UNIVERSAL RESULT IDENTIFY

1. CHECK IF A NUMBER IS AN ARMSTRONG NUMBER

Output:

371 is an Armstrong number.

Test Cases:

Test Cases: 153 → Armstrong,

370 → Armstrong,

9474 → Armstrong,

123 → Not Armstrong,

0 → Armstrong

2. FIND THE SECOND LARGEST NUMBER IN AN ARRAY

Output:

Second largest = 12

Test Cases:

[10,5,8,20,12] → 12;

[5,5,5] → No second largest;

[1] → No second largest

3. COUNT VOWELS AND CONSONANTS IN A STRING

Output:

Vowels: 7Consonants: 13

Test Cases:

Test Cases: "Debugging Competition" → Vowels 7, Consonants 13; "Hello World!" → 3,7

4. FIND THE GCD (GREATEST COMMON DIVISOR) OF TWO NUMBERS

Output:

GCD of 48 and 18 = 6GCD of 100 and 25 = 25GCD of 7 and 13 = 1GCD of 10 and 0 = 10GCD of 0 and 5 = 5

Test Cases:

Test Cases: (48,18)→6; (100,25)→25; (7,13)→1; (10,0)→10; (0,5)→5

5. SUM OF DIGITS OF A NUMBER

Output:

Sum of digits of 123 = 6

Test Cases:

Test Cases: 123→6; 0→0; 9999→36; -456→15; 1001→2

6. REVERSE A STRING

Output:

Original: hello | Reversed: olleh

Test Cases:

Test Cases: "hello"→olleh; "racecar"→racecar; ""→""

7. FACTORIAL OF A NUMBER (ITERATIVE)

Output:

Factorial of 5 = 120Factorial of 0 = 1Factorial of 10 = 3628800Factorial not defined for -3

Test Cases:

Test Cases: 5→120; 0→1; 10→3628800; -3→Not defined

8. CHECK IF A NUMBER IS A PALINDROME

Output:

121 is a Palindrome-121 is a Palindrome123 is not a Palindrome0 is a Palindrome10 is not a Palindrome

Test Cases:

Test Cases: 121→Palindrome; -121→Palindrome; 123→Not; 0→Palindrome; 10→Not

9. COUNT FREQUENCY OF EACH CHARACTER IN A STRING (CASE INSENSITIVE)

Output:

p:1r:2o:1g:2a:1m:2i:1n:1

Test Cases:

Test Cases: "Programming"; "Data Structures"; "123abcABC"

10. FIND ALL UNIQUE ELEMENTS IN AN ARRAY

Output:

Unique elements: 1 3 5

Test Cases:

Test Cases: [1,2,2,3,4,4,5]→1 3 5; [7,7,7]→(empty)

11. FIND THE FIRST NON-REPEATING CHARACTER IN A STRING

Output:

First non-repeating character: g

Test Cases:

Test Cases: "aabbccddeefg"→g; "aabbcc"→-; "swiss"→w

12. CHECK IF A NUMBER IS A PERFECT NUMBER

Output:

Input: 6 => Is perfect? TrueInput: 28 => Is perfect? TrueInput: 12 => Is perfect? FalseInput: 496 => Is perfect? TrueInput: 100 => Is perfect? FalseInput: 1 => Is perfect? False

Test Cases:

Test Cases: 6→True; 28→True; 12→False; 496→True; 1→False

13. MERGE TWO SORTED ARRAYS

Output:

Merged array: 1 2 3 4 5 6

Test Cases:

Test Cases: [1,3,5] & [2,4,6] → [1,2,3,4,5,6]

14. FIND THE MAXIMUM AND MINIMUM ELEMENT IN AN ARRAY

Output:

Max: 8Min: 2

Test Cases:

Test Cases: [3,5,7,2,8]→Max 8 Min 2; [1]→Max 1 Min 1

15. CONVERT DECIMAL NUMBER TO BINARY

Output:

Decimal: 10 => Binary: 1010

Test Cases:

Test Cases: 0→0; 5→101; 255→11111111

16. REPLACE ALL VOWELS IN A STRING WITH '*'

Output:

Original with vowels replaced: H*ll* W*rld

Test Cases:

Test Cases: 'Hello World'→H*ll* W*rld; 'AEIOUaeiou'→**********

17. PASCAL'S TRIANGLE (FIRST N ROWS)

Output:

Prints first 7 rows of Pascal's triangle (formatted)

Test Cases:

Test Cases: n=7 as sample

18. FIND THE SUM OF EVEN NUMBERS IN AN ARRAY

Output:

Sum of even numbers: 18

Test Cases:

Test Cases: [4,7,2,9,12,15]→18; [1,3,5]→0

19. FIND THE POWER OF A NUMBER (x^n) WITHOUT pow()

Output:

2 raised to the power 5 is 32

Test Cases:

Test Cases: (2,5)→32; (5,0)→1; (3,3)→27

20. TRANSPOSE OF A MATRIX

Output:

Transpose of the matrix:1 4 2 5 3 6

Test Cases:

Test Cases: [[1,2,3],[4,5,6]] → see output

21. SIMULATE A SIMPLE ELEVATOR SYSTEM (UP/DOWN)

Output:

Moving Up:Floor 3Floor 4Floor 5Floor 6

Test Cases:

Test Cases: (2,6)→moves up; (5,2)→moves down; (3,3)→already on same floor

22. DIGIT REARRANGEMENT TO FORM MAXIMUM EVEN NUMBER

Output:

Input: 1234Largest even number: 4312

Test Cases:

Test Cases: 1234→4312; 531→-1; 8201→8210

23. NumberPalindromeChecker

output:

Number: 12321

Is Palindrome? true

Number: 45654

Is Palindrome? true

Number: 12345

Is Palindrome? false

Number: -121

Is Palindrome? false

Number: 0

Is Palindrome? true

Number: 10

Is Palindrome? false

Number: 1001

Is Palindrome? true

24.PrimeFactorization

Output:

Prime factors of 28 are: 2 2 7

Prime factors of 45 are: 3 3 5

Prime factors of 60 are: 2 2 3 5

Prime factors of 13 ar

e: 13

25.PalindromePartitionCounter

Output:

Total palindromic partitions: 2

Test cases:

Input: "aab"

26.NQueensSolver

Output:

0 1 0 0

0 0 0 1

1 0 0 0

0 0 1 0

Test cases:

Solve

s for N=4

27.BinaryTreeInorderTraversal

Output:

Inorder traversal: 3 1 4 0 2 5

Test cases:

28.TopologicalSort

Output:

Topological Sort: 0 2 4 1 3 5

Test cases:

Graph edges implied by matrix. One possible topological order:

29.Knapsack01

Output:

Max value: 9

Test Case:

Weights = {1,3,4,5}, Values = {1,4,5,7}, Max weight = 7

30.LAST QUESTION:X O X GAME

input type

0 0

1 1

0 1

1 0

0 2

output

Welcome to Tic Tac Toe!

Player X goes first.

```
  |   |
-----------
  |   |
-----------
  |   |
Player X, enter row and column (0-2):  X |   |
-----------
  |   |
-----------
  |   |
Player O, enter row and column (0-2):  X |   |
-----------
  | O |
-----------
  |   |
Player X, enter row and column (0-2):  X | X |
-----------
```

| O |

| |

Player O, enter row and column (0-2): X | X |

O | O |

| |

Player X, enter row and column (0-2): X | X | X

O | O |

| |

Player X wins!