Lab Report

Course: Embedded Systems and IoT Lab

Course Code: CSE234

Experiment No: 3

Experiment Name: Automatic Street Light on/off by using TinkerCard

Submitted To

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Objective :

1. To learn how to use an LDR (Light Dependent Resistor) sensor with Arduino.
2. To control LEDs based on light intensity.
3. To practice reading analog values and controlling outputs.
4. To simulate the circuit using Tinkercad..

Introduction :

Arduino is a microcontroller that can be used to read sensor values and control devices like LEDs. In this experiment, we used a light sensor (LDR) to detect the light level and control two LEDs.

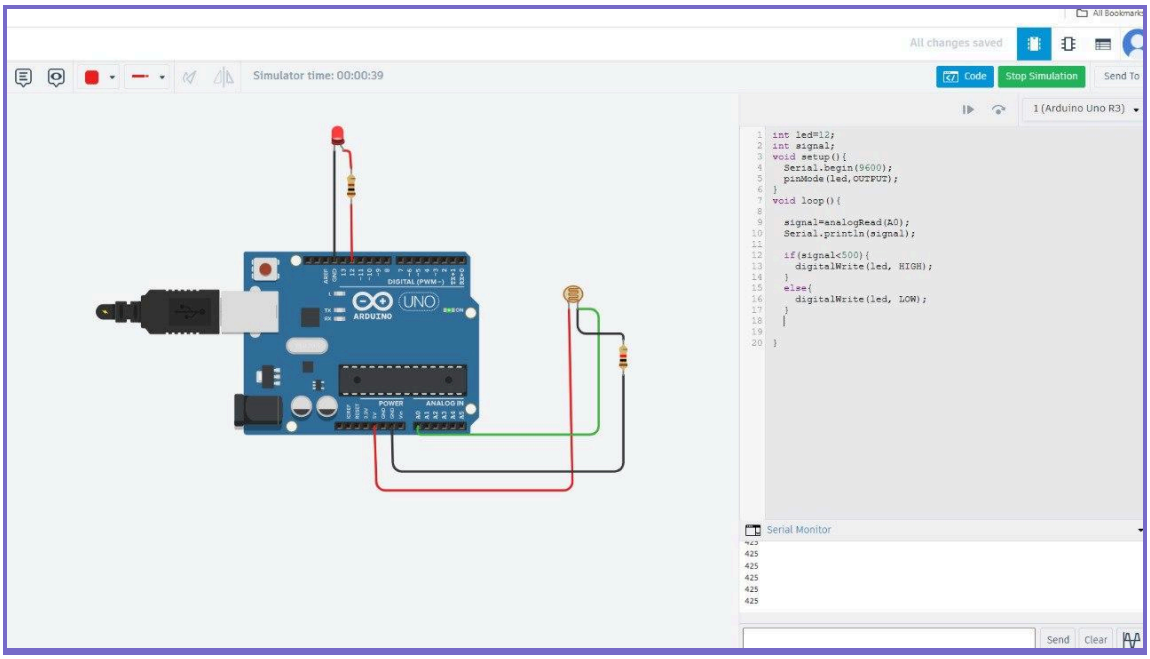
We built the circuit in Tinkercad. If the light is low (dark), both LEDs will turn ON. If there is enough light, the LEDs will stay OFF.

This experiment helps us understand how sensors and actuators can work together using Arduino.

Equipment Used :

1. Arduino UNO (in Tinkercad)
2. LEDs (Green and Yellow)
3. 220Ω Resistors (for LEDs)
4. LDR sensor
5. 10kΩ Resistor (for LDR voltage divider)
6. Jumper Wires
7. Tinkercad online simulator

Figure :



Working Principle :

How it Works:

1. An LDR changes its resistance based on light. In darkness, its resistance is high, and in light, it is low.
2. The LDR and 10kΩ resistor make a voltage divider, and we connect the center point to the A0 pin of Arduino.
3. Arduino reads the voltage using analogRead(A0), which gives a value between 0 and 1023.
4. If the value is less than 300, both LEDs turn ON using digitalWrite(pin, HIGH).
5. If the value is more than 300, both LEDs turn OFF using digitalWrite(pin, LOW).

Why Resistors are Used:

- Each LED has a 220Ω resistor to limit the current and protect the LED.
- A 10kΩ resistor is used with the LDR to form a voltage divider, which helps read light level properly

Arduino Code:

```
void setup(){

 pinMode(13, OUTPUT);
```

```
pinMode(8, OUTPUT);
  Serial.begin(9600);
}
void loop(){
  int ldrValue = analogRead(A0);
  Serial.println(ldrValue);
  if(ldrValue < 300){
  digitalWrite(13, HIGH);
    digitalWrite(8, HIGH);
  }
  else{
  digitalWrite(13, LOW);
    digitalWrite(8, LOW);
  }
  delay(500);
}
```

Circuit Connection Summary :

LDR Circuit:

- One leg of the LDR goes to 5V, the other goes to A0 and also connects to a 10kΩ resistor.
- The other end of the 10kΩ resistor goes to GND.

LEDs:

- LED 1 anode → Pin 13 through a 220Ω resistor
- LED 2 anode → Pin 8 through a 220Ω resistor
- Both cathodes connect to GND

Result and Discussion :

After running the simulation in Tinkercad, we observed:

- When light on the LDR is low (dark), both LEDs turn ON.
- When there is light on the LDR, both LEDs turn OFF.
- The serial monitor also prints the light value, which helps us understand how the LDR behaves in different lighting conditions.

This shows that the circuit and code work properly. We used basic analog input and digital output techniques to make a smart lighting system.

Conclusion :

In this experiment, we used an LDR sensor to control two LEDs based on light intensity using Arduino in Tinkercad. The LEDs turned on in the darkness and off in light. This helped us learn how to read sensor values and control outputs using simple conditions. It also showed how we can simulate real-world systems using Tinkercad**.**