



Level 4

**Asteroids may rotate at constant angular velocity.**

Unlike Level 3, shapes of images stemming from the same asteroid may be rotated by integer multiples of 90° among each other. The axis of rotation is perpendicular to the image plane.

As in Level 2-3, output a result line for each asteroid in order of its first occurrence.

Input format: Same as in Level 3.

Output format: Same as in Level 3.



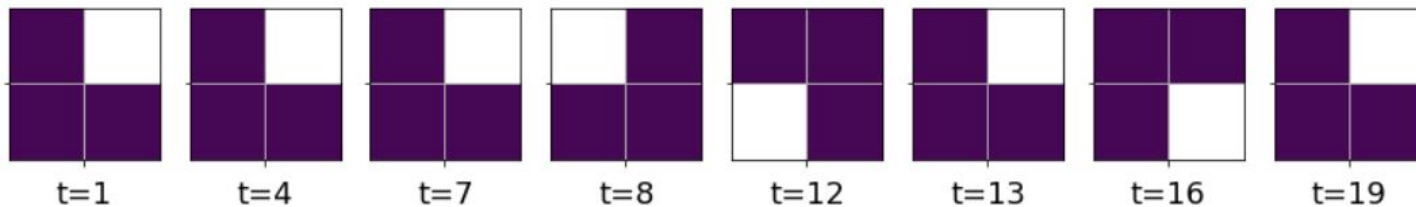
The subset of images on which a certain asteroid shows up within the observation period has the following **refined** properties:

- › Each image of the subset shows the same shape apart from rotations **by multiples of 90°** .
- › 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 and direction are the same from $t-d$ to t as from t to $t+d$.**

Conversely, any subset of images fulfilling the above conditions is assumed to stem from the same asteroid.



Sample input:



Sample output:

```
1 19 4
4 16 4
```



Sample input:

```
1 19 8
1 2 2
1 0
1 1
4 2 2
1 0
1 1
7 2 2
1 0
1 1
8 2 2
0 1
1 1
```

Sample input (cont):

```
12 2 2
1 1
0 1
13 2 2
1 0
1 1
16 2 2
1 1
1 0
19 2 2
1 0
1 1
```