Land Division (100 Marks)

Mr. Tiwari has grown old and wants to divide the rectangular land among his N sons. The rectangular field has area an of L \* B where B = 1 fixed. Mr. Tiwari has divided the land into the L continuous segments of 1 \* 1 each. The money value of each segment is different though and is known to Mr. Tiwari only. He wants his sons to choose to their choice of the land but without knowing the money value of the land. The land segments are numbered from 0 to L-1 and the same is the money value of that segment of land.

For example, if the land segment is numbered 1, then the money value of that segment is 1 Crore.

Mr. Tiwari asked his sons to choose the starting (S) and ending (D) land segment (both inclusive) of their choice but only the continuous ones are allowed. The first son will choose first, then second and so on from the remaining portion of the land.Mr. Tiwari would also provide the closest left and right land segments apart from the chosen segment if possible.

Example:

Consider the length of the rectangular field as 5.

If the son has chosen a land segment from 1 to 3, then Mr. Tiwari would also provide the land segment 0 and 4 to the son as they are the closest left and right segment to his chosen land segment.

All the N sons have made their choice of the land segments and Mr. Tiwari wants to find out the money value that each son will have at the end of land division. He is not good with calculations though and needs your help for it.

Example:

Consider there are 3 sons of Mr. Tiwari, N = 3.

The length of the rectangular field is 10 and it is divided into segments of 1\*1 each.

Son 1: The First son chooses a land segment from 2 to 3.

Money value = 2 + 3 = 5

Mr. Tiwari would provide the closest left and right segment. Thus, providing land segment 1 and 4.

Total Money value of first son = 5 + 1 + 4 = 10

Son 2: The Second Son chooses a land segment from 5 to 5.

Money value = 5

Mr. Tiwari would provide the closest left and right segment. Thus, providing land segment 0 and 6.

Note: Land segments 1 to 4 are already occupied by the Son 1. Closest left segment thus is segment 0.

Total Money value of second son = 5 + 0 + 6 = 11

Son 3: The Third son chooses land a segment from 7 to 8

Money value = 7 + 8 = 15

Mr. Tiwari would provide the closest left and right segment. Since there is no land segment free on the left side, he will get only the right land segment which is 9.

Total Money value of third son = 15 + 9 = 24

Can you help Mr. Tiwari to know the final money value of each for his sons?

Note: All the sons have chosen a valid land segment which is true for all the test cases.

Input Format

The first line of input consists of two space-separated integers, length of rectangular land (L) and number of sons (N).

Next N lines consists of two space-separated integers each, starting index of land segment (S) and ending index of land segment (D). Ni line represents the land segments chosen by the Ni son.

Constraints

1< = L <=10000000000 (1e9)

0<= S <= D <L

1<= N <=100000 (1e5)

Output Format

For each son, print the total money value in a separate line.

Sample TestCase 1

Input

10 3

2 3

5 5

7 8

Output

10

11

24

Explanation

As explained in the example above.