**Project Title:**

Smart Home Automation using ESP8266

And Blynk

**🔹 1. Objective:**

To design a basic smart home system that allows wireless control of appliances such as lights and fans using a smartphone app (Blynk) and an ESP8266 NodeMCU microcontroller.

**🔹 2. Components Required:**

* ESP8266 NodeMCU
* 2-Channel Relay Module
* Bulb or LED for light control
* Fan or motor (12V recommended)
* Smartphone with Blynk App
* Jumper wires and breadboard
* Power supply

**🔹 3. Circuit Diagram:**

*(You can draw this based on the connections below or ask me to generate an image)*

**Connections:**

* D1 → Relay IN1 → Light
* D2 → Relay IN2 → Fan
* Relay VCC → 3.3V
* Relay GND → GND
* Relay COM → Appliance Live Wire
* Relay NO → Live Wire going to appliance
* Neutral Wire → Appliance neutral pin
* ESP8266 powered by USB or 5V

**🔹 4. Mobile App (Blynk) Setup:**

1. Install Blynk app.
2. Create a new project with:
   * Device: ESP8266
   * Connection: Wi-Fi
3. Add two **Button widgets**:
   * **V0**: Label – Light Control
   * **V1**: Label – Fan Control
4. Set buttons to “Switch” mode.
5. Copy your **Auth Token** (from email) and paste into code.

**🔹 5. Arduino Code:**

cpp

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#define BLYNK\_TEMPLATE\_ID "TMPLxxxxxxx"

#define BLYNK\_TEMPLATE\_NAME "Azzy"

#define BLYNK\_AUTH\_TOKEN "Your\_Auth\_Token"

#include <ESP8266WiFi.h>

#include <BlynkSimpleEsp8266.h>

char auth[] = "Your\_Auth\_Token";

char ssid[] = "Your\_WiFi\_Name";

char pass[] = "Your\_WiFi\_Password";

int lightRelay = D1;

int fanRelay = D2;

void setup()

{

pinMode(lightRelay, OUTPUT);

pinMode(fanRelay, OUTPUT);

digitalWrite(lightRelay, LOW);

digitalWrite(fanRelay, LOW);

Serial.begin(9600);

Blynk.begin(auth, ssid, pass);

}

BLYNK\_WRITE(V0)

{

int value = param.asInt();

digitalWrite(lightRelay, value);

}

BLYNK\_WRITE(V1)

{

int value = param.asInt();

digitalWrite(fanRelay, value);

}

void loop()

{

Blynk.run();

}

**🔹 6. Working:**

* When the user taps the **button** on the Blynk app, it sends a signal to the ESP8266.
* The microcontroller receives the command and turns ON/OFF the connected relay.
* The relay then controls the **light** or **fan** as required.

**🔹 7. Advantages:**

* Wireless control of home appliances.
* Simple and budget-friendly project.
* Good introduction to IoT (Internet of Things).

**🔹 8. Challenges:**

* Relay flickering due to power issues.
* Wi-Fi disconnection.
* Auth token must be correct, or project won’t work.

**🔹 9. Future Improvements:**

* Add sensors (temperature, motion).
* Use voice control (Google Assistant).
* Monitor power usage.
* Create a secure web interface.

**🔹 10. Conclusion:**

This project demonstrates how smart home automation can be achieved using low-cost components and a mobile app. It opens doors to future upgrades for creating a fully automated home system.