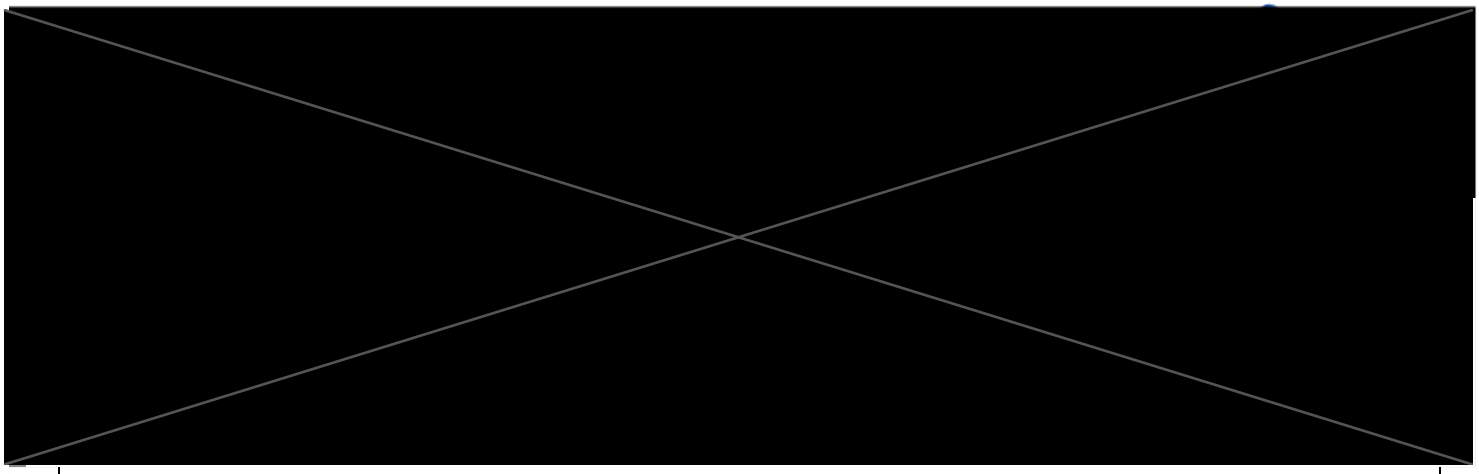

In her free time, Bessie likes to dabble in experimental physics. She has recently discovered a pair of new subatomic particles, named **mootrinos** and **antimootrinos**. Like standard matter-antimatter pairs, mootrinos and antimootrinos annihilate each other and disappear when they meet. But what makes these particles unique is that they switch their direction of motion (while maintaining the same speed) whenever Bessie looks at them.

For her latest experiment, Bessie has placed an **even number** N ($2 \leq N \leq 2 \cdot 10^5$) of these particles in a line. The line starts with a mootrino on the left and then alternates between the two types of particles, with the i-th particle located at position p_i ($0 \leq p_1 < \cdots < p_N \leq 10^{18}$). Mootrinos initially move **right** while antimootrinos initially move **left**, and the i-th particle moves with a constant speed of s_i units per second ($1 \leq s_i \leq 10^9$).

Bessie makes observations at the following times:

- First, 1 second after the start of the experiment.
- Then 2 seconds after the first observation.
- Then 3 seconds after the second observation.
- ...
- Then $n + 1$ seconds after the n-th observation.

During each observation, Bessie notes down which particles have disappeared.

This experiment may take an extremely long time to complete, so Bessie would like to first simulate its results. Given the experiment setup, help Bessie determine when (i.e., **the observation number**) she will observe each particle disappear! It may be shown that all particles will eventually disappear.

INPUT FORMAT (input arrives from the terminal / stdin):

Each input contains T ($1 \leq T \leq 10$) independent test cases.

Each test case consists of three lines. The first line contains N, the second line contains $p_1, \ldots, p_N$, and the third line contains $s_1 \ldots, s_N$.

It is guaranteed that the sum of all N does not exceed $2 \cdot 10^5$.

OUTPUT FORMAT (print output to the terminal / stdout):

For each test case, output the observation number for each particle's disappearance, separated by spaces.

SAMPLE INPUT:

```
4
2
1 11
1 1
2
1 12
1 1
2
1 11
4 6
2
1 11
4 5
```

SAMPLE OUTPUT:

```
9 9
11 11
1 1
```

```
3 3
```

For the first test, Bessie observes the following during the first 8 observations:

- The mootrino (initially moving **right**) appears at positions $2 \to 0 \to 3 \to -1 \to 4 \to -2 \to 5 \to -3$.
- The antimootrino (initially moving **left**) appears at positions $10 \to 12 \to 9 \to 13 \to 8 \to 14 \to 7 \to 15$.

Then right at observation
9, the two particles meet at position
6 and annihilate each other.

For the second test, the antimootrino starts 1 additional unit to the right, so the two particles meet at position 6.5 half a second before observation 11.

Note that we only care about observation numbers, not times or positions.

SAMPLE INPUT:

```
2
4
1 3 5 8
1 1 1 1
4
1 4 5 8
1 1 1 1
```

SAMPLE OUTPUT:

```
1 1 3 3
7 2 2 7
```

For the first test:

- The two leftmost particles meet at position 2 right at observation 1.
- The two rightmost particles meet at position 6.5 half a second before observation 3.

SCORING:

- Input 3 satisfies $N = 2$.
- Input 4 satisfies $N \leq 2000$ and $p_i \leq 10^4$ for all cows.
- Inputs 5-7 satisfy $N \leq 2000$.
- Inputs 8-12 satisfy no additional constraints.