

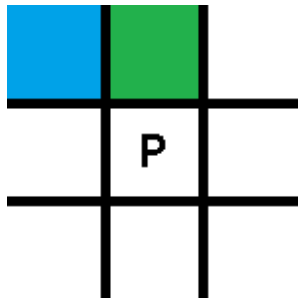
Chess, Please

(You will have less restriction on time for this problem)

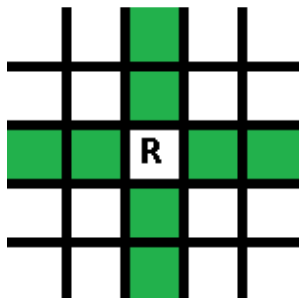
Ever play chess by yourself? Not the funnest game in the world. Nobody ever wants to play chess with me, so I'm stuck doing random moves by my "opponent." Then I came across a great idea... I'll randomly put a bunch of pieces on a chess board, and find out how fast I can take all of the opposing pieces!

For those of you who haven't played chess, here are the rules for moving each piece (Green squares are where the piece can move/take):

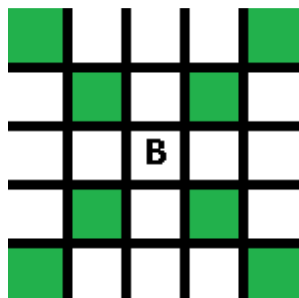
Pawn: These can only move forward one space (from bottom to top). They can take another piece by moving forward one space and to the side one space. (The blue space is how the pawn takes other pieces)



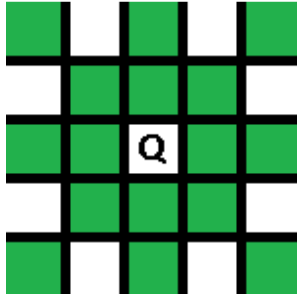
Rook: These pieces can move as many spaces forward, backward, left or right as it pleases (but only one of these), as long as no other pieces are in the way.



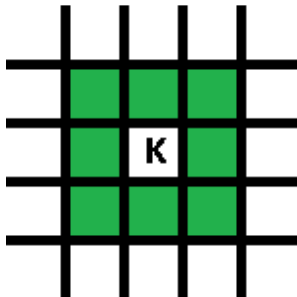
Bishop: These pieces can move in any single diagonal direction as many spaces as desired, as long as no other pieces are in the way.



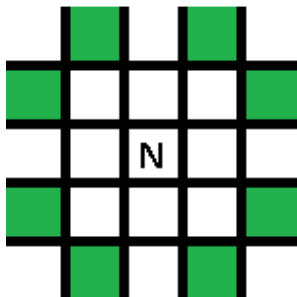
Queen: This piece moves like a Rook and Bishop combined. It can move in any of the eight directions, as long as no pieces are in its way.



King: This piece can move one space in any direction.



Knight: This is a special piece. It must move two spaces in one direction, and then a single space in a perpendicular direction. For example, move 2 spaces left, then one space down. This is the only piece that can move even if there are pieces in the way.



No two pieces can occupy the same space, so by moving one piece onto an opposing piece, the other piece is considered "taken," and is no longer on the board (you cannot take any of your own pieces). So the question then becomes, can you tell me how quickly I can take all of the opposing pieces?

Input

Input begins with a single integer, G , the number of games to evaluate. For each game, we will define a chess board by giving 8 lines of 8 characters, each representing a space. Each space will have one of the following characters:

'.' (period), represents an empty space.

'P': represents a pawn.

'R': represents a rook.

'B': represents a bishop.

'Q': represents a queen.

'K': represents a king.

'N': represents a knight.

'X': represents a piece to be taken.

There will always be a way to take every opposing piece. In true underdog fashion, you will have no more than three pieces to use. You will have to overtake no more than 8 opposing pieces. The pieces you will have to utilize will be as follows:

- 1) No more than 1 King or Queen
- 2) No more than 2 rooks, bishops, or knights
- 3) No more than 3 pawns

Output

Output a single integer per game, which will be the minimum number of moves to get to a board without any opposing pieces.

Sample Input

3

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..BX....
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..N.....
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..X.....
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.....
.....
..P.....
.....
.....
..X.....
..P.....
..R.....
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.....
.....

Sample Output

1
7
3