🧠 Python Control Flow Problems (Module 2)

✅ Section 1: If-Else and Conditional Logic

💡 Basic Conditionals

1. Check if a number is positive or negative.
2. Input a number and determine if it's even or odd.
3. Check if a number is a multiple of 5.
4. Check if a character is a vowel or consonant.
5. Determine if the entered number is zero, positive, or negative.
6. Check if a person is eligible to vote (18+).
7. Determine the largest of two numbers.
8. Find the smallest of three numbers.
9. Check if a year is a leap year.
10. Check if a number is divisible by 2 and 3.

🧱 Section 2: Nested Conditions

11. Take 3 inputs and print the greatest number.
12. Classify a triangle by its sides: Equilateral, Isosceles, or Scalene.
13. Classify a character: Alphabet, Digit, or Special Character.
14. Check if a student has passed (marks ≥ 40 in each subject).
15. Check if a number is between 100 and 200.
16. Determine letter grades from a percentage (A, B, C...).
17. Check if a number is odd and greater than 100.
18. Determine if a string has both uppercase and lowercase letters.
19. Check if a string has more vowels than consonants.
20. Input 3 numbers and print them in ascending order.

🔁 Section 3: For Loops

🔢 Number Ranges

21. Print numbers 1 to 10.
22. Print all even numbers from 1 to 100.

23. Print all odd numbers from 50 to 100.
24. Print all numbers divisible by 3 between 1 to 30.
25. Print squares of numbers 1 to 10.
26. Print multiplication table of a number.
27. Print numbers from 10 to 1 (reverse order).
28. Print the factorial of a number.
29. Print the sum of numbers from 1 to N.
30. Print the product of numbers from 1 to N.

Patterns (use nested loops)

31. Print a square of stars (5x5).
32. Print a right-angle triangle of stars.
33. Print a triangle of numbers (1 22 333 ...).
34. Print a reverse triangle of stars.
35. Print a pyramid of numbers.

Section 4: While Loops

36. Print numbers from 1 to 20 using while.
37. Print sum of digits of a number.
38. Count digits in a number.
39. Reverse a number.
40. Print Fibonacci sequence up to N terms.
41. Find the factorial using while loop.
42. Print a countdown from 10 to 0.
43. Continue taking input until the user enters "exit".
44. Check if a number is a palindrome.
45. Check if a number is an Armstrong number.

Section 5: Loop Logic and Control Statements

46. Print all prime numbers between 1 to 100.
47. Check if a number is prime.

48. Print the first N prime numbers.
49. Skip numbers divisible by 3 using continue.
50. Break the loop when number > 100 is entered.
51. Search for an element in a list using a loop.
52. Print only even-positioned elements in a list.
53. Print the sum of all odd numbers between 1 and N.
54. Count how many numbers between 1–N are divisible by 7.
55. Print common elements from two lists.

🧩 Section 6: Logical Operators and Boolean Practice

56. Check if input age is between 18 and 60.
57. Check if a character is a lowercase vowel.
58. Check if a number is divisible by 2 or 3 but not 5.
59. Check if all three conditions are True (using and).
60. Determine if at least one out of 3 numbers is negative.

🎲 Section 7: Mini Logic Challenges

61. Check if a number is a perfect square.
62. Check if a number is a perfect number (sum of divisors equals the number).
63. Print first N terms of a geometric progression.
64. Count how many vowels are in a word.
65. Find the sum of all digits in all even numbers from 1 to N.

🧪 Section 8: Interactive & Real-World Tasks

66. Create a simple login system with 3 tries.
67. Ask for a number and keep asking until a prime is entered.
68. Take user input and print whether it's numeric or not.
69. Count how many times the word "python" appears in a sentence.
70. Ask for 5 numbers and print the average.

🎮 Section 9: Games & Simulations

71. Number guessing game with limited attempts.
72. Simulate rolling a die 10 times.
73. Randomly select a number from a list until the target number is found.
74. Rock-paper-scissors game (text-based).
75. Simple password strength checker using conditions and loops.

🧩 Section 10: Loop + Condition Integration Problems

76. Find the LCM of two numbers.
77. Find the GCD of two numbers.
78. Take a number and print all its divisors.
79. Count how many perfect squares exist between two numbers.
80. Take 5 numbers and print how many are even, odd, positive, negative.

🖌️ Section 11: Looping Through Strings

81. Print all characters in a string one by one.
82. Count how many digits are in a string.
83. Count uppercase vs lowercase characters.
84. Replace all vowels in a string with '*'.
85. Count how many words are in a sentence.

💼 Section 12: Basic Use Case Problems

86. Check user input and respond with basic chatbot logic (simple rules).
87. Ask for login with retry on incorrect attempts.
88. Format a number with commas using a loop.
89. Input a sentence and count how many words are longer than 5 characters.
90. Validate a basic email (contains '@' and '.').

🧠 Section 13: Loop-Based Number Theory Practice

91. Find all 2-digit numbers where sum of digits = 10.
92. Print all 3-digit Armstrong numbers.
93. Find all prime numbers in a range given by the user.

94. Print all palindromes between 100 and 999.
95. Generate first N terms of the Fibonacci series.

🏁 Section 14: Final Mini Projects (Control Flow)

96. **ATM Simulator**: Enter PIN → Show Menu (Withdraw, Balance, Exit).
97. **Grading System**: Input marks for 5 subjects → Calculate percentage → Grade.
98. **Basic Calculator**: Take two numbers and operator → return result.
99. **Shopping Cart**: Loop to input items → total → checkout.
100. **Login/Signup System**: Store usernames/passwords → validate input → allow login.