Assignment 1: Exercises on Operators, Strings, and Lists

Instructions:

1. Complete all exercises.
2. Ensure you include comments in your code explaining each step.
3. Save your code as a Jupyter Notebook (.ipynb file) and upload it to your GitHub repository.
4. Prepare a report (PDF) summarizing your assignment, including explanations of the exercises, your approach, and key learnings. Submit this report to your GitHub repository and print it out.(Report should have GitHub repository Link)

Submission Guidelines:

- Ensure your code is clean and readable.
- Include comments where necessary.
- Submit your work by the deadline.

Part 1: Operators

Exercise 1: Arithmetic Operators

Write a Python program to perform the following operations:

1. Add, subtract, multiply, and divide two numbers (input by the user).
2. Use the modulus operator to find the remainder of their division.
3. Use the exponentiation operator to raise the first number to the power of the second number.
4. Perform floor division on the two numbers.

Expected Input:

```
Enter first number: 10
Enter second number: 3
```

Expected Output:

```
Addition: 13
Subtraction: 7
Multiplication: 30
Division: 3.33
Modulus: 1
Exponentiation: 1000
Floor Division: 3
```

Exercise 2: Comparison Operators

Write a Python program that asks for two numbers and checks:

1. If the first number is greater than the second.
2. If the first number is equal to the second.
3. If the first number is less than or equal to the second.

Print the results.

Exercise 3: Logical Operators

Write a Python program that:

1. Takes three boolean values (`True` or `False`) as input.
2. Uses `and`, `or`, and `not` operators to return the result of combining them.

Part 2: Strings

Exercise 4: String Manipulation

1. Take a string input from the user.
2. Display the following:
     o   The length of the string.
     o   The first and last character.
     o   The string in reverse order.
     o   The string in uppercase and lowercase.

Exercise 5: String Formatting

Write a program that asks for the user's name and age, and displays the message in this format:

```
Hello [Name], you are [Age] years old.
```

Exercise 6: Substring Search

Write a Python program that:

1. Asks for a sentence input from the user.
2. Asks for a word to search in the sentence.
3. Outputs whether the word exists in the sentence and, if it does, at which position (index).

Part 3: Lists

Exercise 7: List Operations

Write a Python program that:

1. Creates a list of 5 numbers (input from the user).
2. Displays the sum of all the numbers in the list.
3. Finds the largest and smallest number in the list.

Exercise 8: List Manipulation

1. Create a list of 5 of your favorite fruits.
2. Perform the following:
   o Add one more fruit to the list.
   o Remove the second fruit from the list.
   o Print the updated list.

Exercise 9: Sorting a List

Write a Python program that:

1. Asks the user to input a list of 5 numbers.
2. Sorts the list in ascending order and displays it.
3. Sorts the list in descending order and displays it.

Exercise 10: List Slicing

Given the list `numbers = [1, 2, 3, 4, 5, 6, 7, 8, 9, 10]`, perform the following:

1. Print the first 5 elements.
2. Print the last 5 elements.
3. Print the elements from index 2 to index 7.

Bonus Challenge

Exercise 11: Nested List

Write a Python program that:

1. Takes input of 3 students' names and their respective scores in 3 subjects.
2. Stores them in a nested list.
3. Prints each student's name and their average score.