Java Assignment: Nested Loops, If-Else, Switch Case, and Functions

1. **Check Prime Number:** Write a function to check if a number is prime using nested loops and if-else.
2. **Reverse a Number:** Create a function to reverse a number using while loop and if-else.
3. **Sum of Digits:** Write a function to find the sum of digits of a number using nested loops.
4. **Factorial Calculation:** Calculate the factorial of a number using a function and for loop.
5. **Palindrome Number:** Check if a number is palindrome using nested loops and functions.
6. **Number is Armstrong or Not:** Create a function to check if a number is an Armstrong number.
7. **Greatest of Three Numbers:** Find the greatest of three numbers using nested if-else and a function.
8. **Fibonacci Series:** Print Fibonacci series up to a given number using nested loops.
9. **Sum of First N Natural Numbers:** Calculate the sum of the first N natural numbers using a function.
10. **Calculate Power:** Write a function to calculate the power of a number using nested loops.
11. **Menu-Driven Calculator:** Use switch case to create a calculator for addition, subtraction, multiplication, and division.
12. **Swap Two Numbers Without Third Variable:** Swap two numbers without using a third variable and using only arithmetic operations.

13. **Leap Year Check:** Write a function to check if a year is a leap year using nested if-else.
14. **Sum of Odd Numbers:** Calculate the sum of odd numbers up to N using nested loops.
15. **Sum of Even Numbers:** Calculate the sum of even numbers up to N using nested loops.
16. **Simple Interest Calculation:** Create a function to calculate simple interest using nested if-else.
17. **Check Strong Number:** Write a function to check if a number is a Strong number (sum of factorials of digits equals the number).
18. **Sum of Alternate Digits:** Calculate the sum of alternate digits of a number (e.g., 12345 → 1+3+5) using nested loops.
19. Write pattern programs:

```
    5
   4 4
  3 3 3
 2 2 2 2
1 1 1 1 1
```

```
A
B C
C D E
D E F G
```

```
    A
   ABA
  ABCBA
 ABCDCBA
ABCDEDCBA
```

```
    1
   121
  12321
 1234321
123454321
```

20. Write programs for following patterns:

```
1 2 3 4 5 6 7
 2 3 4 5 6 7
  3 4 5 6 7
   4 5 6 7
    5 6 7
     6 7
      7
     6 7
    5 6 7
   4 5 6 7
  3 4 5 6 7
 2 3 4 5 6 7
1 2 3 4 5 6 7
```

```
1
1 1
1 2 1
1 3 3 1
1 4 6 4 1
```