

## B. Meeting on the Line

time limit per test: 2 seconds  
memory limit per test: 256 megabytes

$n$  people live on the coordinate line, the  $i$ -th one lives at the point  $x_i$  ( $1 \leq i \leq n$ ). They want to choose a position  $x_0$  to meet. The  $i$ -th person will spend  $|x_i - x_0|$  minutes to get to the meeting place. Also, the  $i$ -th person needs  $t_i$  minutes to get dressed, so in total he or she needs  $t_i + |x_i - x_0|$  minutes.

Here  $|y|$  denotes the absolute value of  $y$ .

These people ask you to find a position  $x_0$  that minimizes the time in which all  $n$  people can gather at the meeting place.

### Input

The first line contains a single integer  $t$  ( $1 \leq t \leq 10^3$ ) — the number of test cases. Then the test cases follow.

Each test case consists of three lines.

The first line contains a single integer  $n$  ( $1 \leq n \leq 10^5$ ) — the number of people.

The second line contains  $n$  integers  $x_1, x_2, \dots, x_n$  ( $0 \leq x_i \leq 10^8$ ) — the positions of the people.

The third line contains  $n$  integers  $t_1, t_2, \dots, t_n$  ( $0 \leq t_i \leq 10^8$ ), where  $t_i$  is the time  $i$ -th person needs to get dressed.

It is guaranteed that the sum of  $n$  over all test cases does not exceed  $2 \cdot 10^5$ .

### Output

For each test case, print a single real number — the optimum position  $x_0$ . It can be shown that the optimal position  $x_0$  is unique.

Your answer will be considered correct if its absolute or relative error does not exceed  $10^{-6}$ . Formally, let your answer be  $a$ , the jury's answer be  $b$ . Your answer will be considered correct if  $\frac{|a-b|}{\max(1,|b|)} \leq 10^{-6}$ .

### Example

input

Copy

7  
1  
0  
3  
2  
3 1  
0 0  
2  
1 4  
0 0  
3  
1 2 3  
0 0 0  
3  
1 2 3  
4 1 2  
3  
3 3 3  
5 3 3  
6  
5 4 7 2 10 4  
3 2 5 1 4 6

output

Copy

0  
2  
2.5  
2  
1  
3  
6

### Note

- In the 1-st test case there is one person, so it is efficient to choose his or her position for the meeting place. Then he or she will get to it in 3 minutes, that he or she need to get dressed.
- In the 2-nd test case there are 2 people who don't need time to get dressed. Each of them needs one minute to get to position 2.
- In the 5-th test case the 1-st person needs 4 minutes to get to position 1 (4 minutes to get dressed and 0 minutes on the way); the 2-nd person needs 2 minutes to get to position 1 (1 minute to get dressed and 1 minute on the way); the 3-rd person needs 4 minutes to get to position 1 (2 minutes to get dressed and 2 minutes on the way).

Codeforces Round 823 (Div. 2)

Finished

Practice

→ Virtual participation

Virtual contest is a way to take part in past contest, as close as possible to participation on time. It is supported only ICPC mode for virtual contests. If you've seen these problems, a virtual contest is not for you - solve these problems in the archive. If you just want to solve some problem from a contest, a virtual contest is not for you - solve this problem in the archive. Never use someone else's code, read the tutorials or communicate with other person during a virtual contest.

Start virtual contest

→ Clone Contest to Mashup

You can clone this contest to a mashup.

Clone Contest

→ Submit?

Language: GNU G++20 13.2 (64 bit, win

Choose file: Choose File No file chosen

Submit

→ Last submissions

Submission	Time	Verdict
282769096	Sep/24/2024 15:21	Accepted

→ Problem tags

binary search geometry greedy implementation math ternary search \*1600

No tag edit access

→ Contest materials

Announcement

Tutorial (en)