

# **ASSIGNMENT-1**

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## **SMART HOME WITH SENSORS USING TINKERCAD**

“Home automation” refers to the automatic and electronic control of household features, activity, and appliances.

There are 3 main elements of a home automation system:  
**sensors, controllers, actuators.**

- **Sensors** can monitor changes in daylight, temperature, or motion detection. Home automation systems can then adjust those settings (and more) to your preferences.
- **Controllers** refer to the devices — personal computers, tablets or smartphones — used to send and receive messages about the status of automated features in your home.
- **Actuators** may be light switches, motors, or motorized valves that control the actual mechanism, or function, of a home automation system. They are programmed to be activated by a remote command from a controller.

We have used :

- An **Ultrasonic Sensor** for measuring distance (threshold= 40cm) and Servo motor for opening the door.
- If the room detects any movement, the light (LED) will automatically be lighting. If there is no movement in the room, then the light will remain off. We use a **PIR** for detecting movement and LED as a light source.
- The temperature sensor will detect the room temperature and if that is greater than 20 (degree Celsius) then a fan will be running, otherwise, the fan will remain stopped. (we use a **temperature sensor LM35** for detecting temperature and a motor for running a fan).

## **CODE:**

```
#include<Servo.h>
const int pingPin = 7;
int servoPin = 8;

Servo servo1;

void setup() {
  Serial.begin(9600);
  servo1.attach(servoPin);
  pinMode(2,INPUT);
  pinMode(4,OUTPUT);
  pinMode(11,OUTPUT);
  pinMode(12,OUTPUT);
  pinMode(13,OUTPUT);
  pinMode(A0,INPUT);
  digitalWrite(2,LOW);
  digitalWrite(11,HIGH);

}

void loop() {

  long duration, inches, cm;

  pinMode(pingPin, OUTPUT);
  digitalWrite(pingPin, LOW);
  delayMicroseconds(2);
  digitalWrite(pingPin, HIGH);
  delayMicroseconds(5);
  digitalWrite(pingPin, LOW);
  pinMode(pingPin, INPUT);
  duration = pulseIn(pingPin, HIGH);

  inches = microsecondsToInches(duration);
  cm = microsecondsToCentimeters(duration);

  servo1.write(0);

  if(cm < 40)
  {
    servo1.write(90);
```

```
delay(2000);
}
else
{
    servo1.write(0);
}
int pir = digitalRead(2);

if(pir == HIGH)
{
    digitalWrite(4,HIGH);
    delay(1000);
}
else if(pir == LOW)
{
    digitalWrite(4,LOW);
}

float value=analogRead(A0);
float temperature=value*0.48;

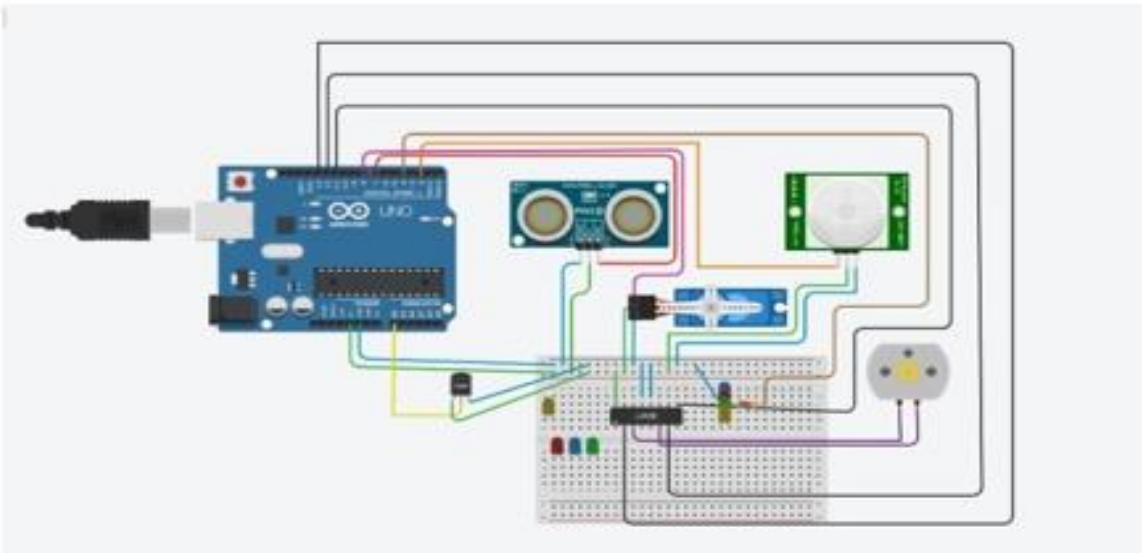
Serial.println("temperature");
Serial.println(temperature);

if(temperature > 20)
{
    digitalWrite(12,HIGH);
    digitalWrite(13,LOW);
}
else
{
    digitalWrite(12,LOW);
    digitalWrite(13,LOW);
}

long microsecondsToInches(long microseconds) {
    return microseconds / 74 / 2;
}

long microsecondsToCentimeters(long microseconds) {
    return microseconds / 29 / 2;
}
```

## **BEFORE SIMULATION:**



## **AFTER SIMULATION:**

