

Password Door lock security system using Arduino Board

Introduction:

This project is a Password Security Lock System Using Arduino, Keypad & Servo. n according to the requirement. Security is becoming a major concern these days as theft is on the rise. So **digital password lock can easily secure your home or locker.** It only opens your door when the correct password is entered. The circuit of this project is very simple which includes Arduino, keypad module, button, servo motor, and LCD. Arduino controls the entire process, such as taking the password from a keypad module, comparing passwords, changing passwords, turning the servo motor, and sending the status to the LCD display. The keypad is used to enter the password. The buzzer is used for indications. Similarly, the servo motor is used to open the gate when the motor is rotating and the LCD is used to display status or a message on it. The system comprises of a 4x4 keypad.

Block Diagram:

Figure 1 shows the block diagram of ***Password Door lock security control system.*** It consists of 6 main building blocks.

- Arduino uno R3 Development board: It consists of At mega 8 microcontroller along with I/O pins. It provides the necessary control action based on the application.
- Keypad: 4x4 key pad
- LCD display: JHD162A 16X2 LCD Display
- Buzzer (piezo): A buzzer is a small yet efficient component to add sound features to our project/system. We use 5v Active Buzzer
- Micro Servo Motor: we use SG90 Servo Motor. A **servo motor** is a type of motor that can rotate with great precision. Normally this type of motor consists of a control circuit that provides feedback on the current position of the motor shaft, this feedback allows the servo motors to rotate with great precision. If you want to rotate an object at some specific angles or distance, then you use a servo motor
- NPN Transistor: NPN bipolar transistors is used to operate as “ON/OFF” type solid state switch by biasing the transistors Base terminal differently to that for a signal amplifier.

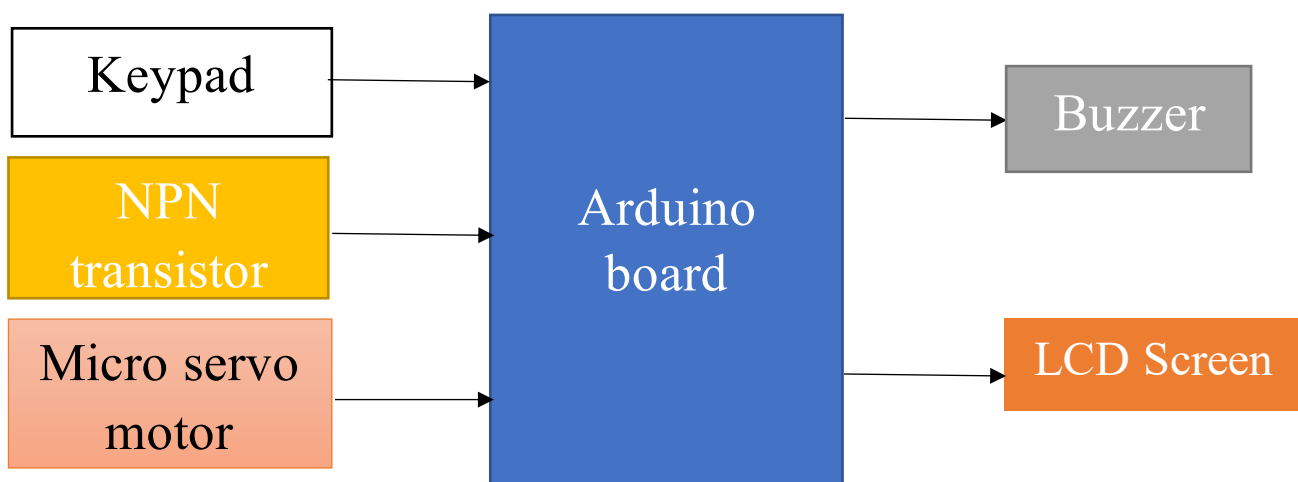


Figure 1. **Password Door lock security control system**

Circuit Diagram:

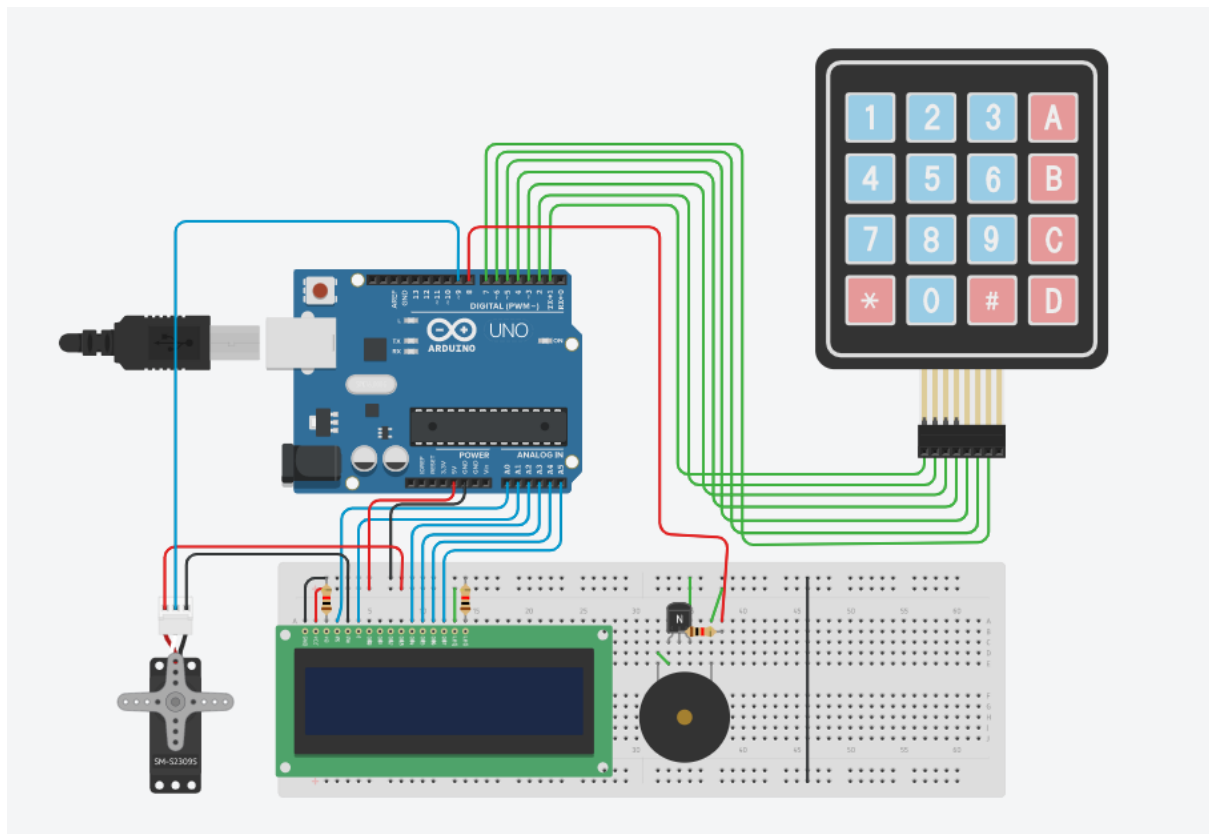


Figure 2. *Password Door lock security system using Arduino Board*

Designing of The Circuit:

In this project, I have defined the default password “7609” in the Arduino. You can change it via coding. When we enter a password, it will match it with the password stored in the Arduino. If it is correct, then it will show ‘Access Granted, welcome’ and then rotate servo motor to 180 doors as the door is opened. It will then give 5 seconds time for entering via the door. Once 5 seconds is completed, the door will get locked automatically. If the password is wrong, then it will show ‘Code Incorrect, Go Away’. The buzzer will also beep once when any key is pressed.

First of all, we will make a connection to the 4×3 Keypad. For connecting the keypad with the Arduino, we are using digital pins D1 to D7. Connect all seven pins of the keypad to analog pins D1 ~ D7 of Arduino.

To connect the servo motor with the Arduino, use digital pin D9 of Arduino to output the PWM pin of the servo motor. Now connect the positive wire of buzzer to the pin D10 of Arduino and negative wire to the ground.

Now we will connect the 16×2 LCD to the Arduino.

1. Connect pin 1,3,5,16 of LCD to the GND.
2. Connect pin 2,15 of LCD to the VCC (5V).
3. Connect pin 4 of LCD to pin A0 of Arduino.
3. Connect pin 6 of LCD to pin A1 of Arduino.
3. Connect pin 11 of LCD to pin A2 of Arduino.
3. Connect pin 12 of LCD to pin A3 of Arduino.
3. Connect pin 13 of LCD to pin A4 of Arduino.
3. Connect pin 14 of LCD to pin A5 of Arduino.

Simulation:

I had performed the simulation on Tinker cad online platform with Arduino board. The online simulation link is given below:

<https://www.tinkercad.com/things/9cc7fGfZMGL-password-door-lock-security-system-7609-password>

Results and Analysis:

The simulation results are shown in figures below.

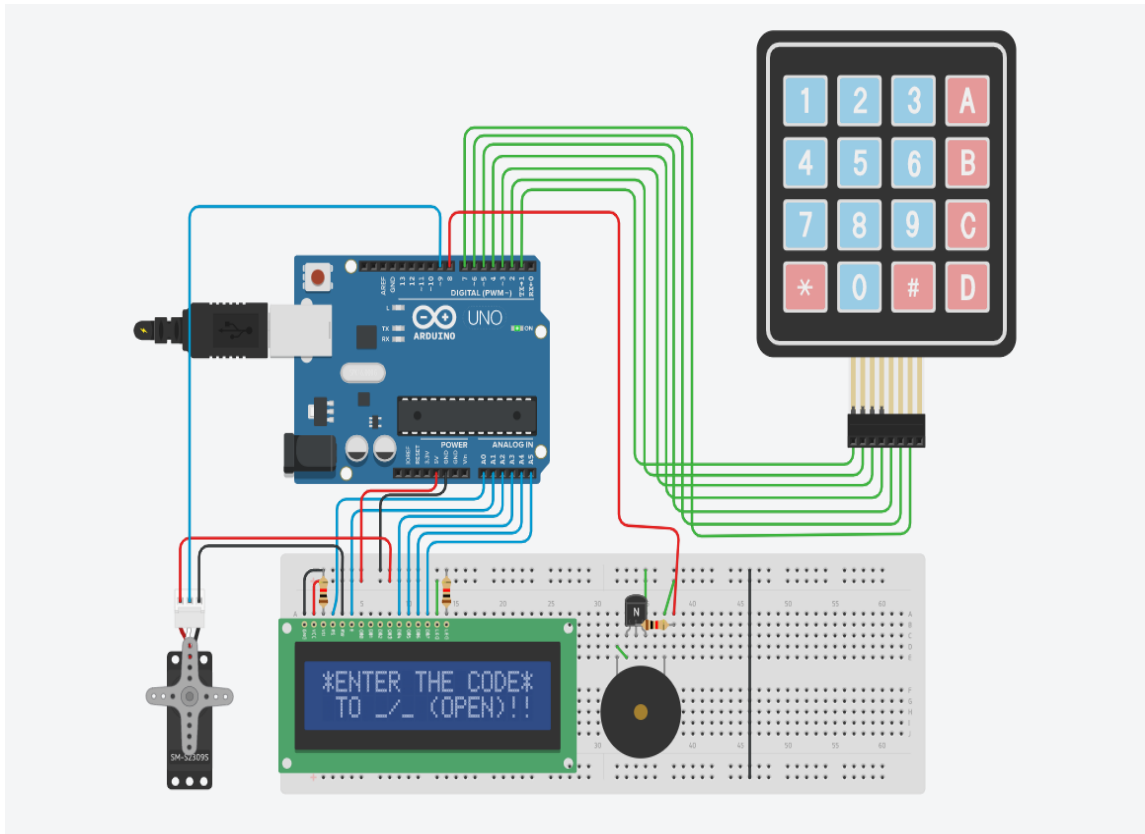


Figure 3. the main circuit to enter the code (7609 password)

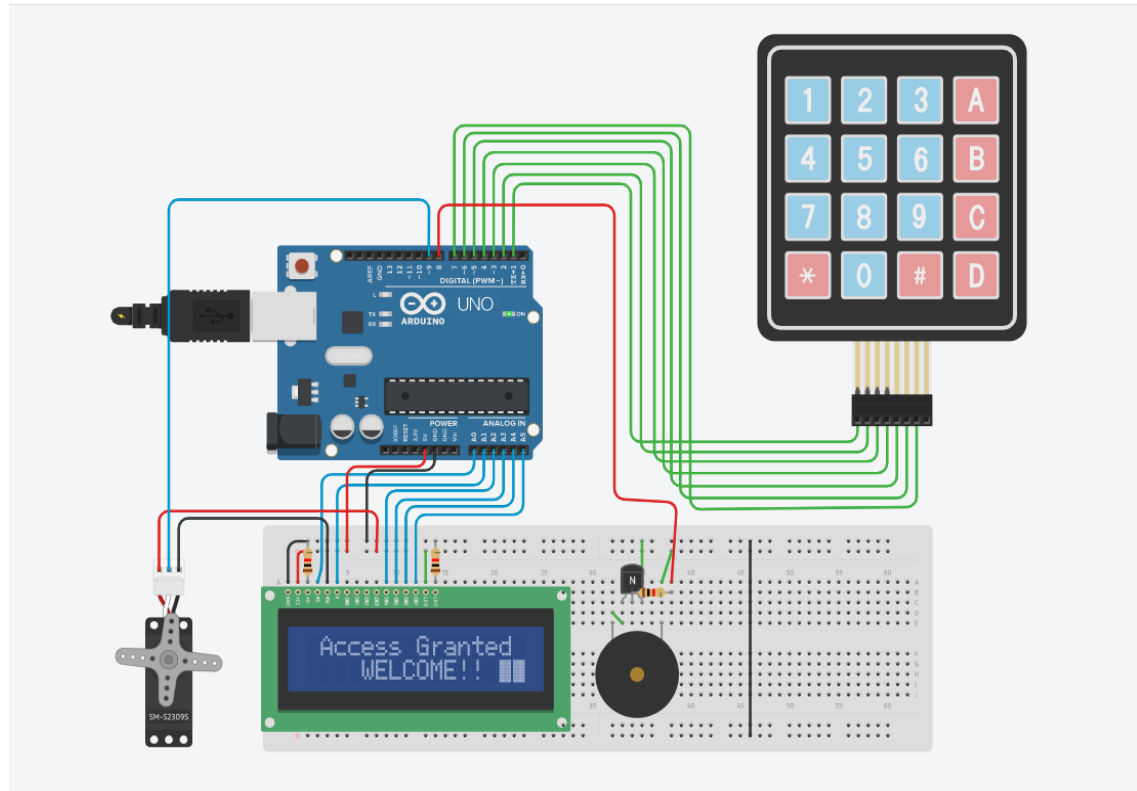


Figure 4. After entering the correct password access will be granted(7609 password)

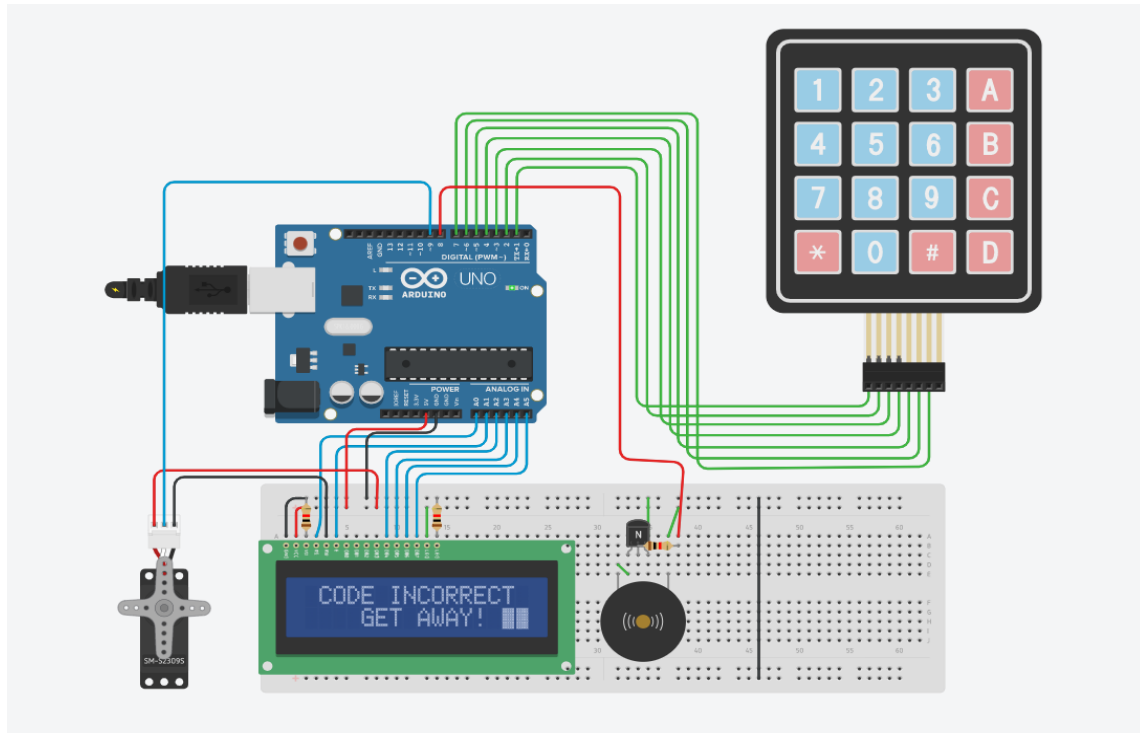


Figure 6. *If the **password** entered is **wrong**, then **door** would remain **locked**, denying access to the person and the buzzer will remain buzzing.*

Conclusion

In this project, I had presented a **Password Security Lock System Using Arduino, Keypad, and Servo motor according to the requirement**. In future, the hardware model of proposed system can be implemented.