**Lab Assignment 3**

**FOR Loop**

**1. Armstrong Numbers in Range**

* Input: Start = 100, End = 500
* Output: 153, 370, 371, 407

**2. Pascal’s Triangle**

* Input: N = 5
* Output:

1

1 1

1 2 1

1 3 3 1

1 4 6 4 1

**3. Star Pyramid Pattern**

* Input: Rows = 4
* Output:

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**4. Frequency of Elements in a Vector**

* Input: Vector = [2, 3, 2, 4, 3, 2, 5]
* Output:

2 → 3 times

3 → 2 times

4 → 1 time

5 → 1 time

**5. Matrix Addition**

* Input:

Matrix A = [[1,2],[3,4]]

Matrix B = [[5,6],[7,8]]

* Output:

Result = [[6,8],[10,12]]

**6. Palindrome String Check**

* Input: String = "madam"
* Output: "Palindrome"
* Input: String = "hello"
* Output: "Not Palindrome"

**7. Prime Numbers in Range**

* Input: Start = 10, End = 30
* Output: 11, 13, 17, 19, 23, 29

**WHILE Loop**

**8. Collatz Sequence**

* Input: 6
* Output: 6 → 3 → 10 → 5 → 16 → 8 → 4 → 2 → 1

**9. GCD of Two Numbers**

* Input: a = 48, b = 18
* Output: 6

**10. Palindrome Number Check**

* Input: 121
* Output: Palindrome
* Input: 123
* Output: Not Palindrome

**11. Compute Power (x^y)**

* Input: x = 2, y = 5
* Output: 32

**12. Count Vowels and Consonants**

* Input: String = "Hello World"
* Output: Vowels = 3, Consonants = 7

**13. Cumulative Sum Until >100**

* Input: 10, 20, 30, 50
* Output:

Sum exceeded 100 after 4 numbers.

Final Sum = 110

**14. Largest Digit in a Number**

* Input: 95824
* Output: 9

**REPEAT Loop**

**15. Fibonacci Sequence until Limit**

* Input: Limit = 50
* Output: 0 1 1 2 3 5 8 13 21 34

**16. Menu-driven Calculator**

* Input: Choice = 1 (Addition), Numbers = 5, 3
* Output: 8
* Input: Choice = 4 (Division), Numbers = 10, 2
* Output: 5

**17. Number Guessing Game**

* Input: Secret = 7, User Guesses = [3, 5, 7]
* Output: "Correct! You guessed 7."

**18. Reverse Words of a Sentence**

* Input: "R programming is fun"
* Output: "fun is programming R"

**19. Perfect Number Check**

* Input: 28
* Output: Perfect Number
* Input: 20
* Output: Not Perfect Number

**20. Random Number Generator (Stop at Divisible by 7)**

* Input: Random sequence → 5, 12, 18, 21
* Output: Stops at 21 (since divisible by 7)