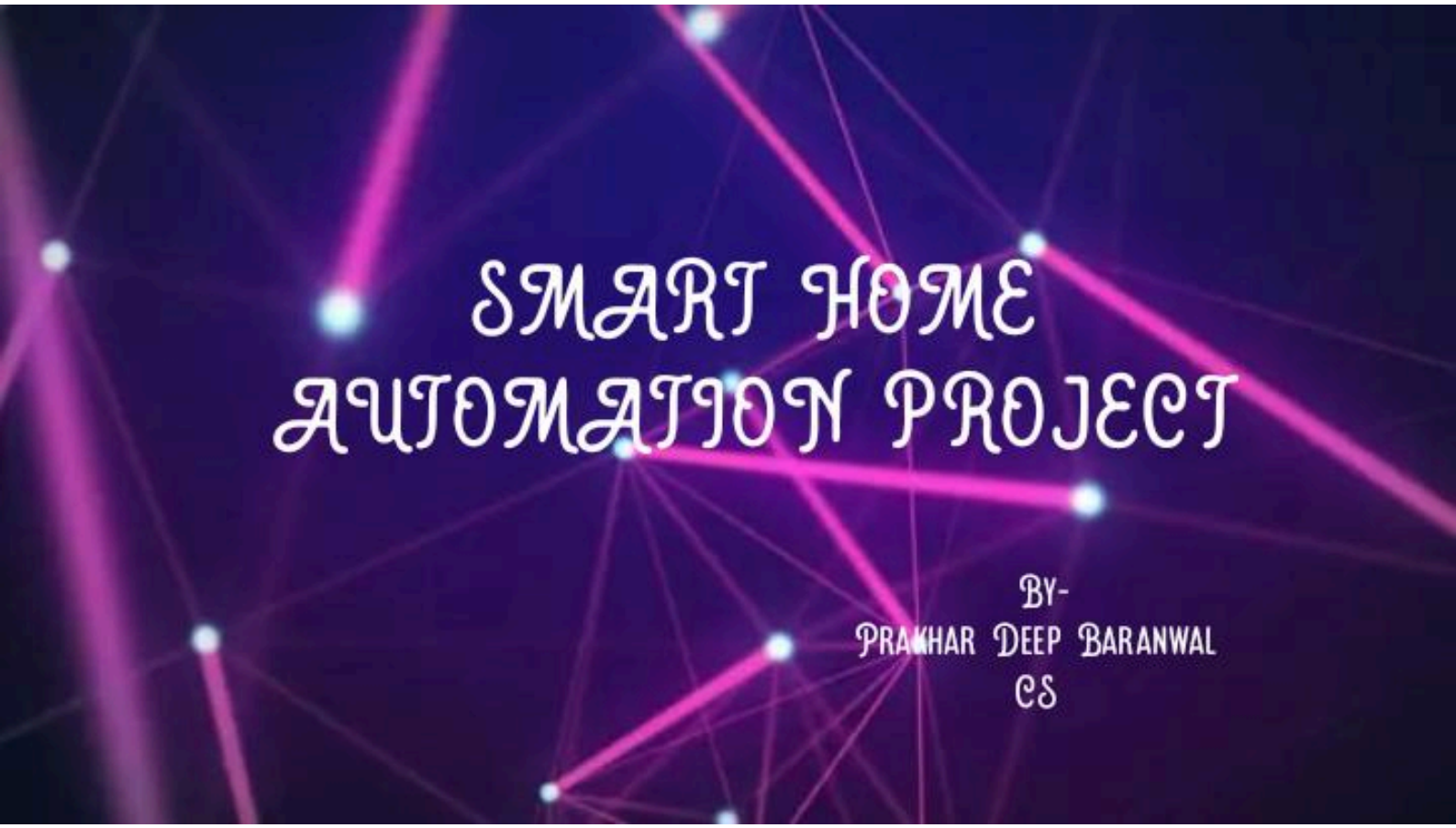
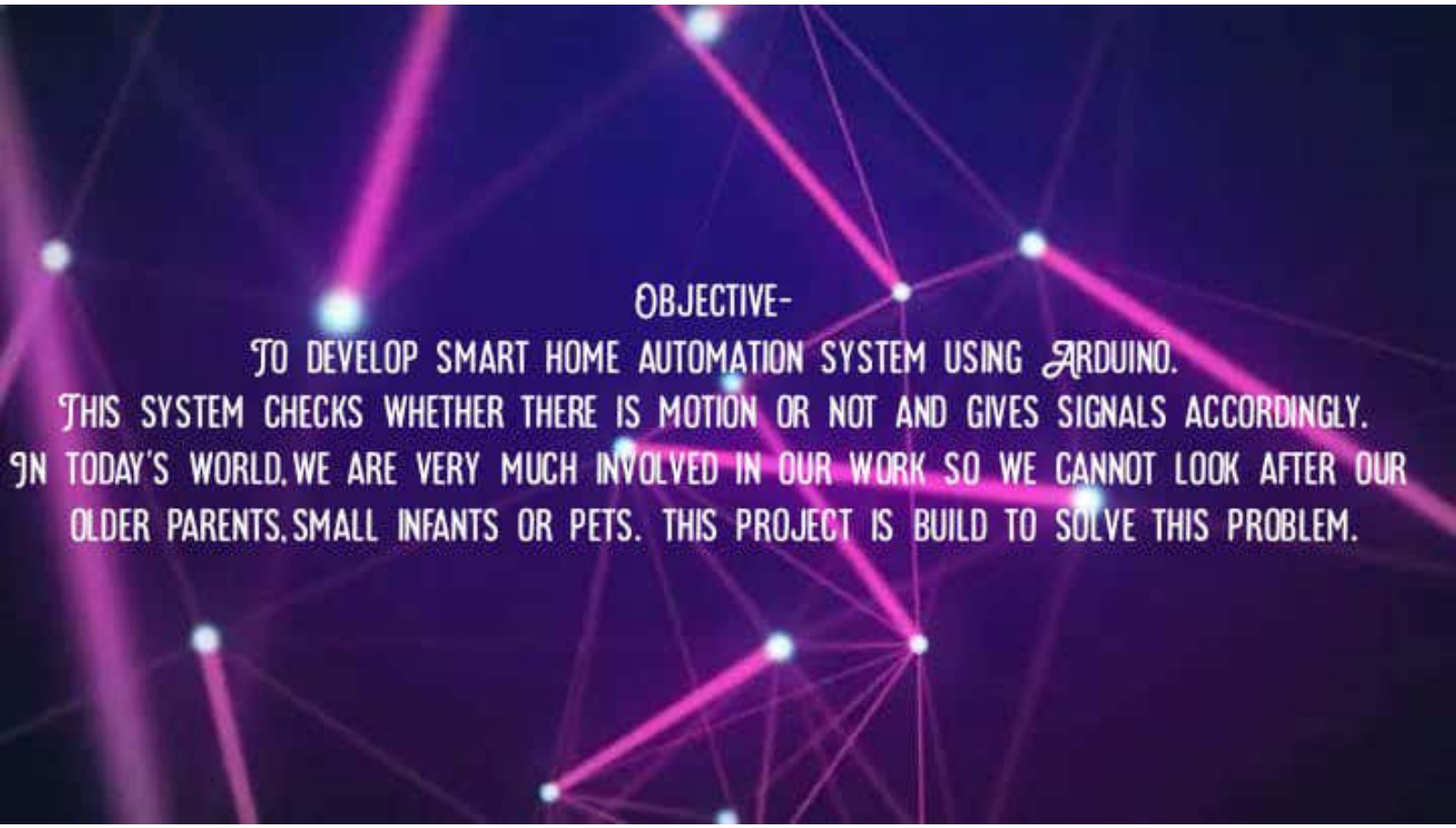
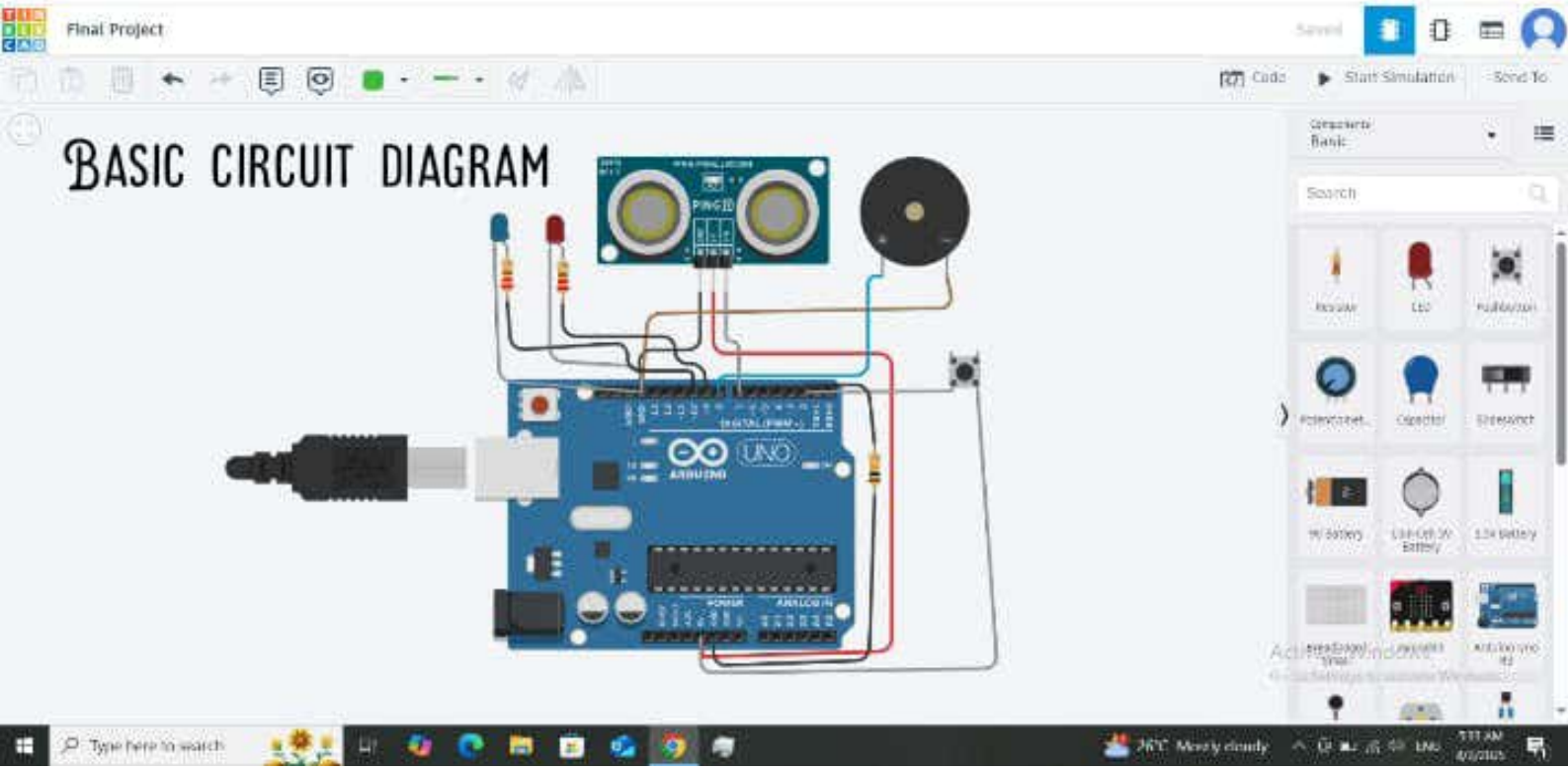
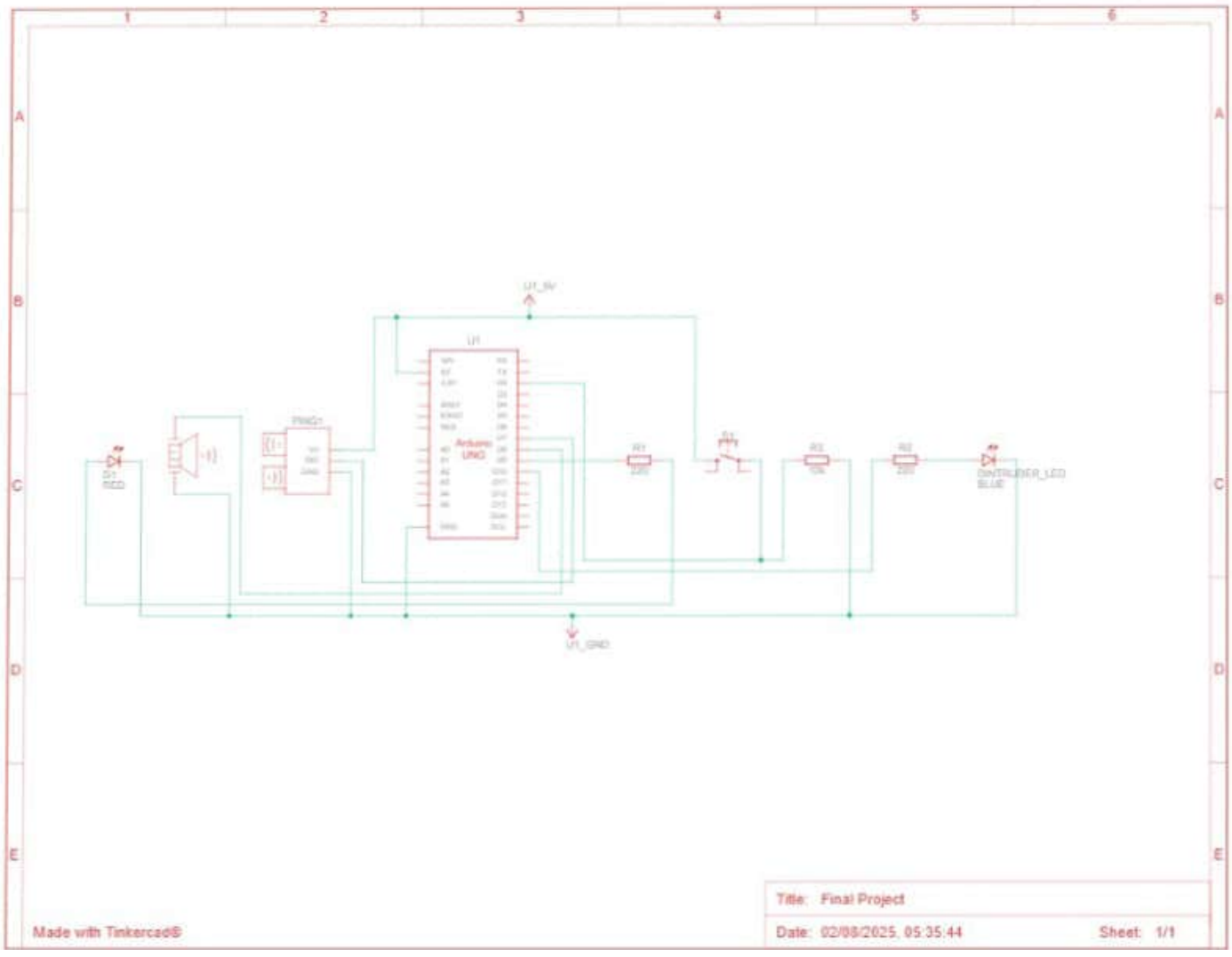

SMART HOME
AUTOMATION PROJECT
BY-
PRAKHAR DEEP BARANWAL
CS


OBJECTIVE-
TO DEVELOP SMART HOME AUTOMATION SYSTEM USING ARDUINO.
THIS SYSTEM CHECKS WHETHER THERE IS MOTION OR NOT AND GIVES SIGNALS ACCORDINGLY.
IN TODAY'S WORLD, WE ARE VERY MUCH INVOLVED IN OUR WORK SO WE CANNOT LOOK AFTER OUR OLDER PARENTS, SMALL INFANTS OR PETS. THIS PROJECT IS BUILD TO SOLVE THIS PROBLEM.


COMPONENTS USED-
ARDUINO UNO
ULTRASONIC DISTANCE SENSOR
PIEZO BUZZER
220 OHM RESISTORS
RED LED
BLUE LED
PUSHBUTTON
10 KILOOHM RESISTOR


Final Project
Code
Start Simulation
Send To
BASIC CIRCUIT DIAGRAM
Components
Basic
Search
UNO
ARDUINO


1
2
3
4
5
6
A
B
C
D
E
U1_5V
U1
Arduino UNO
PING+
D1
RED
R1
220Ω
S1
R2
10k
R3
220
CONTROLLER_LED
BLUE
U1_GND
Made with Tinkercad®
Title: Final Project
Date: 02/08/2025, 05:35:44
Sheet: 1/1

WORKING-

THE SYSTEM IS MADE SUCH THAT IF NO MOTION IS DETECTED BY IT FOR CONTINUOUS 5 SECONDS.THE BUZZER BEEPS AND RED LED BLINKS SIGNALLING THAT THE PERSON LIVING IN THE HOUSE IS IDLE FROM A VERY LONG TIME WHICH MEANS THERE MAY BE SOME EMERGENCY.THE BUZZER AND STOPS WHEN MOTION IS DETECTED AGAIN. FROM PROJECT POINT OF VIEW.WE HAVE TAKEN THIS TIME AS 5 SECONDS BUT IN REAL LIFE .IT COULD BE 8 TO10 HOURS DEPENDING UPON OUR NEEDS.

ALSO.THERE MAYBE SOME TIME WHEN PEOPLE LIVING INSIDE HOUSE MOVE OUT FOR WALK OR MAY SLEEP AT NIGHT SO NO MOTION IS DETECTED IN THIS TIME INTERVAL. IN THIS MEANTIME,IF SOME MOTION IS DETECTED, IT MEANS THAT AN INTRUDER IS PRESENT.

IN THE PROJECT, THIS TIME INTERVAL IS TAKEN AS BETWEEN 10 TO 15 SECONDS. IF MOTION IS DETECTED IN THIS PARTICULAR TIME INTERVAL,BLUE LED BLINKS AND BUZZER BEEPS SIGNALLING THAT SOME INTRUDER IS PRESENT.

THE CYCLE REPEATS ITSELF AFTER EVERY 24 SECONDS JUST LIKE IN REAL WORLD.

ibm project code - Notepad

File Edit Format View Help

```
const int signalPin = 7;
const int buzzerPin = 8;
const int stillnessLED = 9;     // LED1: for stillness alert (blue)
const int intruderLED = 10;     // LED2: for intruder alert (red)
const int resetPin = 2;         // Reset button pin

float previousDistance = 0;
unsigned long lastChangeTime = 0;
unsigned long lastBlinkTime = 0;

const unsigned long stillThreshold = 5000;       // 5 seconds of stillness
const float motionTolerance = 1.5;               // distance threshold for motion
const unsigned long blinkInterval = 300;         // LED and buzzer blink speed
const unsigned long cycleDuration = 24000;       // 24-second cycle duration

bool objectIsStill = false;
bool ledState = false;

unsigned long systemStartTime = 0;
const unsigned long intruderStartTime = 10000;   // 10 sec
```


Ln 1, Col 1 100% Windows (CRLF) UTF-8

ibm project code - Notepad

File Edit Format View Help

```
const unsigned long intruderStartTime = 10000;   // 10 sec
const unsigned long intruderEndTime = 15000;     // 15 sec

bool intruderAlertActive = false;

void setup() {
  pinMode(buzzerPin, OUTPUT);
  pinMode(stillnessLED, OUTPUT);
  pinMode(intruderLED, OUTPUT);
  pinMode(resetPin, INPUT);  // External pull-down resistor
  Serial.begin(9600);
  systemStartTime = millis();
}

void loop() {
  unsigned long currentTime = millis();
  unsigned long timeSinceStart = currentTime - systemStartTime;

  // --- AUTO-RESTART TIMER EVERY 24 SECONDS ---
  if (timeSinceStart >= cycleDuration) {
```


Ln 1, Col 1 100% Windows (CRLF) UTF-8

ibm project code - Notepad

File Edit Format View Help

```
  if (timeSinceStart >= cycleDuration) {
    Serial.println("🔁 24-second cycle complete. Restarting timer.");
    systemStartTime = currentTime;
    intruderAlertActive = false;
    objectIsStill = false;
    lastChangeTime = currentTime;   // 🔧 important fix
    digitalWrite(buzzerPin, LOW);
    digitalWrite(intruderLED, LOW);
    digitalWrite(stillnessLED, LOW);
  }

  // --- RESET BUTTON CHECK ---
  if (digitalRead(resetPin) == HIGH) {
    Serial.println("🔄 Reset button pressed. Resetting alerts.");
    intruderAlertActive = false;
    objectIsStill = false;
    lastChangeTime = currentTime;   // 🔧 important fix
    digitalWrite(buzzerPin, LOW);
    digitalWrite(intruderLED, LOW);
    digitalWrite(stillnessLED, LOW);
```

ibm project code - Notepad

File Edit Format View Help

```
    delay(300); // Debounce delay
  }

  // --- Read distance from sensor ---
  float currentDistance = getDistance();
  Serial.print("Distance: ");
  Serial.println(currentDistance);

  bool motionDetected = abs(currentDistance - previousDistance) > motionTolerance;

  // --- Detect Intruder Alert Window ---
  if (!intruderAlertActive &&
      motionDetected &&
      timeSinceStart >= intruderStartTime &&
      timeSinceStart <= intruderEndTime) {
    intruderAlertActive = true;
    Serial.println("🚨 Intruder detected!");
  }

  // --- Handle Intruder Alert Blinking ---
```


Ln 1, Col 1 100% Windows (CRLF) UTF-8

ibm project code - Notepad

File Edit Format View Help

```
// --- Handle Intruder Alert Blinking ---
if (intruderAlertActive) {
  if (currentTime - lastBlinkTime >= blinkInterval) {
    ledState = !ledState;
    digitalWrite(intruderLED, ledState);
    digitalWrite(buzzerPin, ledState);
    lastBlinkTime = currentTime;

    if (ledState) {
      Serial.println("🔒 Intruder detected! (Blink)");
    }
  }
  digitalWrite(stillnessLED, LOW); // Suppress stillness alert
}

// --- Motion Detected Outside Intruder Window ---
else if (motionDetected) {
  lastChangeTime = currentTime;
  objectIsStill = false;
  digitalWrite(buzzerPin, LOW);
```


Ln 1, Col 1 100% Windows (CRLF) UTF-8

ibm project code - Notepad

File Edit Format View Help

```
    digitalWrite(stillnessLED, LOW);
    digitalWrite(intruderLED, LOW);
    lastBlinkTime = currentTime;
  }

  // --- Stillness Alert ---
  else if (!motionDetected && !intruderAlertActive) {
    if (currentTime - lastChangeTime >= stillThreshold) {
      objectIsStill = true;
    }

    if (objectIsStill &&
        !(timeSinceStart >= intruderStartTime && timeSinceStart <= intruderEndTime)) {
      if (currentTime - lastBlinkTime >= blinkInterval) {
        ledState = !ledState;
        digitalWrite(stillnessLED, ledState);
        digitalWrite(buzzerPin, ledState);
        lastBlinkTime = currentTime;
      }
    }
```

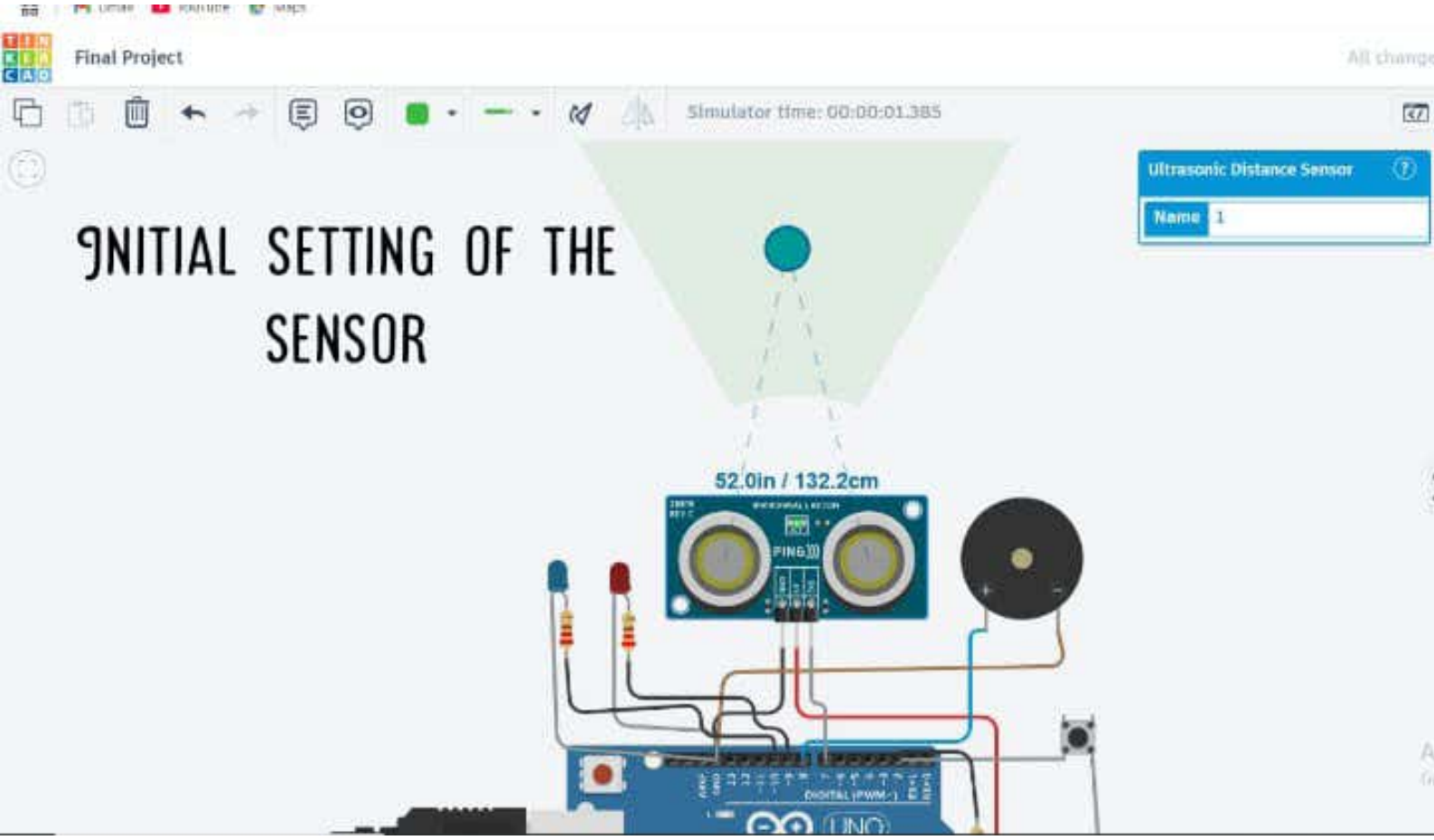

Ln 1, Col 1 100% Windows (CRLF) UTF-8

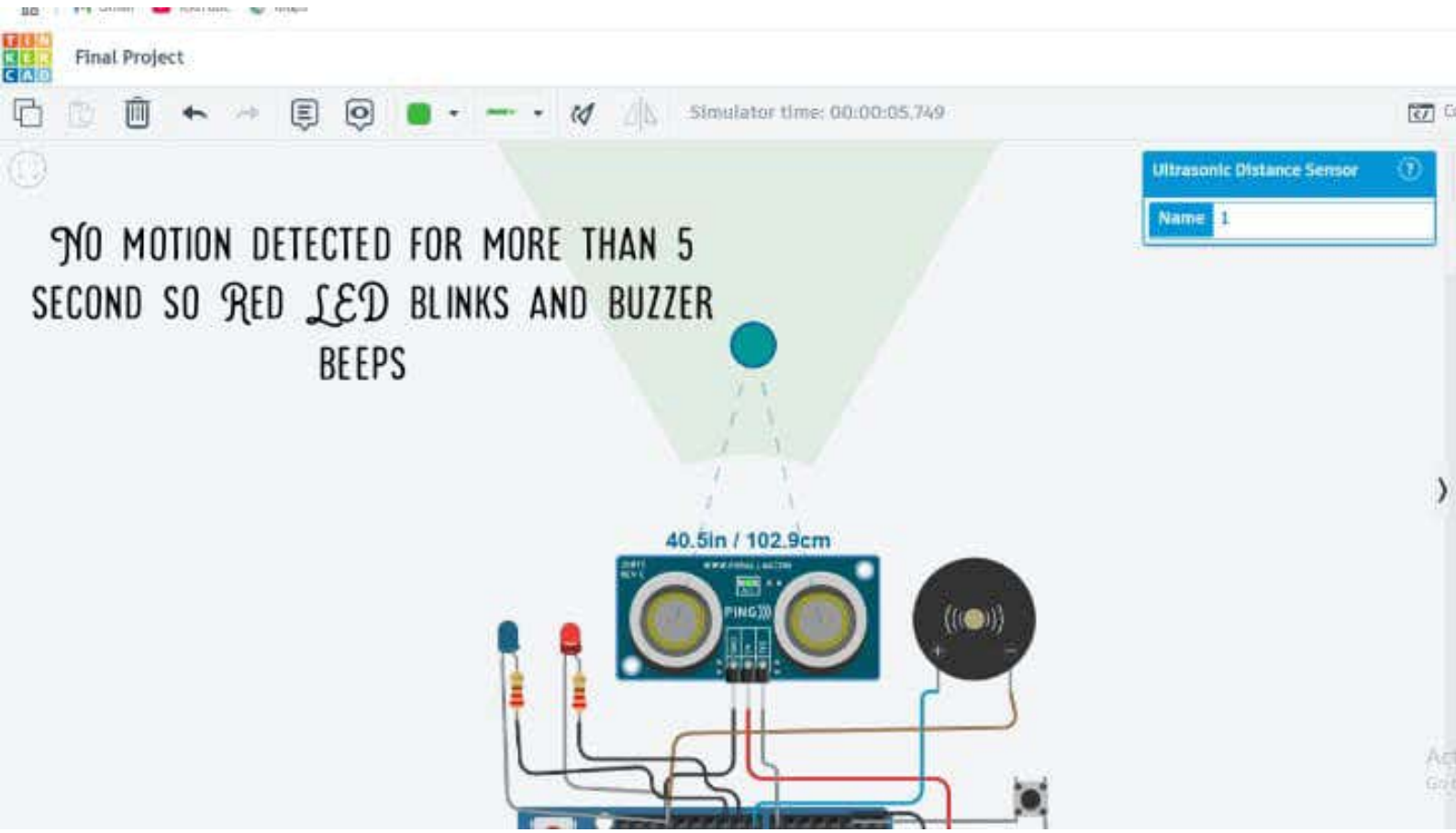
ibm project code - Notepad

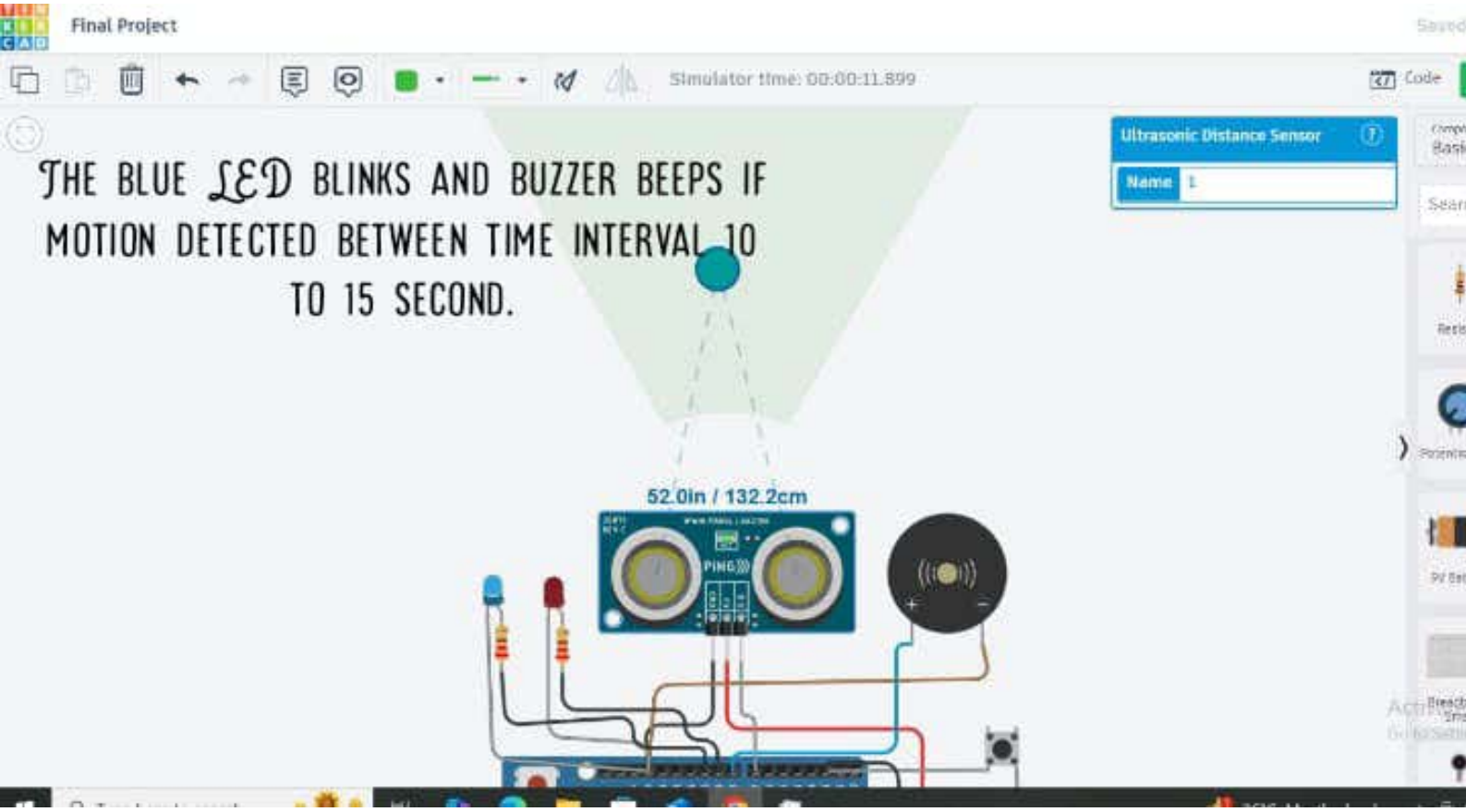
File Edit Format View Help

```
  previousDistance = currentDistance;
}

// --- Ultrasonic Distance Function ---
float getDistance() {
  pinMode(signalPin, OUTPUT);
  digitalWrite(signalPin, LOW);
  delayMicroseconds(2);
  digitalWrite(signalPin, HIGH);
  delayMicroseconds(10);
  digitalWrite(signalPin, LOW);

  pinMode(signalPin, INPUT);
  long duration = pulseIn(signalPin, HIGH, 30000); // Timeout after 30ms
  if (duration == 0) return previousDistance;

  float distance = duration * 0.034 / 2;
  return distance;
}
```


Ln 1, Col 1 100% Windows (CRLF) UTF-8


Final Project
Simulator time: 00:00:01.385
Ultrasonic Distance Sensor
Name 1
INITIAL SETTING OF THE SENSOR
52.0in / 132.2cm
PING)))
DIGITAL (PWM~)
UNO

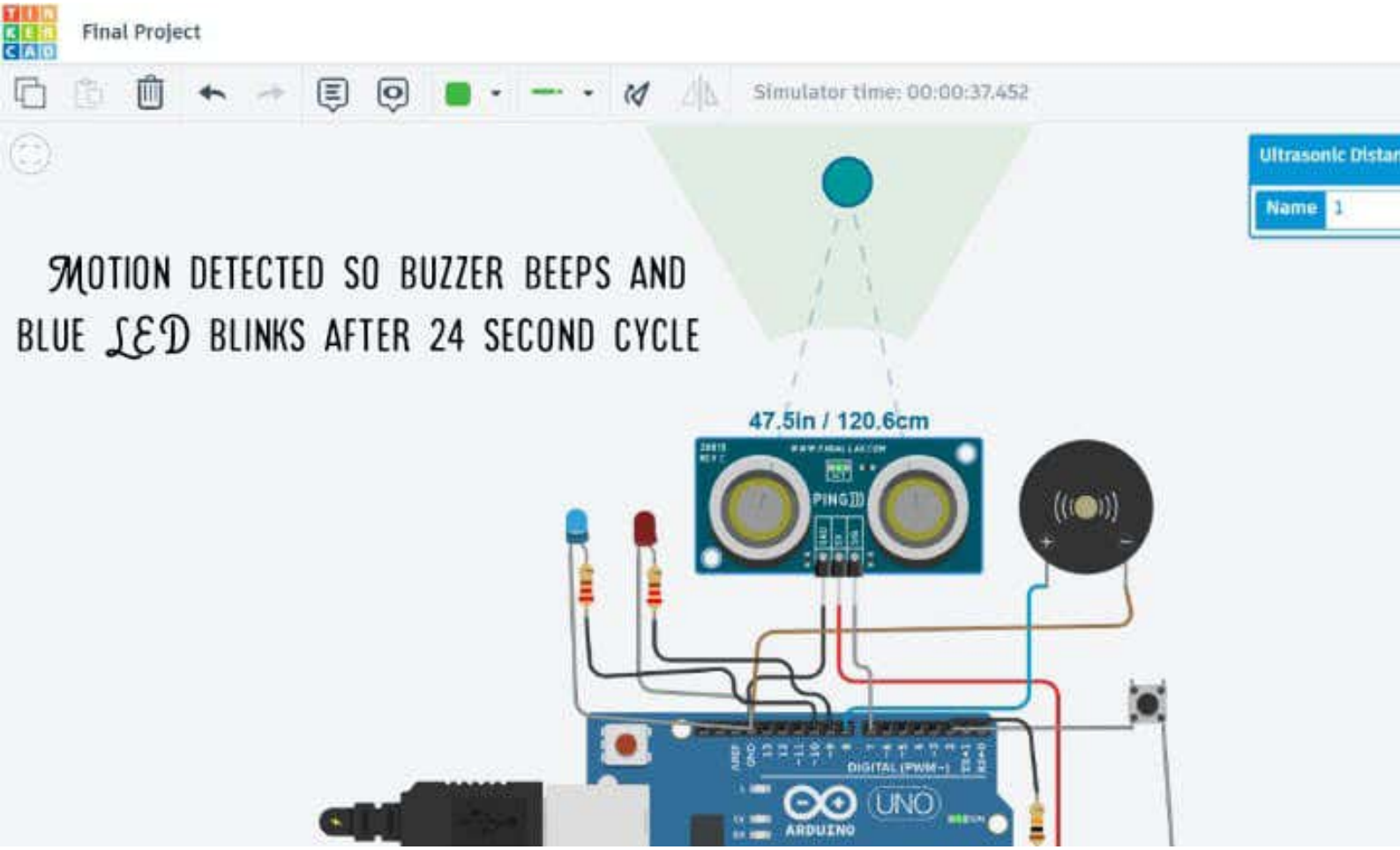

Final Project
Simulator time: 00:00:05.749
Ultrasonic Distance Sensor
Name 1
NO MOTION DETECTED FOR MORE THAN 5 SECOND SO RED LED BLINKS AND BUZZER BEEPS
40.5in / 102.9cm
PING)))


Final Project
Simulator time: 00:00:11.899
Code
THE BLUE LED BLINKS AND BUZZER BEEPS IF MOTION DETECTED BETWEEN TIME INTERVAL 10 TO 15 SECOND.
Ultrasonic Distance Sensor
Name
52.0in / 132.2cm
PING

```
108
109       if (objectIsStill &&
110           !(timeSinceStart >= ir
111         if (currentTime - lastBl
112           ledState = !ledState;
113           digitalWrite(stillness
114           digitalWrite(buzzerPir
115           lastBlinkTime = currer
116         }
117       }
118     }
119
120     previousDistance = currentDi
121   }
122
123   // --- Ultrasonic Distance Func
124   float getDistance() {
125     pinMode(signalPin, OUTPUT);
126     digitalWrite(signalPin, LOW);
127     delayMicroseconds(2);
128     digitalWrite(signalPin, HIGH)
129     delayMicroseconds(10);
130
```

Serial Monitor

```
Distance: 128.54
ð□□" Intruder detected! (Blink)
Distance: 128.54
Distance: 128.54
Distance: 128.54
Di
```


Final Project
Simulator time: 00:00:37.452
Ultrasonic Distar
Name 1
MOTION DETECTED SO BUZZER BEEPS AND
BLUE LED BLINKS AFTER 24 SECOND CYCLE
47.5in / 120.6cm
PING)))
DIGITAL (PWM~)
UNO
ARDUINO


APPLICATIONS-
IT GIVES STILLNESS OR IDLE ALERT WHICH IMPLIES THAT SOME MEDICAL EMERGENCY IS PRESENT.
IT ALSO GIVES INTRUDER ALERT THAT ENSURES SAFETY OF THE HOUSE.


THANK
YOU