Week 2 – Programming Basics

1. Swap two variables without using a temporary variable
Description: Write a program to swap the values of two variables (e.g., a and b) without using a third variable.
Example:
Input:
a = 5, b = 10
Output:
a = 10, b = 5

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2. Find the largest and smallest of three numbers
Description: Read three integers and print the largest and smallest.
Example:
Input:
3, 9, 5
Output:
Largest: 9, Smallest: 3

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3. Calculate the area and perimeter of a rectangle
Description: Given length and width, calculate and display both area and perimeter.
Example:
Input:
length = 4, width = 6
Output:
Area: 24, Perimeter: 20

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4. Temperature converter (Celsius ↔ Fahrenheit)
Description: Convert temperature from Celsius to Fahrenheit and vice versa.
Formula:
$F = (C \times 9/5) + 32$
$C = (F - 32) \times 5/9$
Example:
Input:
C = 25

Output:
F = 77

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5. Compute Simple and Compound Interest
Description: Given Principal (P), Rate (R), and Time (T), compute:
Simple Interest = (P × R × T) / 100
Compound Interest = P × ((1 + R/100) ^ T - 1)
Example:
Input:
P = 1000, R = 5, T = 2
Output:
SI = 100, CI ≈ 102.5

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6. Convert total seconds into hours, minutes, and seconds
Description: Convert a given number of seconds into hours, minutes, and seconds format.
Example:
Input:
3665
Output:
1 hr, 1 min, 5 sec

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7. Check whether a number is even or odd
Description: Determine if a number is divisible by 2.
Example:
Input:
7
Output:
Odd

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8. Determine if a number is positive, negative, or zero
Description: Use if-else statements to categorize a number.
Example:
Input:
-3

Output:
Negative

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9. Grade Calculator (0–100 → A–F)
Description: Input a student's marks (0–100) and print the grade based on a scale.
Example:
Input:
85
Output:
B

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10. Leap Year Checker
Description: Determine if a given year is a leap year.
Rule: Year divisible by 4 → leap year, except centuries not divisible by 400.
Example:
Input:
2000
Output:
Leap year
Input:
1900
Output:
Not leap year

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11. Simple Calculator using switch-case
Description: Input two numbers and an operator (+, -, *, /) and compute the result.
Example:
Input:
5, 3, +
Output:
8

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12. Traffic Light System using switch-case
Description: Input a color (Red, Yellow, Green) and display an action (Stop, Ready, Go).

Example:
Input:
Green
Output:
Go

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13. Month name & number of days using switch-case
Description: Input a month number (1–12) and display its name and number of days.
Example:
Input:
2
Output:
February, 28 or 29 days

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14. Check character type
Description: Input a character and determine if it's a vowel, consonant, digit, or special symbol.
Example:
Input:
a
Output:
Vowel

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15. Triangle validity and type
Description: Given three sides, determine if they form a valid triangle and if it's equilateral, isosceles, or scalene.
Rule: Sum of any two sides > third side.
Example:
Input:
3, 4, 5
Output:
Valid triangle, Scalene

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16. Print numbers from 1 to 100
Description: Use a loop to print num\bers sequentially.

Example:
Output:
1, 2, 3, …, 100

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17. Sum of first N natural numbers
Description: Calculate and print the sum using a loop.
Example:
Input:
5
Output:
15

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18. Multiplication table of a number
Description: Print the multiplication table for a given number (up to 10 or N).
Example:
Input:
5
Output:
5 × 1 = 5
5 × 2 = 10
…
5 × 10 = 50

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19. Reverse a number
Description: Reverse the digits of an integer.
Example:
Input:
1234
Output:
4321

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20. Count digits in a number
Description: Find how many digits are in a number.
Example:

Input:
786
Output:
3

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21. Sum of digits
Description: Calculate the sum of all digits of a number.
Example:
Input:
123
Output:
6

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22. Print even numbers in a range
Description: Input start and end values, print all even numbers between them.
Example:
Input:
1, 10
Output:
2, 4, 6, 8, 10

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23. Fibonacci series up to N terms
Description: Generate the Fibonacci sequence (0, 1, 1, 2, 3, 5, 8…) up to N terms.
Example:
Input:
7
Output:
0, 1, 1, 2, 3, 5, 8

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24. Find GCD of two numbers
Description: Compute the greatest common divisor using repeated subtraction or the Euclidean algorithm.
Example:
Input:
12, 18

Output:
6

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25. Find LCM of two numbers
Description: Compute least common multiple using the relationship: LCM(a, b) = (a × b) / GCD(a, b)
Example:
Input:
12, 18
Output:
36