Problem B

Linear-time Select

Time limit: 2s
Memory limit: 512 MB

This task is now due. Steven has redacted the problem statement. There can be other order statistics related questions for future iterations of CS3230.

Input format

The first line of input contains an integer TC, denoting the number of test cases.

Each test case consists of three lines:

- The first line contains one integer N.
- The second line contains three integers A, B, and C.
- The third line contains two integers X and Y (although these two values are not used in this task).

Output format

For each test case, output the median of of **U** (or **S**). Note that the output is either an integer or an integer with 0.5 suffix.

Constraints

- $1 \leq TC \leq 30$;
- $1 \leq N \leq 10^6$;
- $1 \leq A, B, C \leq 10^9$ – (these are the same PA1-B2 constraints, but interpreted slightly differently);
- X, Y are not used in this task (but you should still read them — Steven is lazy to tweak the input files).

The probability of acceptance for various programming language users:

- C++ "very high"
- Java "low", need to use the best possible algorithm implemented correctly
- Python "near zero" (at least Steven cannot make the intended correct Python solution runs below this maximum time limit of 2s yet (there is a non-intended heavily-optimized C++ solution that is hovering around 3s on this setup)) — In fact, any student who can get AC on Python for B will also get bonus 1% CA marks (still capped at max 40%) as promised in the early part of the semester (declare this in your PA2 reflection report).

Remarks: If you have tried more than 14 times for this task, please hold your horses and wait until tutorial on Mon/Tue of Week 07 for a bit more details about this topic. Just enjoy the rest of your recess week.

Sample Input

Copy Input

```
2
7
7 77 777
7777 77777
10
7 77 777
7777 77777
```

Sample Output

Copy Output

```
3822
3601.5
```

Notes

Dr Steven Halim.

Last used: CS3230, 17 Feb-03 Mar 2023 (yes, over recess week).