PN532 NFC Module with Buzzer and OLED Display

Introduction

This document provides a detailed explanation of the Arduino code that interfaces a PN532 NFC module with a buzzer and an OLED display. The code reads NFC tags, validates them, and provides visual and auditory feedback based on the tag's validity.

Components Used

- Arduino board
- PN532 NFC module
- Buzzer (connected to pin 7)
- OLED Display (SSD1306)

Pin Connections

PN532 Module:

- TX (PN532) -> RX (Arduino Pin 2)
- RX (PN532) -> TX (Arduino Pin 3)
- VCC (PN532) -> VCC (Arduino 3.3V/5V)
- GND (PN532) -> GND (Arduino GND)

Buzzer:

- Positive (Long Leg) -> Arduino Pin 7
- Negative (Short Leg) -> GND (Arduino GND)

OLED Display:

- SDA -> Arduino SDA (Analog Pin 4)
- SCL -> Arduino SCL (Analog Pin 5)
- VCC -> VCC (Arduino 3.3V/5V)
- GND -> GND (Arduino GND)

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Code Explanation

Libraries Used:

- **SoftwareSerial:** Software serial communication for PN532 module.
- **PN532_SWHSU:** PN532 communication library.
- **Adafruit_GFX:** Graphics library for OLED display.
- **Adafruit_SSD1306:** OLED display communication library.

Initialization:

- PN532 and OLED display are initialized in the **setup()** function.
- Buzzer pin is set as an output.

Reading NFC Tags:

- The **readNFC()** function attempts to read NFC tags using the PN532 module.
- If a valid tag is detected, it displays the tag ID on the OLED screen.
- If the tag ID matches predefined valid IDs, it displays "Valid UID" and activates the buzzer briefly.
- If the tag ID does not match the valid IDs, it displays "Invalid UID" and activates the buzzer for a longer duration.

Display Functions:

- **clearUID():** Clears the previous UID displayed on the OLED screen.
- **printUID():** Prints the current UID on the OLED screen.
- **ValidUID()**: Displays "Valid UID" message and activates the buzzer briefly.
- **inValidUID():** Displays "Invalid UID" message and activates the buzzer for a longer duration.

Conclusion

This Arduino code demonstrates how to interface a PN532 NFC module with a buzzer and an OLED display. It reads NFC tags, validates them, and provides feedback through visual and auditory signals. This setup can be used in various applications such as access control systems, attendance tracking, and interactive displays.

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