7 Nihilistic Needles

One day you go to sleep and wake up in an empty room. The room has walls that are painted an eggshell white and there are no discernable features on the walls. One day a bed appears, and a nightstand with a glass of water, which you quickly drink and sleep in as those would be much preferable to the floor. The room seems to shake sometimes as if it is surrounded by heavy machinery like a floor of a warehouse.

You wake up to see that one of the walls has a series of about 400mm by 400mm holes cut out in it, with weird dials in each hole. Another section of drywall pops out and a number pad is deployed with an enter key to submit numbers. After smacking the keys for about 120 minutes with random sequences of numbers a tiny roll of paper somehow appears at your feet. Hastily you unroll it and it is a CVS receipt with magnetic ink that smudges easily but on the back you find instructions written with a no.2 pencil:

The instructions tell you that each dial has tiny numbers written on them and the dials will hit these exact minutes when the number displayed in minutes has passed since the beginning of the cycle. For example a dial with 12 inscribed on it will hit 12 exactly 12 minutes after all of the dials have started spinning.

These numbers are distinct and no dials share any numbers at any minute. There are ranges of minutes where every dial goes past one of their marks, and your job is to find the smallest range of minutes where every single dial hits at least one mark.

However, time is not the subject in this search, marks passed is the criterion. This means that there could be a large numerical range of minutes that passes but if no dials have minutes in that range, that distance should be treated as 0. If two ranges of time have the same length and hit all of the dials, type them in ascending order from the starting minute of the range.

None of the numbers will be larger than $1 * 10^9$.

7.1 Input

- The first line contains an integer N, representing the number of dials.
- The following N lines each contain six distinct integers representing the minute marks on that dial.
- All minute marks are distinct across all dials, meaning no two dials share the same minute mark.

7.2 Output

- Print the ranges of minutes during which every dial passes at least one of its marks.
- Each line should contain two integers representing the starting and ending minutes of a valid range.
- If multiple ranges have the same length, print them in ascending order based on their starting minute.

7.3 Sample Input/Output

Sample Input	Sample Output
3 1 12 8 15 20 18 3 11 7 19 14 22 4 17 9 13 16 21	1 4 4 8 7 9 8 11 9 12 11 13 12 14 13 15 14 16 17 19 19 21 20 22