

Kickstart Round C 2017

[A. Ambiguous Cipher](#)[B. X Squared](#)[C. Magical Thinking](#)**D. The 4M Corporation**[Contest Analysis](#)[Questions asked](#) **2**

Submissions

Ambiguous Cipher

7pt	Not attempted 813/966 users correct (84%)
12pt	Not attempted 683/755 users correct (90%)

X Squared

9pt	Not attempted 377/706 users correct (53%)
14pt	Not attempted 319/358 users correct (89%)

Magical Thinking

6pt	Not attempted 570/621 users correct (92%)
19pt	Not attempted 149/325 users correct (46%)

The 4M Corporation

11pt	Not attempted 109/194 users correct (56%)
22pt	Not attempted 60/78 users correct (77%)

Top Scores

ACMonster	100
subscriber	100
Kasugano.Sora	100
spnautilus	100
1717374	100
Benq	100
LeeSin	100
yubowenok	100
praran26	100
cephian	100

Problem D. The 4M Corporation

This contest is open for practice. You can try every problem as many times as you like, though we won't keep track of which problems you solve. Read the [Quick-Start Guide](#) to get started.

Small input
11 points

Solve D-small

Large input
22 points

Solve D-large

Problem

The 4M Corporation has hired you to organize their departments and allocate headcount. You will create at least one department, and each department will receive some positive integer number of employees. It will not be easy, though — you have four different bosses, and each has given you a different instruction:

1. The department with the fewest employees must have exactly **MINIMUM** employees.
2. The department with the most employees must have exactly **MAXIMUM** employees.
3. The average number of employees across all departments must be exactly **MEAN**.
4. The median of the number of employees across all departments must be exactly **MEDIAN**. As a reminder, the median of a list is the value that, when the list is sorted in nondecreasing order, is in the center (for a list of odd length) or is the average of the two values in the center (for a list of even length).

Moreover, for the sake of efficiency, it is best to avoid creating too many departments. What is the smallest number of departments that you can create, if it is possible to satisfy your bosses' requests?

Input

The first line of the input gives the number of test cases, **T**. **T** test cases follow. Each consists of four integers: **MINIMUM**, **MAXIMUM**, **MEAN**, and **MEDIAN**, in that order.

Output

For each test case, output one line containing Case #x: y, where x is the test case number (starting from 1), and y is either the minimum possible number of departments, or IMPOSSIBLE if it is impossible to satisfy all four bosses' requests.

Limits

 $1 \leq T \leq 100$.

Small dataset

 $1 \leq \text{MINIMUM} \leq 8$.
 $1 \leq \text{MAXIMUM} \leq 8$.
 $1 \leq \text{MEAN} \leq 8$.
 $1 \leq \text{MEDIAN} \leq 8$.

The constraints for the Small dataset guarantee that the answer is either IMPOSSIBLE or is less than 14.

Large dataset

 $1 \leq \text{MINIMUM} \leq 10000$.
 $1 \leq \text{MAXIMUM} \leq 10000$.
 $1 \leq \text{MEAN} \leq 10000$.
 $1 \leq \text{MEDIAN} \leq 10000$.

Sample

Input	Output
5	Case #1: IMPOSSIBLE
6 4 5 1	Case #2: IMPOSSIBLE
7 7 8 8	Case #3: 1
2 2 2 2	Case #4: 2
3 7 5 5	Case #5: 3
1 4 3 4	

Sample Case #1 is IMPOSSIBLE because the maximum value cannot be smaller than the minimum value.

Sample Case #2 is IMPOSSIBLE because the mean and median cannot be larger than the maximum value.

In Sample Case #3, you can create a single department with 2 employees. This satisfies all four bosses: the department with the fewest employees has exactly 2, the department with the most employees has exactly 2, and the mean and median are both 2.

In Sample Case #4, you can create one department with 3 employees and another department with 7 employees. Note that it would **not** suffice to create only one department with 5 employees, because then the department with the fewest employees would not have exactly 3 and the department with the most employees would not have exactly 7.

For Sample Case #5, you can create one department with 1 employee and two more departments with 4 employees each.

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