Two Robots

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You have a warehouse with M containers filled with an infinite number of candies. The containers are arranged in a single row, equally spaced to be 1 meter apart. You also have 2 robots that can pick up 1 piece of candy and transport it between any two containers.

The robots take instructions in the form of *queries* consisting of two integers, M_a and M_b, respectively. To execute a query, a robot travels to container M_a, picks up 1 candy, transports it to container M_b, and then stops at M_b until it receives another query.

Calculate the *minimum total distance* the robots must travel to execute N queries *in order*.

Note: You choose which robot executes each query.

Input Format

The first line contains a single integer, T (the number of test cases); each of the T test cases is described over $N+1$ lines.

The first line of a test case has two space-separated integers, M (the number of containers) and N (the number of queries).
The N subsequent lines each contain two space-separated integers, M_a and M_b, respectively; each line N_i describes the i^{th} query.

Constraints

- $1 \leq T \leq 50$
- $1 < M \leq 1000$
- $1 \leq N \leq 1000$
- $1 \leq a, b \leq M$
- $M_a \neq M_b$

Output Format

On a new line for each test case, print an integer denoting the *minimum total distance* that the robots must travel to execute the queries in order.

Sample Input

```
3
5 4
1 5
3 2
4 1
2 4
4 2
1 2
4 3
10 3
2 4
5 4
9 8
```

Sample Output

```
11
2
5
```

Explanation

In this explanation, we refer to the two robots as R_1 and R_2, each container i as M_i, and the total distance traveled for each query j as D_j.

Note: For the first query a robot executes, there is no travel distance. For each subsequent query that robot executes, it must travel from the location where it completed its last query.

Test Case 0:
The minimum distance traveled is 11:

- Robot: R_1
  $M_1 \rightarrow M_5$
  $D_0 = |1 - 5| = 4$ meters.
- Robot: R_2
  $M_3 \rightarrow M_2$
  $D_1 = |3 - 2| = 1$ meter.
- Robot: R_1
  $M_5 \rightarrow M_4 \rightarrow M_1$
  $D_2 = |5 - 4| + |4 - 1| = 1 + 3 = 4$ meters.
- Robot: R_2
  $M_2 \rightarrow M_2 \rightarrow M_4$
  $D_3 = |2 - 2| + |2 - 4| = 0 + 2 = 2$ meters.

Sum the distances traveled ($D_0 + D_1 + D_2 + D_3 = 4 + 1 + 4 + 2 = 11$) and print the result on a new line.

Test Case 1:

- Robot: R_1
  $M_1 \rightarrow M_2$
  $D_0 = |1 - 2| = 1$ meters.
- Robot: R_2
  $M_4 \rightarrow M_3$
  $D_1 = |4 - 3| = 1$ meters.

Sum the distances traveled ($D_0 + D_1 = 1 + 1 = 2$) and print the result on a new line.

Test Case 2:

- Robot: R_1
  $M_2 \rightarrow M_4$
  $D_0 = |2 - 4| = 2$ meters.
- Robot: R_1
  $M_4 \rightarrow M_5 \rightarrow M_4$
  $D_1 = |4 - 5| + |5 - 4| = 1 + 1 = 2$ meters.
- Robot: R_2
  $M_9 \rightarrow M_8$
  $D_2 = |9 - 8| = 1$ meters.

Sum the distances traveled ($D_0 + D_1 + D_2 = 2 + 2 + 1 = 5$) and print the result on a new line.

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```
1  import java.io.*;
2  import java.util.*;
3  import java.text.*;
4  import java.math.*;
5  import java.util.regex.*;
6
7  public class Solution {
8
9      public static void main(String[] args) {
10         /* Enter your code here. Read input from STDIN. Print output to STDOUT. Your class should be named Solution. */
11     }
12 }
```

Line: 1 Col: 1

Upload Code as File Test against custom input Run Code Submit Code