

## New Salaries

*Limits: 1 sec., 256 MiB*

Oh no! It's October and the communists took control of the country again. This is going to have bad consequences for Mr. Bourgeois company, which just approved the way new salaries will be calculated. The company has  $N$  workers and the salary for each of them is going to be determined as a number drawn uniformly from the range  $[L_i, R_i]$ . Since the company already figured out which workers are the most efficient ones, for each  $i$  in  $[2, N]$  we know that  $L_{i-1} \leq L_i$  and  $R_{i-1} \leq R_i$  - but note that as a result of chance, worker  $i - 1$  can still end up with a larger salary than worker  $i$ .

The communists who thrive for equality introduced a new law, where any worker who got a smaller salary than one of his coworkers can sue the company for the amount of their difference. What's even more atrocious is that they can do it for every worker who got a larger salary. So if there were three employees: Alice, Bob and Charlie who got salaries of amounts 1, 3 and 7 coins respectively, then employee Bob can sue with regards to Charlie for 4 coins, while Alice can sue for 2 coins because of Bob and for 6 coins because of Charlie. The total amount of damages the company will have to pay is 12.

While the exact salary amounts are not known yet, Mr. Bourgeois would like to find out the expected amount of damages that his company will have to pay. Since the answer can be very big, output the answer divided by  $N^2$ .

## Input

The first line contains  $N$ . The next  $N$  lines each contain two real numbers -  $L_i$  and  $R_i$ .

## Output

Output one number - expected payment divided by  $N^2$ . Your answer will be considered correct if it's absolute or relative error is less than  $10^{-4}$ .

## Constraints

$$1 \leq N \leq 100000, 1 \leq L_i \leq R_i \leq 10^6$$

## Samples

Input ( <i>stdin</i> )	Output ( <i>stdout</i> )
2 1.2 10.2 2.2 15.2	1.114672365
3 1 3 3 5 100 120	24