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IOT EDGE NODES AND ITS APPLICATIONS CSE4034 (L55+L56)

Allen Ben Philipose – 18BIS0043

TASK – 2
ANTI-THEFT SYSTEM

Aim

Create a TinkerCad circuit simulation for an anti-theft system using an Arduino, multiple sensors, and actuators with an alerting section.

Usage Scenario

This developed circuit can be used for securing certain items, rooms, halls, gates etc. On activation, the system is designed to detect both proximity of surrounding objects as well as the temperature of the environment.

On intrusion to the secure facility, the ultrasonic sensor will pick up the distance between the new obstruction (suspected thief) and the secured item. This is the primary trigger. If this condition is satisfied, the system detects the heat spikes caused by the intruder and if the results turn positive, the alerting segment is activated.

Alerting segment has 3 primary divisions –

i. Red LED
ii. Buzzer
iii. ThingSpeak

Integration with ThingSpeak not only will help in data collection and analysis, but also in improving the alert systems in the future.

Code

```
String ssid     = "Simulator Wifi";
String password = "";
String host     = "api.thingspeak.com";
const int httpPort   = 80;
String       uri                                    =
"/update?api_key=Q8ISYBE1VAIBAT25&field1=";
int Distance = 0;
int Door = 1; // Open Initially
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);
}
int setupESP8266(void) {
  Serial.begin(115200);
  Serial.println("AT");
```

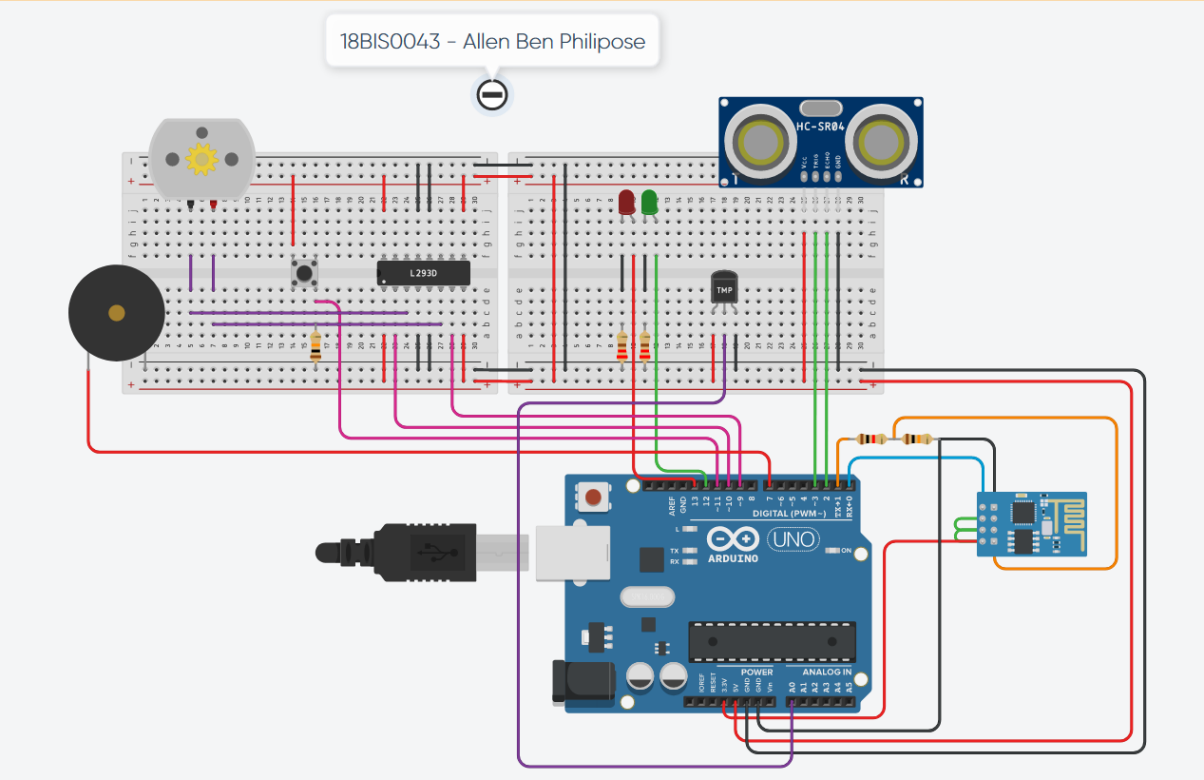
```
  delay(10);
  if (!Serial.find("OK")) return 1;
  Serial.println("AT+CWJAP=\""  +  ssid  +  "\",\""  +
password + "\"");
  delay(10);
  if (!Serial.find("OK")) return 2;
  Serial.println("AT+CIPSTART=\"TCP\",\""  +  host  +
"\"," + httpPort);
  delay(50);
  if (!Serial.find("OK")) return 3;
  return 0;
}
void anydata(int t1, int t2) {
  int temp1 = map(t1,0,1000,0,1000);
  int temp2 = map(t2,0,1000,0,1000);
  String httpPacket = "GET " + uri + String(temp1) +
"&field2="    +    String(temp2)    +"&amp"    +    "
HTTP/1.1\r\nHost: " + host + "\r\n\r\n";
  int length = httpPacket.length();
  Serial.print("AT+CIPSEND=");
  Serial.println(length);
  delay(10);
  Serial.print(httpPacket);
  delay(10);
```

```
  if (!Serial.find("SEND OK\r\n")) return;
}

void ring(){
  tone(7, 1000, 200);
  delay(100);
  noTone(7);
}
void blink(){
  for(int i=0;i<5;i++){
    digitalWrite(8, HIGH);
    delay(200);
    digitalWrite(8, LOW);
    delay(200);
  }
}

void setup() {
  pinMode(13, OUTPUT);
  pinMode(12, OUTPUT);
  pinMode(11, INPUT);
  pinMode(10, INPUT);
  pinMode(9, INPUT);
```

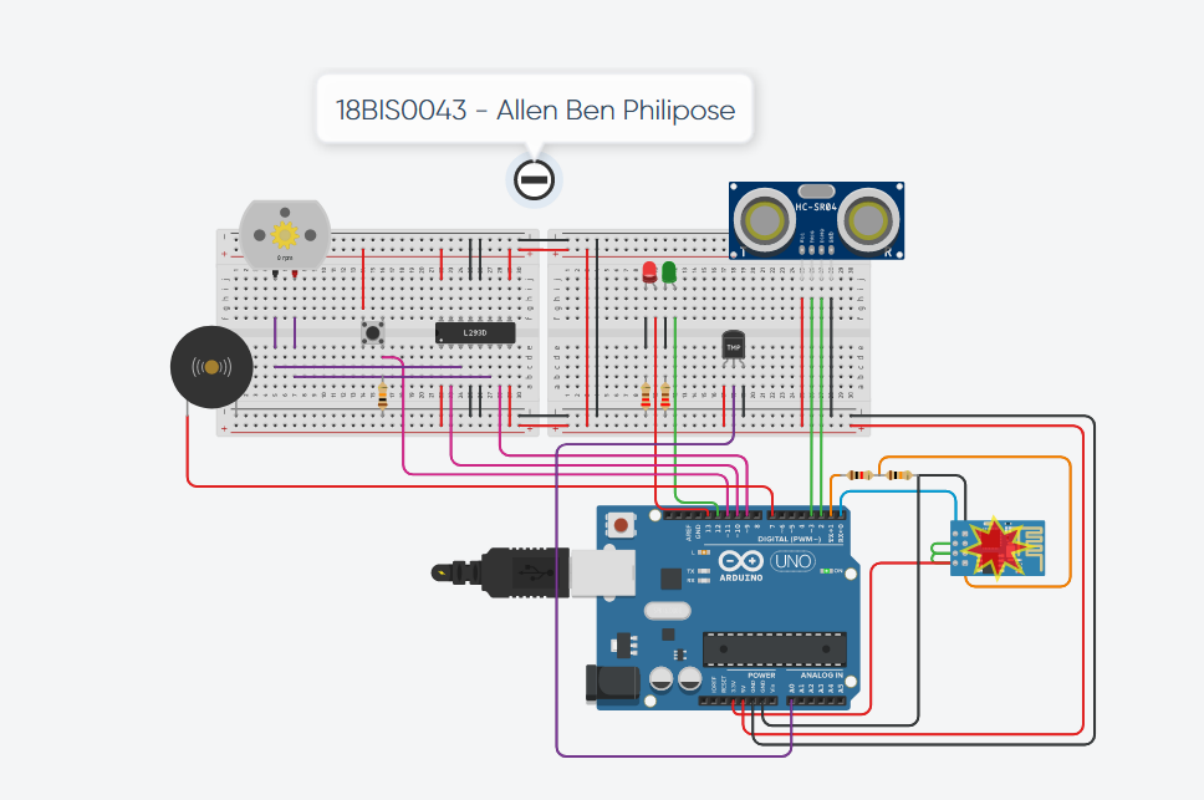
```
  pinMode(8, OUTPUT);
  pinMode(6, INPUT);
  setupESP8266();
}

void loop() {
  Distance = 0.01723 * readUltrasonicDistance(3, 2);
  int temp = map(analogRead(A0),20,358,0,50);
  Serial.print(temp);
  int m = 0;
  if (Distance >= 100) {
    digitalWrite(13, LOW);
    digitalWrite(12, HIGH);
    m=0;
    if (Door==0) {
        digitalWrite(12, HIGH);
        digitalWrite(13, LOW);
        digitalWrite(9, HIGH);
        digitalWrite(10, LOW);
         blink();
        digitalWrite(9, LOW);
        Door = 1;
    }
```

```
  }
  else {
    if(temp >= 35) {
      digitalWrite(13, HIGH);
      digitalWrite(12, LOW);
      ring();
      if (Door==1) {
        digitalWrite(13, HIGH);
        digitalWrite(12, LOW);
        digitalWrite(10, HIGH);
        digitalWrite(9, LOW);
        blink();
        digitalWrite(10, LOW);
        Door = 0;
      }
    }
    m=1;
  }
  anydata(m, Door);
}
```

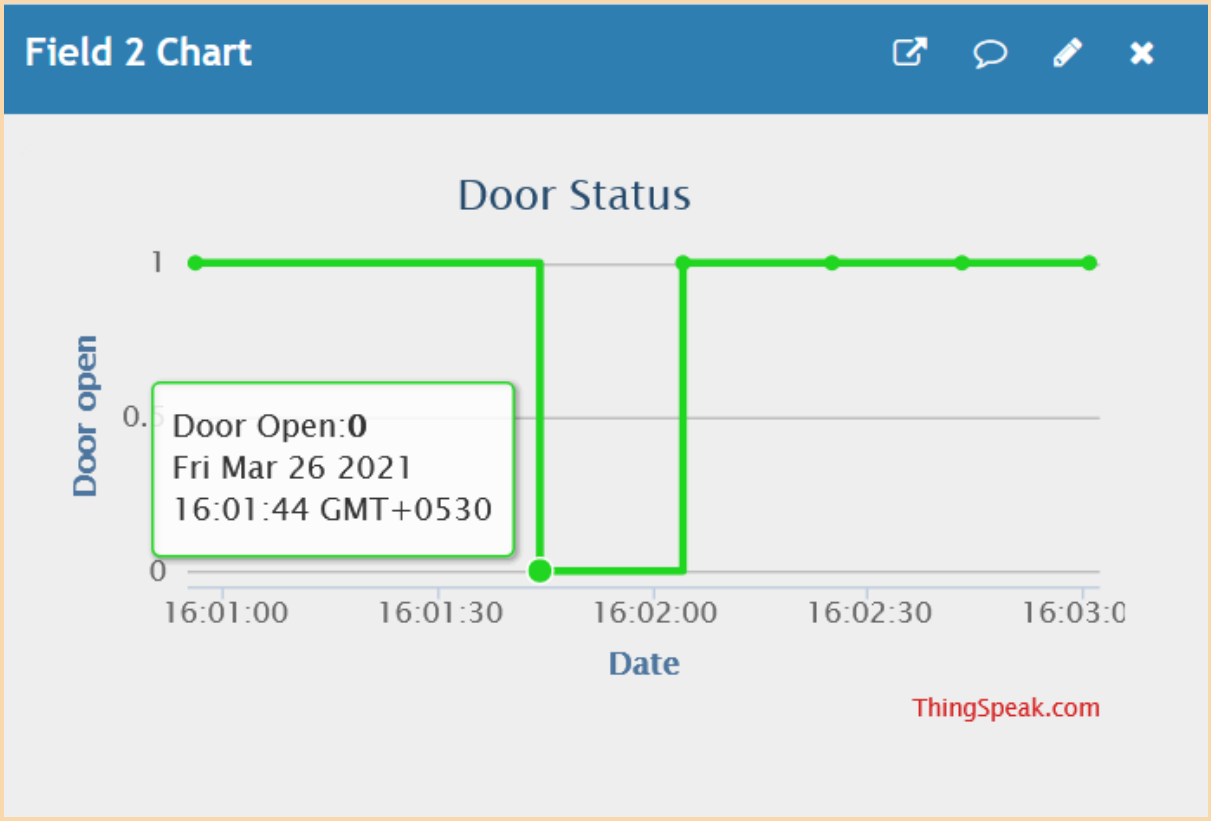
Circuit Diagram

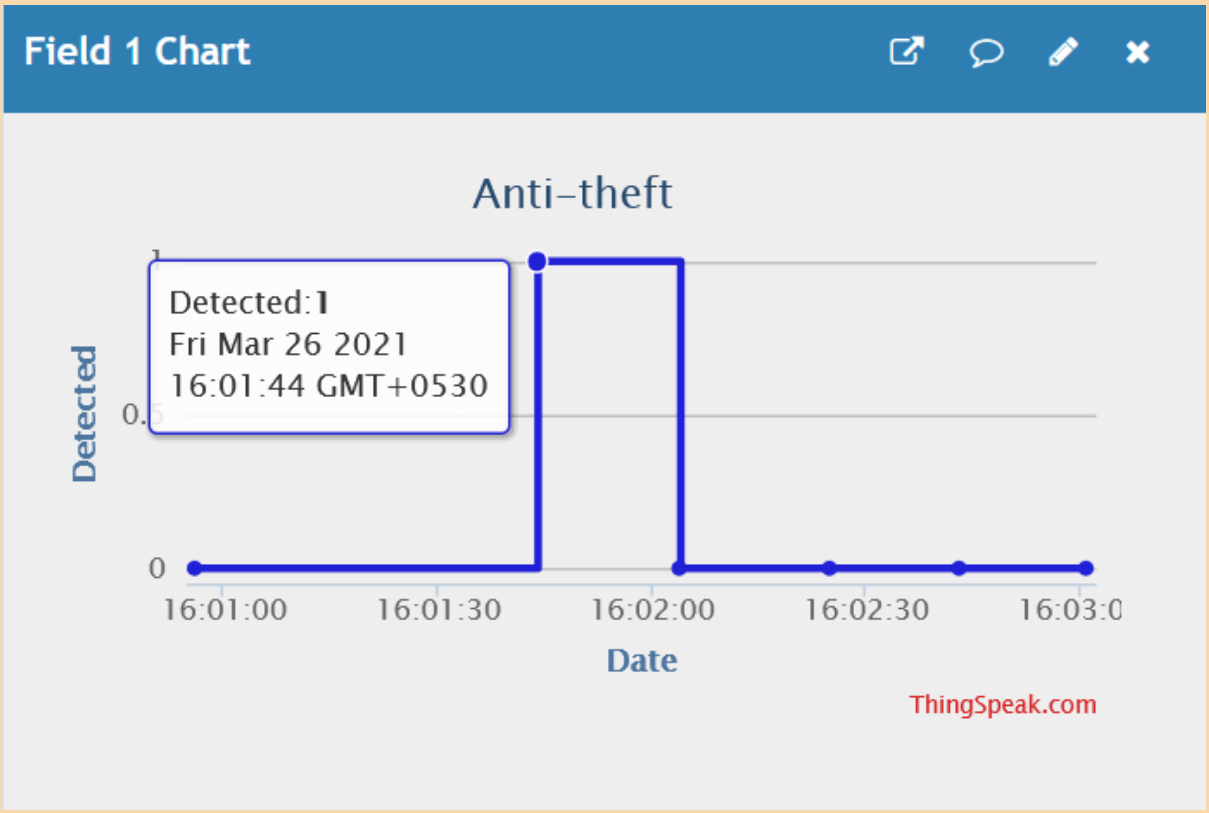


Active circuit:



ThingSpeak output





When **thief detected = true, door open = false**

Components

1. **ESP8266** – Connection between the local system to cloud services for data analysis, visualization, and other forms of alerting methods.
2. **LEDs** – Red glows when the intruder is in the proximity and the heat sensor picks up the spike. Until then, the area is secure and the green LED glows.
3. **Ultrasonic Sensor** – For detecting Proximity.
4. **Temperature Sensor** – For detecting Heat spikes.
5. **Buzzer** – For alerting the required person via sound by ringing when the Ultrasonic sensor and the Temperature sensor gives values above the set threshold.
6. **Motor** – Standard issue motor used to represent the gates/doors that are used to protect the item. Once both the parameters exceed the necessary threshold, the motor is immediately notified about the intrusion and the doors are closed.
7. **Push button** – Manual Override for the gates.

Conclusion

Therefore, we have created a TinkerCad circuit simulation for an anti-theft system using an Arduino, multiple sensors, and actuators with an alerting segment. The design stands out because the circuit has multiple sensors plugged in for accurate input and a strong array of alerting methods.