EXERCISE-1

DESIGN SMART HOME AUTOMATION SYSTEM

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AIM:

Create a system to control the LED lights and fans remotely.

COMPONENTS REQUIRED:

I. Arduino UNO
II. LED's
III. Push buttons.
IV. **DHT11** sensor

FEATURES:

Control the devices using the virtual switches in Tinker cad and monitor the room temperature.

METHODOLOGY / PROCEDURE:

- We will be using the virtual components like the LED's, push buttons, photoresistors, temperature sensor, Dc motor with encoder to replicate the fan and resistors to control the LED's, these components will be connected to the Arduino board with the help of wires connected on a bread board, then the Arduino will be provided with power supply to provide the output.
- Initialize necessary pins for LEDs (pins 6, 5, 8), motor (pin 9), button (pin 2), relay (pin 2), temperature sensor (pin A2), and LDR sensor (pin A3).
- Start serial communication at a baud rate of 9600 for debugging purposes.
- Continuously read the analog value from the temperature sensor connected to pin A2 and convert it to a corresponding voltage.
- Convert the voltage to a temperature in Celsius using the formula: (voltage - 0.5) * 100.

- Print the temperature value to the serial monitor for monitoring.

- If the temperature exceeds the threshold (10°C), turn on the LEDs connected to pins 6 and 5; otherwise, turn them off.

- If the temperature exceeds the threshold, map the temperature to motor speed and adjust the motor speed using PWM on pin 9 accordingly.

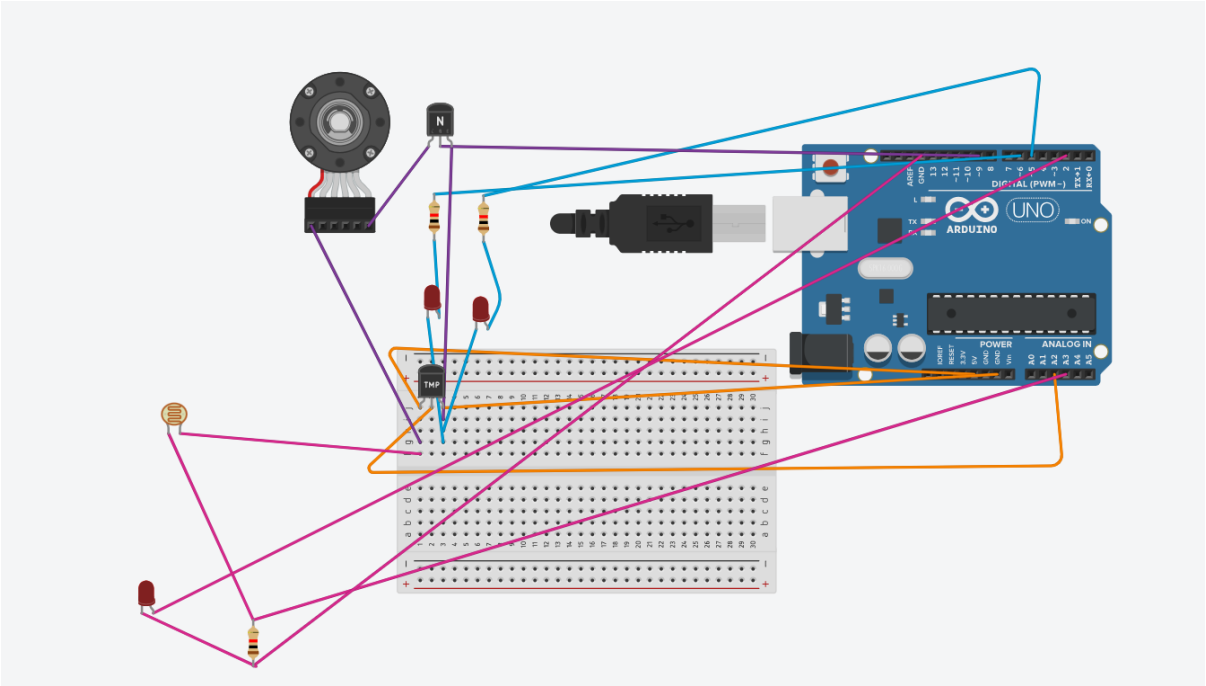
- If the temperature is below the threshold, turn off the motor by setting pin 9 to a low value.

- Continuously read the light level from the LDR sensor connected to pin A3.

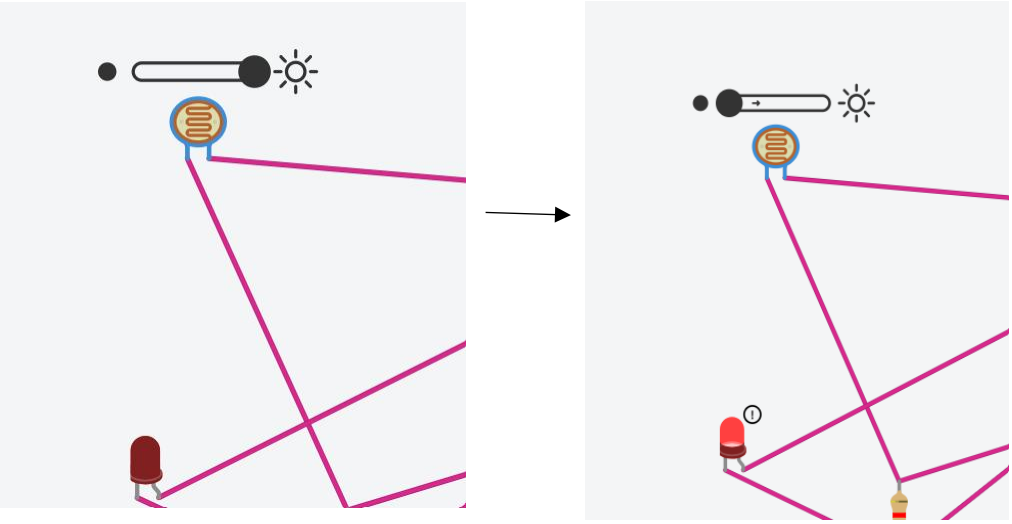
- If the light level is below the threshold (500), turn on the relay connected to pin 2 to activate the bulb; otherwise, turn off the relay.

- Delay for 1 second before repeating the loop for accurate readings and actions.

CIRCUIT DIAGRAM:



PHOTORESISTOR:



Serial monitor:

```
Temperature: 72.19 Â°C
Bulb is ON
Temperature: 85.87 Â°C
Bulb is ON
Temperature: 85.87 Â°C
Bulb is ON
```

CODE:

```
#define TEMP_SENSOR_PIN A2
#define LED 8
#define ledpin2 6
#define ledpin3 5
#define BUTTON 2
#define MOTOR_PIN 9
#define LDR_PIN A3
#define RELAY_PIN 2

#define LDR_THRESHOLD 500
#define TEMP_THRESHOLD 10

bool motorState = false;

void setup() {
 Serial.begin(9600);
 pinMode(LED, OUTPUT);
 pinMode(ledpin2 , OUTPUT);
 pinMode(ledpin3 , OUTPUT);
 pinMode(BUTTON, INPUT_PULLUP);
 pinMode(MOTOR_PIN, OUTPUT);
 pinMode(RELAY_PIN, OUTPUT);
 pinMode(LDR_PIN, INPUT);
}

void loop() {

 int sensorValue = analogRead(TEMP_SENSOR_PIN);
```

```
float voltage = sensorValue * (5.0 / 1023.0);
float temperature = (voltage - 0.5) * 100.0;

Serial.print("Temperature: ");
Serial.print(temperature);
Serial.println(" °C");


if (temperature > TEMP_THRESHOLD) {
  digitalWrite(ledpin2 , HIGH);
  digitalWrite(ledpin3 , HIGH);
} else {
  digitalWrite(ledpin2 , LOW);
  digitalWrite(ledpin3, LOW);
}


if (temperature > TEMP_THRESHOLD) {
  int motorSpeed = map(temperature, TEMP_THRESHOLD, 30, 10, 255);
  motorSpeed = constrain(motorSpeed, 10, 255);
  analogWrite(MOTOR_PIN, motorSpeed);
} else {
  analogWrite(MOTOR_PIN, 0);
}


int lightLevel = analogRead(LDR_PIN);

if (lightLevel < LDR_THRESHOLD) {
  digitalWrite(RELAY_PIN, HIGH);
```

```
    Serial.println("Bulb is ON");
  } else {
    digitalWrite(RELAY_PIN, LOW);
    Serial.println("Bulb is OFF");
  }

  delay(1000);
}
```

RESULT:

Hence a smart home automation has been set up with the help of the respective sensors and motors and the result has been successfully verified .