Reading Papers (reading)

Luca knows that to become a good scientist he has to read *a lot of papers* in his field. However, it is always challenging to find the right balance between reading what other researchers have published and doing your own work!

Figure 1: Hopelessness increases as the list of papers grows longer and longer...

To tackle this problem systematically, he has decided to organize in advance all the reading work for the next L days. He has collected N papers that he wants to read, each consisting of P_i pages for $i = 0 \dots N-1$, and he has divided them into two groups.

The first group comprises "the classics": foundational papers that can be read at any time. The second, instead, includes papers on recent hot topics, whose relevance vanishes after a given deadline D_i. For convenience, we indicate $D_i = -1$ when there is no deadline, and $D_i = d$ (with d between 0 and $L-1$) when the deadline is d days in the future from today.

Luca has decided to allocate a limited amount of time to the reading activity: on any given day, he wants to read **at most one paper** (no matter its page length). Doing so might result in some papers not being read by the deadline: in such cases, those papers are always discarded and not considered further, it would be a waste of time to read hot topic papers after the deadline!

What is the maximum number of pages that Luca can read in the next L days, optimizing his reading strategy towards this aim?

> ☞ Among the attachments of this task you may find a template file `reading.*` with a sample incomplete implementation.

Input

The first line contains the two integers N and L. The following N lines contain two integers P_i and D_i each: the number of pages of the i-th paper, and its deadline (or -1 when there is no deadline).

Output

You need to write a single line with an integer: the maximum number of pages that can be read respecting deadlines.

Constraints

- $1 \leq N, L \leq 150\,000$.
- $1 \leq P_i \leq 100$ for each $i = 0 \ldots N-1$.
- $0 \leq D_i < L-1$ or $D_i = -1$ for each $i = 0 \ldots N-1$.
- Luca can already start reading a paper on the first day (day 0, today).

Scoring

Your program will be tested against several test cases grouped in subtasks. In order to obtain the score of a subtask, your program needs to correctly solve all of its test cases.

– **Subtask 1** (0 points) Examples.

– **Subtask 2** (20 points) $D_i = 0$ or $D_i = -1$ for each $i = 0 \ldots N-1$.

– **Subtask 3** (25 points) $N, L \leq 10$ and every paper has a deadline: $D_i \neq -1$ for each i.

– **Subtask 4** (30 points) $N, L \leq 1000$ and every paper has a deadline: $D_i \neq -1$ for each i.

– **Subtask 5** (15 points) $N, L \leq 1000$.

– **Subtask 6** (10 points) No additional limitations.

Examples

input	output
3 365 5 30 20 0 10 0	25
4 365 5 -1 42 -1 20 0 10 0	67

Explanation

In the **first sample case**, two papers need to be read immediately by the first day (day 0). To maximize the page count, Luca can pick the second one from the list (20 pages). Then, he can comfortably read the first paper (5 pages) on any day between day 1 and day 30.

In the **second sample case**, one of the optimal reading strategies consists in reading the third paper (20 pages) on the first day, and then reading the first and second one (5 and 42 pages) during the next following two days.