Problem Set Three: Python Exercises

Task 0: Football Game Points Calculation

You are given the list:

['Win', 'Draw', 'Loss', 'Win', 'Draw', 'Loss', 'Win', 'Draw', 'Loss',

'Win', 'Draw', 'Loss', 'Win', 'Draw', 'Loss', 'Win', 'Draw', 'Loss']

This represents the results of football games for a team. Initialize a variable 'points' to 0. Iterate over the list, and:

- Increment 'points' by 3 for each 'Win'.
- Increment 'points' by 1 for each 'Draw'.
- Do not increment for a 'Loss'.

After the loop, print the value of 'points'. You should get 24.

Task 1: Finding Even Numbers

Write a loop that iterates over numbers from 1 to 100 and stores the even numbers in a list called 'even_nums'.

Task 2: Squares of Numbers Divisible by Three

Revisit Task 1. Instead of storing even numbers, store the squares of numbers divisible by 3 in a list called 'squares_divis_by_three'.

Task 3: Combining Conditions

Combine your solutions from Tasks 1 and 2 into a single loop. Check for two conditions:

- Numbers divisible by both 2 and 3.

Use 'elif' to store even numbers and another 'elif' for numbers divisible by 3.

Task 4: Factorial Calculation

Write a function 'calc_factorial' to calculate the factorial of a given positive integer n.

Hint: Use the '*=' operator and the 'range' function.

Task 5: Calculating Average Height

You are given the list:

players = [('Mbape', 180, 77), ('Lewandowski', 185, 80), ('Kane', 186, 81)]

- Write a function 'calc_avg' to calculate the average of numbers in a list.
- Extract player heights into a list called 'player_height' using a 'for' loop.
- Calculate the average height using the 'calc_avg' function.

Task 6: BMI Calculation

Write a 'calc_bmi' function that takes height and weight and returns the BMI.

Iterate over 'players' and calculate the BMI for each player. Print their names and BMIs.

Task 7: Removing Duplicates from a List

Write a function that takes a list with duplicate elements and returns the list without duplicates.

Task 8: Removing Duplicates, Maintaining Order

Write a function that removes duplicates while preserving the order of elements in the input list.

Task 9: Vector Length Calculation

Write a function that takes a list of numbers and returns the square root of the sum of their squares (the length of the vector).

Task 10: Name Formatting

You are given the list:

['Alexander Hibbard',
 'Myrtle Fritz',
 'Cathleen Muncie',
 'Norma Bolton',
 'Helen Danek',
 'Norman Cruz',
 'Mary Hanson',
 'Sean Smith',
 'James Carter',
 'Dorinda Turner']

which contains first names and surnames of people. Your task is to create new list, where 2 things will change:

a) there will be only initials of first name, for example 'A' instead of 'Alexander',
b) The surnames will be like 'DANEK' instead of 'Danek'.

Hints: initialize new_names list. Then loop over the list. Inside the loop, use split method on each element to separate first name and surname.
The output of the split method can be assigned to variables 'first_name' and 'last_name' (you can do this in one line).
Once you have 'first_name' and 'last_name' variables, you can use string methods or indexing on them to achieve the format described in a) and b).

Then you can join these 2 string variables again as a single string and append the result to new_names list.

Additional Tasks for the Ambitious

Task 11: Fibonacci Sequence

Write a function that returns the first 'n' elements of the Fibonacci sequence.

Task 12: Lucas Sequence

Write a function that returns the first 'n' elements of the Lucas sequence.

Task 13: BMI Dictionary

Revisit Task 6. Instead of printing the name and BMI, store them in a dictionary where the keys are player names and the values are BMIs.

Task 14: Merging Dictionaries

Write a function that takes two dictionaries and merges them into one.

Task 15: Handling Overlapping Keys in Dictionaries

Revisit Task 14. Handle cases where both input dictionaries have overlapping keys.

Task 16: Merging Multiple Dictionaries

Extend Task 15 to handle an arbitrary number of dictionaries.