

Hard Problem

Description

HH and Shik are happy tree friends. They usually play some games together.

Now they are playing a game. Both of them have to pick one real number. It's too boring to them because they can pick a real number with no condition! They decide to modify the steps of the game as following :

First, they will choose the some ranges $[l_i, r_i]$. The range they choose may overlap with others. Second, they choose a real number belongs to the union of ranges $[l_1, r_1] \cup \dots \cup [l_n, r_n]$ uniform randomly.

They want to ask you a question before they choose a real number. Can you tell them what the expected value of product of the numbers they choose?

Input

The first line contains an integer T indicating the total number of test cases. Each test case starts with one line containing a integer n , denoting the number of range they choose. Then n lines with two integers l_i, r_i .

- $1 \leq T \leq 1000$
- $1 \leq n \leq 100000$
- $0 \leq l_i \leq r_i \leq 10^6$
- There are at most 5 test cases with $n > 1000$.

Output

For each test case, please output the answer in one line.

Sample Input

```
2
3
1 2
3 5
8 13
3
1 3
2 4
3 5
```

Sample Output

```
60.0625
9
```