Orange Collector

Daniel the Oranje has decided to venture to Katong Dungeon to conduct a research on a new breed of oranges, the triple-XXY breed of oranges, which are extremely big and juicy.

When he arrives, Daniel finds N oranges lined up in a neat row, ready to be shipped off to Appleland. Now is the time to strike! Daniel decides that he shall take a subset of these oranges back to Orangeland where Ryan the Smurf and Shaun the Sheep can conduct some research.

For the triple-XXY orange i, the orange has a juiciness level A_i. Daniel would like to choose the set of oranges that has the maximum sum of A_i.

Since Daniel has many minion oranges, he would need to specify to his minions the list of indices of the oranges that he would like. Let us assume that Daniel chooses M oranges ($1 \leq M \leq N$) and that the indices of oranges chosen are $P_1, P_2, ..., P_{M-1}, P_M$, such that $P_1 \leq P_2 \leq ... \leq P_{M-1} \leq P_M$.

Triple-XXY oranges are of course, violent. They need to have some form of similarity or they will start fighting and cause this mission to be a disaster. Every orange has an ugliness level C_i. When packaging the oranges, it is necessary that for $1 \leq j < M$, $(C_{P_j} \& C_{P_{j+1}}) > 0$, where & refers to the bitwise AND operator.

Triple-XXY oranges, as we all know, wear lipstick, face masks and nail polish. They are extremely vain. If the orange on their left is too ugly, their eyes will get cancer. If the orange on their left is too beautiful, they will sink into depression and social anxiety. Each orange i has a range of willingness levels from L_i to R_i. Hence, it is necessary that for $1 \leq j < M$, $L_{P_{j+1}} \leq C_{P_j} \leq R_{P_{j+1}}$.

Find and output the maximum juiciness level.

Input

The first line of input will be a number N.

For the next N lines from lines 2 to $N+1$, line i will contain A_i, C_i, L_i, R_i.

Output

Output will be one line, the maximum total juiciness level.

Subtasks

The maximum execution time for each instance is 2.5s. For all testcases, the input will satisfy the following bounds:

- $1 \le N \le 10^5$
- $1 \le A_i, C_i, L_i, R_i \le 10^5$

Subtask	Marks	Additonal Constraints
1	5	$N = 2$
2	15	$1 \le N \le 1000$
3	20	$C_i = 1$ for all $1 \le i \le N$
4	20	$L_i = 1$, $R_i = 10^5$ for all $1 \le i \le N$
5	40	No additional constraints

Sample Input 1

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4
3 4 1 5
2 3 1 5
1 2 1 5
4 1 1 5
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Sample Output 1

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6
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Sample Input 2

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6
5 5 2 6
4 3 1 2
3 1 3 4
4 1 1 4
2 5 1 5
6 8 1 8
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Sample Output 2

13

Sample Input 3

5
7 1 2 4
2 1 1 2
5 1 4 6
3 1 5 6
5 1 1 4

Sample Output 3

14

Sample Output Explanation

For sample input 1, Daniel will pick oranges 2 and 4. This is allowed as $L_4 \leq C_2 \leq R_4$. Sample input 1

For sample input 2, Daniel will pick oranges 2, 3, 4 and 5.

For sample input 3, Daniel will pick oranges 1, 2 and 5.

Note: Sample input 3 is valid for subtask 3.