Blocks Game

Problem Statement

In this problem, you will solve a puzzle from the Secret Society Hidden Mystery Game by G5 Games. A typical board for this game is shown here:

Each block can only move in one dimension: vertical blocks can only move vertically and horizontal blocks can only move horizontally. The goal of the game is to slide the yellow block out of the frame through the hole in the frame on the right side. To do that, you have to slide the rest of the blocks out of the way. In addition, for this problem, you must do it in the smallest number of moves possible.

Here are some details to constrain our game:

- Moving a block through two spaces counts as two moves.

- The task is just to find the minimum number of moves required to win the game – the sequence of specific moves is not important.

- The board is in form of a square.

- Once the yellow block is located right next to the exit, you have won the game. You do not need to move the yellow block off the board.

- The blocks can only move inside the board, and movement of any block outside the board is not permitted.

- The game is always winnable, in a finite number of moves.

Input Format

Each run of the program will process a sequence of test cases each containing an instance of the game.

The first line of input contains a number T. T specifies the number of test cases in the input.

Each test case is specified as follows:

On the first two lines of the test instance is an integer Y, representing the column with the leftmost side of the yellow block and N, giving the dimensions of the board. Since the board is always square, N is the number of rows and the number of columns of the board. Hence, the board coordinates can be considered as an N x N matrix (i.e. the top left corner of the board is row 0 and column 0). The yellow block is always located in the third row (i.e. it is in the row labelled 2).

The third line of the test case contains an integer B representing the number of brown blocks in the problem.

The next B lines give the location of each of the brown blocks in the following format:

$S\ D\ R\ C$

Where

- S is an integer give the number of spaces the block covers. A block will always fit in the board.

- D is either 'V' or 'H' designating whether the block is horizontal or vertical

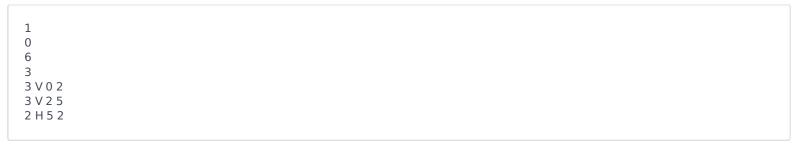- R and C are the row and column, respectively, of the top left square of the block

Constraints:

- $1 <= T <= 5$

- $0 <= Y < N - 2$

- $4 <= N <= 6$

- $1 <= B <= 12$

- The maximum number of unique board configurations that can be reached in any test instance is 250,000.

Output Format

The output must be one integer for each instance of the problem on a separate line giving the minimum number of moves required to win the game.

Sample Input

```
1
0
6
3
3 V 0 2
3 V 2 5
2 H 5 2
```

Sample Output

```
9
```

Explanation

The input specification corresponds to the image below.

This game is winnable in 9 moves. For example, one possible sequence of moves that wins in the shortest number of moves is:

1) Move the horizontal brown block one square to the right.

2-4) Move the left vertical block down three squares. Note that this counts as three moves.

5-7) Move the yellow block to the right three squares.

8) Move the right vertical block down one square.

9) Move the yellow block right one square so that it is next to the exit.