Modules

Time Limit: 2.5s
Memory Limit: 512MB

Task Statement

Jacob is considering which modules he should take for the next year, in fact, he has shortlisted N modules he is considering. Each module has a start time, S_i, an end time, E_i, and the number of modular credits it offers, C_i. To graduate, he must select modules with a cumulative modular credit of greater than or equal to K. However, Jacob hates classes that are close together (in time). In fact, he wants the smallest time difference between two adjacent classes to be as large as possible! Since he has better things to do than coding this question, he wants you to help him find what is this largest difference.

Note that he cannot take two modules simultaneously. However, if a module ends just as another begins, he is able to attend both as travel time is obviously negligible. He just won't be very happy as the gap between the modules is 0.

Input

The first line of the input consists of 2 integers, N and K. The next N lines of the input consists of 3 integers each, representing S_i, E_i, and C_i for the i-th module.

Output

Output one integer, representing the maximal value of the smallest gap between two modules if he selects the optimal selection of modules. If he can graduate by choose only one module, output "1000000000". If he cannot graduate via any means, output "-1".

Subtasks

Subtask	Score	Bounds	Additional Info
1	21	$N, K \leq 100$	$S_i, E_i \leq 100$
2	27	$N, K \leq 500$	-
3	36	$N \leq 100{,}000$	-
4	11	$K = 2$	$C_i = 1$
5	5	No additional constraints	-
For all subtasks: $0 < N \leq 1{,}000{,}000$, $0 \leq S_i < E_i, \leq 10^9$, $0 < C_i, K \leq 10^9$			

Sample Input 1:

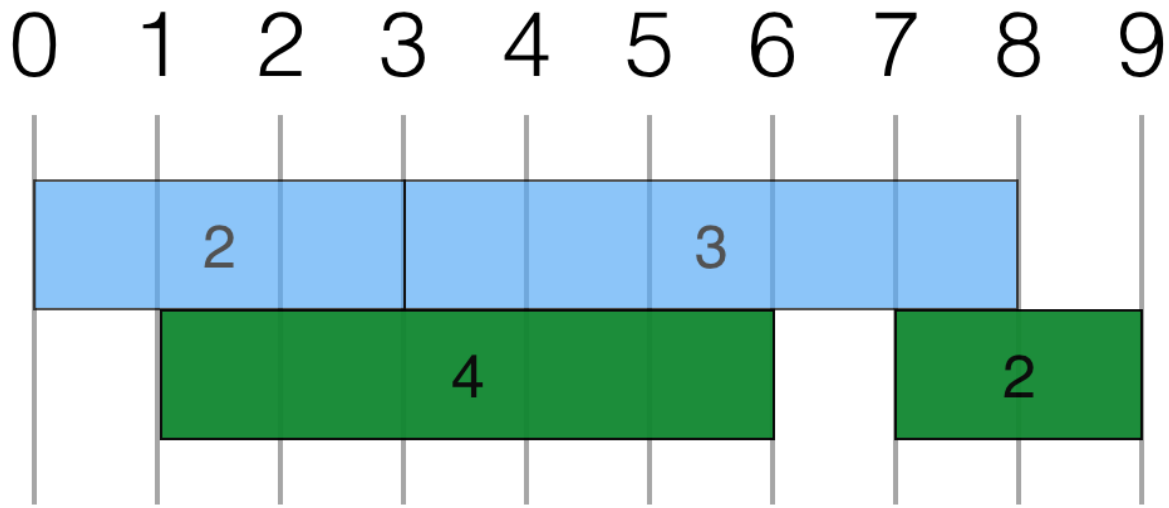
```
4 5
0 3 2
1 6 4
3 8 3
7 9 2
```

Sample Output 1:

```
1
```

Note that this only satisfies Subtasks 1, 2, 3, and 5.

Here's an illustration of sample input 1:



The solution by picking the modules in dark green (darker in B&W).

Sample Input 2:

```
6 2
0 3 1
1 2 1
2 5 1
3 4 1
4 6 1
3 7 1
```

Sample Output 2:

2

Sample Input 3:

3 3
1 298 1
384 409 1
583 999 1

Sample Output 3:

86

Even though the module timetable looks ridiculous, Jacob still has to take all three modules. The smallest gap between the modules is 86 time units.

Note that this only satisfies Subtasks 2, 3 and 5.