Questions for practice

1. Digital Root Program
Write a C program to repeatedly find the sum of digits of a number until a
single digit is obtained.
Display each intermediate step.
Example
Input: 9875
Output: 9+8+7+5=29 → 2+9=11 → 1+1=2

2. Special Palindrome Analyzer
Write a C program to check whether a number is palindrome.
If palindrome → print product of odd digits.
Otherwise → print sum of all digits.

3. Prime Frequency in Number
Write a C program to count how many prime digits (2, 3, 5, 7) are present
in a given number and display their sum.

4. Series Generator (Alternate Pattern)
Write a C program to print first N terms of the series:
1, 2, 4, 3, 9, 4, 16, 5, 25, 6, …
(odd position → square numbers, even position → natural numbers)

5. Pattern Printing – Number Pyramid
Write a C program to print:
1
121
12321
1234321
123454321

6. Armstrong Number Range
Write a C program to print all Armstrong numbers between two given limits.

7. Binary to Decimal Without Library
Write a C program to convert a binary number into decimal without using
built-in functions.

8. Frequency of Digits
Write a C program to count frequency of each digit (0–9) in a number.
Example
Input: 1201223

Output:
0 → 1 time
1 → 2 times
2 → 3 times
3 → 1 time

9. Special Series Term Finder
Write a C program to print the nth term of the series:
2, 5, 10, 17, 26, 37, …
(Hint: pattern based on $n^2 + 1$)

10. Number Classification
Write a C program to check whether a number is:
 • Perfect
 • Abundant
 • Deficient
Display appropriate message.

11. Fibonacci Position Finder
Write a C program to check whether a number belongs to Fibonacci series.
If yes → print its position.
Otherwise → print "Not in series"

12. Hollow Diamond Pattern
Write a C program to print a hollow diamond using * for a given odd number n.
Example (n = 5)
```
  *
 * *
*   *
 * *
  *
```
Constraints:
 • Use nested loops
 • No string functions

13. Number Triangle with Row Sum
Write a C program to print the following pattern and display sum of each row.
Example (n = 4)
```
1          Sum = 1
1 2        Sum = 3
1 2 3      Sum = 6
```

```
1 2 3 4  Sum = 10
```

14 Multiplication Table Grid

Write a C program to print multiplication tables from 1 to n in grid form.
Example (n = 3)
```
1   2   3
2   4   6
3   6   9
```
Requirement:
- Use nested loops only
- Format output in matrix style

15. Prime Number Matrix

Write a C program to print first n × n prime numbers in matrix form.
Example (n = 3)
```
2    3    5
7   11   13
17  19   23
```