Pigeon Identification Nuances

Speak to any of the serious practitioners in the cutthroat world of pigeon racing and they will happily bend your ear about the plumage of their favourite bird, the suspicious speckling on the beak of an opponent's pigeon, or how *Old Marv* (the renound three-time winner) had one leg half an inch longer than the other. To the rest of the world they all look the same.

In a recent ceremonial display, pigeon positions were recorded *at regular intervals* by a visitor whose inability to distinguish the birds meant that, in these snapshots of time, the position of each pigeon was recorded but not which pigeon was which. For those unfamiliar with such displays, each pigeon flies on a straight line (all of which are parallel) at a fixed speed. Different pigeons have their own starting positions on their respective lines, might fly at different speeds and, while all face in the same direction, some of the more advanced birds demonstrate their skill by flying backwards.

For example, the starting snapshot might have recorded pigeons at positions 0, 2 and 3, a second snapshot recording pigeons at positions 1, 1 and 5, a third with positions 0, 2 and 7, and a fourth with positions -1, 3 and 9. This corresponds to one pigeon starting at position 0 flying at 1 unit per snapshot, a second pigeon starting at position 2 and flying at -1 unit per snapshot (i.e. flying backwards) and a third pigeon starting at position 3 and flying at 2 units per snapshot.

Write a program that reads in the position of the pigeons at each snapshot and outputs a list of starting positions and speeds. The first line of the input will contain a single integer, p ($1 \leq p \leq 750$), indicating the number of pigeons. The next $p + 1$ lines will contain the positions of the pigeons in a single snapshot, each consisting of p integers (each between -2^{30} and 2^{30} inclusive). The snapshots will be given in order, with the first snapshot showing the pigeons in their starting positions.

You should output p lines, each line containing two integers, the starting position of a pigeon followed by the speed of that pigeon.

Sample Input

```
3
0 2 3
5 1 1
2 0 7
9 3 -1
```

Sample Output

```
0 1
2 -1
3 2
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