[CS 11] Prac 8h – Rook Threats

Problem Statement

Consider an $r \times c$ chessboard with some chess pieces in it. For simplicity, we ignore the actual rules of chess. For example, chess pieces don't have "color".

We say a square on the chessboard is **unsafe** if a piece can reach it in one move.

In one move, a rook can travel to any other square in its row or column, as long as there are no other pieces on the way there.

Given the locations of rooks, label which squares are unsafe.

Task Details

Your task is to implement a function called `rook_threats`. This function has a single parameter: a `tuple` of r `str`s, each of which is c characters long and represents a row. Each character represents a square and is:

- a `.` if it is free;
- a `#` if it contains a rook.

The function must return a `list` of `str`s representing the same chessboard, but with the unsafe squares labelled with `*`.

Restrictions

(See 8a for more restrictions)

For this problem:

- Loops and lists are allowed.
- Up to 18 function definitions are allowed.
- Recursion is **disallowed**. (The recursion limit has been greatly reduced.)
- Sets and dictionaries are allowed.
- Generators and comprehensions are allowed.
- The source code limit is 6000.

Example Calls

Example 1 Function Call

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```
rook_threats((
    '.............',
    '...#.....##..',
    '.............',
    '.....#.......',
    '.............',
    '.............',
    '.............',
    '...#.........',
))
```

Example 1 Return Value

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```
[
    '...*.*...**..',
    '***#*****##**',
    '...*.*...**..',
    '*****#*******',
    '...*.*...**..',
    '...*.*...**..',
    '...*.*...**..',
    '***#*********',
]
```

Example 1 Explanation

Hint: You can print a grid of `str`s by doing:

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```
for row in grid:
    print(row)
```

or by doing

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```
print(*grid, sep='\n')
```

Constraints

- The function `rook_threats` will be called at most $1{,}000$ times.
- The sum of the rc across all calls will be at most $500{,}000$.
- $1 \leq r \leq 100$
- $1 \leq c \leq 5{,}000$

Scoring

- You get 100 ❤ points if you solve all test cases where:
  - $r, c \leq 50$
  - the sum of the rc across all calls will be at most $10{,}000$.
- You get 30 ❤ points if you solve all test cases where:
  - there are at most 5000 pieces.
- You get 30 ❤ points if you solve all test cases.

Submit solution

[CS 11] Practice 8 ❤

My submissions ❤

✓ **Points:** 160 (partial)

Time limit: 6.0s

Memory limit: 1G

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Problem type

Allowed languages
~~NONE~~, py3

Clarifications

Report an issue

No clarifications have been made at this time.