



Level 3



Asteroids recur in regular intervals over the whole observation period.

That is, one asteroid can produce more than one image. Also, an asteroid does not change its orbit parameters during the observation period. It will always take the same amount of time to circle back to the same point in space (and also to return in front of the satellite sensors)

We refine the assumptions about identifying asteroids. Unlike Level 2, **images showing the same shape need not necessarily show the same asteroid.**

Task for level 3: **You have to identify the subset of images showing the same asteroid.** Output a result line for each asteroid in order of its first occurrence



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

- › As in Level 2, each image of the subset shows the same shape.
- › **The subset consists of at least 4 images.**
- › **If the subset contains images at times t and $t+d$ then it must also contain images at times $t-d$ and $t+2d$ if those timestamps are within the observation period.** That is, an asteroid cannot “spawn” in the middle of the observed period. It has to be present over the whole observation period.

A subset of images is valid only if all the above conditions are fulfilled.

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



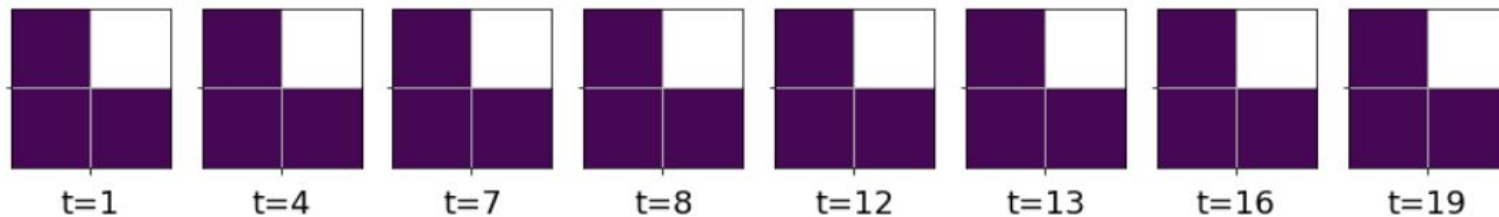
As in Level 2, output a result line for each asteroid in order of its first occurrence.

Input format: Same as in Level 1.

Output format: Same as in Level 2.



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
1 0
1 1
```

Sample input (cont):

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