



## Problem J. Toby Stones

Input: Standard  
Output: Standard  
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Toby is an intelligent Boston Terrier who has a garden. In his garden he has  $N$  stones which, like Toby, are either black or white. The stones are organized in a row and numbered from 0 to  $N - 1$ .

Toby likes to change his stones quite a lot and he does so by taking a contiguous part of his stones, from integer indexes  $I$  to  $J$ , and making some changes to all stones located between those two indexes (including the stones at  $I$  and  $J$ ).

Given a list of changes that Toby makes to his garden, your task is to answer queries about the number of black and white stones in his garden.

Initially all stones in Toby's garden are white.

### Input

The input contains several test cases. Each test case starts with a line in which there are two positive integers  $N$  ( $1 \leq N \leq 10^6$ ) and  $M$  ( $1 \leq M \leq 10^6$ ) that represent, respectively, the number of stones in Toby's garden and the number of changes and queries to answer. Then  $M$  lines follow, each containing either a change or a query. Each of those lines starts with an integer  $Q$  ( $0 \leq Q \leq 3$ ):

If  $Q$  is 0, then the line is a query, in that case two numbers follow:  $I$  ( $0 \leq I < N$ ) and  $J$  ( $I \leq J < N$ ), indicating the start and end positions to consider to answer the query.

If  $Q$  is 1, then the line is a change of type reverse, in that case two integers follow:  $I$  ( $0 \leq I < N$ ) and  $J$  ( $I \leq J < N$ ), indicating that Toby wants to reverse the color of all stones between those indexes so that the color of stone  $I + K$  becomes the color of stone  $J - K$  and the color of stone  $J - K$  becomes the color of stones  $I + K$  for all integer  $K$  such that  $0 \leq K$  and  $I + K < J - K$ .

If  $Q$  is 2, then the line is a change of type flip color, in that case two integers follow:  $I$  ( $0 \leq I < N$ ) and  $J$  ( $I \leq J < N$ ), indicating that Toby wants to change the color of all stones between those indexes so that all white stones become black stones and all black stones become white stones.

If  $Q$  is 3, then the line is a change of type set color, in that case three integers follow:  $I$  ( $0 \leq I < N$ ),  $J$  ( $I \leq J < N$ ) and  $C$  ( $0 \leq C \leq 1$ ) indicating that Toby wants to set the color of all stones between indexes  $I$  and  $J$ . If  $C$  is 0, then all stones between those two indexes should become black, while if it is 1 they should become white.

### Output

For each query in the input, you should print a single line with two integers: the number of black stones and the number of white stones between the indexes  $I$  and  $J$  given in the query.



## Example

Input	Output
10 7	0 10
0 0 9	5 0
3 0 4 0	5 0
0 0 4	0 7
1 0 9	0 51
0 5 9	
2 5 9	
0 3 9	
100 1	
0 0 50	

Use fast I/O methods