Problem D. darkkcyan and Contestant Positions Planning

Input file:	standard input
Output file:	standard output
Time limit:	2 seconds
Memory limit:	256 megabytes

The final round of the VNOI Cup season XX will be held in a room of length n. In the room, there are n evenly spaced positions numbered from 1 to n. At position i, we can place a desk or a network connection device.

For each contestant, we need to choose a pair of positions (u, v) $(1 \le u < v \le n)$, one position for placing his desk and one position for placing the network connection device. To ensure the best possible connection for each contestant, the computer on the contestant's desk will be wired to their network connection device. Therefore, when arranging positions for the contestants, the following conditions must be satisfied:

- No two contestants can have desks at the same position.

- No two network connection devices can be placed at the same position.

- The positions of the desks and network connection devices must be different to ensure safety.

- When arranging positions for the contestants, there cannot exist two pairs of positions (u, v) and (u', v') such that $u < u' < v < v'$. This is because if these two pairs of positions exist, the two network cables connecting the pairs of positions will *intersect*, making it difficult for the technical staff to wire them.

darkkcyan is assigned the task of arranging positions for the contestants and network connection devices. Of course, *darkkcyan* needs to do this optimally so that as many contestants as possible can sit in the contest room. During the process of arranging positions for the contestants, there are m events that occur. At the i-th event, a new contestant enters the room and is assigned the pair of positions (u_i, v_i). It is guaranteed that at any given time, the positions of the contestants in the room satisfy the aforementioned requirements.

After each event, help *darkkcyan* calculate the **maximum** number of contestants that can be added to the contest room while still satisfying the requirements.

Input

The first line contains two integers n and m $(2 \le n \le 10^9$, $1 \le m \le \min\left\{\frac{n}{2}, 500\,000\right\})$ – the number of positions in the contest room and the number of events.

The i-th line of the next m lines contains two integers u_i and v_i $(1 \le u_i < v_i \le n)$ – the position pair of the contestant entering the room in the i-th event.

It is guaranteed that at any given time, the positions of the contestants in the room satisfy the requirements mentioned in the statement.

Output

Print m lines. The i-th line should contain a single integer, the maximum number of contestants that can be added to the contest room while still satisfying the requirements.

Scoring

Subtask	Score	Constraints
1	500	$m \leq 5000$
2	500	$u_i > u_{i+1}$ for all $1 \leq i < m$
3	1250	No additional constraints
Total	2250	

Examples

standard input	standard output
7 3 3 4 5 6 1 7	2 1 0
8 2 5 7 2 4	2 1
100 10 84 95 75 76 71 73 70 78 59 66 58 69 6 11 4 22 3 51 1 79	49 48 46 45 44 43 42 41 40 38