The Knight's Travails

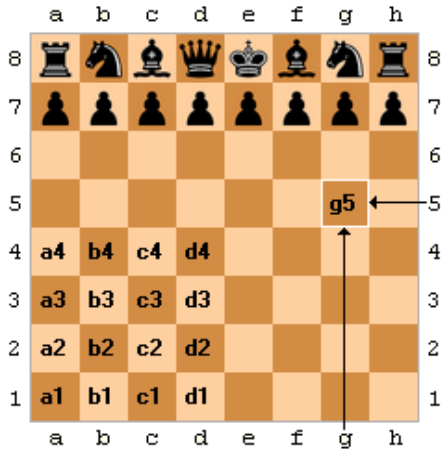
Faced with falling out of the public consciousness, IBM have decided to re-ignite the famous Deep Blue vs Gary Kasparov chess matches of the 1990's. Unfortunately, there's one small problem: they've lost the code to Deep Blue. Whoops. Public Relations have decided that this isn't a problem though, IBM is a very large company, they'll just get their best employees on writing it all again. Luckily for you, you've been pulled onto this team. And you've just received your first assignment.

Given a standard 8x8 chessboard, accept two squares identified by algebraic chess notation. The first square is the starting position, and the second square is the ending position. Find the shortest sequence of valid moves to take a Knight piece from the starting position to the ending position. Each move must be a legal move by a Knight. For any two squares there may be more than one valid solution. There are no pieces other than the Knight on the board.

Glossary

Algebraic chess notation identifies each square with a letter from A to H and a number from 1 to 8. The columns are labelled with letters, and the rows are numbered. The lower left is A1.

A **Knight** moves two steps in a straight line from its starting position, turns 90 degrees to the left or right and then moves one square. A Knight can jump over other pieces. In the diagram to the right the Knight at position B8 can move to either A6 or C6, while the Knight at position G8 can move to F6 or H6.



Input

Must be two squares, identified in algebraic chess notation representing the starting and ending positions of the Knight, separated by a space.

Output

Must be a list of squares through which the Knight passes, in algebraic chess notation. This must include the ending position, but exclude the starting position.

Example

Test Input:

```
A8 B7
```

Expected Output:

```
C7 B5 D6 B7
```

Assignment

In a language of your choice, write a program to find the shortest sequence of moves for a Knight between the starting and ending positions. Your program can accept the input and produce the output in whatever form you think is most effective. Include all code to run the program, and whatever instructions are necessary. **The work must be your own.**