**30-Day Beginner Algorithm Challenge**

Each day includes 10 beginner-friendly algorithm practice questions based on a focused concept. Use any language: Python, Java, JavaScript, etc.

### ⬛ Day 1: Output & Flow

1. Print numbers from 1 to 10.
2. Print even numbers from 1 to 20.
3. Print your name 5 times.
4. Print all numbers from 50 to 100.
5. Print all odd numbers between 1 and 30.
6. Print numbers in reverse from 10 to 1.
7. Print first 10 multiples of 3.
8. Print all numbers divisible by 5 between 1 and 100.
9. Print a message inside a box made of stars.
10. Print a welcome message with the current date.

### 🟡 Day 2: Input + Arithmetic

1. Input two numbers and print their sum.
2. Input two numbers and print their difference.
3. Input two numbers and print their product.
4. Input two numbers and print their quotient.
5. Calculate simple interest (P \* R \* T / 100).
6. Calculate area of a circle given radius.
7. Calculate area and perimeter of a rectangle.
8. Convert temperature from Celsius to Fahrenheit.
9. Find the square of a number.
10. Input 3 numbers, print their average.

### 🔹 Day 3: Selection (if/else)

1. Check if a number is even or odd.
2. Check if a number is positive or negative.
3. Find the maximum of two numbers.
4. Check if a number is divisible by 3.
5. Check if a person is eligible to vote (age >= 18).
6. Check if a number is a multiple of both 3 and 5.
7. Print “Pass” if score >= 40, else print “Fail”.
8. Check if a number is zero.
9. Check if temperature is cold (<15), warm (15-30), or hot (>30).
10. Determine the sign of a number (positive, negative, zero).

### 🔹 Day 4: Nested Conditionals

1. Find the largest of three numbers.
2. Check if a year is a leap year.
3. Input two numbers, perform operation based on a symbol (+, -, \*, /).
4. Check if a character is a vowel or consonant.
5. Grade student based on score (A-F).
6. Categorize person by age (child, teen, adult, senior).
7. Check if a number is positive and even.
8. Compare 3 subjects’ marks and declare best subject.
9. Compare lengths of three strings and print the longest.
10. Print if a number is in range 10-50, 51-100, or above 100.

### 🌀 Day 5: Looping Basics

1. Print multiplication table of any number.
2. Print squares of numbers 1 to 10.
3. Print factorial of a number using loop.
4. Sum of numbers from 1 to n.
5. Count down from n to 0.
6. Print odd numbers between 10 and 50.
7. Print every 3rd number from 1 to 30.
8. Find product of all numbers from 1 to 10.
9. Print first n multiples of 7.
10. Print all lowercase letters from a to z.

### 🔹 Day 6: Sum & Count

1. Sum of first 100 natural numbers.
2. Count how many numbers divisible by 3 between 1 and 100.
3. Input 10 numbers, find their sum.
4. Count positive and negative numbers in a list.
5. Find the average of 5 test scores.
6. Count number of digits in an integer.
7. Input 10 numbers, count how many are even.
8. Find sum of digits of a number (e.g. 123 = 1+2+3).
9. Count how many numbers are greater than 50.
10. Calculate running total as user inputs numbers until 0.

### 🌟 Day 7: Mini Challenge Day

1. Check if number is divisible by 2, 3, 5.
2. Print sum and average of 10 numbers.
3. Print multiplication table of a number in reverse order.
4. Find area of triangle using formula.
5. Convert days to years, weeks, and days.
6. Take 5 numbers, find smallest and largest.
7. Reverse a number (e.g. 123 -> 321).
8. Count the number of times a digit appears in a number.
9. Sum of odd numbers between 1 and 50.
10. Check if sum of two numbers is greater than a third.

### 🔸 Day 8–13: Arrays – Basics to Challenge (See earlier content)

### 🔵 Day 14: Strings - Basics

1. Input a string and print it.
2. Print length of a string.
3. Print first and last character of a string.
4. Reverse a string manually.
5. Convert string to uppercase.
6. Convert string to lowercase.
7. Count number of vowels.
8. Count number of consonants.
9. Check if string contains a specific letter.
10. Concatenate two strings.

### 🔵 Day 15: Palindromes & Anagrams

1. Check if a string is a palindrome.
2. Reverse string using loop.
3. Compare two strings for equality.
4. Check if two strings are anagrams.
5. Sort characters in string alphabetically.
6. Count frequency of characters.
7. Print duplicate characters in a string.
8. Replace a character in string.
9. Find all substrings of a string.
10. Check if string starts or ends with a specific character.

### 🔵 Day 16: Searching - Linear

1. Search for a value in a list.
2. Find index of first occurrence.
3. Count occurrences of a value.
4. Search in a string for a character.
5. Check if number exists in list.
6. Input list and target, return True/False if found.
7. Search from end of array.
8. Find all positions of a value.
9. Search a substring in a string.
10. Search for multiple items in list.

### 🔵 Day 17: Sorting - Bubble Sort

1. Bubble sort in ascending order.
2. Bubble sort in descending order.
3. Count how many swaps made.
4. Sort string alphabetically.
5. Sort list of strings by length.
6. Sort list of numbers without built-in sort.
7. Sort numbers using nested loop.
8. Sort and remove duplicates.
9. Sort string by frequency of characters.
10. Sort mixed values (negatives, zeros, positives).

### 🔵 Day 18: Frequency & Analysis

1. Count word frequency in sentence.
2. Count letter frequency in string.
3. Find most frequent character.
4. Find least frequent character.
5. Count how many words in sentence.
6. Count how many sentences in paragraph.
7. Remove all whitespace in string.
8. Remove all digits in string.
9. Check how many times a substring appears.
10. Count and print characters one-by-one.

### 🌟 Day 19: Strings & Lists Mini-Challenge

1. Check if list of words is a palindrome.
2. Merge two lists of strings.
3. Convert string to list and back.
4. Replace words in sentence.
5. Remove duplicates from list of strings.
6. Find common words in two lists.
7. Find longest word in list.
8. Capitalize first letter of every word.
9. Count how many palindromes in list.
10. Filter words by length.

### 🟣 Day 20: Prime Numbers

1. Check if a number is prime.
2. List all prime numbers from 1 to 100.
3. Count primes from 1 to n.
4. Print first n prime numbers.
5. Sum of all primes under 50.
6. Check if a number is composite.
7. Print twin primes below 100.
8. Check if number is divisible by any number other than 1 and itself.
9. Generate primes between two ranges.
10. Check if sum of two primes equals target number.

### 🟣 Day 21: Factorials & Fibonacci

1. Find factorial of a number.
2. Generate first n Fibonacci numbers.
3. Print Fibonacci sequence up to a number.
4. Check if number is in Fibonacci sequence.
5. Sum of first n Fibonacci numbers.
6. Print even Fibonacci numbers.
7. Print odd Fibonacci numbers.
8. Compare iterative vs recursive factorial.
9. Compare iterative vs recursive Fibonacci.
10. Count how many Fibonacci numbers under 100.

### 🟣 Day 22: GCD, LCM, HCF

1. Find GCD of two numbers.
2. Find LCM of two numbers.
3. Print common divisors of two numbers.
4. Find HCF manually.
5. Find LCM of array of numbers.
6. Check if two numbers are co-prime.
7. List all factors of a number.
8. Sum of all factors.
9. Find smallest number divisible by 1 to 10.
10. Count how many numbers between 1 and 100 are divisible by both 2 and 3.

### 🟣 Day 23: Patterns & Shapes

1. Print square of stars.
2. Print right triangle pattern.
3. Print left triangle pattern.
4. Print inverted triangle pattern.
5. Print pyramid pattern.
6. Print number pattern increasing each line.
7. Print descending numbers.
8. Print star pyramid.
9. Print hollow square.
10. Print Pascal’s triangle (first 5 rows).

### 🟣 Day 24: Math Mini Challenge

1. Sum of even numbers from 1 to 100.
2. Product of digits of a number.
3. Armstrong number check.
4. Check if number is a perfect square.
5. Generate random numbers (manually or library).
6. Round a decimal number.
7. Count digits of a number.
8. Convert decimal to binary.
9. Convert binary to decimal.
10. Print multiplication table for 1 to 10.

### 🔶 Day 25: Quiz & Grading App

1. Create 3-question quiz with score tracking.
2. Check correct or incorrect answers.
3. Assign grade (A-F) based on percentage.
4. Validate user input for choices.
5. Display total score.
6. Show correct answers after quiz.
7. Store questions and answers in list.
8. Ask for user name and show personalized score.
9. Add timer delay (if applicable).
10. Display feedback message based on grade.

### 🔶 Day 26: ATM Simulation

1. Input initial account balance.
2. Create menu: check balance, withdraw, deposit.
3. Allow repeated operations until exit.
4. Validate withdrawal amount.
5. Disallow negative deposits.
6. Show updated balance after every transaction.
7. Count number of transactions.
8. Print transaction summary.
9. Handle overdraft gracefully.
10. Save balance to file (optional).

### 🔶 Day 27: Student Gradebook

1. Store student names and scores.
2. Input 3 subject marks per student.
3. Calculate total and average.
4. Assign grades.
5. Print student report card.
6. Find student with highest score.
7. Count students who passed.
8. Count number of As, Bs, etc.
9. Sort students by score.
10. Search for student by name.

### 🔶 Day 28: Shopping Cart

1. Add items with name, price, quantity.
2. Display cart summary.
3. Calculate subtotal.
4. Apply discount if total > threshold.
5. Remove item from cart.
6. Update quantity of item.
7. Calculate total items.
8. Print receipt with formatting.
9. Clear cart.
10. Save cart summary.

### 🔶 Day 29: Phone Book App

1. Add contact name and number.
2. Search contact by name.
3. Update contact.
4. Delete contact.
5. Show all contacts.
6. Sort contacts alphabetically.
7. Save contact to file.
8. Load contacts from file.
9. Validate phone number format.
10. Display contact count.

### 🌟 Day 30: Final Project Challenge

1. Combine menu system with options.
2. Add user login system.
3. Allow CRUD operations on list.
4. Use functions to organize code.
5. Implement input validation.
6. Use loops for continuous flow.
7. Format output clearly.
8. Add error handling.
9. Document your code with comments.
10. Reflect: What did you learn from 30 days?

Congratulations on completing the 30-Day Algorithm Challenge! 🚀