

Procedure:

1. Setting up the Hardware:

- a. Gather all the required components mentioned, including the ESP32DEVKIT, sensors (Piezo, Gas Sensor, Ultrasonic Distance Sensor, PIR Sensor), resistors (R1, R2, R4, R5), microcontroller (Positional Micro Servo), DC motor, transistors (T1, T2), photoresistor, light bulbs, and a 3.3V battery.
- b. Connect the components according to the circuit diagram provided with the project documentation. Ensure proper wiring and connections.

Installing Blynk.io:

- a. Visit the Blynk.io website and create an account if you don't have one.
- b. Download and install the Blynk app on your mobile device from the respective app store.

Creating the Blynk Project:

- a. Open the Blynk app and create a new project.
- b. Choose the ESP32 as the hardware model in the Blynk project settings.
- c. Generate an authorization code for your project.

Setting up the ESP32 :

- a. Connect the ESP32 Module to your computer using a USB cable.
- b. Install the necessary drivers and Arduino IDE software if not already done.
- c. Open the Arduino IDE and select the appropriate board and port.

Assembling the Hardware Components:

- a. Connect the components to the ESP32 as follows:
 - Connect the Piezo (PIEZO1) to a digital pin on the ESP32 for generating sound alerts.
 - Connect the Gas Sensor (GAS1) to an analog pin on the ESP32 for detecting gas levels.
 - Connect the Ultrasonic Distance Sensor (PING1) to the ESP32 for measuring water tank levels.
 - Connect the PIR Sensor (PIR1) to a digital pin for motion detection.
 - Connect the Positional Micro Servo (SERVO1) to a digital pin for controlling automatic doors.
 - Connect LED's for smart lighting control simulation.

- Connect a 3.3V battery to power the system.

Writing and Uploading the ESP32 Code:

- a. Write the ESP32 code to control and integrate all the components as per the project requirements.
- b. Ensure that the code includes functionalities for automatic water level monitoring, smart lighting control, automatic doors, smoke detection, and data visualization on UI dashboards.
- c. Upload the code to the ESP32 using the Arduino IDE.

Ensure that your mobile device is connected to the same Wi-Fi network as the ESP32 Module.

- b. Open the Blynk app and tap on the "+" button to add a new widget.
- c. Select the desired widget type for each automation feature (e.g., buttons, sliders, graphs).
- d. Configure each widget to correspond to the appropriate digital or analog pins on the ESP32 .

Testing and Calibration:

- a. Ensure all hardware connections are secure and functioning correctly.
- b. Test each component's functionality individually and in conjunction with others to ensure proper automation features.
- c. Calibrate sensors and adjust thresholds as needed to achieve accurate readings and desired automation behavior

Testing and Operation:

- a. Power the ESP32 Module using the 9V battery.
- b. Verify that the ESP32 Module is connected to the Blynk cloud by checking the LED status on the board.
- c. Interact with the Blynk app widgets to control and monitor the home automation features.
- d. Test each automation feature, such as checking water tank levels, controlling lighting, detecting motion, and monitoring gas levels.

```

}

void loop()
{
    Blynk.run();

    timer.run();
}

```

Results and Discussion:



