Problem A. Business As Usual

Input file:	`business.in`
Output file:	`business.out`
Time limit:	12 seconds
Memory limit:	256 megabytes

You're planning to enter the market with your new amazing product, but want to pick just the right time. In order to do that, you're monitoring the demand for your product. More specifically, you know all possible buyers for your product, and for each buyer you know the maximum price p_i they're willing to pay. When you enter the market, you will need to choose the price p you're going to sell your product at. All buyers that are willing to pay that much ($p_i \geq p$) will buy your product, paying p each, all others will not buy your product. Assuming the cost to actually create the product is negligible, you want to maximize your income — p multiplied by the number of buyers with $p_i \geq p$.

However, the demand does not stay constant, so you need to estimate the maximum income in many different situations. More specifically, we will describe the changes in demand by pairs (p_j, n_j), denoting that the number of buyers with maximum price p_j has changed by n_j. n_j might be negative, meaning that some buyers that were previously willing to buy no longer are, but the total amount of buyers at each maximum price will stay non-negative.

You need to compute the maximum possible income after each change in demand.

Input

The first line of the input file contains one integer k ($1 \leq k \leq 15 \cdot 10^4$) — the number of changes in demand. The next k lines contain two space-separated integers each, p_j and n_j ($1 \leq p_j \leq 10^5$, $-10^6 \leq n_j \leq 10^6$), denoting the maximum price for which the demand is changing, and the change in demand for that maximum price. Initially there's no demand for your product.

Output

Output k integers one per line: after each change in demand, print the maximum possible income for the current market situation.

Examples

business.in	business.out
5 4 2 7 2 7 1 7 -1 4 -2	8 16 21 16 14

Note

Let's study the example. Initially there's no demand, then two buyers willing to pay at most 4 appear. At this moment it's optimal to sell at price 4, and earn 8. Then, two more buyers appear, willing to pay at most 7. Two possible strategies now are to sell at price 4, selling 4 units and earning 16, or to sell at price 7, selling 2 units and earning 14. Obviously, the first strategy is better. Now another buyer willing to pay 7 appears, and suddenly it's better to sell at price 7, earning 21 (selling at price 4 would earn only 20). Then that buyer disappears, driving the optimum back to 16. And finally the buyers willing to pay at most 4 disappear, leaving us with the obvious strategy to sell at 7 to the two remaining buyers, earning 14.