



## Problem E. Mr. Dotnet's Farewell Party

Mr. Dotnet is going to Germany for 3 months, so his friends have a party to give him a special gift.

Mr. Dotnet's friends don't want him to recognize his gift before the end of the party, so they decide to buy  $n$  same boxes and place them in front of the guests' seats. When all the guests have taken their seats. Mr. Dotdev who knows that Mr. Dotnet's gift is put on position  $k$  (positions are numbered from 1 to  $n$  from left to right) performs  $m$  swaps: during the  $i$ -th swap, he chooses the box on position  $x_i$  and the box on position  $y_i$ , and swaps them.

Since Mr. Dotdev is a magician, he fakes some of his actions to trick the audience — when he starts performing a swap, he may fake it, so it is not performed (but it looks like it is performed for guests). There are no constraints on which swaps Mr. Dotdev should fake or should actually perform — for example, he may fake all of the swaps, or even not fake anything at all. For the trick to work perfectly, the gift should end up on a position where Mr. Dotnet is sitting. Since faking swaps is difficult, for each position he wants to know the minimum number of swaps he has to fake so that Mr. Dotnet's gift ends up there.

### Input

The first line contains three integers  $n$ ,  $m$  and  $k$  ( $2 \leq n \leq 2 \times 10^5$ ;  $1 \leq m \leq 2 \times 10^5$ ;  $1 \leq k \leq n$ ) — the number of boxes, the number of swaps and the initial position of the Mr. Dotnet's gift, respectively.

Then  $m$  lines follow, the  $i$ -th line contains two integers  $x_i$  and  $y_i$  ( $1 \leq x_i, y_i \leq n$ ;  $x_i \neq y_i$ ) denoting the  $i$ -th swap.

### Output

Print  $n$  integers. The  $i$ -th integer should be the minimum number of swaps Mr. Dotdev has to fake so the gift ends up on position  $i$  (or  $-1$ , if Mr. Dotdev cannot put the gift there).



## Examples

test	answer
4 5 1 3 4 2 1 4 1 3 1 3 1	2 0 3 1
7 15 5 5 3 4 2 6 1 2 4 1 6 3 7 5 6 4 2 6 4 2 6 6 3 6 3 7 6 2 6 7 2	-1 1 1 1 2 1 0