Meeting Schedule

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

A company has n employees, and each employee i has a free time window $[l_i, r_i]$ (both endpoints are integers) during which they can attend meetings.

The company is organizing a team-building event where every pair of employees needs to have a one-on-one conversation. For two employees to meet, their free time windows must intersect (share at least one common point).

Employees can adjust their schedules by changing the endpoints of their free time windows. However, rescheduling is troublesome, and changing an endpoint from time a to time b causes $(a - b)^2$ units of frustration. Larger adjustments require moving more appointments around, so the frustration grows quadratically. After adjustment, each time window must remain valid (the left endpoint smaller than or equal to the right endpoint, and both endpoints are still integers).

You need to find the minimum total frustration so that every pair of employees can find a time to meet.

Input

There are multiple test cases. The first line of the input contains an integer T ($1 \le T \le 10^4$), indicating the number of test cases. For each test case:

The first line contains an integer n ($2 \le n \le 2 \times 10^5$), indicating the number of employees.

For the following n lines, the i-th line contains two integers l_i and r_i ($0 \le l_i \le r_i \le 10^6$), indicating the free time window of the i-th employee.

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

Output

For each test case, output one line containing an integer, indicating the minimum total frustration.

Example

standard input	standard output
3 3 6 8 0 2 1 7 2 1 3 2 4 2 1 1 100 100	8 0 4901

Note

For the first sample test case, employee 1 can adjust his/her window from $[6, 8]$ to $[4, 8]$ with frustration $(6 - 4)^2 = 4$, and employee 2 can adjust from $[0, 2]$ to $[0, 4]$ with frustration $(4 - 2)^2 = 4$. Now the three windows $[4, 8]$, $[0, 4]$, $[1, 7]$ pairwise intersect, so every pair can meet. The total frustration is $4 + 4 = 8$.

For the second sample test case, the two employees' windows already intersect, so no adjustment is needed.