

Disk Failure 2 (disks2)

Edoardo is busy setting up the servers that will host the second OIS round. However, he notes that the servers have something odd. Edoardo immediately recognizes the reason: the disks are broken again!

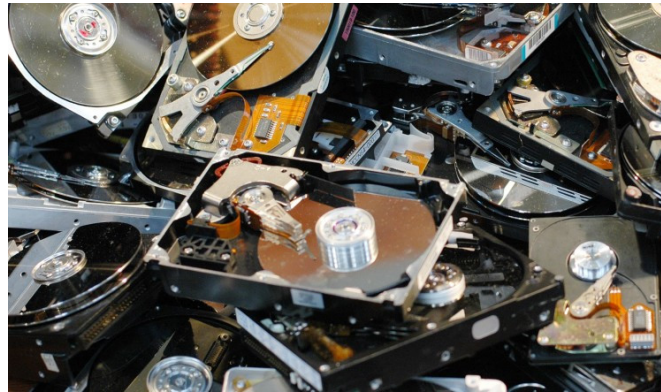


Figure 1: It's not the first time it happens.

The server will host N contests in the next N days, each contest start from hour A_i to hour B_i of day i . Edoardo knows he will need T hours to repair the broken disks. During the repair the server has to be turned off, but Edoardo doesn't want to turn off the server during a contest, so he has to do it at night. Since this is quite urgent, help Edoardo by finding the first contest after which he can turn off the server and repair the disks.

 Among the attachments of this task you may find a template file `disks2.*` with a sample incomplete implementation.

Input

The first line contains two integers N and T .

The next N lines each contain two integers A_i and B_i .

Output





You need to write a single line with an integer: the first night Edoardo can repair the disks or -1 if he can't repair the disks **before the last contest**.

Constraints

- $1 \leq N \leq 100\,000$.
- $1 \leq T \leq 24$.
- $0 \leq A_i < B_i \leq 24$ for each $0 \leq i \leq N - 1$.
- $A_0 = 0$.
- Hour 24 of day i is the same as hour 0 of day $i + 1$.

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** (40 points) $A_i = 0$ for each $0 \leq i \leq N - 1$.

- **Subtask 3** (30 points) $T = 1$.

- **Subtask 4** (30 points) No additional limitations.


Examples

input	output
5 10 0 20 5 23 7 19 10 22 9 20	2
3 20 0 23 7 23 6 22	-1

Explanation

In the **first sample case**, Edoardo needs 10 hours to replace the disks.

- The first night the server is unused from 20:00 to 5:00 for 9 hours which is not enough.
- The second night the server is unused from 23:00 to 7:00 for 8 hours which is not enough.
- The third night the server is unused from 19:00 to 10:00 for 15 hours which is enough to replace the disks.

In the **second sample case**, Edoardo needs 20 hours to replace the disks.

- The first night the server is unused from 23:00 to 7:00 for 8 hours which is not enough.
- The second night the server is unused from 23:00 to 6:00 for 7 hours which is not enough.

Edoardo can't repair the disks before the last contest, so the answer is -1 .