Indian Institute of Information Technology Kalyani

ARDUINO PROJECT

Title: **BANK LOCKER SECURITY SYSTEM**

Team Members

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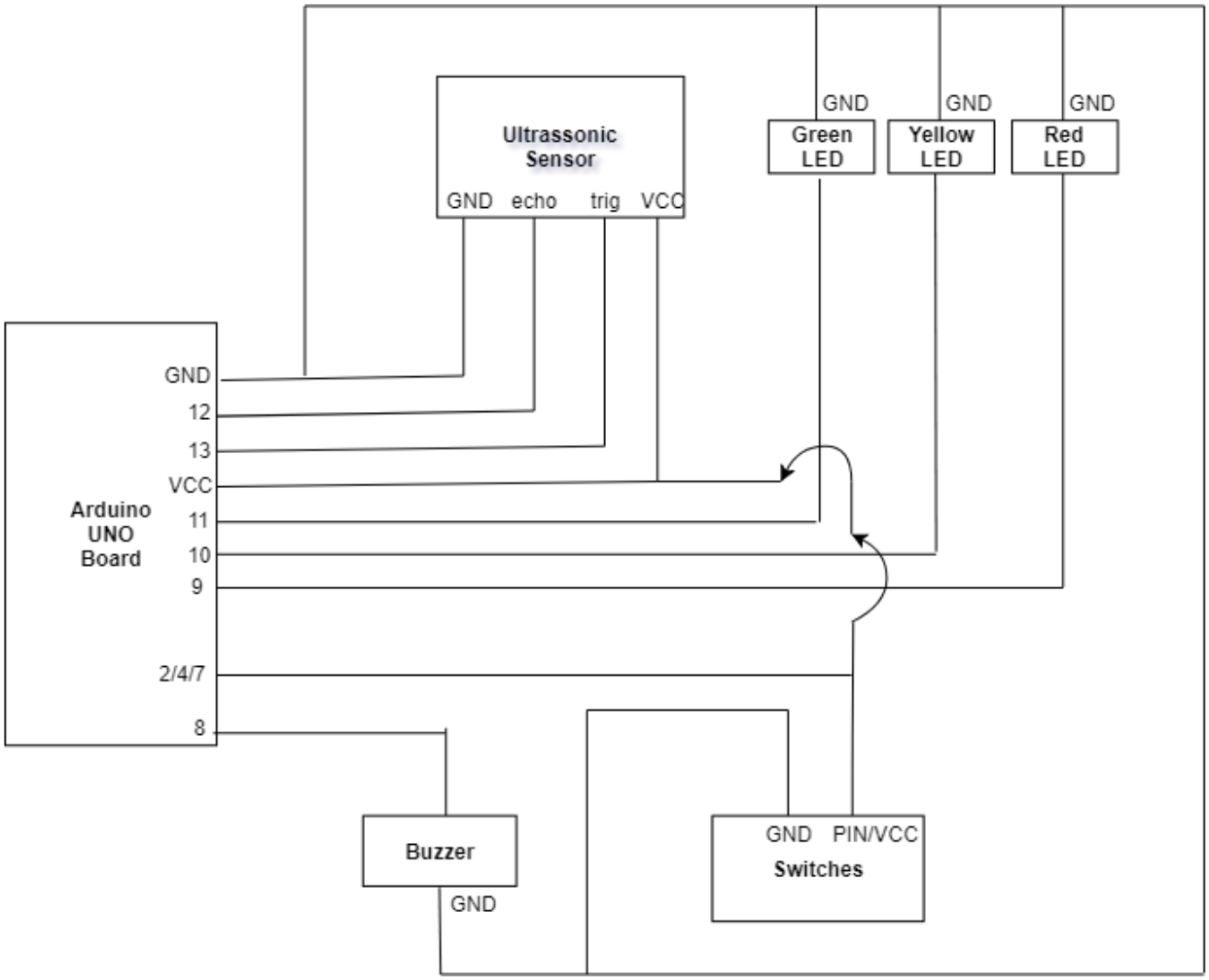
Aim

To make a Security Lock System which checks for password when the user comes within certain range of the device.

Introduction

The Security Lock System makes use of Ultrasonic Sensor to detect the distance of the user from the system. When the user is at distance of 10cm or near, it checks for the password that should be entered by the user within 5 seconds after which it matches the password with the correct password. Further, if the password is correct, then the device gets unlocked and the contents can be accessed. If, in case, user gets away from the device, device gets locked and the contents can’t be accessed further. The Lock System uses LEDs to show if the user is within the correct distance or not.

Block Diagram



Program

```
#define s1 2              // Assigning pin 2 for switch 1 input
#define s2 4              // Assigning pin 4 for switch 2 input
#define s3 7              // Assigning pin 7 for switch 3 input
#define buzzPin 8         // Assigning pin 8 for buzzer output
#define red     9         // Assigning pin 9 for red led output
#define yellow  10    // Assigning pin 10 for yellow led output
#define green   11    // Assigning pin 11 for green led output
#define echoPin 12    // Assigning pin 12 for echo pin output
#define trigPin 13    // Assigning pin 13 for trigger pin output

int flag = 0;

void setup(){

     // Setting baud rate for Serial Communication

     Serial.begin(9600);

     // Setting Mode of pins

     pinMode(trigPin, OUTPUT);
     pinMode(echoPin, INPUT);
     pinMode(red, OUTPUT);
     pinMode(yellow, OUTPUT);
     pinMode(green, OUTPUT);
     pinMode(buzzPin, OUTPUT);

}

void loop(){

     long duration, distance;
     Int p1, p2, p3;

     // Measuring distance of hand
```

```
digitalWrite(trigPin, LOW);
delayMicroseconds(2);
digitalWrite(trigPin, HIGH);
delayMicroseconds(10);
digitalWrite(trigPin, LOW);
duration = pulseIn(echoPin, HIGH);
distance = (duration/2) / 29.1;

if(flag == 0){ // Until password matches continue

     if(distance < 10){

          digitalWrite(red, LOW);
          digitalWrite(yellow, LOW);
          digitalWrite(green, HIGH);

          Serial.println("You can now enter Password: ");

          delay(1000);
          tone(buzzPin, 1000, 200);
          delay(5000);

          // Reading password combination from switches

          p1 = digitalRead(s1);
          p2 = digitalRead(s2);
          p3 = digitalRead(s3);

          // If combination matches with 101

          if(p1 == 1 && p2 == 0 && p3 == 1){

               Serial.println("Welcome to IIIT Kalyani!");
               flag = 1;

          }
```

```
            else{

                Serial.println("Wrong Password!");
                flag = 0;

            }
        }

        else if(distance >= 10 && distance <= 20){

            digitalWrite(red, LOW);
            digitalWrite(yellow, HIGH);
            digitalWrite(green, LOW);

            Serial.println("Almost there!");

            delay(1000);
            tone(buzzPin, 500, 500);

        }

        else if(distance > 20){

            digitalWrite(red, HIGH);
            digitalWrite(green, LOW);
            digitalWrite(yellow, LOW);

            Serial.println("Too far!");

            delay(1000);
            tone(buzzPin, 200, 1000);

        }
    }
}
```

Components

- Arduino Uno Board
- Ultrasonic Sensor
- Buzzer
- Switches
- LEDs
- Breadboard
- Wires

Components Description

Arduino Uno Board

The Arduino Uno is a microcontroller board based on the ATmega328 (datasheet). It has 14 digital input/output pins (of which 6 can be used as PWM outputs), 6 analog inputs, a 16 MHz ceramic resonator, a USB connection, a power jack, an ICSP header, and a reset button.

Ultrasonic sensor

Ultrasonic transducers or ultrasonic sensors are a type of acoustic sensor divided into three broad categories: transmitters, receivers and transceivers. Transmitters convert electrical signals into ultrasound, receivers convert ultrasound into electrical signals, and transceivers can both transmit and receive ultrasound.

Buzzer

A buzzer or beeper is an audio signalling device, which may be mechanical, electromechanical, or piezoelectric (*piezo* for short). Typical uses of buzzers and beepers include alarm devices, timers, and confirmation of user input such as a mouse click or keystroke.

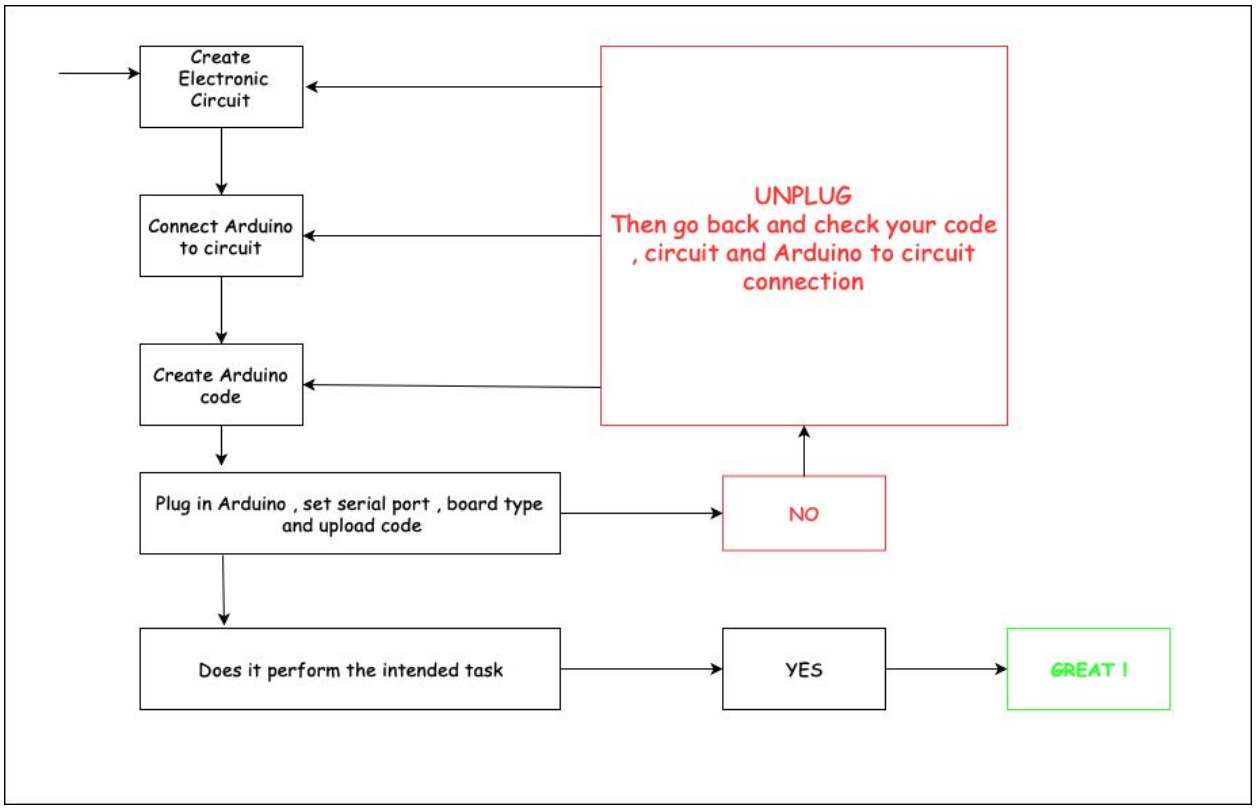
LEDs

A light-emitting diode (LED) is a two-lead semiconductor light source. It is a p–n junction diode that emits light when activated.When a suitable current is applied to the leads, electrons are able to recombine with electron holes within the device, releasing energy in the form of photons.

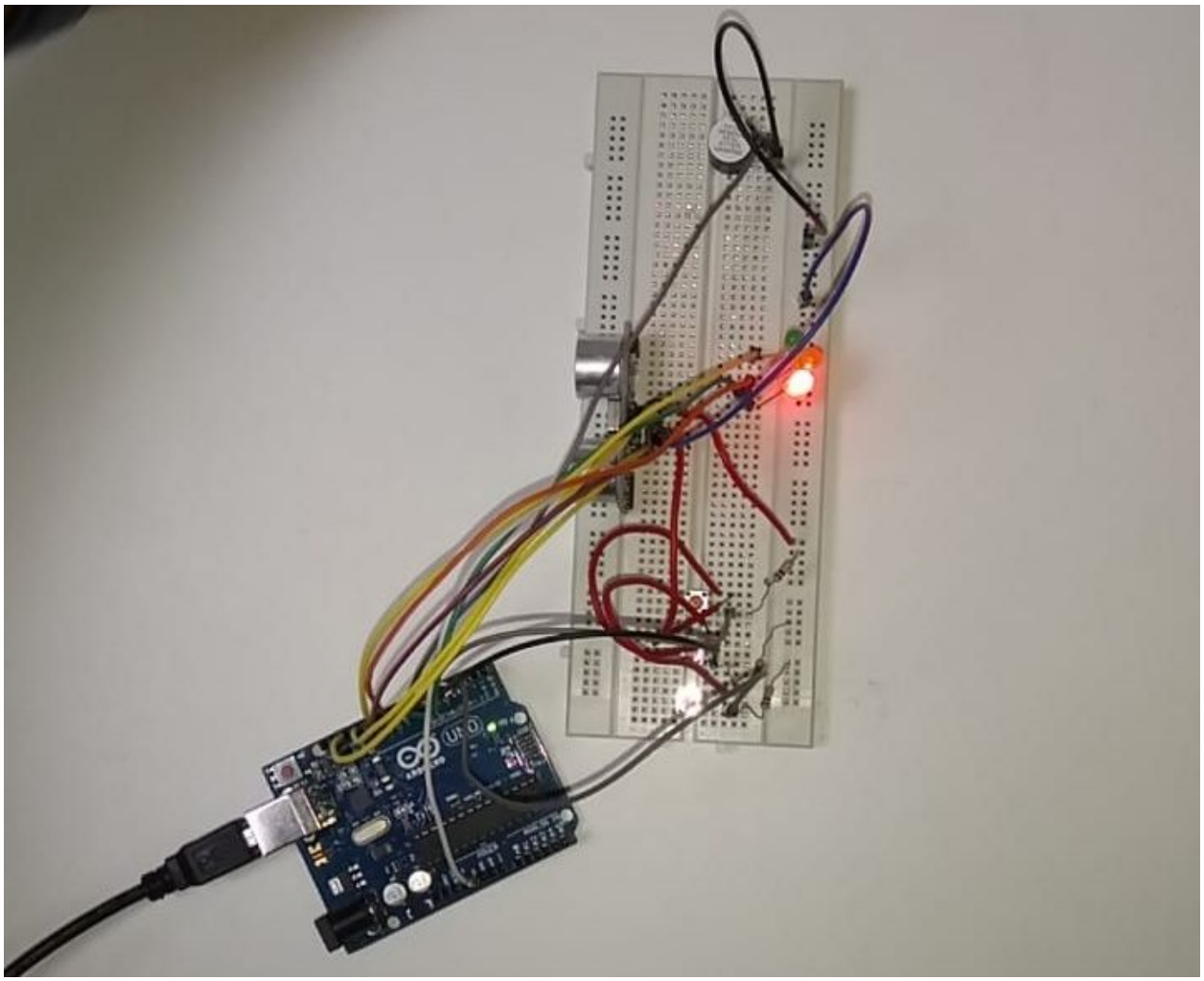
Breadboard

A breadboard is a construction base for prototyping of electronics. Originally it was literally a breadboard, a polished piece of wood used for slicing bread. In the 1970s the solderless breadboard (a.k.a. plugboard, a terminal array board) became available and nowadays the term "breadboard" is commonly used to refer to these.

Flow Chart



Practical Circuit



Conclusion

From this project we could learn the interfacing of different sensors, LEDs, buzzers and switches with Arduino Uno Board. We also learnt how to use the Arduino Software (IDE) to write programs (sketch) which we upload on the Arduino Uno Board.

Arduino Uno finds many other applications like '*Home Automation System'*, *'Auto Intensity Control of Street Lights'*, '*Traffic Light Countdown Timer',* etc.