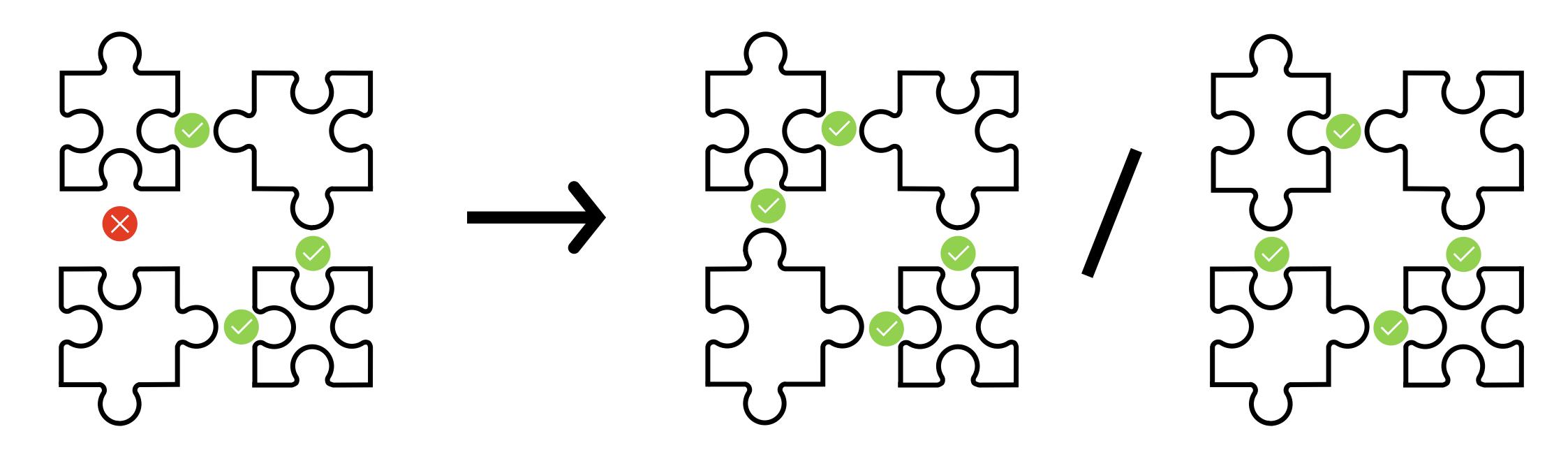
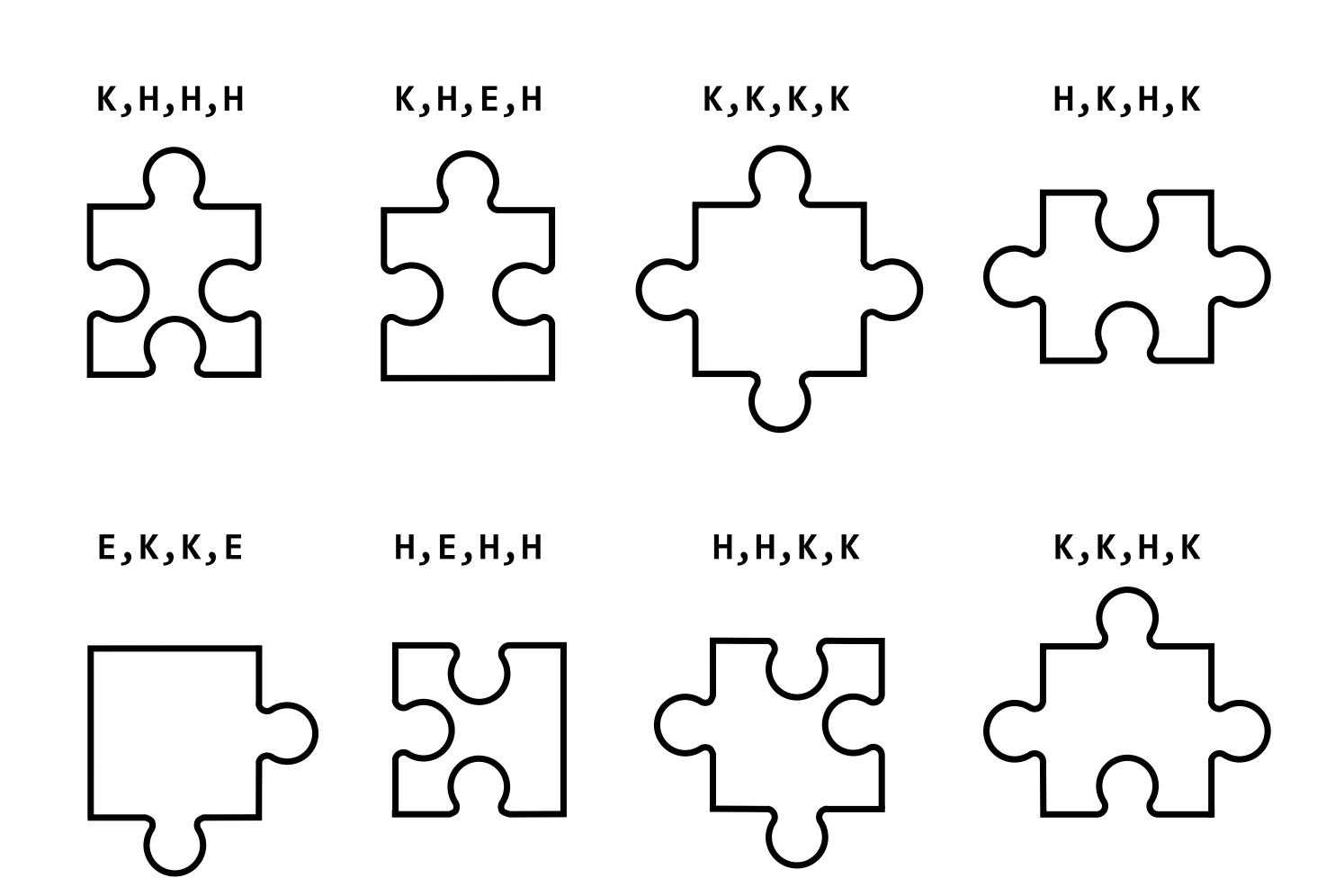


- You are given an already assembled puzzle, but the puzzle contains mistakes.
- Two neighboring pieces that have two holes or two knobs on their connecting sides counts as mistake.
- For each mistake, replace one of the pieces, with a different type of piece.
 The new piece must fix the mistake, while keeping all correct connections the same.
- You have an infinite number of replacement pieces. They are not taken from the puzzle.





- Edge pieces of the puzzle have an 'E' instead of 'K' or 'H'.
- The 4 characters that describe a piece are given in this order: top, right, bottom, left.



Input

Name	Description	Example
Puzzle Size	An integer representing the width and height of the puzzle.	5 E,K,H,E E,K,H,H E,K,H,H E,K,H,H E,E,H,K K,H,K,E K,H,H,K K,K,H,K H,K,K,H K,E,H,H
Puzzle	The already assembled puzzle, represented by a matrix of pieces.	H,K,H,E K,K,H,H K,K,K,K H,K,H,H K,E,H,H K,K,H,E H,K,H,H H,K,K,H K,K,K,K K,E,K,H K,H,E,E K,K,E,K H,K,E,H H,H,E,H K,E,E,K

Output

Name	Description	Example
Puzzle	The corrected puzzle	E,K,H,E E,K,H,H E,K,H,H E,H,K,H E,E,H,K K,H,K,E K,H,H,K K,K,H,K H,K,K,H K,E,H,H H,K,H,E K,H,K,H,H K,K,K,K H,K,H,H K,E,H,H K,K,H,E H,K,H,H H,H,K,H K,K,K,K K,E,H,H K,H,E,E K,K,E,K H,K,E,H H,H,E,H K,E,E,K







