// WiFi Credentials

const char\* ssid1 = "Airtel\_prad\_5900";

const char\* password1 = "air97139";

const char\* ssid2 = "Deva";

const char\* password2 = "Vittala@26";

// device names (change names as per requirement)

String Device\_1\_Name = "Moon Light";

String Device\_2\_Name = "Balcony Light";

String Device\_3\_Name = "Light";

String Device\_4\_Name = "Fan";

//Update the HEX code of IR Remote buttons 0x<HEX CODE>

#define IR\_Button\_1 0x1FEE01F

#define IR\_Button\_2 0x1FE10EF

#define IR\_Button\_3 0x1FE906F

#define IR\_Button\_4 0x1FE50AF

#define IR\_Button\_5 0x1FEE0BF

#define IR\_Button\_6 0x1FE10BF

#define IR\_Button\_7 0x1FE806F

#define IR\_Button\_8 0x1FE50BF

#define IR\_All\_On 0x1FE807F

#define IR\_All\_Off 0x1FE48B7

#include <WiFi.h>

#include <Espalexa.h>

#include "BluetoothSerial.h"

#include <IRremote.h>

#include <Preferences.h>

#include <AceButton.h>

using namespace ace\_button;

#if !defined(CONFIG\_BT\_ENABLED) || !defined(CONFIG\_BLUEDROID\_ENABLED)

#error Bluetooth is not enabled! Please enable it in menuconfig

#endif

BluetoothSerial SerialBT;

Espalexa espalexa;

Preferences pref;

// define the GPIO connected with Relays and switches

#define RelayPin1 26 //fan

#define RelayPin2 25 //light

#define RelayPin3 33 //moon light

#define RelayPin4 32 // socket

#define SwitchPin1 35 // fan green

#define SwitchPin2 34 //light blue

#define SwitchPin3 39 //moon light // purple

#define SwitchPin4 36 //socket //white

#define wifiLed 22

#define IR\_RECV\_PIN 21

#define WiFiResetButton 0 //BOOT button

// Relay State

bool toggleState\_1 = HIGH; // Initial state OFF for active-high relays

bool toggleState\_2 = HIGH; // Initial state OFF for active-high relays

bool toggleState\_3 = HIGH; // Initial state OFF for active-high relays

bool toggleState\_4 = HIGH; // Initial state OFF for active-high relays

ButtonConfig config1;

AceButton button1(&config1);

ButtonConfig config2;

AceButton button2(&config2);

ButtonConfig config3;

AceButton button3(&config3);

ButtonConfig config4;

AceButton button4(&config4);

void handleEvent1(AceButton\*, uint8\_t, uint8\_t);

void handleEvent2(AceButton\*, uint8\_t, uint8\_t);

void handleEvent3(AceButton\*, uint8\_t, uint8\_t);

void handleEvent4(AceButton\*, uint8\_t, uint8\_t);

int wifiFlag = 0;

char bt\_data;

IRrecv irrecv(IR\_RECV\_PIN);

decode\_results results;

// prototypes

boolean connectWifi();

//callback functions

void firstLightChanged(uint8\_t brightness);

void secondLightChanged(uint8\_t brightness);

void thirdLightChanged(uint8\_t brightness);

void fourthLightChanged(uint8\_t brightness);

boolean wifiConnected = false;

// ====================== Device Control Callbacks ======================

void firstLightChanged(uint8\_t brightness) {

if (brightness == 255) {

digitalWrite(RelayPin1, HIGH); // HIGH turns relay ON for active-high modules

toggleState\_1 = HIGH;

} else {

digitalWrite(RelayPin1, LOW); // LOW turns relay OFF for active-high modules

toggleState\_1 = LOW;

}

pref.putBool("Relay1", toggleState\_1); // Store the logical state (true for ON)

}

void secondLightChanged(uint8\_t brightness) {

if (brightness == 255) {

digitalWrite(RelayPin2, HIGH); // HIGH turns relay ON

toggleState\_2 = HIGH;

} else {

digitalWrite(RelayPin2, LOW); // LOW turns relay OFF

toggleState\_2 = LOW;

}

pref.putBool("Relay2", toggleState\_2);

}

void thirdLightChanged(uint8\_t brightness) {

if (brightness == 255) {

digitalWrite(RelayPin3, HIGH); // HIGH turns relay ON

toggleState\_3 = HIGH;

} else {

digitalWrite(RelayPin3, LOW); // LOW turns relay OFF

toggleState\_3 = LOW;

}

pref.putBool("Relay3", toggleState\_3);

}

void fourthLightChanged(uint8\_t brightness) {

if (brightness == 255) {

digitalWrite(RelayPin4, HIGH); // HIGH turns relay ON

toggleState\_4 = HIGH;

} else {

digitalWrite(RelayPin4, LOW); // LOW turns relay OFF

toggleState\_4 = LOW;

}

pref.putBool("Relay4", toggleState\_4);

}

void addDevices() {

espalexa.addDevice(Device\_1\_Name, firstLightChanged);

espalexa.addDevice(Device\_2\_Name, secondLightChanged);

espalexa.addDevice(Device\_3\_Name, thirdLightChanged);

espalexa.addDevice(Device\_4\_Name, fourthLightChanged);

espalexa.begin();

}

void sendFeedback(int relay, int value) {

EspalexaDevice\* d = espalexa.getDevice(relay);

d->setPercent(value);

}

// ====================== IR Remote ======================

void ir\_remote() {

if (irrecv.decode(&results)) {

switch (results.value) {

case IR\_Button\_1:

toggleState\_1 = !toggleState\_1; // Toggle the state

digitalWrite(RelayPin1, toggleState\_1); // Apply the new state

pref.putBool("Relay1", toggleState\_1);

(toggleState\_1 == LOW) ? sendFeedback(0, 0) : sendFeedback(0, 100);

break;

case IR\_Button\_2:

toggleState\_2 = !toggleState\_2;

digitalWrite(RelayPin2, toggleState\_2);

pref.putBool("Relay2", toggleState\_2);

(toggleState\_2 == LOW) ? sendFeedback(1, 0) : sendFeedback(1, 100);

break;

case IR\_Button\_3:

toggleState\_3 = !toggleState\_3;

digitalWrite(RelayPin3, toggleState\_3);

pref.putBool("Relay3", toggleState\_3);

(toggleState\_3 == LOW) ? sendFeedback(2, 0) : sendFeedback(2, 100);

break;

case IR\_Button\_4:

toggleState\_4 = !toggleState\_4;

digitalWrite(RelayPin4, toggleState\_4);

pref.putBool("Relay4", toggleState\_4);

(toggleState\_4 == LOW) ? sendFeedback(3, 0) : sendFeedback(3, 100);

break;

case IR\_All\_Off: all\_SwitchOff(); break;

case IR\_All\_On: all\_SwitchOn(); break;

}

irrecv.resume();

}

}

// ====================== Bluetooth Control ======================

void bluetooth\_control() {

if (SerialBT.available()) {

bt\_data = SerialBT.read();

switch (bt\_data) {

case 'A': digitalWrite(RelayPin1, HIGH); toggleState\_1 = HIGH; sendFeedback(0, 100); pref.putBool("Relay1", true); break;

case 'a': digitalWrite(RelayPin1, LOW); toggleState\_1 = LOW; sendFeedback(0, 0); pref.putBool("Relay1", false); break;

case 'B': digitalWrite(RelayPin2, HIGH); toggleState\_2 = HIGH; sendFeedback(1, 100); pref.putBool("Relay2", true); break;

case 'b': digitalWrite(RelayPin2, LOW); toggleState\_2 = LOW; sendFeedback(1, 0); pref.putBool("Relay2", false); break;

case 'C': digitalWrite(RelayPin3, HIGH); toggleState\_3 = HIGH; sendFeedback(2, 100); pref.putBool("Relay3", true); break;

case 'c': digitalWrite(RelayPin3, LOW); toggleState\_3 = LOW; sendFeedback(2, 0); pref.putBool("Relay3", false); break;

case 'D': digitalWrite(RelayPin4, HIGH); toggleState\_4 = HIGH; sendFeedback(3, 100); pref.putBool("Relay4", true); break;

case 'd': digitalWrite(RelayPin4, LOW); toggleState\_4 = LOW; sendFeedback(3, 0); pref.putBool("Relay4", false); break;

case 'Z': all\_SwitchOn(); break;

case 'z': all\_SwitchOff(); break;

}

}

}

// ====================== Relay Control ======================

void all\_SwitchOn() {

toggleState\_1 = HIGH; digitalWrite(RelayPin1, HIGH); pref.putBool("Relay1", true); sendFeedback(0, 100);

toggleState\_2 = HIGH; digitalWrite(RelayPin2, HIGH); pref.putBool("Relay2", true); sendFeedback(1, 100);

toggleState\_3 = HIGH; digitalWrite(RelayPin3, HIGH); pref.putBool("Relay3", true); sendFeedback(2, 100);

toggleState\_4 = HIGH; digitalWrite(RelayPin4, HIGH); pref.putBool("Relay4", true); sendFeedback(3, 100);

}

void all\_SwitchOff() {

toggleState\_1 = LOW; digitalWrite(RelayPin1, LOW); pref.putBool("Relay1", false); sendFeedback(0, 0);

toggleState\_2 = LOW; digitalWrite(RelayPin2, LOW); pref.putBool("Relay2", false); sendFeedback(1, 0);

toggleState\_3 = LOW; digitalWrite(RelayPin3, LOW); pref.putBool("Relay3", false); sendFeedback(2, 0);

toggleState\_4 = LOW; digitalWrite(RelayPin4, LOW); pref.putBool("Relay4", false); sendFeedback(3, 0);

}

boolean connectWifi() {

int attempts = 0;

Serial.begin(115200);

WiFi.begin(ssid1, password1);

Serial.print("Connecting to WiFi..");

while (WiFi.status() != WL\_CONNECTED && attempts < 15) {

Serial.print(".");

digitalWrite(wifiLed, HIGH);

delay(500);

digitalWrite(wifiLed, LOW);

delay(500);

attempts++;

}

Serial.println();

if (WiFi.status() == WL\_CONNECTED) {

Serial.print("Connected with ");

Serial.print(ssid1);

Serial.print(" IP: ");

Serial.println(WiFi.localIP());

digitalWrite(wifiLed, HIGH);

return true;

} else {

WiFi.begin(ssid2, password2);

attempts = 0;

while (WiFi.status() != WL\_CONNECTED && attempts < 15) {

Serial.print("..");

digitalWrite(wifiLed, HIGH);

delay(500);

digitalWrite(wifiLed, LOW);

delay(500);

attempts++;

}

Serial.println();

if (WiFi.status() == WL\_CONNECTED) {

Serial.print("Connected with ");

Serial.print(ssid2);

Serial.print(" IP: ");

Serial.println(WiFi.localIP());

digitalWrite(wifiLed, HIGH);

return true;

} else {

Serial.println("WiFi connection FAILED");

digitalWrite(wifiLed, LOW);

return false;

}

}

}

// AceButton event handlers

void handleEvent1(AceButton\* button, uint8\_t eventType, uint8\_t buttonState) {

if (eventType == AceButton::kEventClicked) {

toggleState\_1 = !toggleState\_1;

digitalWrite(RelayPin1, toggleState\_1);

pref.putBool("Relay1", toggleState\_1);

(toggleState\_1 == LOW) ? sendFeedback(0, 0) : sendFeedback(0, 100);

}

}

void handleEvent2(AceButton\* button, uint8\_t eventType, uint8\_t buttonState) {

if (eventType == AceButton::kEventClicked) {

toggleState\_2 = !toggleState\_2;

digitalWrite(RelayPin2, toggleState\_2);

pref.putBool("Relay2", toggleState\_2);

(toggleState\_2 == LOW) ? sendFeedback(1, 0) : sendFeedback(1, 100);

}

}

void handleEvent3(AceButton\* button, uint8\_t eventType, uint8\_t buttonState) {

if (eventType == AceButton::kEventClicked) {

toggleState\_3 = !toggleState\_3;

digitalWrite(RelayPin3, toggleState\_3);

pref.putBool("Relay3", toggleState\_3);

(toggleState\_3 == LOW) ? sendFeedback(2, 0) : sendFeedback(2, 100);

}

}

void handleEvent4(AceButton\* button, uint8\_t eventType, uint8\_t buttonState) {

if (eventType == AceButton::kEventClicked) {

toggleState\_4 = !toggleState\_4;

digitalWrite(RelayPin4, toggleState\_4);

pref.putBool("Relay4", toggleState\_4);

(toggleState\_4 == LOW) ? sendFeedback(3, 0) : sendFeedback(3, 100);

}

}

void setup() {

Serial.begin(115200);

pref.begin("relay\_store", false);

toggleState\_1 = pref.getBool("Relay1", LOW);

toggleState\_2 = pref.getBool("Relay2", LOW);

toggleState\_3 = pref.getBool("Relay3", LOW);

toggleState\_4 = pref.getBool("Relay4", LOW);

// Configure relays as outputs with saved state

pinMode(RelayPin1, OUTPUT);

digitalWrite(RelayPin1, toggleState\_1);

pinMode(RelayPin2, OUTPUT);

digitalWrite(RelayPin2, toggleState\_2);

pinMode(RelayPin3, OUTPUT);

digitalWrite(RelayPin3, toggleState\_3);

pinMode(RelayPin4, OUTPUT);

digitalWrite(RelayPin4, toggleState\_4);

pinMode(wifiLed, OUTPUT);

irrecv.enableIRIn();

SerialBT.begin("DNY\_AI\_E\_HALL");

Serial.println("Bluetooth device started... Ready to pair!");

// Button setup

pinMode(SwitchPin1, INPUT\_PULLUP);

config1.setEventHandler(handleEvent1);

pinMode(SwitchPin2, INPUT\_PULLUP);

config2.setEventHandler(handleEvent2);

pinMode(SwitchPin3, INPUT\_PULLUP);

config3.setEventHandler(handleEvent3);

pinMode(SwitchPin4, INPUT\_PULLUP);

config4.setEventHandler(handleEvent4);

// Check for Wi-Fi reset button

pinMode(WiFiResetButton, INPUT\_PULLUP);

if (digitalRead(WiFiResetButton) == LOW) {

Serial.println("Resetting WiFi Credentials");

pref.clear();

pref.end();

} else {

wifiConnected = connectWifi();

if (wifiConnected) {

addDevices();

}

}

}

void loop() {

button1.check();

button2.check();

button3.check();

button4.check();

bluetooth\_control();

ir\_remote();

if (wifiConnected) {

espalexa.loop();

}

}