

1. **Topic Name:** Home Automation
2. **Background:** Home automation began to increase in popularity in the late 1990s and early 2000s as internet technology developed fast and smart homes suddenly became a more affordable option. Home automation means using technology to automate or remotely control various household functions. For example, the operation of lighting, heating or entertainment devices. This typically requires the installation of dedicated wiring and computers.
3. **Objectives:** Home automation aims **to make homes simpler, better, or more accessible**. Every aspect of the home can be automated, if you can imagine it, it may be possible. Home automation is not one technology, it's the integration of multiple technologies into one system.
4. **Scope :** A home automation system will **monitor and/or control home attributes such as lighting, climate, entertainment systems, and appliances**. It may also include home security such as access control and alarm systems.

5 **Logic :**

Devices to be automated: Lights, thermostat, security system

Triggers: Motion sensors, door sensors, voice commands

Flowchart: When the motion sensor detects movement, the lights turn on. If the door sensor is triggered while you're away, the security system sends an alert to your phone. If you say "turn up the heat" to your voice assistant, the thermostat adjusts the temperature.

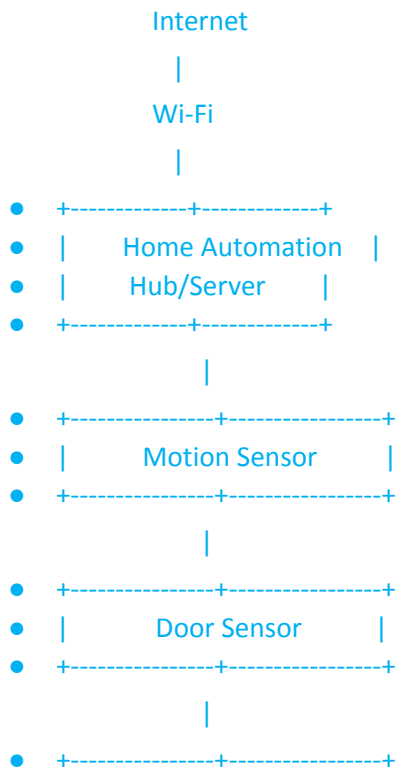
Rules and conditions: The lights turn off automatically after 10 minutes of no motion. The security system sends an alert to your phone if the door sensor is triggered while you're away. The thermostat adjusts the temperature based on the time of day.

Testing: Test the system to ensure that the devices are responding as expected and make adjustments as needed

6 **Implementation Plan/ Procedures [with Diagram] :**

- 1) Determine the scope of the project and identify the devices and systems to be automated.
- 2) a home automation platform or hub that is compatible with the devices you want to automate.
- 3) Install the home automation hub and connect it to your home Wi-Fi network.
- 4) Install and configure the necessary devices such as motion sensors, door sensors, cameras, thermostats, locks, lights, and any other devices that you want to automate. Make sure they are all compatible with the home automation hub you have chosen.
- 5) Create a flowchart or logic for how the different devices will interact with each other.
- 6) Set up the rules and conditions for each device and trigger, based on your desired outcomes
- 7) Test the system to make sure that everything is working as expected. Troubleshoot any issues that arise.
- 8) Refine the rules and conditions based on your testing and feedback.
- 9) Train users on how to use the home automation system, including any voice commands or mobile apps that are required.
- 10) Monitor the system regularly and make any necessary updates or changes as needed.

Diagram



- | Security Camera |
- +-----+-----+
- |
- +-----+-----+
- | Smart Thermostat |
- +-----+-----+
- |
- +-----+-----+
- | Smart Lock |
- +-----+-----+
- |
- +-----+-----+
- | Lights |
- +-----+-----+
- |
- o Smart Phone /
- Voice Assistant

7 Code :

```
#include <Adafruit_MQTT.h>
#include <Adafruit_MQTT_Client.h>
#include <ESP8266WiFi.h>
#define light1 16 //D0
#define light2 5 //D1

#define WLAN_SSID "ARAF"
#define WLAN_PASS "araf123456"

#define AIO_SERVER "io.adafruit.com"
#define AIO_SERVERPORT 1883 // use 8883 for SSL
#define AIO_USERNAME "araf213"
#define AIO_KEY "aio_apDv07mg8jo0SynfYzInNLgyiDQS"

WiFiClient client;
Adafruit_MQTT_Client mqtt(&client, AIO_SERVER, AIO_SERVERPORT, AIO_USERNAME,
AIO_KEY);

Adafruit_MQTT_Subscribe L1 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME
"/feeds/light1");
Adafruit_MQTT_Subscribe L2 = Adafruit_MQTT_Subscribe(&mqtt, AIO_USERNAME
"/feeds/light2");
```

```
void MQTT_connect();

void setup() {
  Serial.begin(9600);

  pinMode(light1, OUTPUT);
  pinMode(light2, OUTPUT);
  digitalWrite(light1, LOW);
  digitalWrite(light2, LOW);

  pinMode(LED_BUILTIN, OUTPUT);
  digitalWrite(LED_BUILTIN, HIGH);

  delay( 100 ); // power-up safety delay

  Serial.println(); Serial.println();
  Serial.print("Connecting to ");
  Serial.println(WLAN_SSID);

  WiFi.begin(WLAN_SSID, WLAN_PASS);
  while (WiFi.status() != WL_CONNECTED) {
    delay(500);
    Serial.print(".");
  }
  Serial.println();

  digitalWrite(LED_BUILTIN, LOW);

  Serial.println("WiFi connected");
  Serial.println("IP address: ");
  Serial.println(WiFi.localIP());

  mqtt.subscribe(&L1);
  mqtt.subscribe(&L2);

}

void loop() {

  MQTT_connect();

  Adafruit_MQTT_Subscribe *subscription;
```

```

while ((subscription = mqtt.readSubscription(2000))) {

    if (subscription == &L1) {
        Serial.print("Light > ");
        Serial.print(F("Got: "));
        Serial.println((char *)L1.lastread);
        String Light_state = (char *)L1.lastread;
        if (Light_state == "on") {
            digitalWrite(light1, HIGH);
            Serial.println("Light1 is on");
        }
        else if (Light_state == "off") {
            digitalWrite(light1, LOW);
            Serial.println("Light1 is off");
        }
    }
    else if (subscription == &L2) {
        Serial.print("Light > ");
        Serial.print(F("Got: "));
        Serial.println((char *)L2.lastread);
        String Light_state = (char *)L2.lastread;
        if (Light_state == "on") {
            digitalWrite(light2, HIGH);
            Serial.println("Light2 is on");
        }
        else if (Light_state == "off") {
            digitalWrite(light2, LOW);
            Serial.println("Light2 is off");
        }
    }
}

void MQTT_connect() {
    int8_t ret;

    if (mqtt.connected()) {
        return;
    }

    digitalWrite(LED_BUILTIN, HIGH);
    Serial.print("Connecting to MQTT... ");

    uint8_t retries = 3;
    while ((ret = mqtt.connect()) != 0) { // connect will return 0 for connected
        Serial.println(mqtt.connectErrorString(ret));
    }
}

```

```
Serial.println("Retrying MQTT connection in 5 seconds...");
mqtt.disconnect();
delay(2000); // wait 2 seconds
retries--;
if (retries == 0) {
  // basically die and wait for WDT to reset me
  //while (1);
  Serial.println("Waiting 4 min to reconnect");
  delay(240000);
}
}
Serial.println("MQTT Connected!");
digitalWrite(LED_BUILTIN, LOW);
}
```