Optionally, Find the GitHub Repo here.

1) Write a function to print the factorial of a number.

```java
package Assignment1;

import java.util.Scanner;

public class Q1_Factorial {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int no = sc.nextInt();
        System.out.println("Factorial of the number is: " +
                fact(no));
    }

    static int fact(int a) {
        if (a == 0)
            return 1;
        else if (a > 0)
            return a * fact(a - 1);
        else
            return 0;

    }
}
```

Output:

```
Q1_Factorial
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the number: 6
Factorial of the number is: 720

Process finished with exit code 0
```

2) Calculate simple interest. Accept P, T, R from user.

```
package Assignment1;

import java.util.Scanner;

public class Q2_SimpleInterest {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the principal amount: ");
        int p = sc.nextInt();
        System.out.print("Enter the rate of interest: ");
        int r = sc.nextInt();
        System.out.print("Enter the number of years: ");
        int n = sc.nextInt();
        int interestCalculated = interest(p, r, n);
        System.out.println("The amount of interest is: " + interestCalcu-
lated);
        System.out.println("Total payable amount is: " + (p + interest-
Calculated));
    }

    public static int interest(int p, int r, int n) {
        return p * r * n / 100;
    }
}
```

Output:

```
Q2_SimpleInterest
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the principal amount: 10000
Enter the rate of interest: 4
Enter the number of years: 1
The amount of interest is: 400
Total payable amount is: 10400

Process finished with exit code 0
```

3) To check if the given number is Armstrong or not.

4) To print all Armstrong numbers between two range.

```
package Assignment1;

import java.util.Scanner;
import java.lang.Math;

public class Q3_04_ArmstrongCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        int choice;
        System.out.print("Press 1 for armstrong and press 2 for armstrong
range: ");
        choice = sc.nextInt();
        switch (choice) {
            case 1 -> {
                System.out.print("Enter the number you want to check: ");
                int n = sc.nextInt();
                System.out.print(is_armstrong(n) ? String.format("%d is
Armstrong.", n)
                        : String.format("%d is not an Armstrong number.",
n));
            }
            case 2 -> {
                System.out.print("Enter the starting range: ");
                int start = sc.nextInt();
                System.out.print("Enter the ending range: ");
                int end = sc.nextInt();
                Q3_04_ArmstrongCheck arm = new Q3_04_ArmstrongCheck();
                System.out.printf("Armstrong numbers between %d and %d are:
", start, end);
                arm.armstrong_range(start, end);
            }
        }
    }

    public static boolean is_armstrong(int n) {
        String ns = Integer.toString(n);
        int len = ns.length();
        int sum = 0;
        char[] single = new char[len];

        for (int j = 0; j < len; j++)
            single = ns.toCharArray();

        for (int i = 0; i < len; i++) {
            int fnl = Integer.parseInt(String.valueOf(single[i]));
            sum += Math.pow(fnl, len);
        }
        return sum == n;
    }

    void armstrong_range(int start, int end) {
        for (int i = start; i <= end; i++)
            if (is_armstrong(i))
                System.out.print(i + " ");
    }
}
```

Output:

```
Q3_04_ArmstrongCheck
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:
Press 1 for armstrong and press 2 for armstrong range: 1
Enter the number you want to check: 153
153 is Armstrong.
Process finished with exit code 0
```

```
Q3_04_ArmstrongCheck
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:D:\Program Files\
Press 1 for armstrong and press 2 for armstrong range: 2
Enter the starting range: 1
Enter the ending range: 1000
Armstrong numbers between 1 and 1000 are: 1 2 3 4 5 6 7 8 9 153 370 371 407
Process finished with exit code 0
```

5) To check if a given number is Prime. Use function.

```java
package Assignment1;

import java.util.Scanner;

public class Q5_PrimeCheck {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number you want to check: ");
        int no = sc.nextInt();
        System.out.print(is_prime(no) ? String.format("%d is a prime num-
ber.", no) : String.format("%d is a composite number.", no));
    }

    public static boolean is_prime(int n) {
        for (int i = 2; i <= n / 2; i++)
            if (n % i == 0)
                return false;
        return true;
    }
}
```

Output:

```
Q5_PrimeCheck
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the number you want to check: 5
5 is a prime number.
Process finished with exit code 0
```

6) Print all prime numbers between two range.

```
package Assignment1;

import java.util.Scanner;

public class Q6_PrimeCheckRange {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the start range: ");
        int start = sc.nextInt();
        System.out.print("Enter the start range: ");
        int last = sc.nextInt();
        System.out.printf("Prime numbers between %d and %d are: ", start,
last);
        prime_range(start, last);
    }

    public static void prime_range(int start, int end) {
        for (int i = start; i < end; i++)
            if (Q5_PrimeCheck.is_prime(i))
                System.out.print(i + " ");
    }
}
```

Output:

```
Q6_PrimeCheckRange
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:D:\Program Files\Jet
Enter the start range: 1
Enter the start range: 50
Prime numbers between 1 and 50 are: 1 2 3 5 7 11 13 17 19 23 29 31 37 41 43 47
Process finished with exit code 0
```

7) To print n^{th} prime number.

```java
package Assignment1;

import java.util.Scanner;

public class Q7_NthPrime {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter n: ");
        int n = sc.nextInt();
        nth_prime(n);
    }

    public static void nth_prime(int n) {
        int counter = 0, i = 2;
        while (counter != n) {
            if (Q5_PrimeCheck.is_prime(i)) {
                counter++;
                if (counter == n) {
                    System.out.println(i);
                    break;
                }
            }
            i++;
        }
    }
}
```

Output:

```
Q7_NthPrime
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter n: 9
23
Process finished with exit code 0
```

8) To print all composite numbers within n. Use function.

```java
package Assignment1;

import java.util.Scanner;

public class Q8_CompositeWithinN {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the range: ");
        int n = sc.nextInt();
        composite_check(n);
    }

    public static void composite_check(int n) {
        System.out.print(2 + " ");
        for (int i = 1; i <= n; i++)
            if (!Q5_PrimeCheck.is_prime(i))
                System.out.print(i + " ");
    }
}
```

Output:

```
Q8_CompositeWithinN
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the range: 9
2 4 6 8 9
Process finished with exit code 0
```

9) Find the area of circle.

```java
package Assignment1;

import java.util.Scanner;

public class Q9_AreaOfTheCircle {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the radius of the circle: ");
        float r = sc.nextFloat();
        System.out.println("The area of the circle is: " + area(r));
    }

    public static double area(float r) {
        return Math.PI * r * r;
    }
}
```

Output:

```
Q9_AreaOfTheCircle
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaag
Enter the radius of the circle: 6
The area of the circle is: 113.09733552923255

Process finished with exit code 0
```

10) To print all Fibonacci numbers till n. Use function.

```java
package Assignment1;

import java.util.Scanner;

public class Q10_Fibonacci {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int n = sc.nextInt();
        for (int i = 0; i < n; i++)
            System.out.print(fibonacci(n)[i] + " ");
    }

    public static int[] fibonacci(int n) {
        int a = 0;
        int b = 1;
        int sum;
        int[] arr = new int[n];
        arr[0] = a;
        for (int i = 1; i <= n - 1; i++) {
            sum = a + b;
            b = a;
            a = sum;
            arr[i] = sum;
        }
        return arr;
    }
}
```

Output:

```
Q10_Fibonacci
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the number: 6
0 1 1 2 3 5
Process finished with exit code 0
```

11) To print n^{th} Fibonacci number.

```java
package Assignment1;

import java.util.Scanner;

import static Assignment1.Q10_Fibonacci.fibonacci;

public class Q11_NthFibonacci {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the number: ");
        int n = sc.nextInt();
        System.out.println("The nth element of the fibonnaci series is: " +
nth_fibonacci(n));
    }

    public static int nth_fibonacci(int n) {
        return fibonacci(n)[fibonacci(n).length - 1];
    }
}
```

Output:

```
Q11_NthFibonacci
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter the number: 6
The nth element of the fibonnaci series is: 5
Process finished with exit code 0
```

12) Sum of square of 1^{st} n natural numbers using function.

```java
package Assignment1;

import java.util.Scanner;

public class Q12_SumOfSquareOfNNumber {
    public static void main(String[] args) {
        System.out.print("Enter the number: ");
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int ans_wo_formula = sum_square_wo_formula(n);
        int ans_with_formula = sum_square_formula(n);
        System.out.println("The sum of cube of n natural numbers is(without
formula): " + ans_wo_formula);
        System.out.print("The sum of cube of n natural numbers is(with for-
mula): " + ans_with_formula);
    }

    public static int sum_square_wo_formula(int n) {
        int sum = 0;
        for (int i = 1; i <= n; i++) {
            sum += i * i;
        }
        return sum;
    }

    //    or with formula
    public static int sum_square_formula(int n) {
        return n * (n + 1) * (2 * n + 1) / 6;
    }
}
```

Output:

```
Q12_SumOfSquareOfNNumber
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:D:\Pr
Enter the number: 6
The sum of cube of n natural numbers is(without formula): 91
The sum of cube of n natural numbers is(with formula): 91
Process finished with exit code 0
```

13) Sum of cube of 1^{st} n natural numbers using function.

```java
package Assignment1;

import java.util.Scanner;

public class Q13_SumOfCubeOfNNumber {
    public static void main(String[] args) {
        System.out.print("Enter the number: ");
        Scanner sc = new Scanner(System.in);
        int n = sc.nextInt();
        int ans_wo_formula = sum_cube_wo_formula(n);
        int ans_with_formula = sum_cube_formula(n);
        System.out.println("The sum of cube of n natural numbers is(without
formula): " + ans_wo_formula);
        System.out.print("The sum of cube of n natural numbers is(with
formula): " + ans_with_formula);
    }

    public static int sum_cube_wo_formula(int n) {
        int sum = 0;
        for (int i = 1; i <= n; i++) {
            sum += i * i * i;
        }
        return sum;
    }

    //    or with formula
    public static int sum_cube_formula(int n) {
        return n * n * (n + 1) * (n + 1) / 4;
    }
}
```

Output:

```
Q13_SumOfCubeOfNNumber
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:D:\Pr
Enter the number: 6
The sum of cube of n natural numbers is(without formula): 441
The sum of cube of n natural numbers is(with formula): 441
Process finished with exit code 0
```

14) To check Palindrome. Use function.

```java
package Assignment1;

import java.util.Objects;
import java.util.Scanner;

public class Q14_Palindrome {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the string to check for palindrome: ");
        String str = sc.next();
        System.out.println(palindrome(str) ? String.format("%s is a palin-
drome.", str) : String.format("%s is not a palindrome.", str));
        System.out.print("Enter the number to check for palindrome: ");
        int no = sc.nextInt();
        System.out.print(palindrome(no) ? String.format("%d is a palin-
drome.", no) : String.format("%d is not a palindrome", no));
    }

    public static boolean palindrome(String str) {
        return Objects.equals(str, reverse(str));
    }

    public static String reverse(String str) {
        char[] arr = str.toCharArray();
        StringBuilder rev_str = new StringBuilder();
        for (int i = arr.length - 1; i >= 0; i--)
            rev_str.append(arr[i]);
        return rev_str.toString();
    }

    //    Method Overriding
    public static boolean palindrome(int num) {
        return num == reverse(num);
    }

    public static int reverse(int num) {
        String str = Integer.toString(num);
        char[] arr = str.toCharArray();
        StringBuilder rev_str = new StringBuilder();
        for (int i = arr.length - 1; i >= 0; i--)
            rev_str.append(arr[i]);
        return Integer.parseInt(rev_str.toString());
    }
}
```

Output:

```
Q14_Palindrome
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaag
Enter the string to check for palindrome: Nayan
Nayan is not a palindrome.
Enter the number to check for palindrome: 123654
123654 is not a palindrome.
Process finished with exit code 0
```

15) Reverse words in a long string using function.

```
package Assignment1;

import java.util.Scanner;

public class Q15_ReverseWords {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter a sentence: ");
        String sentence = sc.nextLine();
        reverse(sentence);
    }

    public static void reverse(String sentence) {
        String[] words = sentence.split(" ");
        for (int i = words.length - 1; i >= 0; i--)
            System.out.print(words[i] + " ");
    }
}
```

Output:

```
Q15_ReverseWords
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe"
Enter a sentence: This is a laptop
laptop a is This
Process finished with exit code 0
```

16) To remove a character from a string at specific position and print the remaining string.

```
package Assignment1;

import java.util.Scanner;

public class Q16_RemoveChar {
    public static void main(String[] args) {
        Scanner sc = new Scanner(System.in);
        System.out.print("Enter the string: ");
        String str = sc.next();
        System.out.print("Enter the position: ");
        int index = sc.nextInt();
        System.out.printf(rev_char(str, index) + " is what we get by remov-
ing from %d position in %s", index, str);
    }

    public static String rev_char(String str, int i) {
        return str.substring(0, i - 1) + str.substring(i);
    }
}
```

Output:

Q16_RemoveChar

```
"D:\Program Files\Java\jdk-17.0.1\bin\java.exe" "-javaagent:D:\Prog
Enter the string: Dishang
Enter the position: 3
Dihang is what we get by removing from 3 position in Dishang
Process finished with exit code 0
```