

Experiment 8

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Branch: BE-CSE

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Subject Name: IOT Lab

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Subject Code: 22CST-329

1.Aim: To Create a Smart door lock system-using RFID

2.Objectives:

1. To study hardware and software related to IoT
2. To understand the function of Arduino Uno and other controllers.

Hardware Required:

1. Arduino Uno, RFID ,LCD ,I2C module ,Servomotor, Door lock, Jumper Wires

Arduino with RC522:

RC522 is a Multi-communication RFID Module for Arduino and Microcontrollers. The RC522 is known as MFRC-522 due to its NFX semiconductor microcontroller. The module allows the developers to interface it with any other SPI, I2C, and UART based microcontrollers. It comes with an RFID card tag and key fob consisting of 1KB of memory.



Door Security System Using RFID RC522 When the user brings the token near the module it detects the token and reads its value. If the value is same as defined in the code then Access Granted message is shown on LCD and it opens the door for the user. After some delay, which is also, defined in the code the door automatically closes. This process occurs every time the user wants to access it. There can be multiple users but each user has it unique token.

3.Code:

```
#include <Keypad.h>
```

```
#include <Servo.h>
```

```
#include <LiquidCrystal.h>
```



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```
const byte rows = 4, columns = 4;

int holdDelay = 700, pos = 0, statebtn = 0, buzzer = A3, redled = A1, greenled = A2, button = 2;

String default_passwd = "1234", input_passwd = "";

char keys[rows][columns] = {{ '1', '2', '3', 'A' }, { '4', '5', '6', 'B' }, { '7', '8', '9', 'C' }, { '*', '0', '#', 'D' } };

byte rowPins[rows] = { 6, 7, 8, 9 }, columnPins[columns] = { 10, 11, 12, 13 };

Keypad keypad = Keypad(makeKeymap(keys), rowPins, columnPins, rows, columns);

LiquidCrystal lcd(0, 1, A4, 3, 4, 5);

Servo servo_A0;

String input_password(int num_char) {
    String passwd = "";
    while (passwd.length() < num_char) {
        char temp = keypad.getKey();
        if (temp != 0) { lcd.setCursor(passwd.length(), 1); lcd.print("*"); passwd += temp; }
        delay(100);
    }
    return passwd;
}

String Change_password(int num_char, String current_passwd) {
    lcd.clear(); lcd.print("OLD PASSWORD:");

    if (input_password(num_char) != current_passwd) { lcd.clear(); lcd.print("WRONG PASSWORD!"); return current_passwd; }

    lcd.clear(); lcd.print("NEW PASSWORD:");

    String new_passwd = input_password(num_char);

    lcd.clear(); lcd.print("CONFIRM PASSWORD:");

    if (input_password(num_char) == new_passwd) { lcd.clear(); lcd.print("CHANGED PASSWORD!"); return new_passwd; }

    lcd.clear(); lcd.print("NOTHING CHANGED!"); return current_passwd;
}
```



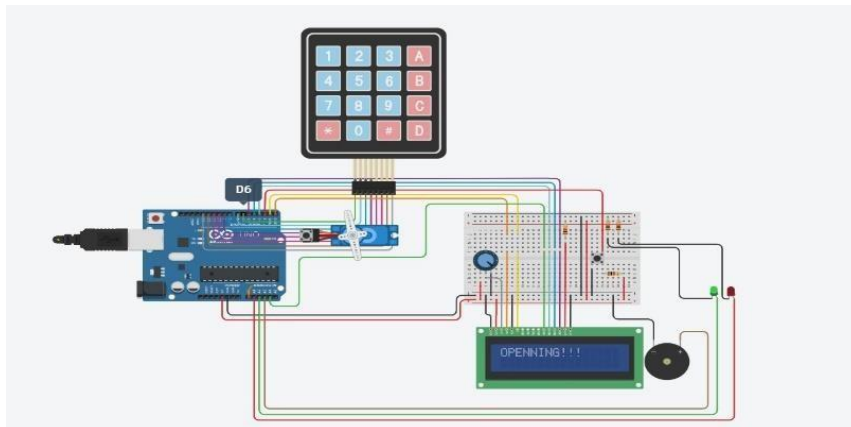
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```
}  
  
void Unlock() {  
    lcd.clear(); lcd.print("INPUT PASSWORD:");  
    input_passwd = input_password(4);  
    if (input_passwd == default_passwd) {  
        lcd.clear(); lcd.print("OPENNING!!!");  
        digitalWrite(greenled, HIGH); digitalWrite(redled, LOW);  
        for (pos = 0; pos <= 180; pos += 1) { servo_A0.write(pos); delay(20); }  
        delay(3000); lcd.clear(); lcd.print("CLOSING!!!");  
        for (pos = 180; pos >= 0; pos -= 1) { servo_A0.write(pos); delay(50); }  
    } else {  
        lcd.clear(); lcd.print("WRONG PASSWORD!");  
        tone(buzzer, 900, 2000); digitalWrite(greenled, LOW); digitalWrite(redled, HIGH);  
        delay(2000);  
    }  
    input_passwd = "";  
}  
  
void setup() {  
    servo_A0.attach(A0); servo_A0.write(pos); pinMode(redled, OUTPUT); pinMode(greenled,  
    OUTPUT);  
  
    pinMode(buzzer, OUTPUT); pinMode(button, INPUT); lcd.begin(16, 2);  
    lcd.print("Welcome!"); delay(2000); lcd.clear();  
}  
  
void loop() {  
    char tempKey = keypad.getKey(); int btnState = digitalRead(button);  
  
    digitalWrite(greenled, LOW); digitalWrite(redled, LOW);  
  
    lcd.setCursor(0, 0); lcd.print("STATUS: LOCKED!"); lcd.setCursor(0, 1);  
    lcd.print("UNLOCK: PRESS #");
```

```
if (btnState == LOW) statebtn = 1;
  if (tempKey == '#' || tempKey == '*') statebtn = 2;
if (statebtn == 1) {
  lcd.clear(); lcd.print("OPENNING!!!");
  digitalWrite(greenled, HIGH); digitalWrite(redled, LOW);
  for (pos = 0; pos <= 180; pos += 1) { servo_A0.write(pos); delay(50); }
  delay(3000); lcd.clear(); lcd.print("CLOSING!!!");
  for (pos = 180; pos >= 0; pos -= 1) { servo_A0.write(pos); delay(50); }
  statebtn = 0;
} else if (statebtn == 2) {
  if (tempKey == '#') Unlock();
  if (tempKey == '*') default_passwd = Change_password(4, default_passwd);
}}
```

Stimulation Images:



4.Learning Outcome:-

- Learned about IoT programming.
- Learned about servomotors and RFID sensors and their implementation.
- Learned about I2C Module
- Learned about different types of jumper wires.