The Ritual Square

Input file:	`standard input`
Output file:	`standard output`
Time limit:	2 seconds
Memory limit:	1024 megabytes

Once the city was complete, people held rituals to honor the light. Small lights were arranged throughout the village square, each one glowing gently with its own unique hue.

Now, the next phase of the ceremony begins. Each light begins its journey along a chosen path, casting light into unseen spaces. Their movements must be orchestrated with care, ensuring that no paths cross—each must flow in its own quiet rhythm.

Follow the patterns they once traced, and restore the moment when the lights spread outward.

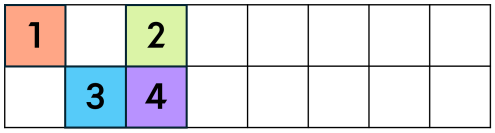
The floor of the square is represented as a grid with H rows and a sufficiently large number of columns. The cell at the r-th row from the top and c-th column from the left is denoted by (r, c).

The people of the island placed N light sources on this grid. As part of the ritual, each light source must move rightward—that is, in the direction of increasing column indices—by a specified distance.

Due to the complexity of synchronizing the movement of the lights, several constraints must be observed:

- Each light is mounted at the center of a 1×1 square tile.
- The N tiles must each move a unique integer distance from 1 to N.
- All N tiles begin moving at the same time, travel at a constant speed, and must arrive at their destinations simultaneously.
- Tiles must not overlap at any point during their movement (though touching edges is allowed).
- After all movements are complete, no two lights may end up in the same column.

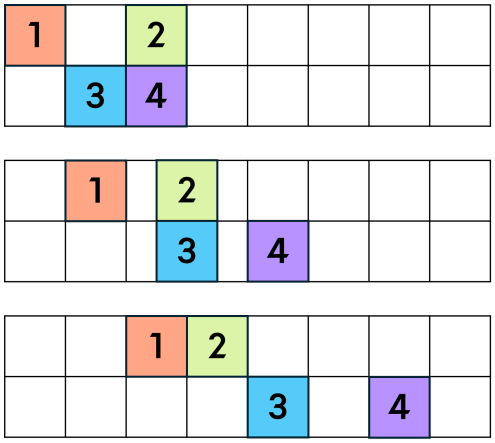
For example, consider $H = 2$ and $N = 4$, with the initial positions of the lights at $(1, 1), (1, 3), (2, 2), (2, 3)$. In the diagram below, each light tile is represented by a colored square.



If we assign the following movement distances to the lights, all the conditions described above are satisfied:

Index	Starting Position	Distance Moved	Final Position
1	$(1, 1)$	2	$(1, 3)$
2	$(1, 3)$	1	$(1, 4)$
3	$(2, 2)$	3	$(2, 5)$
4	$(2, 3)$	4	$(2, 7)$

Below is a visual representation of the lights at three points in time: the beginning, the midpoint of their movement, and the final positions.



Your task is to determine whether it is possible to assign movement distances to the lights in a way that satisfies all the given conditions. If it is possible, provide one valid assignment.

Input

The first line contains two space-separated integers—H and N.

The following N lines each contain two space-separated integers r_i and c_i, indicating that the i th light starts at position (r_i, c_i).

- $1 \leq H \leq 10^9$
- $2 \leq N \leq 2 \times 10^5$
- $1 \leq r_i \leq H$ $(1 \leq i \leq N)$
- $1 \leq c_i \leq 10^9$ $(1 \leq i \leq N)$
- $(r_i, c_i) \neq (r_j, c_j)$ $(1 \leq i < j \leq N)$

Output

If it is possible to assign movement distances such that all conditions are satisfied, print `YES` on the first line.

On the second line, print N space-separated integers $B_1, B_2, \cdots, B_N$, where B_i is the distance the i-th light should move to the right. If multiple valid solutions exist, print any of them.

If it is not possible, print `NO` on a single line.

Scoring

- Subtask 1 (12 points): $N \leq 9$
- Subtask 2 (5 points): $c_1 = c_2 = \cdots = c_N$
- Subtask 3 (32 points): $H = 1$, $N \leq 1000$
- Subtask 4 (11 points): $H = 1$
- Subtask 5 (40 points): No additional constraints.

Examples

standard input	standard output
2 4 1 1 1 3 2 2 2 3	YES 2 1 3 4
10 3 7 1000000000 9 1000000000 3 1000000000	YES 2 1 3
1 5 1 1 1 3 1 5 1 7 1 9	YES 5 4 3 2 1