroids to be formations of unit cubes occupying cells in the 3-dimensional cartesian grid.

The given images are **projections of such formations** along one fixed coordinate axis.

As in Level 2-4, output a result line for each asteroid in order of its first occurrence.

Input format: Same as in Level 4.

Output format: Same as in Level 4.



The subset of images on which a certain asteroid shows up **within the observation period** has the following adapted properties:

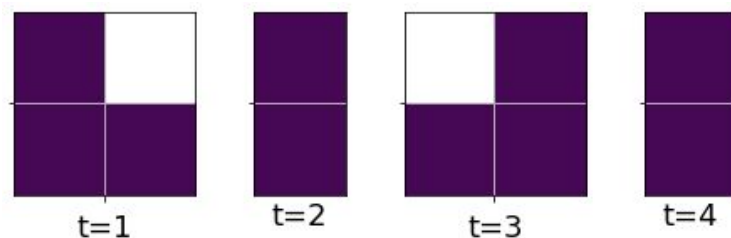
- › Each image of the subset shows **a projection of the same formation possibly rotated by multiples of 90° around one of the three coordinate axis**. The projections might have different offsets, however they always fit completely into the image boundaries.
- › The subset consists of at least 4 images.
- › If the subset contains images at times t and $t+d$ then it also **contains images at times $t-d$ and $t+2d$ (if within the observation period)**.
- › If the subset contains images at times $t-d$, t , $t+d$ then rotational angle, direction and axis **of the 3-dimensional formation** are the same from $t-d$ to t as from t to $t+d$.



Conversely, any subset of images **fulfilling the above conditions for some 3-dimensional formation of unit cubes** is assumed to stem from the same asteroid.

As in Level 2-4, output a result line for each asteroid in order of its first occurrence.

Sample input:



Sample output:

1 4 4

**Sample input:**

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