Python Assignment: Mastering Decision Making in Python

📚 Topics Covered:

- Variables
- Logical Operators (`and`, `or`, `not`)
- Comparison Operators (`==`, `!=`, `<`, `>`, `<=`, `>=`)
- Arithmetic Operators (`+`, `-`, `*`, `/`, `//`, `%`, `**`)
- Conditional Statements:
    - `if`
    - `if-else`
    - `If-elif`

Section A: Concept Review (Short Questions)

Answer the following in your own words:

1. What is a **variable** in Python? Give two examples.
2. What is the difference between = and ==?
3. Explain the purpose of the **logical operators** and, or, and not with examples.
4. What is the difference between / and // operators?
5. What does the ** operator do? Give an example.
6. Write the syntax of an if-elif-else statement.
7. How do comparison operators help in decision-making?

🧱 Task 1: Simple Calculations

Create a program that:

1. Takes two numbers as input.
2. Performs and prints:
    - Addition
    - Subtraction
    - Multiplication
    - Division
    - Floor Division
    - Modulus
    - Exponentiation

📘 *Hint:* Use +, -, *, /, //, %, **

🌈 Section B: Conditional Statements

🧠 Task 2: Positive, Negative, or Zero

Ask the user for a number.
Use if-elif-else to print:

- “Positive Number”
- “Negative Number”
- “Zero”

🎂 Task 3: Age Category Finder

Ask the user for their age.
Use if-elif-else to print:

- “Child” if age < 13
- “Teenager” if 13 ≤ age < 20
- “Adult” if 20 ≤ age < 60

- “Senior Citizen” if age ≥ 60

📊 Task 4: Grading System

Input marks (0–100).
 Use if-elif-else to display:

- A+ for marks ≥ 90
- A for 80–89
- B for 70–79
- C for 60–69
- D for 50–59
- F for <50

✅ Also print “Invalid Input” if marks are not between 0–100.

Section C: Real-Life Logic Problems

🏫 Task 5: Pass or Fail

Ask for student marks in 3 subjects.
 Calculate the average.
 If average ≥ 50, print “Pass”, else “Fail”.

🌦️ Task 6: Weather Suggestion

Ask the user for temperature.
 Use if-elif-else:

- If temp > 35 → “It’s too hot, stay indoors!”
- If 25 ≤ temp ≤ 35 → “Nice weather, go for a walk!”
- If 15 ≤ temp < 25 → “Cool weather, wear a jacket.”
- Else → “It’s cold, stay warm!”

🏧 Task 7: ATM Withdrawal System

Ask the user for their **balance** and **withdrawal amount**.
If withdrawal amount > balance → "Insufficient Funds"
Else → "Transaction Successful" and print remaining balance.

📱 Task 8: Mobile Recharge Offer

Input the recharge amount and use if-elif:

- If amount ≥ 1000 → Print "You get 10GB data + 100 mins free!"
- If 500 ≤ amount < 1000 → "You get 5GB data + 50 mins free!"
- If 200 ≤ amount < 500 → "You get 2GB data + 20 mins free!"
- Else → "You get 500MB data."

🎯 Section D: Challenge Tasks (Advanced Thinking)

🧮 Task 9: Calculator (Mini Project)

Ask the user:

- Two numbers
- An operator (+, -, *, /, //, %, **)

Use **if-elif-else** to perform the correct operation.
Print the result.
If the operator is invalid → print "Invalid Operator".

🎢 Task 10: Grade with Logical Conditions

Take input for marks in Math, Science, and English.
If all marks ≥ 60 → print "Passed in all subjects".
If one or more subjects < 60 → print "Needs Improvement".
If all < 60 → print "Failed".

📘 *Use:* Logical operators with multiple if statements.

🛒 Task 11: Shopping Discount

Input **total purchase amount**.
Use if-elif-else:

- ≥ 10000 → 25% discount
- 5000–9999 → 15% discount
- 1000–4999 → 10% discount
- Else → No discount

Show the **discounted price**.

🧍 Task 12: Body Mass Index (BMI) Calculator

Ask for **weight (kg)** and **height (m)**.
Compute BMI = weight / (height ** 2).
Use if-elif-else:

- BMI < 18.5 → “Underweight”
- 18.5 ≤ BMI < 25 → “Normal”
- 25 ≤ BMI < 30 → “Overweight”
- ≥ 30 → “Obese”

🎢 Task 13: Grade with Logical Conditions

Take input for marks in Math, Science, and English.
If all marks ≥ 60 → print “Passed in all subjects”.
If one or more subjects < 60 → print “Needs Improvement”.
If all < 60 → print “Failed”.

🧾 Section F: Reflection Questions

Write answers briefly:

1. What was the difference between using multiple if statements vs. if-elif-else?
2. In which situations did you use logical operators effectively?
3. How does nesting if statements make programs powerful but also more complex?

🏁 Submission Guidelines

- Submit your .ipynb file named as <YourName>.ipynb
- Include comments (#) explaining each part of your code.
- Ensure your program handles invalid inputs gracefully.
