

Quiz 6 Free Response (65 pts)

Time Limit: 12 mins

Name: _____ AndrewID: _____

You can run code when completing this part of Quiz 6.

Time limit: 12 mins

Free Response 1: getDiagonals (65 pts)

Background: For the purpose of this problem, we will consider only the diagonals in a list that go in the up-right direction. Each diagonal is represented by a 1D list of elements going from the bottom-left to the top-right. The relevant diagonals are highlighted in the list below:

Each diagonal is represented by a 1D list of elements going from the bottom-left to the top-right. For example, for the list above, the diagonals are [1], [4, 2], [7, 5, 3], [8, 6], and [9].

With that in mind, write the non-mutating function `getDiagonals(L)` that takes a non-empty rectangular 2D list `L` and returns a list of the diagonals in `L`. The diagonals should be in the order shown above, starting with the diagonal containing just the element in the top-left, and ending with the diagonal containing just the element in the bottom-right.

Note: You may only use material that was covered in units 1-6. Thus, do not use sets, dictionaries, OOP, or recursion.

Test cases:

```
def testGetDiagonals():
    L = [[1, 2, 3],
          [4, 5, 6],
          [7, 8, 9]]
    diagonals = [[1], [4, 2], [7, 5, 3], [8, 6], [9]]
    assert( getDiagonals(L) == diagonals )

    L = [[1, 2, 3, 4],
          [5, 6, 7, 8]]
    diagonals = [[1], [5, 2], [6, 3], [7, 4], [8]]
    assert( getDiagonals(L) == diagonals )

    L = [[ 5, 7, 1],
          [10, 4, 12],
          [-3, 6, 5],
          [12, 0, -7]]
    diagonals = [[5], [10, 7], [-3, 4, 1], [12, 6, 12], [0, 5], [-7]]
    assert( getDiagonals(L) == diagonals )

    # Verify that the function is non-mutating
    L = [[1, 2, 3],
          [7, 8, 9],
          [4, 5, 6]]
    getDiagonals(L)
    assert( L == [[1, 2, 3], [7, 8, 9], [4, 5, 6]] )
```

Write your answer below.