

Two Robots

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

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
 $M_9 \rightarrow M_8$

$$D_2 = |9 - 8| = 1 \text{ meters.}$$

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