MOTION-BASED SMART LIGHT SYSTEM

PRESENTED BY AKSHAT PORWAL

INTRODUCTION

Motion-Based Smart Light System is an energy-efficient automation setup that uses motion sensors (like PIR sensors) to detect human movement and automatically turn lights on or off. When motion is detected, the light turns on; if no movement is sensed for a set time, the light turns off. This system is commonly used in smart homes, offices, and public spaces to save electricity and enhance convenience.

COMPONENTS REQUIRED

- Ardruino Uno
- PIR Sensor
- Buzzer
- LED
- Resistor
- LCD (For Display)

CIRCUIT DIAGRAM
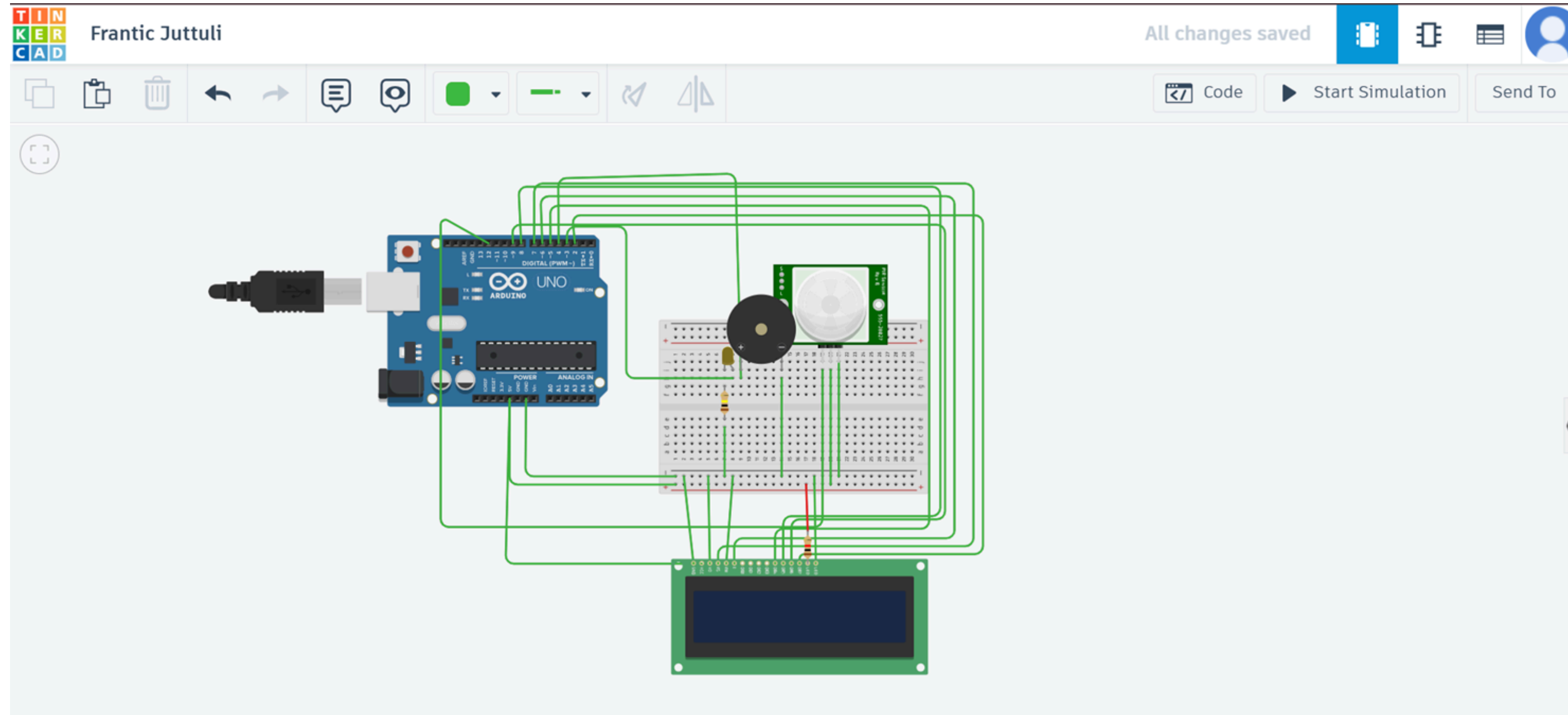
WORKING PRINCIPLE

The system operates using a PIR (Passive Infrared) sensor, which detects infrared radiation (heat) emitted by moving objects like humans. When motion is detected:

- The PIR sensor sends a signal to the microcontroller (e.g., Arduino).
- The microcontroller processes the signal and activates a relay or directly powers an LED/light
- If no motion is detected for a specific duration, the microcontroller turns the light off.

ARDUINO CODE

```cpp
#include <LiquidCrystal.h>

LiquidCrystal lcd(7, 6, 5, 8, 9, 2);

int pirPin = 12;
int buzzerPin = 4;
int led1 = 3;
int motion = 0;

void setup() {
  lcd.begin(16, 2);
  pinMode(pirPin, INPUT);
  pinMode(buzzerPin, OUTPUT);
  pinMode(led1, OUTPUT);
  lcd.print("System Ready");
  delay(2000);
  lcd.clear();
}
```

```cpp
void loop() {
  motion = digitalRead(pirPin);

  if (motion == HIGH) {
    digitalWrite(buzzerPin, HIGH);
    digitalWrite(led1, HIGH);
    lcd.setCursor(0, 0);
    lcd.print("Motion Detected ");
  } else {
    digitalWrite(buzzerPin, LOW);
    digitalWrite(led1, LOW);
    lcd.setCursor(0, 0);
    lcd.print("No Motion       ");
  }

  delay(500);
}
```

APPLICATIONS

- Automatically lights up rooms, hallways, or bathrooms when motion is detected, enhancing convenience and saving energy.
- Ensures lights turn on only when rooms or conference areas are in use, reducing electricity costs.
- Lights and ventilation turn on when someone enters, improving hygiene and energy efficiency.
- Smart streetlights light up only when pedestrians or vehicles pass, conserving power in low-traffic areas.
- Lights automatically adjust based on occupancy, maintaining focus and conserving energy.

CONCLUSION

The Motion-Based Smart Light System is a practical and energy-efficient solution widely used in homes, offices, public spaces, and industrial areas. By automatically controlling lighting based on human presence, it enhances convenience, reduces electricity consumption, and contributes to smart, sustainable living. Its simplicity, effectiveness, and adaptability make it an essential component in modern automation and IoT-based systems

Thank you very much!