# Dividing the Land

Ram Das wanted to divide his rectangular land among his **N** daughters. Area of the rectangular land is **L * B** where B = 1 (fixed). Ram Das has divided his lengthy piece of land into **L** continuous segments of 1 * 1 each. The value of each of these segments is different and is known to Ram Das only. He wanted his daughters to choose the land segments but without knowing the money value of the segments. The segments are numbered from **0 to L-1** and the same is the money value of that segment of land.

For example, if the number of the segment is 1, then the money value of that segment is 1.

Ram Das asked his daughters to choose the starting (**S**) and ending (**D**) segments (both inclusive) of their choice. But they can choose only continuous segments. The first daughter will choose first, then second daughter will choose and so on from the remaining portion of the land. Ram Das would also provide the closest left and right land segments apart from the chosen segment, if possible.

Example:
Let us consider that the length of the rectangular land as 5.
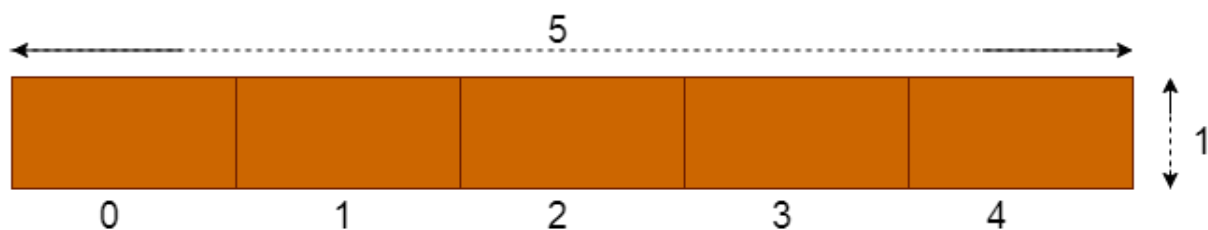
If the first daughter has chosen a land segment from 1 to 3, then Ram Das would also provide the land segment 0 and 4 to the daughter as they are the closest left and right segment to her chosen land segment.
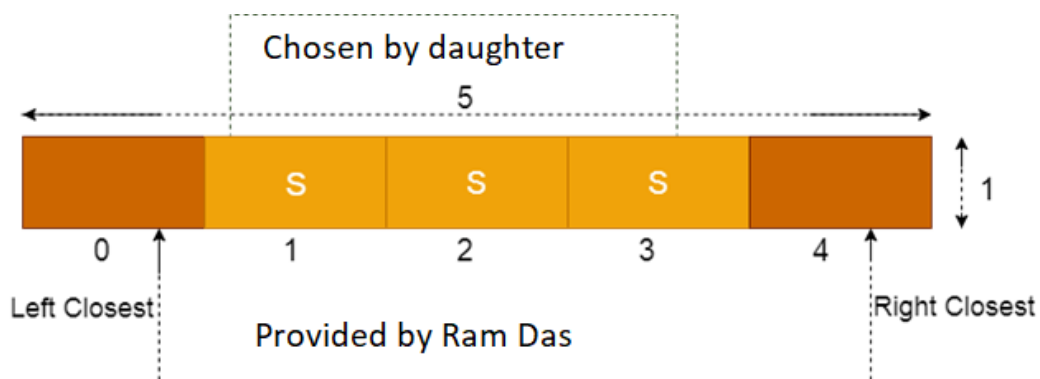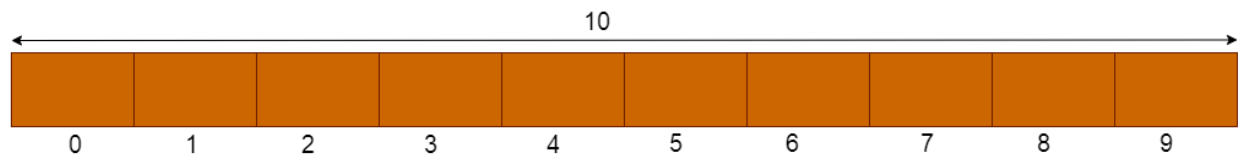
All the N daughters have made their choice of the land segments and Ram Das wants to find out the money value that each daughter will have at the end of land division.
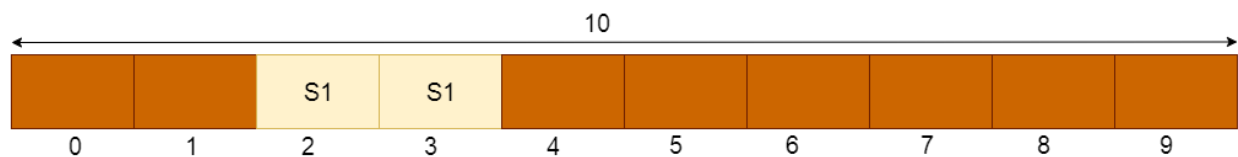
Example:
Consider there are 3 daughters of Ram Das, N = 3.
The length of the rectangular field is 10 and it is divided into segments of 1*1 each.
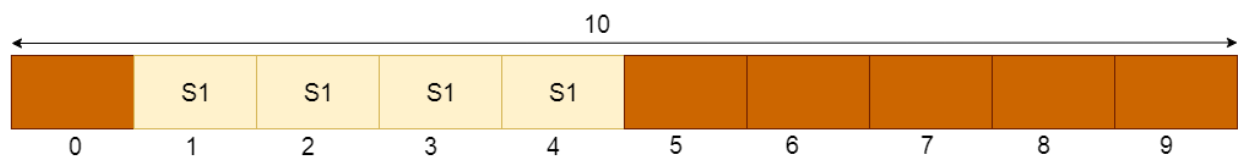

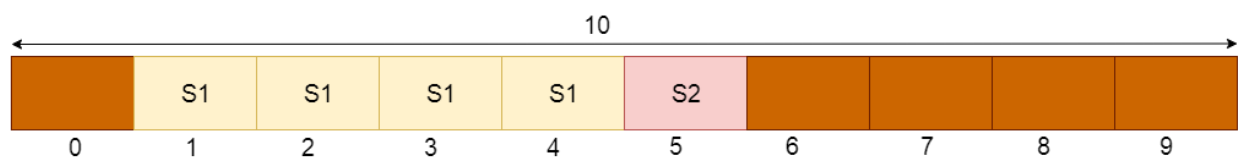**Daughter 1:** The First daughter chooses a land segment from 2 to 3. (marked as S1 below)

Money value = 2 + 3 = 5
Ram Das would provide the closest left and right segment. Thus, providing land segment 1 and 4.

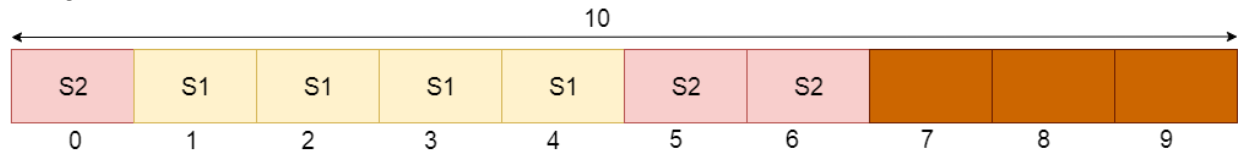

Total Money value for the first daughter = 5 + 1 + 4 = 10

Daughter 2: The Second Daughter (S2) chooses a land segment from 5 to 5.
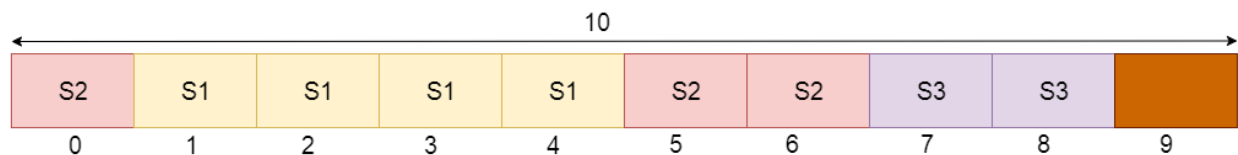
Money value = 5
Ram Das would provide the closest left and right segment. Thus, providing land segment 0 and 6.
Note: Land segments 1 to 4 are already occupied by the Daughter 1. Closest left segment thus is segment 0.
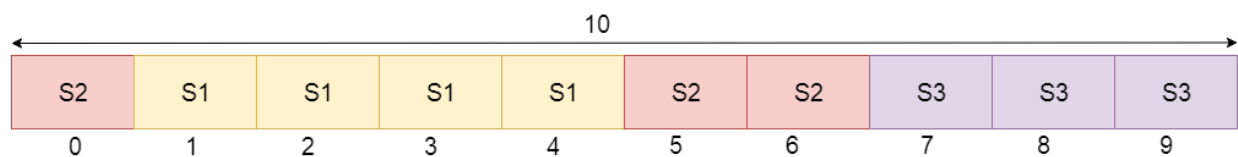

Total Money value of second daughter = 5 + 0 + 6 = 11

Daughter 3: The Third daughter (S3) chooses land segments from 7 to 8

Money value = 7 + 8 = 15
Ram Das 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 Daughter = 15 + 9 = 24

Can you help Ram Das to know the final money value of each for his daughters?

Note: All the daughters 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 daughters (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 daughter.

Constraints
1< = L <=10000000000 (1e9)
0<= S <= D <L
1<= N <=100000 (1e5)

Output Format
For each daughter, 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.