Home Work 7

July 22, 2024

Dylan Liesenfelt

1 Exercise: Meal and Nutrition Tracker

Objective: Develop code that allows users to log daily food intake, track nutritional values, and monitor their diet against personal health goals, supporting informed food choices and dietary objectives.

Classes and Components:

1.1 FoodItem

Variables:

name (private), calories (private), proteins (private), carbs (private), fats (private)

Instance Methods:

___init___(self, name, calories, proteins, carbs, fats): Constructor to initialize a new food item with nutritional info. Getter Methods for each private variable and a display method to print the food item.

[ ]:
```
class FoodItem:
    # constructing the FoodItem object using the given variables
    def __init__(self,name,calories,proteins,carbs,fats):
        self.__name = name
        self.__calories = calories
        self.__proteins = proteins
        self.__carbs = carbs
        self.__fats = fats

    def getName(self): # Name Getter
        return self.__name

    def getCalories(self): # Calorie Getter
        return self.__calories

    def getProteins(self): # Protein Getter
        return self.__proteins
```

```
    def getCarbs(self): # Carbs Getter
        return self.__carbs

    def getFats(self): # Fats Getter
        return self.__fats

    def display(self): # Display method for the FoodItem objects
        print(f'Food Item: {self.__name}, Calories: {self.__calories}, Proteins:
↪ {self.__proteins}g, Carbs: {self.__carbs}g, Fat: {self.__fats}g')
```

1.2 DailyLog

Variables:

date (private), food_items (a list of FoodItem instances, private)

Instance Methods:

___init___(self, date): Constructor to initialize a new daily log.

add_food_item: Adds a FoodItem instance to the log.

get_total_calories: Calculates total calories consumed on that day.

get_total_nutrients: Calculates total proteins, carbs, and fats consumed.

display: Print the daily log.

[ ]:
```
class DailyLog:
    # Constructor for the DailyLog objects using the given vars
    def __init__(self, date):
        self.__date = date
        self.__food_items = [] # The list that holds our food items added into␣
↪the log

    def getDate(self):
        return self.__date # Date Getter, not listed in the instruction but␣
↪only I could think of to date

    def add_food_item(self, food_item): # Method that adds our FoodItem object␣
↪into our list
        self.__food_items.append(food_item)

    def get_total_calories(self):# Method that returns the total calories from␣
↪the FoodItems list
        sum = 0
        for item in self.__food_items:
            sum += item.getCalories()
        return sum
```

```
    def get_total_nutrients(self): # Same as ^ but returns all other nutrients␣
↪as a tuple
        sumProtein, sumCarb, sumFat, = 0,0,0
        for item in self.__food_items:
            sumProtein += item.getProteins()
            sumCarb += item.getCarbs()
            sumFat += item.getFats()
        return sumProtein, sumCarb, sumFat

    def display(self): # Display Method for Log objects
        print(f'Daily Log: {self.__date}')
        for item in self.__food_items:
            item.display()
```

1.3 NutritionProfile:

Variables:

user_id (private), daily_logs (a dictionary with dates as keys and DailyLog instances as values)

Instance Methods:

___init___(self, user_id): Constructor to initialize a new nutrition profile.

add_daily_log(self, daily_log): Adds a DailyLog instance to the profile.

get_log_by_date(self, date): Retrieves a DailyLog by date.

display: Print the nutrition profile.

[ ]:
```
class NutritionProfile:
    # Constructor for the profile using the given vars
    def __init__(self, user_id):
        self.__user_id = user_id
        self.__daily_logs = {}

    def add_daily_log(self, daily_log): # Method that adds our log objects to a␣
↪dictionary
        self.__daily_logs[daily_log.getDate()] = daily_log # key/value = date/
↪log

    def get_log_by_date(self, date): # Method that returns a specific log by␣
↪its date
        return self.__daily_logs.get(date)

    def display(self): # Display method for profile objects
        print(f'Nutrition Profile: {self.__user_id}')
        for log in self.__daily_logs:
            self.__daily_logs[log].display()
```

1.4 Testing:

[ ]:
```python
# Creating some food items
orange  = FoodItem('Orange', 60, 0.9, 11, 0.1)
egg = FoodItem('Egg', 78, 6, 0.6, 5)
avocado = FoodItem('Avocado', 240, 3, 13, 22)


# Create a daily log and add food items
daily_log = DailyLog('2023-04-02')
daily_log.add_food_item(orange)
daily_log.add_food_item(egg)
daily_log.add_food_item(avocado)

# Create a nutrition profile and add the daily log
profile = NutritionProfile('User1') # type: ignore
profile.add_daily_log(daily_log)

# Testing outputs using display
orange.display()
egg.display()
avocado.display()
print('\n')
daily_log.display()
print('\n')
profile.display()
```

```
Food Item: Orange, Calories: 60, Proteins: 0.9g, Carbs: 11g, Fat: 0.1g
Food Item: Egg, Calories: 78, Proteins: 6g, Carbs: 0.6g, Fat: 5g
Food Item: Avocado, Calories: 240, Proteins: 3g, Carbs: 13g, Fat: 22g


Daily Log: 2023-04-02
Food Item: Orange, Calories: 60, Proteins: 0.9g, Carbs: 11g, Fat: 0.1g
Food Item: Egg, Calories: 78, Proteins: 6g, Carbs: 0.6g, Fat: 5g
Food Item: Avocado, Calories: 240, Proteins: 3g, Carbs: 13g, Fat: 22g


Nutrition Profile: User1
Daily Log: 2023-04-02
Food Item: Orange, Calories: 60, Proteins: 0.9g, Carbs: 11g, Fat: 0.1g
Food Item: Egg, Calories: 78, Proteins: 6g, Carbs: 0.6g, Fat: 5g
Food Item: Avocado, Calories: 240, Proteins: 3g, Carbs: 13g, Fat: 22g
```

2 Exercise: Create a Module

Objective:

Save the classes FoodItem, DailyLog, and NutritionProfile into a Python file named nutrition_tracker.py.

This file will act as your module and import it to another jupyter notebook to produce the same output as in Exercise 1.

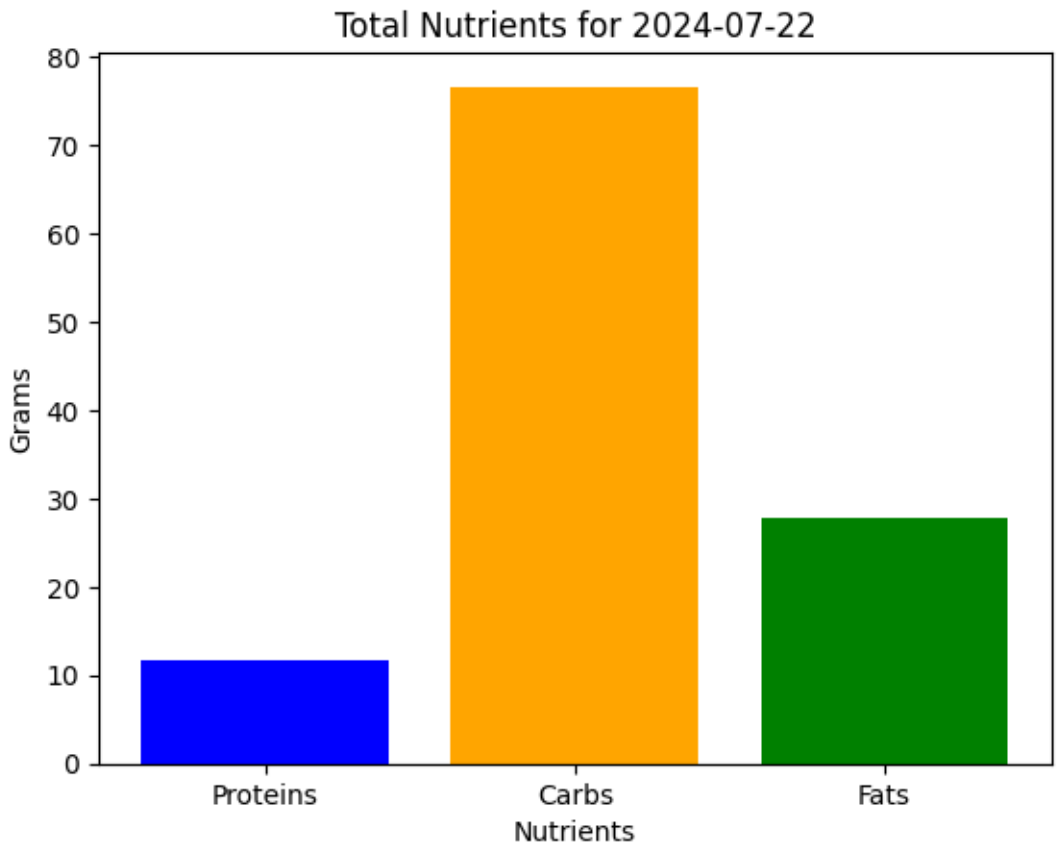
[ ]:
```
import nutrition_tracker

# Create some food items
apple = nutrition_tracker.FoodItem("Apple", 95, 0.5, 25, 0.3)
banana = nutrition_tracker.FoodItem("Banana", 105, 1.3, 27, 0.3)

# Create a daily log and add food items
daily_log = nutrition_tracker.DailyLog("2023-04-02")
daily_log.add_food_item(apple)
daily_log.add_food_item(banana)

# Create a nutrition profile and add the daily log
profile = nutrition_tracker.NutritionProfile("User1")
profile.add_daily_log(daily_log)

# Testing outputs using display
apple.display()
banana.display()
print('\n')
daily_log.display()
print('\n')
profile.display()
```

```
Food Item: Apple, Calories: 95, Proteins: 0.5g, Carbs: 25g, Fat: 0.3g
Food Item: Banana, Calories: 105, Proteins: 1.3g, Carbs: 27g, Fat: 0.3g


Daily Log: 2023-04-02
Food Item: Apple, Calories: 95, Proteins: 0.5g, Carbs: 25g, Fat: 0.3g
Food Item: Banana, Calories: 105, Proteins: 1.3g, Carbs: 27g, Fat: 0.3g



Nutrition Profile: User1
Daily Log: 2023-04-02
Food Item: Apple, Calories: 95, Proteins: 0.5g, Carbs: 25g, Fat: 0.3g
Food Item: Banana, Calories: 105, Proteins: 1.3g, Carbs: 27g, Fat: 0.3g
```

3 Exercise: BONUS - Plot the daily log.

Explore the package matplotlib and create a bar plot from the daily log. Implement the plot as another method, example: daily_log.plot_nutrients()

[ ]:
```python
import matplotlib.pyplot as plt

class PlotDailyLog(DailyLog):
    # Modifying the daily log class through inheritance
    def __init__(self, date):
        super().__init__(date)

    def plot_nutrients(self): # Method to plot log data, specifically nutrients
        nutrients = ['Proteins', 'Carbs', 'Fats'] # Lables
        totalOfNutrients = self.get_total_nutrients() # Data values in grams
        colors = ['blue', 'orange', 'green'] # Bar colors

        plt.bar(nutrients, totalOfNutrients, color=colors) # Make the bars
        plt.xlabel('Nutrients')
        plt.ylabel('Grams')
        plt.title(f'Total Nutrients for {self.getDate()}')
        plt.show() # Display the graph

# Making a new log using our new modified class
newLog = PlotDailyLog('2024-07-22')

# Adding our food objects to our new log
newLog.add_food_item(apple)
newLog.add_food_item(banana)
newLog.add_food_item(avocado)
newLog.add_food_item(egg)
newLog.add_food_item(orange)

# Making the chart
newLog.plot_nutrients()
```


Total Nutrients for 2024-07-22
Grams
0
10
20
30
40
50
60
70
80
Proteins
Carbs
Fats
Nutrients