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Problem H – Horrible Restaurants

Ricardo is a restaurant critic, which means he spends his time eating at restaurants and giving them a rating. Each rating is an integer number of stars between 0 and 3, inclusive. Thus, there are exactly four possible ratings.

During his visit to Cheapland, he must review N restaurants. Unfortunately, all of them are terrible, and if left to his honest opinion, Ricardo would give 0 stars to every restaurant. However, the government of Cheapland can bribe Ricardo to increase the rating of any restaurant.

Each restaurant has its own bribe costs, which depend both on the restaurant itself and on the number of stars awarded. Bribing Ricardo to give a restaurant 3 stars is always more expensive than bribing him for 2 stars, which in turn is more expensive than bribing him for 1 star. Naturally, no payment is required for a 0-star rating.

As one might imagine, the Cheapland government wants to spend as little as possible while making their gastronomic scene look as strong as possible. To plan their strategy, they need to determine the minimum cost required to achieve a total of k stars among all the N restaurants, for every integer value k between 1 and $3N$, inclusive.

However, since bribe costs vary from restaurant to restaurant, calculating these values isn't straightforward – which is why they need your help.

Input

The first line contains an integer N ($1 \leq N \leq 2 \cdot 10^5$) indicating the number of restaurants.

Each of the next N lines describes a restaurant with three integers C_1, C_2 and C_3 ($1 \leq C_1 < C_2 < C_3 \leq 10^9$), where C_i is the cost of getting a rating of i stars for the restaurant.

Output

Output a line for each k from 1 to $3N$ (inclusive), with an integer indicating the minimum total cost required to achieve exactly k stars among all the N restaurants.

Sample input 1	**Sample output 1**
3 1 2 3 2 10 11 5 6 7	1 2 3 5 9 10 12 20 21

Sample input 2	Sample output 2
4 999999998 999999999 1000000000 999999998 999999999 1000000000 999999998 999999999 1000000000 999999998 999999999 1000000000	999999998 999999999 1000000000 1999999998 1999999999 2000000000 2999999998 2999999999 3000000000 3999999998 3999999999 4000000000