🐍 Python Homework: The Ultimate Variable Challenge

Instructions:

- You will complete this homework in **Google Colab**.
- For each task, create a **new code cell** and complete the entire task in that single cell.
- When you are finished, go to File > Download > Download .ipynb. This is the file you will submit on Google Classroom.

Part 1: The Basics of Variables

Task 1: Getting to Know You, Computer 🗣️

Your first mission is to use variables to hold some basic information.

1. Create a variable called my_name and set its value to your name as a **string**.
2. Create a variable called my_age and set its value to your age as an **integer**.
3. Create a variable called is_a_coder and set its value to True as a **boolean**.
4. On a new line, use a single print() command to print all three variables. The output should look like this: John 10 True.

Task 2: Naming the Boxes 📦

Variables have special naming rules! Let's practice finding good and bad names.

- **Good Names** are easy to read and follow the rules.
  - Examples: age, user_name, favorite_color
- **Bad Names** cause errors or are confusing.
  - Examples: 1age (starts with a number), user-name (uses a special character), Age (capital A is okay, but it's best to be consistent!)

For each line below, decide if the variable name is **Good** or **Bad**. Then, in the same code cell, write a comment next to each one (using #) explaining why. If the name is **Bad**, fix it on a new line.

```
favorite_book = "The Hobbit"
# This is a good name because...

3_planets = "Mars"
# This is a bad name because...

My_City = "Islamabad"
# This is a good name, but a better name would be...

total-score = 500
```

This is a bad name because...

Part 2: Using Variables for Math & Text

Task 3: The Simple Calculator 🧮

Let's use variables to build a simple calculator that performs all four basic math operations.

1. Create a variable called num1 and set its value to an **integer** like 20.
2. Create a variable called num2 and set its value to an **integer** like 5.
3. Create a new variable called sum_result that stores the result of num1 + num2.
4. Create a new variable called difference_result that stores the result of num1 - num2.
5. Create a new variable called product_result that stores the result of num1 * num2.
6. Create a new variable called quotient_result that stores the result of num1 / num2.
7. Use **one** print() command to print the results of all four operations, with each result on a new line.
    - *Hint:* Use \n to create a new line.
    - *Example:* print("The sum is:", sum_result, "\nThe difference is:", difference_result, "\nThe product is:", product_result, "\nThe quotient is:", quotient_result)

Task 4: The Data Type Mix-Up 🤖

This is a challenge to check if you understand data types.

1. Create a variable called sentence and set its value to a **string**.
2. Create a variable called length and set its value to a **float**.
3. Create a variable called is_it_true and set its value to a **boolean**.
4. Using the type() function, print the data type for each of the three variables you created. The output should show <class 'str'>, <class 'float'>, and <class 'bool'>.

Part 3: The Interactive Final Challenge

Task 5: The Story Generator 📚

Now let's combine everything you've learned to build a fun program!

1. Use the input() function to ask for a hero's name and store it in a variable called hero.
2. Use the input() function to ask for a place to go and store it in a variable called place.
3. Use the input() function to ask for a number (like 10) and store it in a variable called magic_number.
4. Use string concatenation to create a new variable called story that combines a sentence about the hero, the place, and the magic number.
    - *Example:* story = "The hero " + hero + " went to the " + place + " with " + magic_number + " magic gems."
    - *Note:* The input() function gives you a **string**, even if the user types a number. You will have to put spaces between the variables yourself.
5. Print the final story variable.

Part 4: The Ultimate Calculator 💡

This final challenge will test all your skills! You'll create a calculator that helps you figure out the cost of your favorite snacks.

1. Use the input() function to ask the user: "How many cookies did you buy?" and store the result in a variable called num_cookies.
2. Use the input() function to ask the user: "How much did each cookie cost?" and store the result in a variable called price_per_cookie.
3. Because input() always gives you a **string**, you'll need to convert these variables into **integers** to do math with them.
    - Create a new variable called num_cookies_int and convert num_cookies to an integer using the int() function.
    - Create a new variable called price_per_cookie_int and convert price_per_cookie to an integer using the int() function.
4. Create a new variable called total_cost that is the result of num_cookies_int * price_per_cookie_int.
5. Use a print() command to show the result in a clear sentence.

Example: If the user enters 10 and 2, your output should be: The total cost is 20.