

# Ditto Piano

Input file:            **standard input**  
Output file:           **standard output**  
Time limit:            6 seconds  
Memory limit:         256 megabytes

Busy Beaver is an avid fan of Sheet Music Boss and dreams of playing long, intricate pieces on his piano. However, with only a measly 10 fingers, there's not much he can do. Fortunately, his friend Ditto can grow an arbitrary number of fingers on their hand, letting them play any piece imaginable.

Ditto is trying to play a song consisting of  $N$  notes, numbered 1 to  $N$ . To play the  $i$ -th note, Ditto must press key  $k_i$  at time  $a_i$  and let go at time  $b_i$ . It is guaranteed that no two notes with the same key are played at the same time. In other words, for all pairs of notes  $(i, j)$  where  $k_i = k_j$ , either  $b_i \leq a_j$  or  $b_j \leq a_i$ .

Ditto plans to use a single hand with  $F$  fingers, numbered left to right from 1 to  $F$ , to play the song. They want to assign the finger  $f_i$  to the  $i$ -th note. Ditto can play the song if they can assign a finger to each note to satisfy the following criteria:

- At no point in time do their fingers cross. Formally, for all pairs of notes  $(i, j)$  where there exists a time  $t$  where  $a_i < t < b_i$  and  $a_j < t < b_j$ , if  $k_i < k_j$ , then  $f_i < f_j$ .

Ditto is allowed to delete up to  $M$  notes from the song, where  $M$  is **0 or 1**. Find the minimum number of fingers they need on their hand in order to play the rest of the song. In other words, find the smallest  $F$  where there exists a finger assignment  $f$  that satisfies the above criteria.

## Input

Each test contains multiple test cases. The first line contains the number of test cases  $T$  ( $1 \leq T \leq 10^4$ ). The description of the test cases follows.

The first line of each test case contains two integers  $N$  and  $M$  ( $1 \leq N \leq 2 \cdot 10^5$ ,  $M = 0$  or  $1$ ).

The  $i$ -th of the next  $N$  lines contains three integers  $k_i$ ,  $a_i$ , and  $b_i$  ( $1 \leq k_i \leq 10^9$ ,  $1 \leq a_i < b_i \leq 10^9$ ) — meaning that the  $i$ -th note uses key  $k_i$  from time  $a_i$  to time  $b_i$ .

It is guaranteed that no two notes with the same key are played at the same time and the sum of  $N$  over all test cases does not exceed  $2 \cdot 10^5$ .

## Output

For each test case, print the minimum number of fingers Ditto needs on their hand so that after at most  $M$  note deletions, there exists a satisfactory finger assignment.

## Scoring

There are three subtasks for this problem.

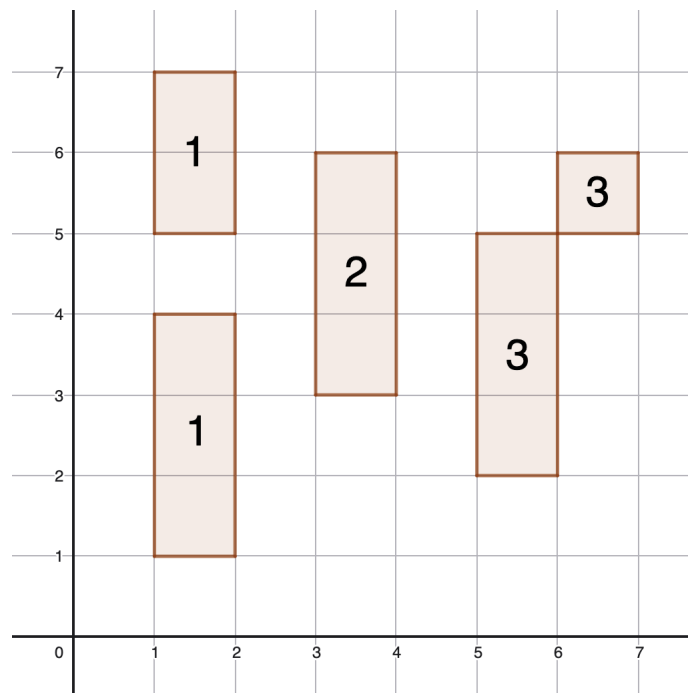
- (10 points): The sum of  $N$  over all test cases does not exceed  $10^3$  and  $M = 0$ .
- (20 points):  $M = 0$ .
- (70 points): No additional constraints.

## Example

standard input	standard output
5	3
5 0	3
3 3 6	2
5 2 5	1
6 5 6	0
1 1 4	
1 5 7	
5 1	
2 1 6	
10 1 6	
4 5 9	
8 5 9	
6 8 10	
4 1	
1 1 2	
2 1 2	
1 3 4	
2 3 4	
1 0	
6 2 5	
1 1	
6 2 5	

## Note

The notes for the first test case are shown below. The x-axis is the key pressed, and the y-axis is the time interval the note is pressed. The minimum number of fingers required is 3 — each note is labeled with a finger to achieve this.



The notes for the second test case are shown below. Deleting either the yellow or blue note would make 3 fingers sufficient, and this is optimal.

