

2nd Annual

Brookfield Computer Programming Challenge

2018

Bonus Problem

Tic-Tacs (Tic)

Alice and Bob have recently acquired an exceedingly large windfall: a lifetime supply of Tic-Tac breath mints. As any good programmers would do, the two decide to play a strategic game with their tic-tacs. Although they enjoy the simplicity of Tic-Tac-Toe, anyone who is remotely competent (including perfect logicians like Alice and Bob) will quickly find a strategy to be able to tie every game. To solve this problem, the two have decided to play a more challenging game instead.

The game begins with a board of n rows and m columns, with each square containing a single tic-tac. On each turn, a player must remove some positive number of tic-tacs from a single row so that after their move, the following criteria are met:

1. Each tic-tac on the board that is not in the bottom row has a tic-tac directly below it.
2. Each tic-tac on the board that is not in the rightmost column has a tic-tac directly to its right.

In addition, to make the game more fun, each player is allowed k skips. If a player uses one of his or her skips, they do not have to remove any tic-tacs that turn, and their turn ends. The player who takes the last tic-tac (the bottom right one) wins. Being the chivalrous young chap that he is, Bob lets Alice play first, and both players play optimally. Who will win?

Input:

- Input will consist of a single line containing n , m , and k representing the number of rows and columns on the board, and the number of skips.

$$1 \leq n, m \leq 10^6$$

$$0 \leq k \leq 20$$

Output:

- Output a single line containing either "Alice" or "Bob" representing who wins assuming both players play optimally.

Example:

Input	Output
2 2 0	Bob
1 5 2	Alice

3 2 1	Alice
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In the first sample, if Alice takes the top left tic-tac, Bob will take the bottom left one. Alice then must take to top right, leaving the last tic-tac for Bob. In the second sample, Alice would take the entire row on her first turn without using her skips.