CS 515 Homework 6

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Homework 6: Nested Lists and Dictionaries
Due: 4/6/22 at 11:59pm

Please submit this homework as a single file containing all functions, called hw6.py

Introduction

This homework will work on using nested lists and dictionaries in practice problems.

1 Question 1: Write a spiral functions

Write a function spiral(L) which takes in a two-dimensional list L and returns a new list containing the numbers in spiral order, starting from L[0][0] and going clockwise.

```
spiral([1,2],[3,4]) -> [1,2,4,3]
spiral([[1,2,3],[4,5,6],[7,8,9]]) -> [1,2,3,6,9,8,7,4,5]
```

2 Question 2: Write a Dictionary Inverter

Write a function inverter(D) which takes a dictionary D and returns a new dictionary with the keys and values swapped.

```
inverter({1:'a', 2:'b', 3:'c'}) -> {'a':1, 'b':2, 'c':3}
inverter({1:'a', 2:'a', 3:'b'}) -> {'a':[1,2], 'b':3}
```

3 Question 3: Matrix Multiplication

Write the function matrixMultiply(A,B) that takes in two 2-D arrays A and B. It treats these lists as matrixes and multiplies them together. If the dimensions are incompatible, it raises an ArimthmeticError.

```
matrixMultiply([[1,2,3],[4,5,6]],[[1,2],[3,4],[5,6]]) -> [[22,28],[49,64]]
```

4 Question 4: Two-Sum

Write the function twoSum(L,t) that takes a list L and a target number t and returns the list of all pairs of two numbers in L that sum to t. You can return the pair in any order. You can only use each number once. **Note: There is a way to do this with a dictionary, which is what is commonly screened for on interviews. I recommend you to implement that solution!**

```
twoSum([1,2,3,4,5], 4) -> [(1,3)] or [(3,1)]
twoSum([1,2,2,3,4,5], 4) -> [(1,3), (2,2)] or [(3,1), (2,2)]
```

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