Machine Learning

Q1: Display the below pattern by using python script?

```
1 2 3 4 5 6 7

1 2 3 4 5 6

1 2 3 4 5

1 2 3 4

1 2 3

1 2

1
```

Q2: Write python script to print the total number of same elements of two lists?

Q3: Implement a simple calculator program that performs arithmetic operations based on user input.

Note: If user input **addition or +** then it performs addition operation, same as it is for other operations

Q4: Write a python script that input a text statement from the user and check how many times a particular character is repeated in the text?

Q5: Function (positional argument & keyword argument):
   a) Write a function that calculates the area of a rectangle given its length and width as positional arguments.
   b) Create a function that prints a person's details (name, age, address) using keyword arguments.

Q6: Lambda function:
   a) Implement a program that uses a lambda function to find the square of a given number.
   b) Write a program that sorts a list of strings based on the length of each string using a lambda function.

Q7: Filter, Map, and Reduce:

a) Create a program that takes a list of strings as input and performs the following operations:
b) Use filter() and a lambda function to filter out strings with a length less than 5.
c) Use map() and a lambda function to convert the filtered strings to uppercase.
d) Use reduce() to concatenate the uppercase strings into a single string.
e) Write a program that reads a list of floating-point numbers from the user and uses map() to round each number to two decimal places. Then, use reduce() to find the sum of the rounded numbers.
f) list of words, use filter() and map() to create a new list that contains the lengths of words that have more than three characters.

Q8:

Coffee Machine Program Requirements

1. **Prompt user by asking "What would you like? (espresso/latte/cappuccino):"**
   a. Check the user's input to decide what to do next.
   b. The prompt should show every time action has completed, e.g. once the drink is dispensed. The prompt should show again to serve the next customer.

2. **Turn off the Coffee Machine by entering "off" to the prompt.**
   a. For maintainers of the coffee machine, they can use "off" as the secret word to turn off the machine. Your code should end execution when this happens.

3. **Print report.**
   a. When the user enters "report" to the prompt, a report should be generated that shows the current resource values. e.g.
   ```
   Water: 100ml
   Milk: 50ml
   Coffee: 76g
   Money: $2.5
   ```

4. **Check resources sufficient?**
    a. When the user chooses a drink, the program should check if there are enough resources to make that drink.
    b. E.g. if Latte requires 200ml water but there is only 100ml left in the machine. It should not continue to make the drink but print: "Sorry there is not enough water."
    c. The same should happen if another resource is depleted, e.g. milk or coffee.

5. **Process coins.**
    a. If there are sufficient resources to make the drink selected, then the program should prompt the user to insert coins.
    b. Remember that quarters = $0.25, dimes = $0.10, nickles = $0.05, pennies = $0.01
    c. Calculate the monetary value of the coins inserted. E.g. 1 quarter, 2 dimes, 1 nickel, 2 pennies = 0.25 + 0.1 x 2 + 0.05 + 0.01 x 2 = $0.52

6. **Check transaction successful?**
    a. Check that the user has inserted enough money to purchase the drink they selected. E.g Latte cost $2.50, but they only inserted $0.52 then after counting the coins the program should say "Sorry that's not enough money. Money refunded.".
    b. But if the user has inserted enough money, then the cost of the drink gets added to the machine as the profit and this will be reflected the next time "report" is triggered. E.g.
        Water: 100ml
        Milk: 50ml
        Coffee: 76g
        Money: $2.5
    c. If the user has inserted too much money, the machine should offer change.

        E.g. "Here is $2.45 dollars in change." The change should be rounded to 2 decimal places.

7. **Make Coffee.**
    a. If the transaction is successful and there are enough resources to make the drink the user selected, then the ingredients to make the drink should be deducted from the coffee machine resources.

        E.g. report before purchasing latte:
        Water: 300ml
        Milk: 200ml
        Coffee: 100g
        Money: $0

        Report after purchasing latte:
        Water: 100ml
        Milk: 50ml
        Coffee: 76g
        Money: $2.5

    b. Once all resources have been deducted, tell the user "Here is your latte. Enjoy!". If latte was their choice of drink.

Note: You can create dummy data if it is required in any question

Note:

- **Assignment Submitted in PDF form.**

- **In PDF form, you must include the screenshot of the code and its output.**

- **If not mentioned, then write a Python script that includes the code for each task.**

- **Include comments in your code to explain the purpose and functionality of each step.**

- **Send it in this email id:**
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- **You can get help from ChatGPT or any Chatbot but at the end.**

- **If Any, then It is highly recommended that you read research papers for assignment.**
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