RFID Access System with RYG LED Logic

TEAM MEMBERS:

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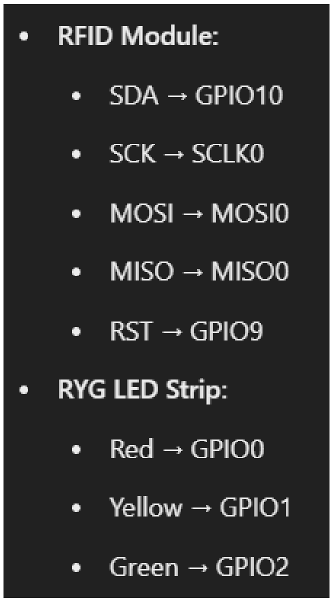
PROBLEM STATEMENT:

Write an Arduino program for the **Arduino ARIES V3 board** that interfaces with an **RFID module** and a **Red-Yellow-Green (RYG) LED strip** using GPIO pins. The system should perform the following tasks:

1. The RFID module reads RFID cards/tags.
2. If the scanned card's UID matches the **authorized UID**, the **Green LED** connected to **GPIO2** should light up, indicating **"Access Granted."**
3. If the scanned card's UID does **not match**, the **Yellow LED** connected to **GPIO1** should light up, indicating **"Access Denied."**
4. After **three consecutive incorrect attempts**, the **Red LED** connected to **GPIO0** should light up, indicating that access is **"Blocked"** due to repeated failed attempts.

BOARD: Aries Development Board v3

PIN CONNECTIONS :

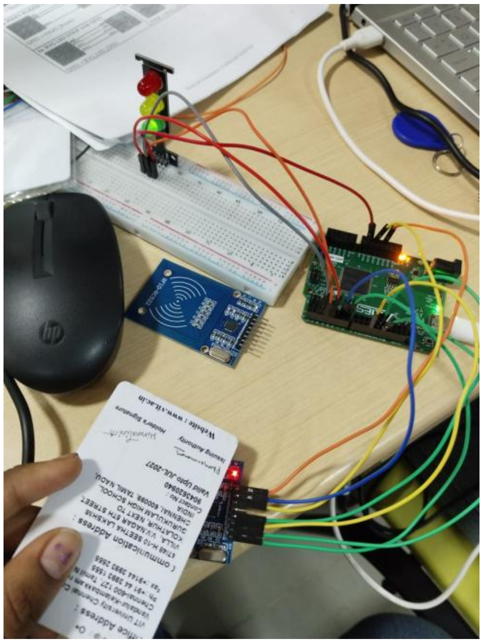


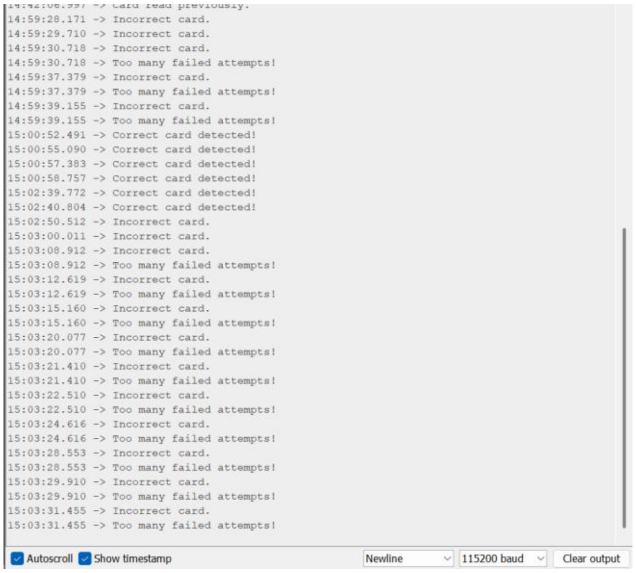
- **RFID Module:**
  - SDA → GPIO10
  - SCK → SCLK0
  - MOSI → MOSI0
  - MISO → MISO0
  - RST → GPIO9
- **RYG LED Strip:**
  - Red → GPIO0
  - Yellow → GPIO1
  - Green → GPIO2

CODE:

```
#include <SPI.h>
#include <MFRC522.h>
#define SS_PIN 10  // SDA of RC522
#define RST_PIN 9
SPIClass SPI(0); // For Aries V3
MFRC522 rfid(SS_PIN, RST_PIN);
MFRC522::MIFARE_Key key;
byte nuidPICC[4];
// Define RYG LED pins
#define GREEN_LED 2
#define YELLOW_LED 3
#define RED_LED 4
// Correct card UID (E7 86 4A CA)
const byte correctUID[4] = {0xE7, 0x86, 0x4A, 0xCA};
int failedAttempts = 0;
void setup() {
Serial.begin(115200);
SPI.begin();
rfid.PCD_Init();
for (byte i = 0; i < 6; i++) key.keyByte[i] = 0xFF;
// Set LED pins as output
pinMode(GREEN_LED, OUTPUT);
pinMode(YELLOW_LED, OUTPUT);
pinMode(RED_LED, OUTPUT);
Serial.println("RFID with RYG LED initialized.");
}
void loop() {
if (!rfid.PICC_IsNewCardPresent() || !rfid.PICC_ReadCardSerial()) return;
// Check for correct UID
bool isCorrect = true;
for (byte i = 0; i < 4; i++) {
if (rfid.uid.uidByte[i] != correctUID[i]) {
isCorrect = false;
break;
}
}
if (isCorrect) {
Serial.println("Correct card detected!");
failedAttempts = 0;
lightLED(GREEN_LED);
} else {
Serial.println("Incorrect card.");
failedAttempts++;
if (failedAttempts >= 3) {
Serial.println("Too many failed attempts!");
lightLED(RED_LED);
} else {
lightLED(YELLOW_LED);
}
}
rfid.PICC_HaltA();
rfid.PCD_StopCrypto1();
delay(1000); // Small delay before next read
}
void lightLED(int ledPin) {
// Turn off all LEDs first
digitalWrite(GREEN_LED, LOW);
digitalWrite(YELLOW_LED, LOW);
digitalWrite(RED_LED, LOW);
// Turn on the selected LED
digitalWrite(ledPin, HIGH);
}
```

OUTPUT:





```
14:42:06.997 -> Card read previously.
14:59:28.171 -> Incorrect card.
14:59:29.710 -> Incorrect card.
14:59:30.718 -> Incorrect card.
14:59:30.718 -> Too many failed attempts!
14:59:37.379 -> Incorrect card.
14:59:37.379 -> Too many failed attempts!
14:59:39.155 -> Incorrect card.
14:59:39.155 -> Too many failed attempts!
15:00:52.491 -> Correct card detected!
15:00:55.090 -> Correct card detected!
15:00:57.383 -> Correct card detected!
15:00:58.757 -> Correct card detected!
15:02:39.772 -> Correct card detected!
15:02:40.804 -> Correct card detected!
15:02:50.512 -> Incorrect card.
15:03:00.011 -> Incorrect card.
15:03:08.912 -> Incorrect card.
15:03:08.912 -> Too many failed attempts!
15:03:12.619 -> Incorrect card.
15:03:12.619 -> Too many failed attempts!
15:03:15.160 -> Incorrect card.
15:03:15.160 -> Too many failed attempts!
15:03:20.077 -> Incorrect card.
15:03:20.077 -> Too many failed attempts!
15:03:21.410 -> Incorrect card.
15:03:21.410 -> Too many failed attempts!
15:03:22.510 -> Incorrect card.
15:03:22.510 -> Too many failed attempts!
15:03:24.616 -> Incorrect card.
15:03:24.616 -> Too many failed attempts!
15:03:28.553 -> Incorrect card.
15:03:28.553 -> Too many failed attempts!
15:03:29.910 -> Incorrect card.
15:03:29.910 -> Too many failed attempts!
15:03:31.455 -> Incorrect card.
15:03:31.455 -> Too many failed attempts!
```

☑ Autoscroll ☑ Show timestamp Newline 115200 baud