DSA required for Job

🔥 **Phase 1: Basic Math for DSA (Duration: 7-10 days)**

📌 **Topics to Learn:**

1. **Arithmetic & Modulo**
2. **Number Systems (Binary, Decimal)**
3. **Basic Algebra (Equations, Expressions)**
4. **Factorials, Prime Numbers, GCD, LCM**
5. **Basic Logic (AND, OR, XOR, NOT)**
6. **Counting (Permutations & Combinations basics)**

📚 Resources:
Khan Academy - Arithmetic & Pre-Algebra

🔥 Phase 2: **Basic Coding in Java or Python** (Duration: 15–20 days)

📌 **Topics to Learn:**

1. **Variables, Data Types, Input/Output**
2. **Operators (Arithmetic, Relational, Logical)**
3. **Conditionals (if, else, nested)**
4. **Loops (for, while)**
5. **Arrays and Strings basics**
6. **Functions & Recursion**
7. **Lists, Dictionaries (or ArrayList, HashMap in Java)**

✅ **1–5: Variables, Data Types, Input/Output**

1. Write a program to take your name and age as input and print it.
2. Input two numbers and print their sum, difference, product, and quotient.
3. Convert temperature from Celsius to Fahrenheit.
4. Swap two numbers (without using a third variable).
5. Take user input for radius and calculate the area and circumference of a circle.

✅ **6–10: Operators (Arithmetic, Relational, Logical)**

6. Check if a number is even or odd.

7. Take two numbers and print whether the first is greater than the second.
8. Write a program to demonstrate all arithmetic operators with two inputs.
9. Check if a number is divisible by both 3 and 5 using logical operators.
10. Print true if a person is eligible to vote (age >= 18), otherwise false.

✅ **11–20: Conditionals (if, else, nested if)**

11. Find the greatest of three numbers.
12. Check whether a number is positive, negative, or zero.
13. Write a program to assign grades based on marks (if-else ladder).
14. Check if a year is a leap year.
15. Take 3 sides of a triangle and check if it's valid or not.
16. Check if a number is prime or not.
17. Simple calculator using if-else (take two numbers and an operator).
18. Take the day number (1 to 7) and print the corresponding day name.
19. Check if a character is a vowel or consonant.
20. Write a program to check if a given number is a palindrome.

✅ **21–30: Loops (for, while)**

21. Print numbers from 1 to 100 using a loop.
22. Print the multiplication table of a given number.
23. Count the number of digits in a given number.
24. Calculate the sum of digits of a number.
25. Reverse a given number.
26. Find factorial of a number using loop.
27. Generate the Fibonacci series up to n terms.
28. Print all even numbers between 1 to 100.
29. Check whether a number is an Armstrong number.
30. Print the sum of all numbers divisible by 5 between 1 and 100.

✅ **31–35: Arrays (Basics)**

31. Find the maximum element in an array.

32. Calculate the sum of all elements in an array.

33. Count the number of even and odd numbers in an array.

34. Find the second largest element in an array.

35. Reverse the elements of an array.

✅ **36–40: Strings (Basics)**

36. Take a string input and print it in reverse.

37. Count vowels and consonants in a string.

38. Check if a string is a palindrome.

39. Count the number of words in a sentence.

40. Convert a string to uppercase and lowercase.

✅ **41–45: Functions & Recursion**

41. Write a function to find the factorial of a number.

42. Write a recursive function to find Fibonacci number at position n.

43. Write a function to check if a number is prime.

44. Write a function to check if a string is palindrome.

45. Write a function to calculate power (a^b) using recursion.

✅ **46–50: Lists & HashMaps (ArrayList & HashMap in Java)**

46. Take n inputs from user and store in a list (ArrayList).

47. Find frequency of each element in a list using HashMap.

48. Remove duplicates from a list.

49. Sort a list in ascending and descending order.

50. Create a phonebook (name → number) using HashMap and allow search by name.