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CB.SC.U4CYS23004

LAB 1:

1)

```java
import java.util.Scanner;

public class PrimeNumbersInRange {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print(s:"Enter the first number: ");
        int start = scanner.nextInt();
        System.out.print(s:"Enter the second number: ");
        int end = scanner.nextInt();

        if (end <= start) {
            System.out.println(x:"The second number must be greater than the first number.");
            return;
        }
        System.out.println("Prime numbers between " + start + " and " + end + ":");
        for (int number = start; number <= end; number++) {
            if (isPrime(number)) {
                System.out.println(number);
            }
        }
        scanner.close();
    }

    public static boolean isPrime(int num) {
        if (num < 2) {
            return false;
        }
        for (int i = 2; i <= Math.sqrt(num); i++) {
            if (num % i == 0) {
                return false;
            }
        }
        return true;
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C ""C:\Program Files\Java\jdk-23\bin\java.exe"
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspaceStorage\4dfa4ae15e467d957e687872fa94cee7\re
programming lab 2_68c5ffa1\bin" PrimeNumbersInRange "
Enter the first number: 1
Enter the second number: 10
Prime numbers between 1 and 10:
2
3
5
7
```

2)

```java
import java.util.Scanner;

public class PrimeFactors {
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter a number: ");
        int number = scanner.nextInt();

        System.out.print(s:"Prime factors: ");
        printPrimeFactors(number);

        scanner.close();
    }

    public static void printPrimeFactors(int num) {
        while (num % 2 == 0) {
            System.out.print(2 + " ");
            num /= 2;
        }

        for (int i = 3; i <= Math.sqrt(num); i += 2) {
            while (num % i == 0 ) {
                System.out.print(i + " ");
                num /= i;
            }
        }

        if (num > 2){
            System.out.print(num + " ");
        }
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C ""C:\Program F
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspaceStorage\4dfa
programming lab 2_68c5ffa1\bin" PrimeFactors "
Enter a number: 12
Prime factors: 2 2 3
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2>
```

3)

```java
import java.util.Scanner;

public class PerfectNumberChecker{

    public static boolean isPerfectNumber(int n) {
        if (n < 1){
            return false;
        }

        int properDivisorsSum = 0;

        for (int i = 1; i <= n / 2; i++){
            if (n % i == 0){
                properDivisorsSum += i;
            }
        }

        return properDivisorsSum == n;
    }
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

            System.out.print(s:"Enter the number: ");
            int number = scanner.nextInt();

        if (isPerfectNumber(number)) {
            System.out.println(number + " is Perfect number");
        } else {
            System.out.println(number + " Not a perfect number");
        }
        scanner.close();
    }
}

```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C "
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspace
programming lab 2_68c5ffa1\bin" PerfectNumberChecker "
Enter the number: 6
6 is Perfect number
```

4)

```java
import java.util.Scanner;

public class XPattern {

    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the string of odd length: ");
        String input = scanner.nextLine();

        if (input.length() % 2 == 1){
            pattern(input);
        } else{
            System.out.print(s:"Please enter the string of the odd length: ");
        }

        scanner.close();
    }

    public static void pattern(String str) {
        int n = str.length();

        for (int i = 0; i < n; i++) {
            for (int j = 0; j < n; j++) {
                if (j == i || j == n - i - 1) {
                    System.out.print(str.charAt(j));
                } else {
                    System.out.print(s:" ");
                }
            }
            System.out.println();
        }
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\Use
programming lab 2_68c5ffa1\bin" XPattern "
Enter the string of odd length: kings
k   s
 i g
  n
 i g
k   s
```

5)

```java
import java.util.Scanner;

public class ReverseDigits{
    Run | Debug | Run main | Debug main
    public static void main(String[] args){
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the number to be reversed: ");
        int number = scanner.nextInt();

        int reversedNumber = 0;

        while (number != 0){
            int digit = number % 10;

            reversedNumber = reversedNumber * 10 + digit;

            number = number / 10;
        }

        System.out.println("Reversed number: " + reversedNumber);
    scanner.close();
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2>
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\
programming lab 2_68c5ffa1\bin" ReverseDigits "
Enter the number to be reversed: 12345
Reversed number: 54321
```

6)

```java
import java.util.Scanner;
public class LuckyPairs{
    Run | Debug | Run main | Debug main
    public static void main(String[] args){
        Scanner scanner = new Scanner(System.in);

        System.out.println(x:"Enter Richie's initial number (A): ");
        int A = scanner.nextInt();

        System.out.println(x:"Enter Riya's initial number (B): ");
        int B = scanner.nextInt();

        System.out.print(s:"Enter the total number of turns (N): ");
        int N = scanner.nextInt();

        int C = A;
        int D = B;

        for (int i = 0; i < N; i++){
            if (i % 2 == 0){
                C *= 2;
            } else {
                D *= 2;
            }
        }

        int finalScore = C + D;

        System.out.println("After" + N + " turns:");
        System.out.println("Richie's number (C): " + C);
        System.out.println("Riya's number (D): " + D);
        System.out.println("Final score (C + D): " + finalScore);

        scanner.close();
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2>
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\
programming lab 2_68c5ffa1\bin" LuckyPairs "
Enter Richie's initial number (A):
2
Enter Riya's initial number (B):
3
Enter the total number of turns (N): 2
After2 turns:
Richie's number (C): 4
Riya's number (D): 6
Final score (C + D): 10
```

7)

```java
import java.util.Scanner;

public class LongestSequence{
    Run | Debug | Run main | Debug main
    public static void main(String[] args){
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the number: ");
        int number = scanner.nextInt();

        String binary = Integer.toBinaryString(number);

        int maxLength = 0;
        int currentLength = 0;

        for (char bit : binary.toCharArray()) {
            if (bit == '0') {
                currentLength ++;
                maxLength = Math.max(maxLength, currentLength);
            } else {
                currentLength = 0;
            }
        }
        System.out.println("Binary representation: " + binary);
        System.out.println("Length of longest sequence of 0's: " + maxLength);

        scanner.close();

    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\work
programming lab 2_68c5ffa1\bin" LongestSequence "
Enter the number: 1002
Binary representation: 1111101010
Length of longest sequence of 0's: 1
```

8)

```java
import java.util.Scanner;

public class SeriesCalculation{

    public static double calculateSeries(int n){
        double seriesSum = 0.0;

        for (int k = 1; k <= n; k++){
            seriesSum += (double) k / factorial (k);
        }

        return seriesSum;
    }

    public static int factorial(int num) {
        int fact = 1;
        for (int i = 1; i <= num; i++){
            fact *= i;
        }
        return fact;
    }

    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);
        System.out.print(s:"Enter the value of n: ");
        int n = scanner.nextInt();

        double result = calculateSeries(n);
        System.out.printf(format:"The result of the series up to %d is: %.6f\n", n, result);

        scanner.close();

    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C ""C:
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspaceSt
programming lab 2_68c5ffa1\bin" SeriesCalculation "
Enter the value of n: 3
The result of the series up to 3 is: 2.500000
```

9)

```java
import java.util.Scanner;

public class PunctualityIncentive {
    public static int calculatePunctualityIncentive(int initialIncentive, int N) {
        int totalIncentive = 0;
        int currentIncentive = initialIncentive;

        for (int day = 0; day < N; day++) {
            totalIncentive += currentIncentive;
            currentIncentive += 200;
        }

        return totalIncentive;
    }

    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the incentive for Monday: ");
        int initialIncentive = scanner.nextInt();

        System.out.print(s:"Enter the number of consecutive days: ");
        int N = scanner.nextInt();

        int totalPunctualityIncentive = calculatePunctualityIncentive(initialIncentive, N);
        System.out.println("The total punctuality incentive is: Rs." + totalPunctualityIncentive);

        scanner.close();
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C ""C:\Pro
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspaceStorag
programming lab 2_68c5ffa1\bin" PunctualityIncentive "
Enter the incentive for Monday: 500
Enter the number of consecutive days: 3
The total punctuality incentive is: Rs.2100
```

10)

```java
import java.util.Scanner;

public class StreakCounter{

    public static int streak (int n){
        int k = 1;
        while ((n + k) % (k + 1) == 0){
            k++;
        }
        return k;
    }
    public static int calculateP (int s, int N) {
        int count = 0;
        for (int n = 2; n < N; n++){
            if (streak(n) == s){
                count++;
            }
        }
        return count;
    }
    Run | Debug | Run main | Debug main
    public static void main(String[] args) {
        Scanner scanner = new Scanner(System.in);

        System.out.print(s:"Enter the value of s: ");
        int s = scanner.nextInt();

        System.out.print(s:"Enter the value of N: ");
        int N = scanner.nextInt();

        int result = calculateP(s, N);

        System.out.println("The count of integers n for which streak(n) = " + s + " is: " + result);
        scanner.close();
    }
}
```

```
C:\Users\arivu\Desktop\2nd year 4th sem\Java programming\Java programming lab 2> cmd /C "
ShowCodeDetailsInExceptionMessages -cp "C:\Users\arivu\AppData\Roaming\Code\User\workspa
programming lab 2_68c5ffa1\bin" StreakCounter "
Enter the value of s: 4
Enter the value of N: 3
The count of integers n for which streak(n) = 4 is: 0
```