[CS 11] Prac 9g – Spiran Spiral

Problem Statement

A new temple has just been discovered in Spira, and of course, Yuna and his guardians visited it to hopefully obtain the aeon inside.

But before that, they first need to solve the puzzle in the temple's cloister of trials!

As part of solving the task, they are required to write letters on the floor. The letters they write must be a subgrid of the infinite grid of letters produced as follows:

- Choose a particular word.
- Fill out the infinite grid with letters from the word by starting at a point and going through the cells according to the following spiral pattern:

```
20-21-22-...
 |
19  6--7--8--9
 |  |        |
18  5  0--1 10
 |  |     |  |
17  4--3--2 11
 |           |
16-15-14-13-12
```

You write each next letter to each next location in this grid. When the word inevitably runs out of letters, you start again from the first letter.

For example, for the word `yevon`, a portion of the infinite grid containing the starting letter would look like the the following:

```
yevony
nevone
oyYeyv
vnoveo
eynovn
```

The starting letter is seen as the capital letter `Y`. This is only for clarification purposes—do **not** turn any letter into uppercase in your output!

We can label the locations in the grid as (i, j), where i represents the "row number" and j represents the "column number". Row numbers increase from top to bottom, and column numbers increase from left to right, and the starting cell is denoted $(0, 0)$. Note that the grid is infinite, so i and j can be negative.

You now want to help Yuna figure out the solution to the cloister of trials!

Given two locations (i_1, j_1) and (i_2, j_2) with $i_1 \leq i_2$ and $j_1 \leq j_2$, provide the subgrid of the infinite grid with (i_1, j_1) as the topleftmost corner and (i_2, j_2) as the bottomrightmost corner.

Task Details

Your task is to implement a function called `spiral_subgrid`. This function has three parameters:

- the first is a `str` representing the word.
- the second is a pair of `int`s (i_1, j_1).
- the third is a pair of `int`s (i_2, j_2).

The function must return `list` of `str`s denoting the grid, as described in the problem statement.

Restrictions

(See 9a for more restrictions)

For this problem in particular:

- Recursion is **disallowed**. (The recursion limit has been greatly reduced.)
- The source code limit is 2000.

Example Calls

Example 1 Function Call

```
spiral_subgrid('yevon', (-2, -2), (2, 3))
```

Example 1 Return Value

```
[
    'yevony',
    'nevone',
    'oyyeyv',
    'vnoveo',
    'eynovn',
]
```

Example 2 Function Call

```
spiral_subgrid('zanarkand', (-4, 4), (4, 5))
```

Example 2 Return Value

```
[
    'dz',
    'ra',
    'kn',
    'aa',
    'nr',
    'dk',
    'za',
    'an',
    'nd',
]
```

Constraints

- The function `spiral_subgrid` will be called at most 50 times.
- $-10^{18} \leq i_1 \leq i_2 \leq 10^{18}$
- $-10^{18} \leq j_1 \leq j_2 \leq 10^{18}$
- $i_2 - i_1 \leq 100$
- $j_2 - j_1 \leq 100$
- The word is a nonempty string of at most 100 lowercase English letters.

Scoring

- You get 125 ❤️ points if you solve all test cases where:
  - $-100 \leq i_1 \leq i_2 \leq 100$
  - $-100 \leq j_1 \leq j_2 \leq 100$
- You get 75 💔 points if you solve all test cases where:
  - $-10^{11} \leq i_1 \leq i_2 \leq 10^{11}$
  - $-10^{11} \leq j_1 \leq j_2 \leq 10^{11}$
- You get 50 💔 points if you solve all test cases.

Submit solution

[CS 11] Practice 9

Points: 250 (partial)

Time limit: 4.0s

Memory limit: 1G

Author: kvatienza (Kevin Atienza)

Problem type

Allowed languages ~~NONE~~, py3

Clarifications

Report an issue

No clarifications have been made at this time.