Lazy Coordinator

Input file:	`standard input`
Output file:	`standard output`
Time limit:	1 second
Memory limit:	512 megabytes

Boris is a contest coordinator on WWWforces, an online platform that conducts regular "What? Where? When?" competitions. There are two types of events in his life:

1. Someone submits a contest proposal (a set of questions) to Boris. He puts this new proposal in the waiting pool.
2. The time comes to organize a new contest. As Boris doesn't remember the initial order of proposals in his pool, he just picks a random proposal, removes it from the pool and uses it for the upcoming contest. Each proposal in the pool is picked with the same probability, regardless on how long it already waits.

There will be exactly n events of the first type and exactly n events of the second type. Moreover, for the k-th event of the second type, there will be at least k events of the first type preceding it. In other words, there will be at least one proposal in the pool any time the coordinator needs it. Finally, it is guaranteed that no two events happen simultaneously.

For each proposal, you should determine the expected time it will stay in the waiting pool.

Input

The first line of the input contains a single integer n ($1 \le n \le 100\,000$) — the number of events of each type.

Then $2n$ lines follow that describe the events. Each line is either "`+` t_i" or "`-` t_i" meaning that an event of the first or the second type (respectively) occurs at the moment t_i.

It is guaranteed that all t_i are positive integers not exceeding 10^9, and the events will be given in the order of strictly increasing t_i. Moreover, for the k-th event of the second type, there will be at least k events of the first type preceding it. Finally, it is guaranteed that there will be exactly n events of the first type and exactly n events of the second type.

Output

For each proposal (event of the first type), print the expected time it will stay in the waiting pool. Your answer will be considered correct if its absolute or relative error does not exceed 10^{-6}.

Formally, assume that your answer is a, and the answer of the jury is b. The checker program will consider your answer correct if $\frac{|a-b|}{\max(1,b)} \le 10^{-6}$.

Examples

standard input	standard output
2 + 1 + 3 - 8 - 12	9.0000000000 7.0000000000
4 + 1 - 2 + 3 - 4 + 5 - 6 + 7 - 8	1.0000000000 1.0000000000 1.0000000000 1.0000000000
3 + 4 + 10 - 11 + 16 - 20 - 100	31.5000000000 25.5000000000 44.0000000000

Note

In the first sample, Boris receives all two proposals first and then uses them in two contests. Each proposal has the probability $\frac{1}{2}$ to be used in each of the contests. Thus, the expected waiting times are $(8-1)\cdot 0.5+(12-1)\cdot 0.5 = 3.5+5.5 = 9$ for the first proposal and $(8-3)\cdot 0.5+(12-3)\cdot 0.5 = 2.5+4.5 = 7$ for the second one.

In the second sample, each proposal is almost immediately used to conduct a contest.