

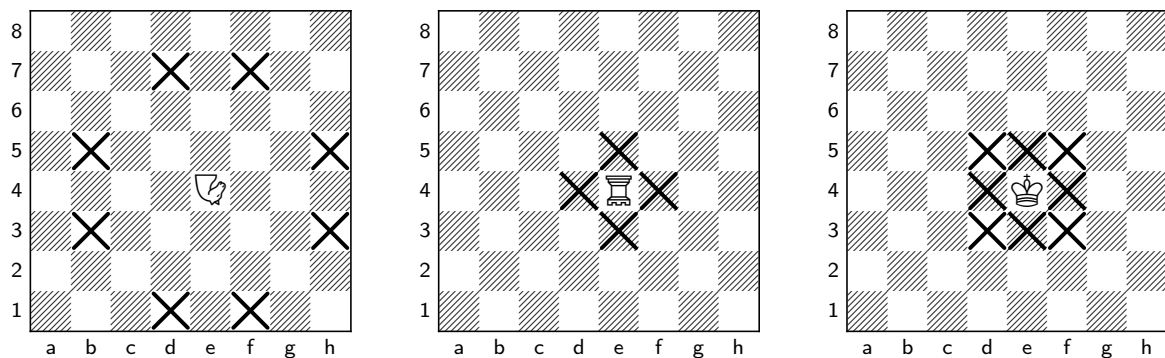
# Definitely Not Chess

Input file: *standard input*  
Output file: *standard output*  
Time limit: 15 seconds  
Memory limit: 1024 mebibytes

Your task is to checkmate the black king using the white king, a camel, and a wazir.

The camel (represented by an inverted knight symbol) is a chess piece that moves in an elongated knight's move: three squares in one direction (one more than a knight) and one square in the other. The wazir (represented by an inverted rook symbol) always moves to an adjacent square along a rank or file, in other words, makes rook moves of length 1. The king moves as in regular chess: to any adjacent square along a rank, file, or diagonal.

Below are the possible moves of all pieces from the **e4** square. Squares reachable in one move are marked by a cross.



The rule of declaring a draw after 50 moves does not apply.

## Input

The first line contains an integer  $t$ : the number of test cases ( $1 \leq t \leq 2 \cdot 10^6$ ). Then  $t$  test cases follow.

Each test case is given on a separate line in the following format: squares of the white king, black king, white camel, and white wazir in algebraic notation, followed by a letter “w” or “b” indicating whether it is White's or Black's turn, respectively. Algebraic notation for chessboard squares consists of two characters: a file number encoded by a letter from “a” to “h”, and a rank number encoded by a digit from “1” to “8”. Ranks are numbered from bottom to top, and files from left to right, as shown in the pictures.

In each test case:

- All pieces are on distinct squares.
- The player that is not to move is not in check.
- The game is not over, meaning there cannot be a stalemate or a checkmate on the board.

## Output

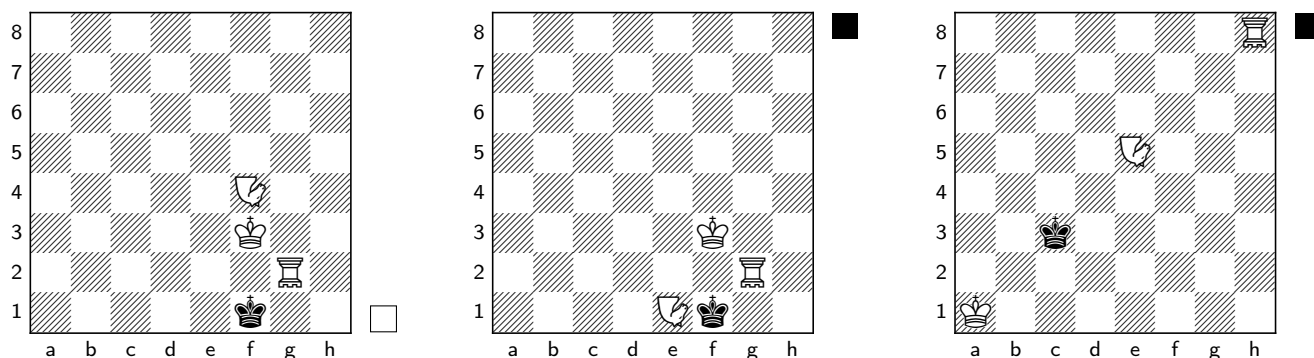
For each test case, print the evaluation of the position on a separate line. The evaluation of the position should be either the number 0 if the position is drawn, or the character “#” immediately followed by the minimum number of moves required to guarantee a checkmate.

## Example

<i>standard input</i>	<i>standard output</i>
3 f3 f1 f4 g2 w f3 f1 e1 g2 b a1 c3 e5 h8 b	#1 0 #66

## Note

The positions in the example look as follows:



This problem assumes the following standard chess rules and concepts:

- Players alternate moves: one for black and the other for white pieces.
- During their turn, a player must choose one of their pieces and make a move with it.
- It is forbidden to move pieces to squares occupied by pieces of the same color.
- Moving to a square occupied by a piece of the opposite color is called *capturing*. The captured piece is removed from the game.
- *Check* is a state when one of the pieces can move to the square occupied by the king of the opposing color.
- A player is forbidden from making a move that puts their king in check at the end of the turn.
- A state where the player with the turn has no valid moves and their king is **not** in check is called *stalemate* and results in a draw.
- A state where the player with the turn is in check and has no valid moves is called *checkmate* and is declared a victory for their opponent. In this problem, only White can achieve a victory.
- When counting the number of moves until checkmate, only the moves of the checkmating side are considered.
- Positions from which the game could proceed indefinitely with optimal play are considered drawn in this problem.