COLOR MIXING LAMP

# **INTRODUCTION :**

Good morning everyone present over here. My name is Tasneem Shaikh and I am here wIth my group to present my project the ‘COLOR MIXING LAMP. Have you ever wondered when we go to a wedding, we see the the decoration on which continuously there is change of colour on them,hoe do they come? Or how someone’s room have different colour aesthetic? They all r made by using different the color mixing lamp.

A color mixing lamp is a type of lighting fixture that allows users to create various colors by blending different primary colors of light. These lamps typically use light-emitting diodes (LEDs) as the light source and have built-in mechanisms to adjust the intensity and combination of colors.

**EXPLANATION OF THE COMPONETS :**

**1. ARDINO BOARD & BREAD BOARD** :

Firstly we have used the ardino nano borad and a bread board on which our connections and programs are going to work.

**2. PHOTOTRANSISTORS:**

Now comes the phototransistors, we have use 3 phototransistors in our circuit. The phototransistors are used to create a current a proportional to the amount of light sensed. This is a 2 leg phototransistor where the shorter leg is attached to the ground side of the circuit and the longer leg is attached to the positive side of the circuit.

**3. JUMPER WIRES :**

Jumper wires are mostly used to connect the ardino boards and the bread board and make the necessary connections required for the project.

**4. 220 OHM AND 10 KILO OHM RESISTORS :**

The 220 ohm and 10 kilo ohm resistors are used in series with LEDs to limit the current flowing through them. LEDs typically require a specific forward current to operate within their rated specifications, and exceeding this current can damage them. Placing a resistor in series helps control the current flow and protect the LEDs.

**5. TRI-COLOUR LED :**

This tri-colour led consists of 3 colours red, blue, and green. This tri-colour led has 4 legs, the longest leg is the ground leg, the leg little shorter than the ground leg is blue and the legs of same size each at both the ends are the red and green legs.

**WORKING :**

Now I would like to explain the working of the model. A color mixing lamp works by combining different colors of light to produce a desired color output. These lamps typically use light-emitting diodes (LEDs) as the light source and employ a method known as additive color mixing to generate a wide range of colors.

1. The microcontroller generates PWM signals for each color
2. PWM signals control the transistors/MOSFETs, adjusting the current flowing through each RGB LED.
3. By varying the intensity of each color, the combined light creates different colors. For example, when all three colors are at maximum intensity, the light appears white. By adjusting the intensity of each color, you can produce a wide range of colors.
4. The user interface (buttons, knobs, etc.) can be added to control the color selection, brightness, and other features depending on the complexity of the design.

And that’s how a color mixing lamp works.

**APPLICATIONS :**

* **Mood Lightning:** it is used in various houses to decorate and show off the beautiful colours
* **Photography and Videography:** used to achieve specific lightning and colour tones
* **Educational Tools:** it can used by the teachers to teach various theory related to light, colour and electromagnetic spectrum
* **Therapeutic Lighting:** Some color mixing lamps are designed for therapeutic purposes, offering different colors to support mood regulation and alleviate certain health conditions
* **Retail Displays:** Retailers use color mixing lamps to highlight and showcase products, creating an engaging and visually appealing shopping.
* **Artistic:** Artists and designers use color mixing lamps to create visually stunning installations and exhibits that play with light and color.

**ADVANTAGES:**

1. **Customization:** Complete control over the color and intensity, allowing to create a personalized lighting experience tailored to preferences.
2. **Versatility:** With programmable control, you can easily modify the code to implement various color patterns, transitions, or even synchronize the lamp with external events
3. **Creative Outlet:** Building your own color mixing lamp allows you to express your creativity in both the design and functionality of the lamp.
4. **Longevity**: LED-based color mixing lamps have a much longer lifespan compared to traditional lighting sources. LEDs can last tens of thousands of hours before needing replacement, reducing maintenance costs and hassle associated with frequent bulb changes.