Quiz 5

To get credit for this quiz, use the Quiz tool at eee.uci.edu to enter your answers, within the Sunday-to-Tuesday quiz period.

Problem 1 (8 points)

Fill in the blanks in the function definition below to make it consistent with its header and docstring. Each blank should contain just one identifier, constant, or operator. [Recall that an identifier is just a name: a variable name, a parameter name, a field/attribute name, a function name, a method name.]

```python
Dish = namedtuple('Dish', 'name price calories')
Restaurant = namedtuple('Restaurant', 'name cuisine phone menu')

def Restaurant_average_calories(R: Restaurant) -> float:
    ''' Return the average number of calories on the restaurant's menu. The menu is a list of Dish structures. '''
    return Menu_average_calories(R.menu)

def Menu_average_calories(M: 'list of Dish') -> float:
    ''' Return the average number of calories on the menu (a list of Dishes) '''
    if len(M) == 0:
        return 0
    else:
        sum = _______________
        for d in _______________ :
            ________________ += _______________.calories
        return _______________ / ________________(M)
```

If this was hard for you, it may be that you're not yet familiar enough with Python statements and how they're constructed.

— Take the first two blanks: We know that the Restaurant_average_calories function takes a Restaurant (which has four fields). We also know that Menu_average_calories takes a list, so that those first two blanks, the arguments in the call to Menu_average_calories, must specify a list. Where can we get a list, given the data we have inside Restaurant_average_calories? The only data there is R, the parameter, which is a Restaurant. The only list available is the menu field/attribute of R. So how do we get one field out of a namedtuple? With dot notation. R.menu (that's the answer) gives us the menu field of R, a list of dishes, which is the appropriate type of data to call Menu_average_calories with.

— If any terms or concepts in the preceding paragraph are unclear to you, now's the time, before the next midterm, to learn or review what they mean.

— It may also mean that you're not comfortable enough with the parts of Lab 5 that deal with dishes and collections. Processing lists, and processing lists of objects that themselves include lists, is an important aspect of the course.
Problem 2 (16 points)

Suppose we have a list of Student objects similar to those we’ve seen before:

```python
Student = namedtuple('Student', 'ID name level major studylist')
# All are strings except studylist, which is a list of Courses.
# An example showing the form of the data:
s1 = Student('11223344', 'Anteater, Peter', 'FR', 'PSB', [ics31, wr39a, bio97, mgt1])
```

Each Student object contains a list of Course objects defined as follows:

```python
Course = namedtuple('Course', 'dept num title instr units')
# All are strings except number of units
# An example showing the form of the data:
ics31 = Course('ICS', '31', 'Intro to Programming', 'Kay', 4)
```

(a) (6 points) Complete the definition of the function below according to the header and docstring shown.

```python
def class_level_count(SB: [Student], class_level: str) -> int:
    ''' Return the number of students in the list SB whose class level matches the specified value. '''
    result = 0
    for s in SB:
        if s.level == class_level:
            result += 1
    return result
```

(b) (10 points) Complete the definition of the function below according to the header and docstring shown. You may define a second function if it helps you organize your solution.

```python
def enrollments_for_instructor(SB: [Student], instructor_name: str) -> int:
    ''' Return the total number of students enrolled in courses taught by named instructor. (If a student is enrolled in two courses taught by the same instructor, that student counts twice.)
    '''
    result = 0  # Of course this is a separate (local) variable from the one in the other function.
    for s in SB:
        result = result + enrollments_on_studylist(s.studylist, instructor_name)
    return result

def enrollments_on_studylist(courses: [Course], instructor_name: str) -> int:
    ''' Return the number of enrollments by this student in courses taught by named instructor
    '''
    result = 0
    for c in courses:
        if c.instr == instructor_name:
            result += 1
    return result
```
Problem 3 (6 points)

Below are two code segments; each one generates an execution error whose message is shown. Fix the code as simply as possible to remove the error and produce the intended result.

(a) (3 points)

L = ['Huey', 'Dewey', 'Louie', 'Donald', 'Daisy']
for i in range(10):
    print(L[i])

Traceback (most recent call last):
  File "/ICS/31/Quizzes/Quiz Code/quiz5.py", line 3, in <module>
    print(L[i])
IndexError: list index out of range

The index (or subscript or position) number, i, goes from 0 to 9 according to the for-loop. But when it hits 5, it runs off the end of the five-element list. The best correction is for i in range(len(L)) so the loop just ranges through the actual size of L. This approach would also work:
for duck in L:
    print(duck)

(b) (3 points)

Restaurant = namedtuple('Restaurant', 'name cuisine phone dish price')
RESTAURANTS = list of Restaurant objects

def Restaurants_serving_cuisines (RL: [Restaurant], cuisines: [str]) -> [Restaurant]:
    ''' Return a list of Restaurants serving any of the cuisines specified. '''
    result = []
    for r in RL:
        if r.cuisine in cuisines:
            result.append(r)
    return r

print("Names of Southeast Asian Restaurants:")
SEAsian_restaurants = Restaurants_serving_cuisines(RESTAURANTS,
    ['Thai', 'Vietnamese', 'Laotian', 'Cambodian'])
for each_rest in SEAsian_restaurants:
    print(each_rest.name)

Traceback (most recent call last):
  File "/ICS/31/Quizzes/Quiz Code/quiz5.py", line 16, in <module>
    print(each_rest.name)
AttributeError: 'str' object has no attribute 'name'