**import java.util.Scanner;**

**public class ColorRange {**

**public static void main(String[] args) {**

// Create a Scanner object for user input

**Scanner scanner = new Scanner(System.in);**

**// Define the valid range for each color component**

**int minRange = 0;**

**int maxRange = 255;**

**// Prompt user to enter RGB values**

**System.out.print(&quot;Enter the Red component (0-255): &quot;);**

**int red = scanner.nextInt();**

**System.out.print(&quot;Enter the Green component (0-255): &quot;);**

**int green = scanner.nextInt();**

**System.out.print(&quot;Enter the Blue component (0-255): &quot;);**

**int blue = scanner.nextInt();**

**// Check if the RGB values are within the specified range**

**boolean isValidRed = red &gt;= minRange &amp;&amp; red &lt;= maxRange;**

**boolean isValidGreen = green &gt;= minRange &amp;&amp; green &lt;= maxRange;**

**boolean isValidBlue = blue &gt;= minRange &amp;&amp; blue &lt;= maxRange;**

**// Display results**

**System.out.println(&quot;\nColor Component Validity:&quot;);**

**System.out.println(&quot;Red: &quot; + (isValidRed ? &quot;Valid&quot; : &quot;Invalid&quot;));**

**System.out.println(&quot;Green: &quot; + (isValidGreen ? &quot;Valid&quot; : &quot;Invalid&quot;));**

**System.out.println(&quot;Blue: &quot; + (isValidBlue ? &quot;Valid&quot; : &quot;Invalid&quot;));**

**// Close the scanner**

**scanner.close();**

**}**

**}**

**2. To build a TrafficLightChecker class, you should focus on creating a**

**system that simulates the behavior of traffic lights. This simulation can**

**be expanded to include functionalities such as checking the current light**

**status, determining the duration of each light phase, and providing a**

**mechanism for switching between lights.**

**import java.util.Scanner;**

**public class TrafficLightChecker {**

**// Enum to define traffic light states**

**private enum TrafficLight {**

**RED, YELLOW, GREEN**

**}**

**// Method to get the next traffic light based on current light**

**private static TrafficLight getNextLight(TrafficLight current) {**

**switch (current) {**

**case RED:**

**return TrafficLight.GREEN;**

**case YELLOW:**

**return TrafficLight.RED;**

**case GREEN:**

**return TrafficLight.YELLOW;**

**default:**

**throw new IllegalArgumentException(&quot;Unexpected value: &quot; +**

**current);**

**}**

**}**

**// Method to display the traffic light status**

**private static void displayStatus(TrafficLight light) {**

**switch (light) {**

**case RED:**

**System.out.println(&quot;The light is RED. Please stop.&quot;);**

**break;**

**case YELLOW:**

**System.out.println(&quot;The light is YELLOW. Prepare to stop.&quot;);**

**break;**

**case GREEN:**

**System.out.println(&quot;The light is GREEN. You may go.&quot;);**

**break;**

**}**

**}**

**public static void main(String[] args) {**

**Scanner scanner = new Scanner(System.in);**

**// Prompt user for the initial traffic light state**

**System.out.print(&quot;Enter the current traffic light color (RED,**

**YELLOW, GREEN): &quot;);**

**String input = scanner.next().toUpperCase();**

**TrafficLight currentLight;**

**try {**

**// Convert the input string to TrafficLight enum**

**currentLight = TrafficLight.valueOf(input);**

**} catch (IllegalArgumentException e) {**

**System.out.println(&quot;Invalid color entered. Please enter RED,**

**YELLOW, or GREEN.&quot;);**

**scanner.close();**

**return;**

**}**

**// Display the current light status**

**displayStatus(currentLight);**

**// Determine the next traffic light state**

**TrafficLight nextLight = getNextLight(currentLight);**

**// Display the next light status**

**System.out.println(&quot;The next light will be: &quot; + nextLight);**

**displayStatus(nextLight);**

**// Close the scanner**

**scanner.close();**

**}**

**}**

**3. To implement a TrafficLightSwitch class that simulates switching traffic lights,**

**you might want to create functionality for managing the current state of the traffic**

**light, switching between states, and possibly displaying information about the**

**light. Below is a detailed example of how you could set up this class:**

**import java.util.Scanner;**

**public class TrafficLightSwitch {**

**// Enum to define traffic light states**

**private enum TrafficLight {**

**RED, YELLOW, GREEN**

**}**

**// Method to get the next traffic light based on current light**

**private static TrafficLight getNextLight(TrafficLight current) {**

**switch (current) {**

**case RED:**

**return TrafficLight.GREEN;**

**case YELLOW:**

**return TrafficLight.RED;**

**case GREEN:**

**return TrafficLight.YELLOW;**

**default:**

**throw new IllegalArgumentException(&quot;Unexpected value: &quot; + current);**

**}**

**}**

**// Method to display the traffic light status**

**private static void displayStatus(TrafficLight light) {**

**switch (light) {**

**case RED:**

**System.out.println(&quot;The light is RED. Please stop.&quot;);**

**break;**

**case YELLOW:**

**System.out.println(&quot;The light is YELLOW. Prepare to stop.&quot;);**

**break;**

**case GREEN:**

**System.out.println(&quot;The light is GREEN. You may go.&quot;);**

**break;**

**}**

**}**

**public static void main(String[] args) {**

**Scanner scanner = new Scanner(System.in);**

**// Prompt user for the initial traffic light state**

**System.out.print(&quot;Enter the current traffic light color (RED, YELLOW,**

**GREEN): &quot;);**

**String input = scanner.next().toUpperCase();**

**TrafficLight currentLight;**

**try {**

**// Convert the input string to TrafficLight enum**

**currentLight = TrafficLight.valueOf(input);**

**} catch (IllegalArgumentException e) {**

**System.out.println(&quot;Invalid color entered. Please enter RED, YELLOW, or**

**GREEN.&quot;);**

**scanner.close();**

**return;**

**}**

**// Display the current light status**

**displayStatus(currentLight);**

**// Determine the next traffic light state**

**TrafficLight nextLight = getNextLight(currentLight);**

**// Display the next light status**

**System.out.println(&quot;The next light will be: &quot; + nextLight);**

**displayStatus(nextLight);**

**// Close the scanner**

**scanner.close();**

**}**

**}**

public class TrafficLight {

public static void main(String[] args) {

String[] lights = {"RED", "GREEN", "YELLOW"};

String currentLight = lights[0];

for (int i = 0; i < 3; i++) {

System.out.println("The light is " + currentLight);

if (currentLight.equals("RED")) {

currentLight = "GREEN";

} else if (currentLight.equals("GREEN")) {

currentLight = "YELLOW";

} else {

currentLight = "RED";

}

try {

Thread.sleep(2000); // wait for 2 seconds

} catch (InterruptedException e) {

Thread.currentThread().interrupt();

}

}

}

}

