

# Problem TRANSBOOK: Transcribed Books

Long before Gutenberg invented letterpress printing, books have been transcribed by monks. Cloisters wanted to be able to check that a book was transcribed by them (and not by a different cloister). Although watermarked paper would have been an option, the cloister preferred to use a system of hard-to-fake serial numbers for identifying their transcriptions.

Each serial number consists of 10 single numbers  $a_1, a_2, \dots, a_{10}$ . Valid serial numbers satisfy  $a_1 + a_2 + \dots + a_9 \equiv a_{10} \pmod{N}$  with  $0 \leq a_{10} < N$ . The  $N$  is specific to and only known by the cloister that has transcribed this book and is therefore able to check its origin.

You are confronted with a pile of books that presumably have been transcribed by a single cloister. You are asked to write a computer program to determine that cloister, i.e. to calculate the biggest possible  $N$  that makes the serial numbers of these books valid. Obviously, no cloister has chosen  $N = 1$ . So if your calculations yield  $N = 1$ , there must be something wrong.

## Input

Input starts with an integer  $t$  on a single line, the number of test cases ( $1 \leq t \leq 100$ ). Each test case starts with an integer  $c$  on a single line, the number of serial numbers you have to consider ( $2 \leq c \leq 1000$ ). Each of the following  $c$  lines holds 10 integer numbers  $a_1, a_2, \dots, a_{10}$  ( $0 \leq a_i < 2^{28}$ ) separated by single spaces.

## Output

For each test case, output a single line containing the largest possible  $N$ , so that each given serial number for that test case is valid. If you cannot find a  $N > 1$  satisfying the condition for all serial numbers or if the numbers are valid independent of the choice of  $N$ , output “impossible” (without the quotes) on a single line.

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**Sample Input 1**

```
4
2
1 1 1 1 1 1 1 1 1 9
2 4 6 8 10 12 14 16 18 90
3
1 1 1 1 1 1 1 1 1 1
5 4 7 2 6 4 2 1 3 2
1 2 3 4 5 6 7 8 9 5
2
1 1 1 1 1 1 1 1 1 1
1 1 1 1 1 1 1 1 1 0
2
2 2 2 2 2 2 2 2 2 0
1 1 1 1 1 1 1 1 1 1
```

**Sample Output 1**

```
impossible
8
impossible
2
```