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Assignment – 1 Smart Home Automation

Task – 1:

Design a Smart Home Automation System with at least 2 Sensors and a Bulb or Buzzer for output

Solution:

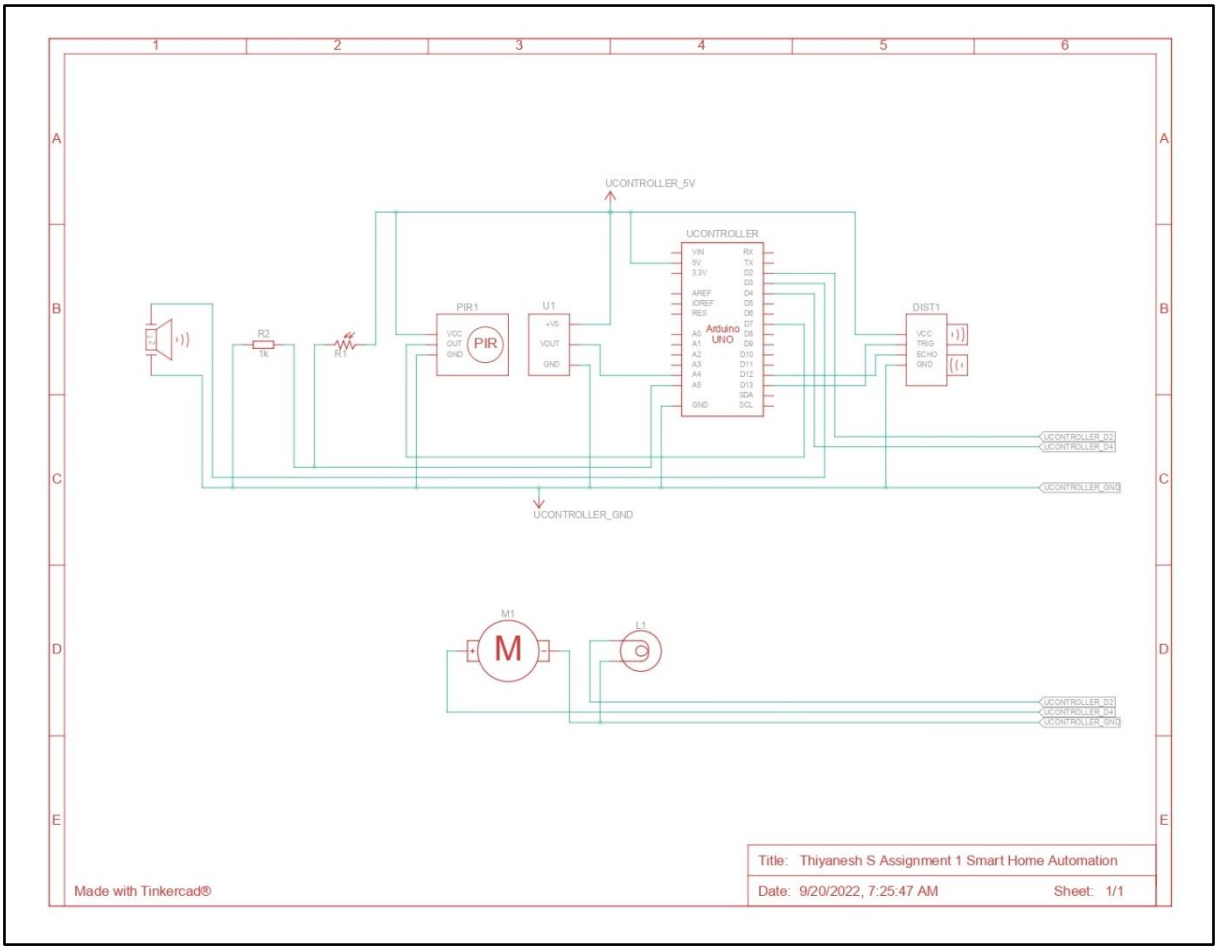
View Solution on Tinkercad:

https://www.tinkercad.com/things/6REs04dGbub-thiyanesh-s-assignment-1-smart-home-automation/editel?sharecode=wHpaFKEYdMXquXSXTQuHPYJPIckZwfp7XF4g2OjoVxs

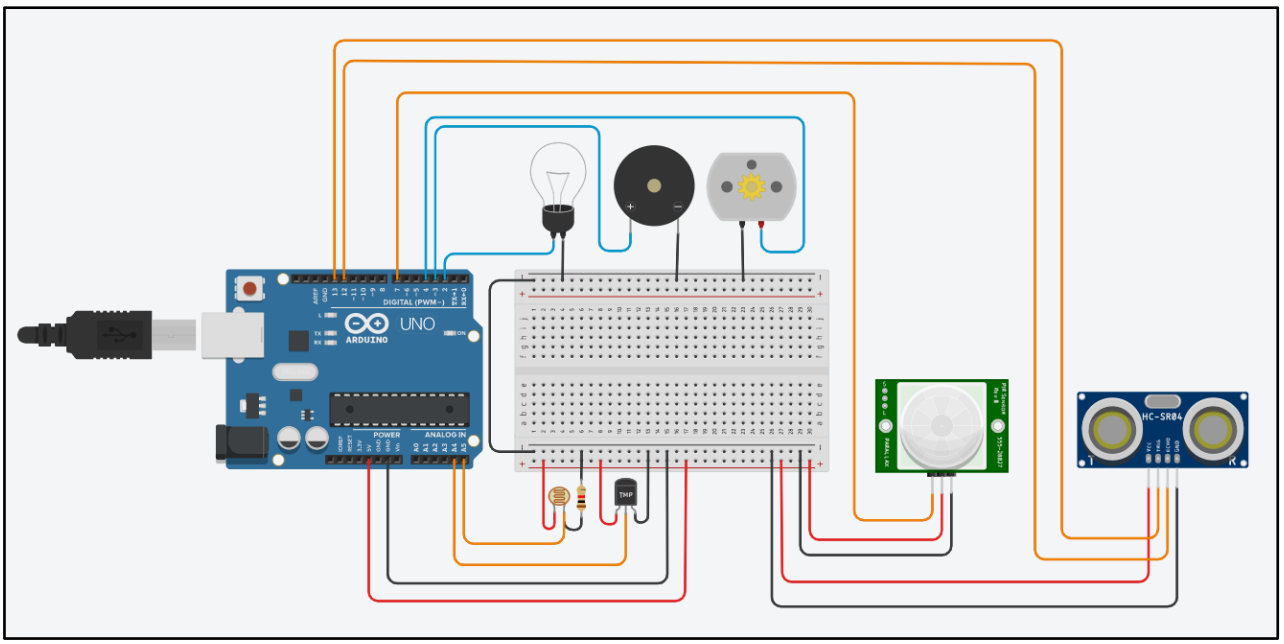
Devices Used:

- Sensors – Photoresistor, Temperature Sensor, PIR Sensor, Ultrasonic Sensor
- Output Devices – Light, Motor, Buzzer
- Arduino, Breadboard, Connecting Wires

Schematic Diagram:



Connectivity Diagram:



Program:

```
// C++ code
// Intialize Variables
int Temperature, Light, ManInRoom, ManAtDoor;

// Initializing Method
void setup() {
        pinMode(7, INPUT);  // Input from PIR Sensor
        pinMode(4, OUTPUT); // Output to Motor
        pinMode(3, OUTPUT); // Output to Buzzer
        pinMode(2, OUTPUT); // Output to Light Bulb
        pinMode(A4, INPUT); // Input from Temperature Sensor
        pinMode(A5, INPUT); // Input form PhotoResistor
}

// Function defined to Calculate the distance of object from UltraSonic Sensor
long readUltrasonicDistance(int triggerPin, int echoPin) {
        pinMode(triggerPin, OUTPUT);
        digitalWrite(triggerPin, LOW);
        delayMicroseconds(2);
        digitalWrite(triggerPin, HIGH);
        delayMicroseconds(10);
        digitalWrite(triggerPin, LOW);
        pinMode(echoPin, INPUT);
        return pulseIn(echoPin, HIGH);
}
```

```
// Main Method that Loops continueously
void loop () {
        Temperature = analogRead(A4); //Get the Temperature of Room
        Light = analogRead(A5);      //Get the Light in Room
        //Get Presence of human in Room
        ManInRoom  = 0.01723 * readUltrasonicDistance(13,12);
        ManAtDoor = digitalRead(7);   //Get the presence of Human at Door
        If(ManAtDoor==HIGH){
                tone(3,50);   // If Human Present at Door, Buzzer goes ON
        } else {
                noTone(3);    // If No Human at Door, Buzzer goes OFF
        }
        if(ManInRoom<330){       // If Human Present in Room
                if(Temperature>150){
                        digitalWrite(4,HIGH); // If Temperature is High, Fan goes ON
                } else {
                        digitalWrite(4,LOW);  // If Temperature is Low, Fan goes OFF
                }
                if(Light<500){
                        digitalWrite(2,HIGH); // If SunLight is Absent, Light goes ON
                } else {
                        digitalWrite(2,LOW);  // If SunLight is Present, Light goes OFF
                }
        } else {               // If No Human in Room, Fan and Light goes OFF
                digitalWrite(4,LOW);
                digitalWrite(2,LOW);
        }
}
```

Explanation:

This Smart Home Automation System uses Photoresistor, Temperature Sensor, PIR Sensor and Ultrasonic Sensor for Inputs and shows Output in Light Bulb, DC Motor and Buzzer. This Smart Home Automation System measures the Intensity Light in Room, Room Temperature and Presence of Human Inside and at the Door Step of the room to make efficient use of Light, Fan and Calling Bell of the Door without Human Intervention.

First, The Ultrasonic Sensor used to detect the Presence of human inside the room, If Human is present then Photoresistor is used to measure the intensity level of light based on which Arduino program decides to turn the Light Bulb ON/OFF and also the Temperature Sensor in used to measure the temperature of the room based on which Arduino Program decides to turn the Fan Motor ON/OFF. If there is No Human is present inside the room, then irrespective of Photoresistor and Temperature sensor values the Light Bulb and Fan Motor goes OFF.

The Next, Parallel working is that the PIR Sensor is connected at the Door Step. Whenever there is a Motion of Human at the doorstep PIR Sensor detects it and Arduino Program sends signal to the Buzzer and it goes ON for few seconds based on the Motion detection at the doorstep.