🧮 Assignment: Arithmetic Operators in Python

🎯 Objective:

This assignment is designed to help you understand and practice Python's arithmetic operators: `+` (Addition), `-` (Subtraction), `*` (Multiplication), `/` (Division), `//` (Floor Division), `%` (Modulus), `**` (Exponentiation)

Level 1: The Basics

1. **Simple Addition and Subtraction:**
    - Assign the value `10` to a variable named `num1`.
    - Assign the value `5` to a variable named `num2`.
    - Create a new variable `sum_result` and assign it the sum of `num1` and `num2`.
    - Create another variable `diff_result` and assign it the difference between `num1` and `num2`.
    - Print the values of `sum_result` and `diff_result`.
2. **Multiplication and Division:**
    - Assign the value `7` to a variable named `factor`.
    - Assign the value `3` to a variable named `quantity`.
    - Calculate the `product` of `factor` and `quantity` and store it in a new variable. Print the result.
    - Assign the value `20` to a variable named `total_items`.
    - Assign the value `4` to a variable named `num_groups`.
    - Calculate the number of `items_per_group` using division and print the result.
3. **Integer Division and Modulo:**
    - Assign the value `17` to a variable named `dividend`.
    - Assign the value `5` to a variable named `divisor`.
    - Calculate the `quotient` using integer division (`//`) and print it.
    - Calculate the `remainder` using the modulo operator (`%`) and print it. Explain what the modulo operator does.

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✅ Task 1: Basic Arithmetic Calculator

Write a Python program that:

- Takes two numbers as input.
- Performs and prints the result of:
    - Addition
    - Subtraction
    - Multiplication
    - Division
    - Floor Division
    - Modulus
    - Exponentiation

Level 2: Combining Operations

4. **Order of Operations:**
    - Evaluate the expression `(10 + 5) * 2` and assign the result to a variable `result1`. Print `result1`.
    - Evaluate the expression `10 + 5 * 2` and assign the result to a variable `result2`. Print `result2`.
    - Explain why `result1` and `result2` are different. (Hint: Think about operator precedence - PEMDAS/BODMAS).
5. **Using Parentheses:**
    - Write Python code to calculate the average of three numbers: `12`, `18`, and `21`. Store the result in a variable `average` and print it. Make sure to use parentheses correctly.
6. **More Combined Operations:**
    - Assign the value `100` to a variable `initial_amount`.
    - Calculate 15% of `initial_amount` and store it in a variable `discount`.
    - Calculate the `final_amount` after subtracting the `discount` from `initial_amount`. Print the `final_amount`.

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Level 3: Applying Concepts

7. **Area of a Rectangle:**
    - Assign the length of a rectangle (e.g., `8`) to a variable `length`.
    - Assign the width of the same rectangle (e.g., `5`) to a variable `width`.
    - Calculate the area of the rectangle using the appropriate operator and store it in a variable `area`. Print the `area`.
8. **Calculating Change:**
    - Assign the amount a customer paid (e.g., `25`) to a variable `amount_paid`.
    - Assign the total cost of items (e.g., `18.75`) to a variable `total_cost`.
    - Calculate the `change` the customer should receive. Print the `change`.
9. **Temperature Conversion (Celsius to Fahrenheit):**
    - Assign a temperature in Celsius (e.g., `25`) to a variable `celsius`.
    - Use the formula to convert Celsius to Fahrenheit: Fahrenheit=(Celsius×59) +32.
    - Calculate the Fahrenheit equivalent and store it in a variable `fahrenheit`. Print the `fahrenheit` value.

✅ Task 1: Marks and Percentage

- Input: Marks of 5 subjects (each out of 100).
- Output:
    - Total marks
    - Percentage
    - Result: "Pass" if percentage ≥ 40, else "Fail"

✅ Task 2: Bill Splitter

- Input: Total bill amount and number of friends.
- Output:
    - Each person's share (use `//`)
    - Remaining amount (use `%`)

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Level 4: Slightly More Challenging

10. **Calculating Average with Integer Division:**
    - Assign the scores of five students in a list (e.g., `[85, 92, 78, 95, 88]`).
    - Calculate the total score.
    - Calculate the average score using integer division. Discuss if this is always the most accurate way to calculate the average.

11. **Understanding Modulo in Real-World Scenarios:**
    - Imagine you have `30` cookies and want to distribute them equally among `7` friends.
    - Use the modulo operator to find out how many cookies will be left over after the distribution. Print the result.

12. **Combining Multiple Steps:**
    - A bakery sells cupcakes for ₹50 each. If a customer buys 6 cupcakes and gets a 10% discount on the total, calculate the final amount the customer has to pay. Use variables for the price, quantity, and discount.

✅ Task 1: Digit Operations

- Input: A 3-digit number.
- Output:
    - Extract and display hundreds, tens, and units digits.
    - Calculate and print the **sum** and **product** of the digits.

💡 Use `//` and `%` to extract digits.