Iterables & Loops p.I
For Loops

Exercises

Level - Easy

Exercise 1-1

1. Given the list `colors = ["red", "green", "blue", "yellow"]`
2. Use a for loop to print each color.

Exercise 1-2

1. Use a for loop with the range function to print numbers from 0 to 9.
2. Modify the loop to calculate and print their sum.

Exercise 1-3

1. Given a string, `sentence = "Hello, world!"`.
2. Use a for loop to count how many times the letter 'l' appears in the string.

Exercise 1-4

Use a for loop to print all even numbers from 2 to 20.

Exercise 1-5

1. Given a list, `fruits = ["apple", "banana", "cherry"]`
2. Use a for loop to create a new list that duplicates the items in the fruits list. The result should be ["apple", "apple", "banana", "banana", "cherry", "cherry"].

Exercise 1-6

Use a for loop to print the multiplication table for the number 5 (from 5x1 to 5x10).

Exercise 1-7

1. Display the number from -10 to 0 using a for loop.
2. Modify this for loop to only get 0 -2 -4 -6 -8 and -10

Level - Moderate

Exercise 2-1

1. Given a string, `word = "algorithm"`
2. Use a for loop to count the number of vowels and consonants in the word.
3. Print the counts at the end.

Exercise 2-2

1. Given two lists, `list1 = [1, 2, 3, 4, 5]` and `list2 = [4, 5, 6, 7, 8]`
2. Use a for loop to find the common elements between the two lists and store them in a new list.

Exercise 2-3

1. Ask the user for a string.
2. Determine whether it's a palindrome (reads the same backward as forward).
   Example: kayak, madam and racecar are palindromes but hello and python are not.

   For simplicity, you can assume the string has no spaces or punctuation.
   You **can't use** `string[::-1] == string_` to check if the word is a palindrome.

Exercise 2-4

Given a number n, use a for loop to generate a list of factorials for all numbers from 1 to n.

Exercise 2-5

Create a 3x3 matrix (list of lists) filled with numbers from 1 to 9 using nested for loops.
You **must start with an empty list** to create your matrix: `matrix = [ ]`

Exercise 2-6

1. Given two lists:
   a. `students = ["Alice", "Bob", "Charlie"]`
   b. `subjects = ["Math", "History", "Biology"]`
2. Use one for loop to pair each student with their associated subject, indicating which student needs to study which subject

Exercise 2-7

1. Ask the user for an integer.
2. Use a for loop that prints the 10 following numbers.
   ex : 10 → 11 12 13 14 15 16 17 18 19 20

Exercise 2-8

1. Given a list, `integers = [1,2,3,4,5,6]`

2. Use a for loop to transfer the values from the integers list to a new list. The integers list should be empty after the for loop.

Exercise 2-9

1. Given a list ["a", "b", "c", "d"]
2. Use one for loop – and only one – to traverse the list without using any other variable.
3. Print the result in the following way:

```
0 : a
1 : b
2 : c
3 : d
```

Exercise 2-10

1. Given a list with repeated elements, `data = [3, 5, 7, 3, 5, 9, 1, 7]`
2. Use a for loop to generate a new list containing only unique elements from the original list, preserving their original order.

Level - Hard

Exercise 3-1

Generate the first n numbers of the Fibonacci sequence using a for loop.
For simplicity, let n be fixed at 10 for this exercise.

The two first fibonacci numbers are 0 and 1.
Then, the next number is the result of the addition of the two previous numbers.
0 + 1 → 1
1 + 1 → 2
1 + 2 → 3
2 + 3 → 5

Exercise 3-2

Use a for loop to print only the prime numbers between 20 and 60.

Exercise 3-3

1. Given a list of numbers, `nums = [2, 5, 3, 5, 8, 9, 5, 2, 3]`
2. Use a for loop to determine and print the mode (the number that appears most frequently).

Exercise 3-4

Using a for loop, print a pyramid of asterisks that's n levels tall.
For instance, with n=3, the output would be:

```
  *
 ***
*****
```

Exercise 3-5

1. Given a string of length 3 such as `s = "abc"`.
2. Use for loops to print all possible permutations of the string characters.

Exercise 3-6

1. Print the following pattern using for loops:

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

2. Print the following pattern using for loops:

```
5 4 3 2 1
4 3 2 1
3 2 1
2 1
1
```

Level - Very Hard

Exercise 4-1

Convert an integer to its Roman numeral representation using a for loop.

Symbol	Value
I	1
IV	4
V	5
IX	9
X	10
XL	40
L	50
XC	90
C	100
CD	400
D	500
CM	900
M	1000

For simplicity, consider numbers between 1 and 3999.

Examples:

- *50 → L*
- *2000 → MM*
- *2010 → MMX*
- *2023 → MMXXIII*
- *2580 → MMDLXXX*
- *3157 → MMMCLVII*
- *3444 → MMMCDXLIV*

Exercise 4-2

Print the following pattern using for loops:

```
*
* *
* * *
* * * *
* * * * *
* * * *
* * *
* *
*
```