

Problem H. How To Identify Self

Input file: standard input
Output file: standard output
Time limit: 1 second
Memory limit: 1024 mebibytes

This is an interactive problem.

...In tonight's nightmare you talked with a wizard... one bad joke, and found self at the chessboard as some white piece. You can see that you are placed on e2, but you cannot see, who you are — the Pawn, the Rook, the Knight, the Bishop, the Queen or the King. You can't ask the other pieces, because you are alone on the board.

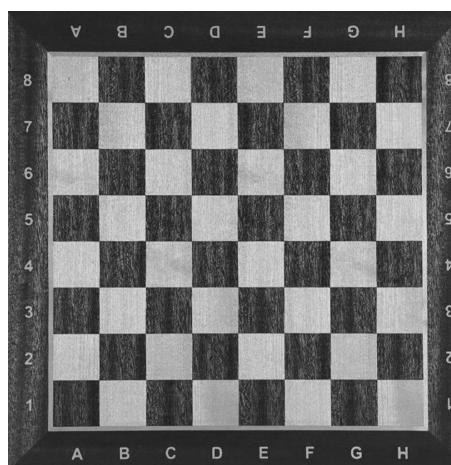
You decided to choose a cell and try to move to this cell. If this move is legal for your piece, you are moving to this cell, otherwise you stay where you are. You are planning to do no more than 4 attempts to determine your piece and then **return to the same field e2** — else the angry wizard can turn you into something worse than chess piece...

Note that the white chess pieces are moving in the following way:

- Pawn — one cell forward (i.e. keep the column and increment the row by 1).
- Rook — at arbitrary number of cells at same row or same column.
- Bishop — diagonally on all four diagonal directions.
- Knight — moving two cells at one direction and one cell in the any of two orthogonal directions, in L-shape.
- Queen — at arbitrary number of cells in same row, column or diagonal directions.
- King — at any of 8 cells that share a common point with the current.

More complicated chess rules related to the pawns (like double first move or transformation to other piece after reaching cell at topmost row) are **not applied** here.

The cells are denoted by the 2-character strings: the first character — the letter between 'a' and 'h', inclusively — denote the column, the second character — the digit between '1' and '8', inclusively — denote the row.



Interaction Protocol

The interaction is started by your program, printing the attempt in the format `? target`, where the *target* is the cell in the chess notation. If you succeed, you receive the integer 1 (and now are on cell *target*), if you failed, you receive 0 and did not move anywhere.

If you want to print the answer, print `! c`, where `c` is the lowercase English character denoting the piece: `'p'` for the Pawn, `'r'` for the Rook, `'b'` for the Bishop, `'n'` for the Knight, `'q'` for the Queen and `'k'` for the King. You may do that exactly once; ensure that you are on the cell `e2` when you are printing the answer. This action **does not** counted as the query. If you printed the answer and you are not on `e2` — the solution is considered wrong.

Example

standard input	standard output
0	? g3
1	? e3
0	? d2
1	? e5
1	? e2
	! r

Note

The interaction in the sample is just to clarify the output format: 5 attempts are **too much** for the correct solution.