

RFID Hostel Management System

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Abstract: The RFID project is a system that allow warden to control the hostel or reduce the usage of electricity at the hostel. This systems use Arduino UNO as the microcontroller to control all of the component that we used. It is using software Arduino IDE as a platform to make the coding and also use RF transceiver. This project can make the warden to switch off the lamp easily without having to go every room that can save time and warden's energy. The project can also educated the resident of hostel especially student to follow the hostel laws such as room's light must be switch off after 11.00 pm. Now warden can easily control the rate of electricity usage in the hostel by using this project.

Keywords: RFID, Arduino UNO, RF Transceiver, Light, Hostel

1. Introduction

RFID hostel systems is a software develop system of managing the hostel activities which is can help warden to controls the using of lighting in every room. This project also can help the warden to manage their allotting record such as can block by tap the RFID card and automatically the light will be switch off. Every use of light will be fully controlled by warden. Then, this system will also help in educate students in following hostel rules that have been provided. RFID Hostel Management System is using passive RFID component. The part of electronics, we are use RFID reader, LCD display, Arduino UNO, RF Transceiver relay 4 channel, and RFID card. This concept is done by manually touch the RFID cards to the RFID reader and the light will on or off. The LCD will display either the light system is on or off.

2. Literature Review

A RFID hostel system is proposed by Satyasrikanth (2016) that use RFID system in automatic toll collection to open a toll's gate at highway by scanning a vehicle that have a tags on it [1]. In addition, our project is also proposed by Muhammad Thariq and Chuah Chai Wen (2017) that use RFID in attendance system. For his project, the technology is divided to two types which is passive system and active system. The passive system is to record the attendance [2]. Furthermore, our project is inspired by Muhammad Aqib (2018) that use RFID in door lock and alert system, once scanning the right tag

and entering the correct password the door will open and send confirmation message otherwise it will send alert message [3]. Meanwhile, for this project, RFID is being used for control light system at hostel to reduce the usage of electricity. The operation almost similar as automatic toll but RFID hostel is to switch on or off the lights by using the RFID cards. When warden touch the RFID cards on RFID reader, a reader will read an information in RFID cards about light at which room to be turned off and automatically turn off the light of the room. Then, the LCD will display which room's light being turned off. This system also avoid a student to turn on a light until a warden set a light system to be turn on by touch a RFID cards on RFID reader.

3. Methodology

The system use an Arduino UNO as the microcontroller to control all of the components as shown in Figure 1. It is using software Arduino IDE as a platform to make the coding. This project also uses RF transceiver as a component which is to accept or give the signal or code within two components. RFID is an important part which is the part we want to control the lamp. Also, LCD is a component that will display to the condition of every room. And lastly, relay 4 channel which is to connect from Arduino and RF transceiver to the lamp.

The flowchart of the system is shown in Figure 2, which detailed the programming methodology from the beginning in which the user touch the RFID card until the relays will toggle switches ON and OFF.

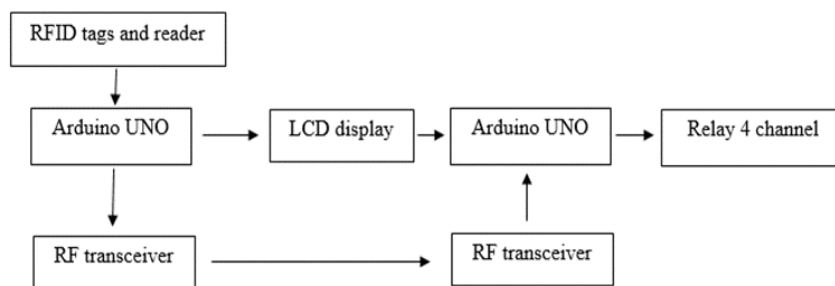


Figure 1: Block diagram of the system

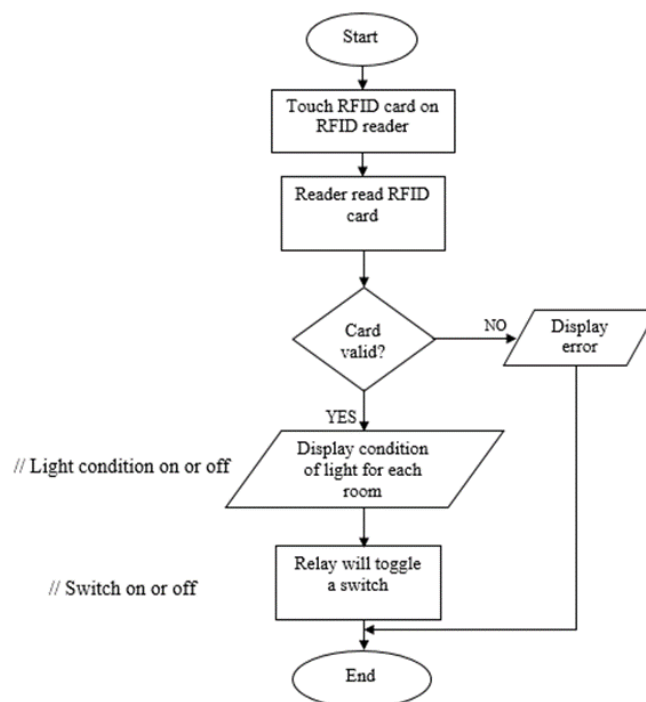


Figure 2: Flow chart

4. Results and Discussion

This is will see the result of the RFID hostel project. This part will separate with two section which is the first is the result from the hardware and the second one is from software.

4.1 Hardware

Figure 3 shown that the model of the RFID hostel project which is you can see at the right which is the red box is a server room or the room that the warden control the switch. The left is the room for student. As example we use three room.

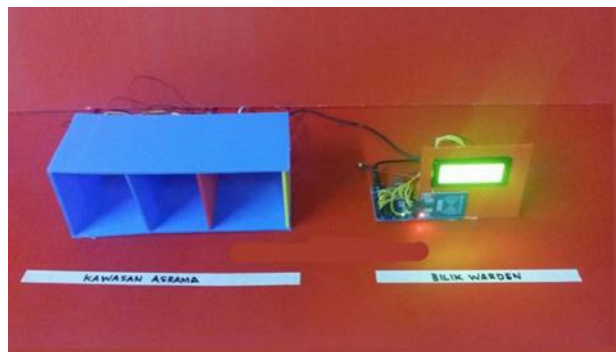


Figure 3: Model of RFID Hostel

Figure 4 shown when warden touch a cards on RFID reader, the lamp for three room being turn off and LCD will display a condition of lamp for three room as “OFF”. This is the situation when warden touch the RFID card on the RFID reader to turn off the light for three room. So students can’t open the light by themselves after 11.00 pm.



Figure 4: The situation when the RFID card touch the RFID reader

Next for Figure 5 when warden touch the RFID cards on the RFID reader for the second time, it been set for lamp for each room to turn on and LCD displaying a condition of light for each room as “ON”. So, students can turn on the light for themselves at the morning.



Figure 5: The situation when warden touch RFID card again on the RFID reader

4.2 Software

Figure 6 show the coding for the transmitter. The coding shown HIGH and LOW which is to declare the situation which is HIGH for ON and LOW for OFF. While Figure 7 is the coding to declare card's identification by put the card's serial number. So, serial number and identification for Card_1 is sync for room 1, Card_2 is for room 2 and Card_3 is for room 3.



```

transmitter
int RF_Receive = 12;

int circuit_status = 0;

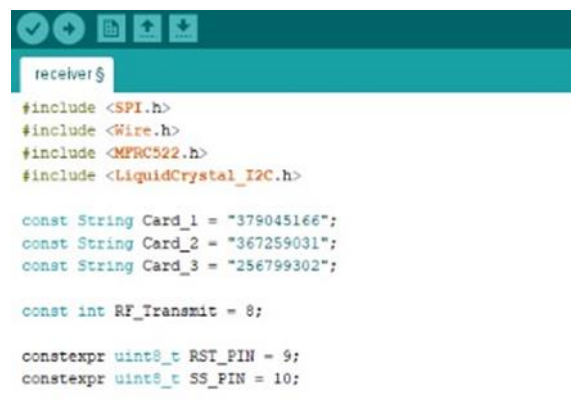
void setup()
{
  pinMode(RF_Receive, INPUT);

  pinMode(relay1, OUTPUT);
  pinMode(relay2, OUTPUT);
  pinMode(relay3, OUTPUT);
  pinMode(relay4, OUTPUT);

  digitalWrite(relay1, HIGH);
  digitalWrite(relay2, HIGH);
  digitalWrite(relay3, HIGH);
  digitalWrite(relay4, HIGH);
}

void loop()
{
  if (digitalRead(RF_Receive) == HIGH && circuit_status == 0)
  {
    digitalWrite(relay1, LOW);
    digitalWrite(relay2, LOW);
    digitalWrite(relay3, LOW);
    digitalWrite(relay4, LOW);
  }
}
    
```

Figure 6: Transmitter coding in Arduino



```

receiver$
#include <SPI.h>
#include <Wire.h>
#include <MFRC522.h>
#include <LiquidCrystal_I2C.h>

const String Card_1 = "379045166";
const String Card_2 = "367259031";
const String Card_3 = "256799302";

const int RF_Transmit = 8;

constexpr uint8_t RST_PIN = 9;
constexpr uint8_t SS_PIN = 10;
    
```

Figure 7: Card id



Figure 8: Coding for (a) card detected and (b) not detected

For Figure 8 (a) and (b) the coding show the looping which is when the card is detected and when the card is not detected, respectively. If the card detected, LCD will display “CARD DETECTED” but when the card is not detected the LCD will display “CARD NOT AUTHORIZED” and assumed as an error.

5. Conclusion

In conclusion, after completing the project of making RFID Hostel, we had successfully done our task. Everyone has given their commitment as long as preparing this project. Besides, we had also get some support and help from our supervisor, outsider consultant, family and friends. Moreover, this project had gain our knowledge and give us chances to present the ideas from the problem statement. Next, we are able to create a RFID Hostel that can turn off the lamp from the server room it does not have to be difficult to go from room to room that can save time and energy. Overall of the conclusion, we has achieved the objectives of our project successfully.

Acknowledgement

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References

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