

Problem B. Minimum Knight moves !!!

Time limit	1000 ms
Mem limit	1572864 kB
Code length Limit	50000 B
OS	Linux

Anjali and Nakul are good friends. They both had a quarrel recently while playing chess. Nakul wants to know the minimum number of moves a knight takes to reach from one square to another square of a chess board (8×8). Nakul is brilliant and he had already written a program to solve the problem. Nakul wants to know whether Anjali can do it. Anjali is very weak in programming. Help her to solve the problem.

A knight can move in the shape of an "L" in a chessboard – two squares either forward, backward, left, or right and then one square to its left or right. A knight move is valid if it moves as mentioned above and it is within the boundary of the chessboard (8×8).



Input

There are T test cases in total. The next T lines contain two strings (start and destination) separated by a space.

The strings start and destination will only contain two characters – First character is an alphabet between 'a' and 'h' (inclusive), Second character is a digit between '1' and '8' (inclusive) – (Quotes just for clarity).

To know the knight moves more clearly refer to the above figure.

Output

Print the minimum number of moves a knight takes to reach from start to destination in a separate line.

Constraints

$$1 \leq T \leq 4096$$

Example

Input:

3

a1 h8

a1 c2

h8 c3

Output:

6

1

4