

Partially Free Meal

Input file: **standard input**
Output file: **standard output**
Time limit: 2 seconds
Memory limit: 512 megabytes

A new restaurant is opened in Byteland. To attract more customers, the meal is partially free. Specifically, there are n types of dishes on sale, labeled by $1, 2, \dots, n$. Each dish can not be ordered more than once. For the i -th dish, its basic price is a_i dollars, and its event price is b_i dollars. Assume you have ordered k dishes $p_1, p_2, \dots, p_k$ ($1 \leq p_i \leq n, p_i < p_{i+1}$), the total amount of dollars that you need to pay for is:

$$\sum_{i=1}^k a_{p_i} + \max_{i=1}^k \{b_{p_i}\}$$

You are a customer at this restaurant, you decide to order exactly k dishes, what's the minimum possible amount of dollars that you need to pay for?

Input

The first line of the input contains a single integer n ($1 \leq n \leq 200\,000$), denoting the number of dishes. Each of the following n lines contains two integers a_i and b_i ($1 \leq a_i, b_i \leq 10^9$), denoting the basic price and the event price of each dish.

Output

Print n lines, the k -th ($1 \leq k \leq n$) of which containing an integer, denoting the minimum possible amount of dollars that you need to pay for when you order exactly k dishes.

Example

standard input	standard output
3	7
2 5	11
4 3	16
3 7	