# Fingerprint (Bluetooth) controlled Lock System

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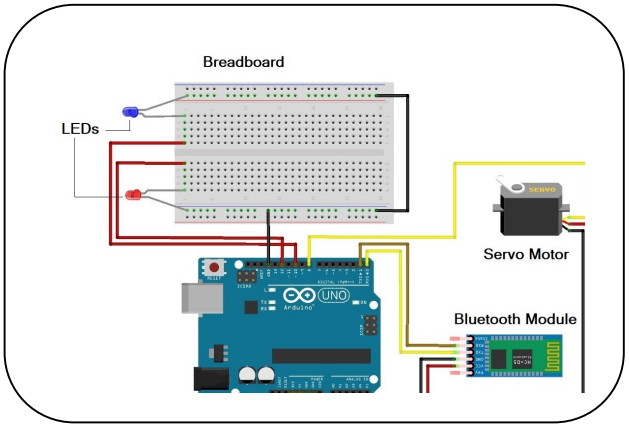



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## Introduction and significance of the project

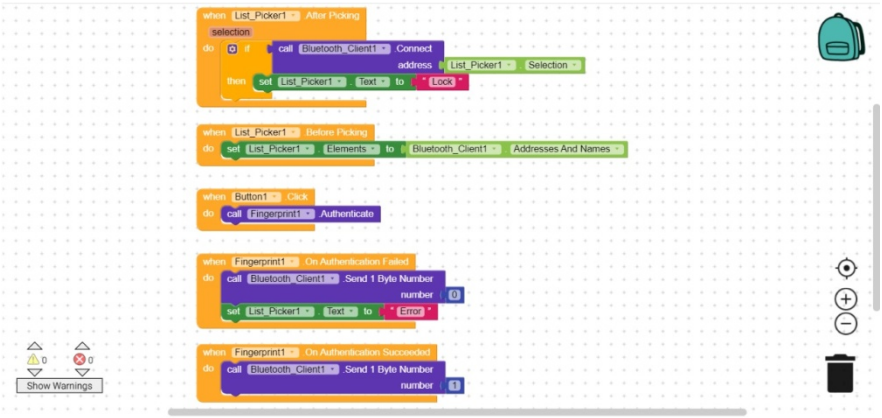
We've made a biometric door locking-unlocking system which will reduce the human effort and will enhance the security in comparison with the orthodox manual door lock system. This is something similar to the locking-unlocking system of the doors of car. Our project helps the person lock and unlock the door by his/her fingerprint using an android phone with the help of Bluetooth Connectivity. The person who desires to lock and unlock the door uses the application in the android phone which reads and verifies the fingerprint of the person. If the fingerprint is verified successfully, the servo motor rotates, thus pulling off the latch and hence opening the door. After a delay of five seconds, the servo motor returns into the normal position, hence closing the latch. This contact-less functioning of the door enhances the safety as only authorized people can open or close the door. Another significant point is that this reduces physical contact.

## Statement of the problem

The world is evolving at a fast pace. It is unanimous that we need to be ready to adapt and improvise to live a better life. With the increase in use of technology, the old and orthodox safety methods aren't much effective. Door Locks are some of the most common safety element around us. Manual door lock systems are not too reliable these days. Anyone can open the door manually and the physical contact with the door lock is too common. To increase the safety and hygiene of the door lock system, we've created a Fingerprint-controlled Door Lock System.

## Procedure and Results

For our project, we used Kodular for making the desired android application for the functioning. Apps can be made on Kodular with dragging and dropping blocks without the use of coding language. The website of Kodular is easily accessible on web browsers.




The code installed in Arduino is:

```
#include<Servo.h>              // including the servo library in our project

int LED_b = 12;               // set the input pin for LEDs
int LED_r = 10;
int Incoming_value = 0;           // initialize the flag variable for bluetooth input
int pin_motor = 8;              // set the input pin for the servo motor
Servo servo;                  // initializing an object of the Servo class

void setup()
{
  Serial.begin(9600);
  pinMode(LED_b, OUTPUT);         // fixing the LED_b pin for outputting data
  pinMode(LED_r, OUTPUT);         // fixing the LED_r pin for outputting data
  pinMode(pin_motor, OUTPUT);       // fixing the servo pin for outputting data
  servo.attach(pin_motor);        // attaching the servo at pin "pin_motor"
  servo.write(0);               // set the servo at 0 degrees
}

void loop()
{
    if(Serial.available()>0)          // checks if the servo is attached properly
    {
        Incoming_value = Serial.read();

    if(Serial.available()>0)          // checks if the servo is attached properly
    {
        Incoming_value = Serial.read();

        if(Incoming_value == 1)       // correct fingerprint inputted
        {
            for(int i=0;i<1;i++)      // produces a particular lighting effect
            {
                digitalWrite(LED_b,HIGH);
                digitalWrite(LED_r,HIGH);
                delay(500);
                digitalWrite(LED_b,LOW);
                digitalWrite(LED_r,LOW);
                delay(500);
            }
            servo.write(90);        // set the servo at 90 degrees
            delay(5000);          // wait for 5 seconds
            servo.write(0);         // resets the servo at 0 degrees

        }
        else if(Incoming_value == 0)        // incorrect fingerprint inputted
        {
            for(int i=0;i<8;i++)      // produces a particular lighting effect
            {
                digitalWrite(LED_r,HIGH);
                delay(60);
                digitalWrite(LED_r,LOW);
                digitalWrite(LED_b,HIGH);
                delay(60);
                digitalWrite(LED_b,LOW);
            }
        }
    }
}
```

## Limitations of the product and Solutions

In our project, we basically used the latch system to open and close the door. In real life, the rotation of the servo motor should be powerful enough to make the translation of the latch connected to the door move open and then slide close. In our project, we moved the latch with the help of a wire connected to the servo motor and hence the motor could bear the weight of the latch. We can use higher-torque generating servo motors to overcome this limitation.

## Conclusion

The project is able to provide a small-scale solution for being a better alternative for manual door locks. We need not worry about misplacing or losing our keys anymore. On a broader level, automated door lock system may enable us to record the date and time of everyone's entry in or exit from the house. This provides greater security and increases the credibility of the project.