[CS 11] Prac 7k – 4 Neighbors In Grid

Problem Statement

Consider an $r \times c$ grid. We number the rows 0 to $r-1$ from top to bottom and the columns 0 to $c-1$ from left to right. We denote by (i, j) the cell at row i and column j.

Given a cell (i, j), output all of its neighboring cells inside the grid, in the following order: north, east, south, west.

The neighbors of the cell marked `#` are marked `*` below:

```
. . . . . . .
. . . . . . .
. . . * . . .
. . * # * . .
. . . * . . .
. . . . . . .
. . . . . . .
```

Copy

Formally, two cells are neighbors in the above sense iff the Manhattan distance between them is exactly 1.

Task Details

Your task is to implement a function called `grid_neighs4`. This function has four `int` parameters r, c, i and j.

The function must return a *generator* that generates pairs of `int`s, as described in the problem statement.

Note that your generator must be **as lazy as possible**. It should yield each resulting next element as soon as it has enough information, and it should produce these results while advancing the input generators for as little as possible.

Restrictions

(See 7a for more restrictions)

For this problem:

- Loops and lists are allowed.
- Up to 8 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 400.

Example Calls

Example 1 Function Call

```
[*grid_neighs4(7, 5, 5, 2)]
```

Copy

Example 1 Return Value

```
[(4, 2), (5, 3), (6, 2), (5, 1)]
```

Copy

Example 2 Function Call

```
[*grid_neighs4(6, 3, 5, 2)]
```

Copy

Example 2 Return Value

```
[(4, 2), (5, 1)]
```

Copy

Constraints

When your program is run:

- The function `grid_neighs4` will be called at most 200 times.
- $1 \le r, c \le 10^{10}$
- $1 \le i \le r$
- $1 \le j \le c$

Scoring

- You get 80 ❤️ points if you solve all test cases.

Clarifications

Report an issue

No clarifications have been made at this time.

Submit solution [CS 11] Practice 7 ❤️

My submissions ❤️

Points: 80 (partial)
Time limit: 6.0s
Memory limit: 1G

Author:
kvatienza (Kevin Atienza)

Problem type

Allowed languages
~~NONE~~, py3