LAB SHEET

Consider the following scenario: You are tasked with implementing a Java program to simulate a simple traffic light system using multithreading. The traffic light consists of three colors: Red, Yellow, and Green. Each color should be represented by a separate thread. The traffic light should follow the sequence of Red (5 seconds) -> Green (10 seconds) -> Yellow (2 seconds) -> Red, and so on.

Write a Java program that uses multithreading to implement the traffic light system with the following requirements:

1. Define three classes, RedLightThread, GreenLightThread, and YellowLightThread, each representing a thread for the corresponding color.

2. Each thread should run in a loop to simulate the sequence of traffic light colors and use the Thread.sleep() method to control the duration of each color. The Thread.sleep() method should be called inside a try-catch block to handle the InterruptedException.

3. Implement the run() method for each thread to print the name of the color (e.g., "Red Light", "Green Light", or "Yellow Light") when it is active and sleep for the specified duration for that color.

4. Use the Thread.start() method to start each thread and ensure they run concurrently.

5. In the main program, create instances of RedLightThread, GreenLightThread, and YellowLightThread, and start them using the start() method.

The program should run indefinitely, simulating the traffic light sequence in a loop.

```
public class TrafficLightSystem {
    public static void main(String[] args) {
```

```
        // Create instances of the three threads
        RedLightThread redThread = new RedLightThread();
        GreenLightThread greenThread = new GreenLightThread();
        YellowLightThread yellowThread = new YellowLightThread();

        // Start the threads
        redThread.start();
        greenThread.start();
        yellowThread.start();
    }
}

// Thread class for the Red Light
class RedLightThread extends Thread {
    private final int RED_LIGHT_DURATION = 5000; // 5 seconds

    @Override
    public void run() {
        try {
            while (true) {
                System.out.println("Red Light");
                Thread.sleep(RED_LIGHT_DURATION);
            }
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
    }
```

```
}

// Thread class for the Green Light
class GreenLightThread extends Thread {
    private final int GREEN_LIGHT_DURATION = 10000; // 10 seconds

    @Override
    public void run() {
        try {
            while (true) {
                System.out.println("Green Light");
                Thread.sleep(GREEN_LIGHT_DURATION);
            }
        } catch (InterruptedException e) {
            e.printStackTrace();
        }
    }
}

// Thread class for the Yellow Light
class YellowLightThread extends Thread {
    private final int YELLOW_LIGHT_DURATION = 2000; // 2 seconds

    @Override
    public void run() {
        try {
            while (true) {
```

```
            System.out.println("Yellow Light");
            Thread.sleep(YELLOW_LIGHT_DURATION);
        }
      } catch (InterruptedException e) {
        e.printStackTrace();
      }
    }
}
```