

PROJECT FINAL REPORT

Password Based Door Lock Security System Using Arduino & Keypad

Course Title: Digital System Design Laboratory

Course Code: SE 412

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Date: 22 February 2022



Abstract

In this digitally dependent world, the security is most concern for every one of us. As we all are facing the fear of robbery, people cannot keep their valuable things safely even at their own houses, banks or in any other places. They are always in fear of losing their valuable things. Old traditional locking system is not that safe as password-based door locking system. So, in this project we have work for all these problems and this project provide much more lock security as compare to traditional lock security. We have replaced the old traditional lock system with password. This project will provide efficient security to the users at low cost. In this user would give a known password. The information will be stored in database. When the correct passcode will be entered, the microcontroller will give instruction to servo motor. Servo motor will perform the action on door unlocking. Thus, what we want is digital technology to construct an integrated and well customized safety system at a price which is reasonable. If the users forgot the password, then he/she will change or reset the password, which gives the more flexibility to the users. It will be also easy to implement and give safety in any places like our houses, institutions, banks or any other public places.

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1.1 Introduction

As we all are very familiar with the term “Security”. Nowadays it is most important to keep our valuable things safe. The world is also growing digitally dependent, and we can even design the doors to be more secure. We can make these digital doors by using “Password” which is more secure than traditional lock system. In this project we have make a “Password Based Door Locking System” using an Arduino. It will be more efficient for the peoples in the field of security. It will be implemented in any places like our Houses, Institutions, Banks and any Public Places. We can only able open the door if we entered correct password for door and if users entered an incorrect password, then message will be display or door will not be open.

1.2 Feature

1. Password from the keypad module.
2. Comparing passwords.
3. Driving buzzer, the buzzer is used for indications.
4. Rotating servo motor Servo. Motor is used for opening the gate while rotating.
5. Sending status to the LCD display. LCD is used for displaying status or messages
6. Reset password.
7. Automatic door lock after 5s.

1.3 Objective

In this project, we will make a Password-Based Security System Using Arduino & Keypad. As thefts are increasing day by day security is becoming a major concern nowadays. So a digital code lock can secure our home or locker easily. It will open your door only when the right password is entered.

1.4 Related work

Website or paper	Related work objective
<p>"Password based Door lock System", by Prof.A.Y.Prabhakar¹,Prof. Dr. Shruti K Oza², Nayan Shrivastava³.</p>	<p>The main objective of this project is to relinquish safety at each common place like home, public places. during this project all the data hold on within the info. once the proper word are going to be entered, the microcontroller can provide steering to servo engine then door can unlock. What we want is computerized innovation to develop a coordinated and every one around altered upbeat framework at a worth that is wise.</p>
<p>Anuj Kumar Gupta, Prachi Sharma, Sahil Pandey, Surabhi, "Password based door lockup system"</p>	<p>The main objective of this project is to style a secure door lockup system. to make this project they've to perform sure task like, planning the facility provide for the whole electronic equipment. choice of Microcontroller, Key pad, DC motor and conjointly choice of buzzer in line with the necessity for his or her project.</p>
<p>https://theiotprojects.com/password-security-lock-system-using-arduino-keypad/ Password Security Lock System Using Arduino & Keypad</p>	<p>Digital password lock can easily secure your home or locker. It only opens your door when the correct password is entered.</p>
<p>https://www.electronicclinic.com/password-door-lock-security-system-using-arduino-and-keypad/ Password Door Lock Security System using Arduino and Keypad and Solenoid Lock.</p>	<p>The password-based door lock system allows only authorized persons to access the restricted areas. The entire project is controlled by using the Arduino. A 4×4 or 4×3 keypad can be used to enter the desired password.</p>

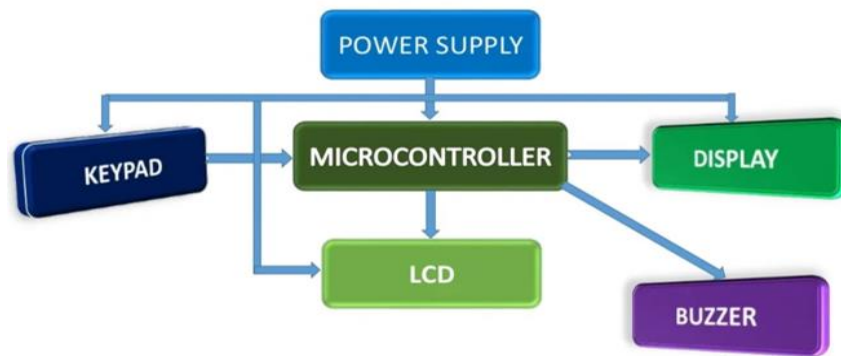
1.5 Parts

S.N.	COMPONENTS NAME	DESCRIPTION	QUANTITY
1	Arduino Board	Arduino UNO R3 Board	1
2	Keypad	4X3 Keypad	1
3	LCD Display	JHD162A 16x2 LCD Display	1
4	Potentiometer	10K	1
5	Servo Motor	SG90 Servo Motor	1
6	Buzzer	5V Active Buzzer	1
7	Connecting Wires	Jumper Wires	40
8	Breadboard	-	1

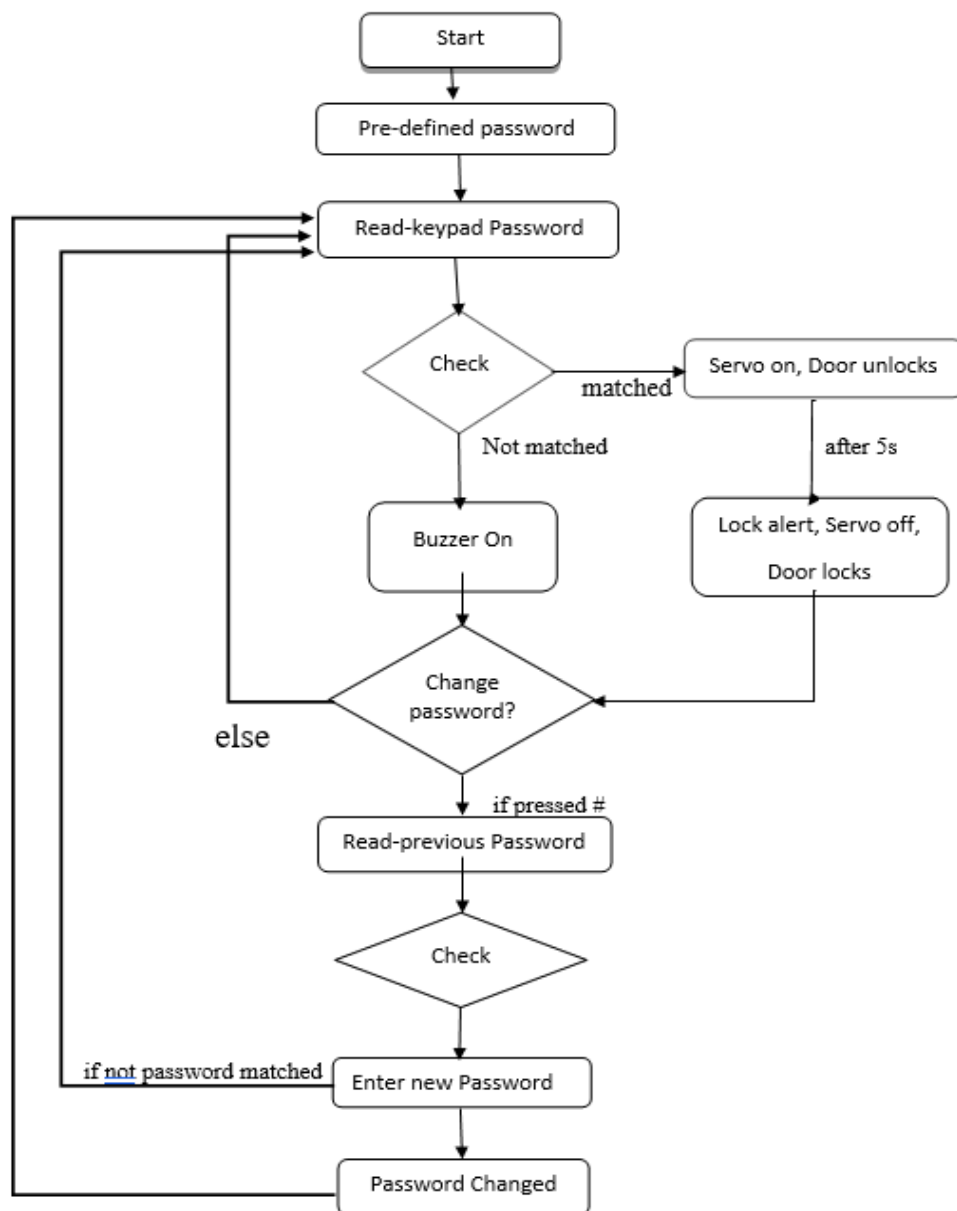
1.6 Methodology

In this project, we have used a default password in the Arduino to store. The default password stored in it will be 'A111'. When we enter a password, it will match it with the password stored in the Arduino. If it is correct, then it will show 'Password Accepted' and the push pull solenoid will come in low state (Door Unlocked). If the password is wrong, then it will show 'Access Denied'. During this condition the buzzer will start beeping and the push pull solenoid will remain in the high state (Door Locked). The buzzer will also beep once when any key is pressed. For changing the Password, we have to press '#'. When we press '#', it will ask for current Password. If we enter the correct password, it will ask for new Password and will save it.

1.6.1 Block Diagram

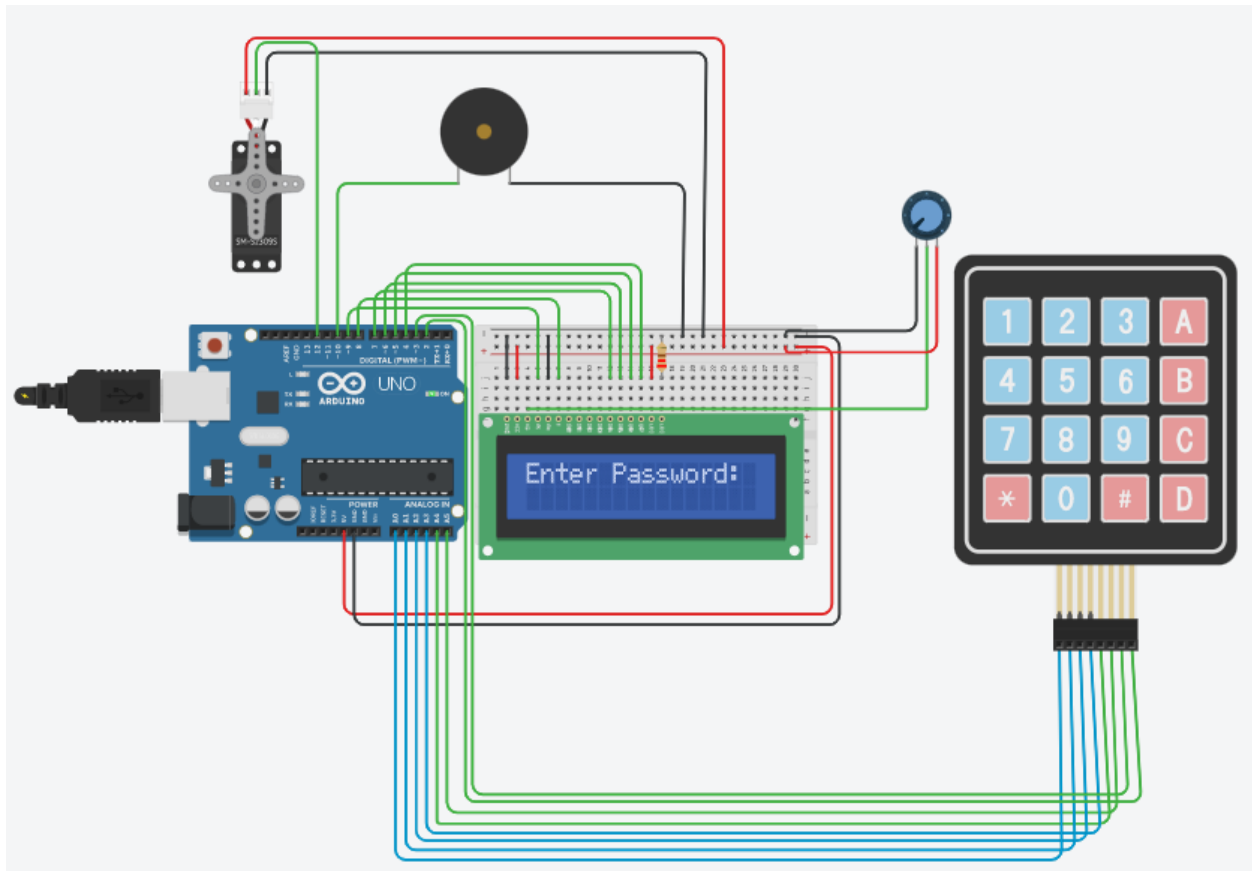


1.7 Flow-chart



The above flowchart gives a brief idea as to how the project works. Initially the password is known. When the device is turned on, it resets the servo angle to lock the door. Now the user is prompted to enter the password. The user enters the passcode through a keypad which is read by the Arduino. Now the entered password is checked with the known password. If the password matches, then the servo motor deflects and the door unlocks for 5 seconds else the buzzer beeps indicating the invalidity of the password. If user want to reset the password he/she needs press # then the system will ask for old password and if it matches then the user can insert new passwords.

1.8 Circuit Diagram



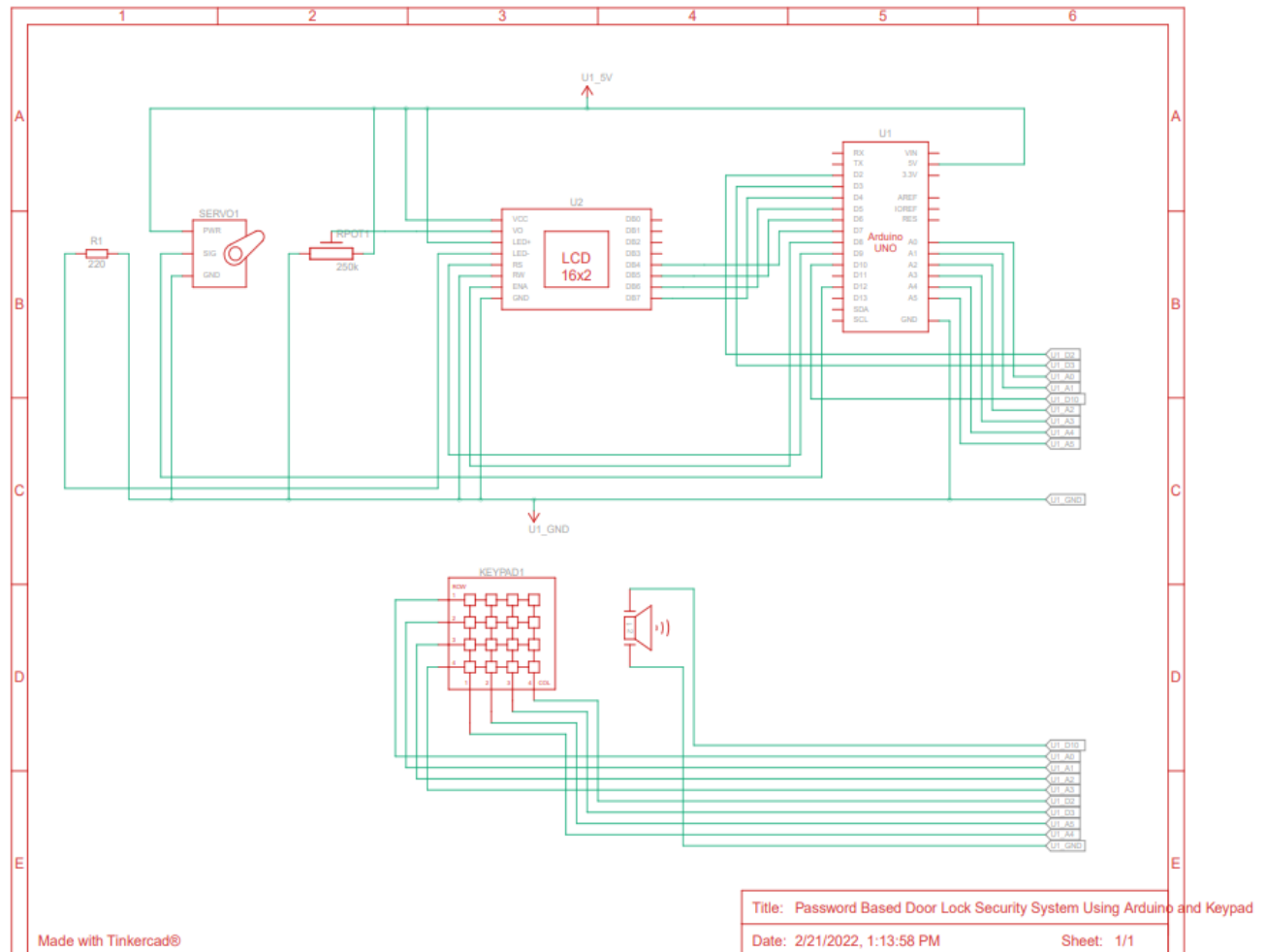
First of all, we will make the connection to the 4x4 Keypad. For connecting the keypad with the Arduino we are using both analog and digital pins. We used analog pins since we need more than 14 digital pins for this project. If you are using Arduino Mega, then there is no need to use analog

pins. Connect first six pins of keypad to analog pins A0 ~ A5 of Arduino and remaining two to digital pins 3 and 2. To connect the push pull solenoid with the Arduino, we will have to use external power because it requires 6 ~ 12V to operate and much more current than the Arduino can provide. So to do that, we will use TIP120 NPN transistor as a switch/driver and a DC power source which can provide 6 ~ 12V. The NPN transistor will switch ON when we will give HIGH to its base. So, connect its first pin (which is the base pin) to the pin 11 through to a $1K\Omega$ resistor, second pin (which is the collector pin) to the negative wire of push pull solenoid and third pin (which is the emitter pin) to the ground. Now connect the positive of power supply to the positive wire of solenoid and the negative of power supply to the ground. Now connect the positive wire of buzzer to the pin 10 of Arduino and negative wire to the ground.

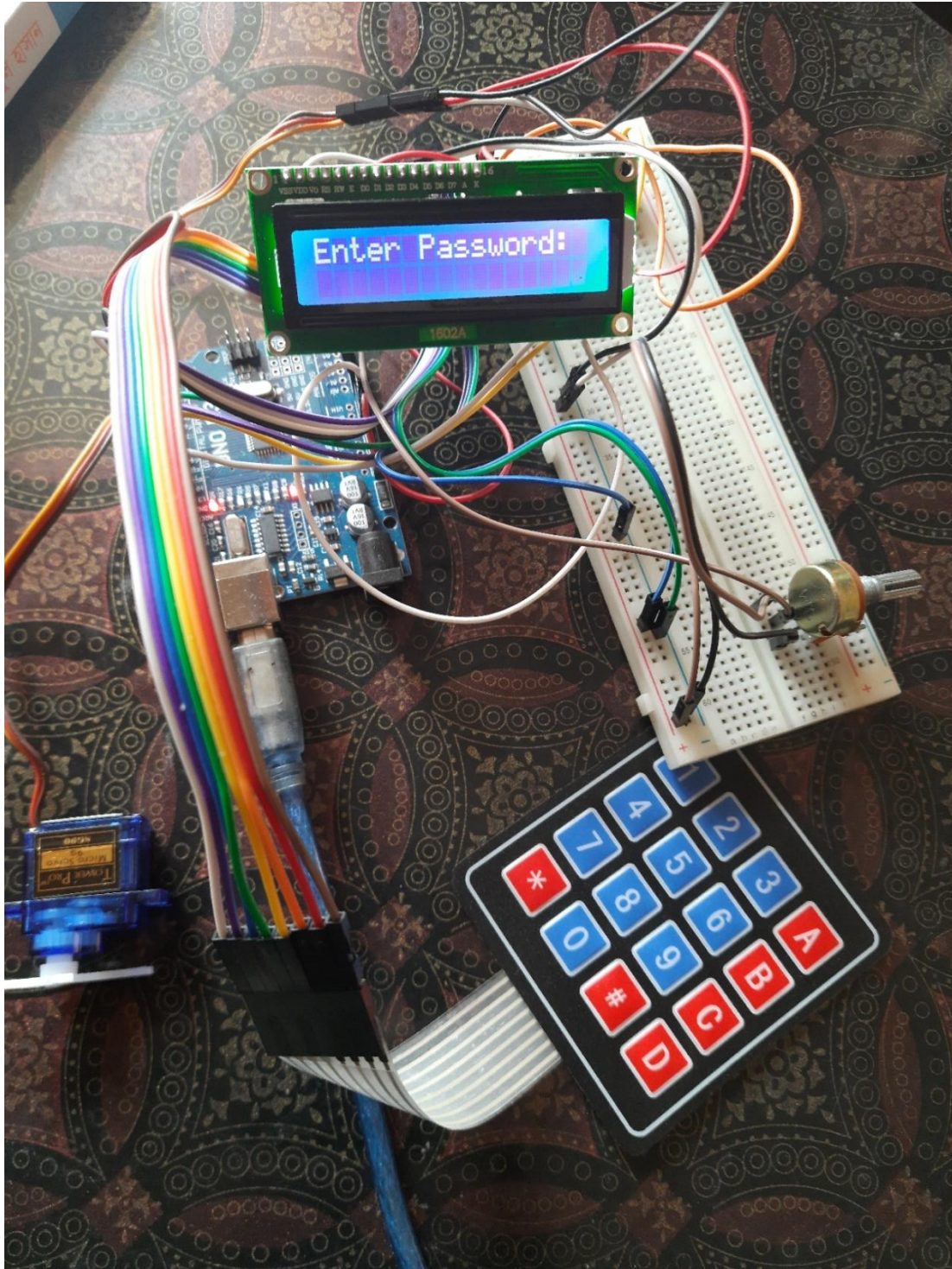
Now we will connect the 16×2 LCD to the Arduino.

- Connect pin 1 (VEE) to the ground.
- Connect pin 2 (VDD or VCC) to the 5V of the Arduino.
- Connect pin 3 (V0) to the middle pin of the $10K\Omega$ potentiometer and connect the other two ends of the potentiometer to VCC and GND. The potentiometer is used to control the contrast of the LCD.
- Connect pin 4 (RS) to the pin 9 of the Arduino. This is Register Select pin used to select a particular register in the LCD driver, which is handled by the LCD library.
- Connect pin 5 (Read/Write) to the ground of Arduino. This pin is not often used so we will connect it to the ground as we are only writing data to LCD.
- Connect pin 6 (E) to the pin 8 of the Arduino. It is used indicate a valid data or command in the following data pins.
- The following four pins are data pins which are used to send data or commands to the LCD. o Connect pin 11 (D4) to pin 7 of Arduino. o Connect pin 12 (D5) to pin 6 of Arduino. o Connect pin 13 (D6) to pin 5 of Arduino. o Connect pin 14 (D7) to pin 4 of Arduino.
- Connect pin 15 to the VCC through the 220 ohm resistor. By changing this resistor value we can change the backlight LED brightness. Larger values will make the back light much more darker.
- Connect pin 16 to the Ground.

1.9 Schematic Diagram



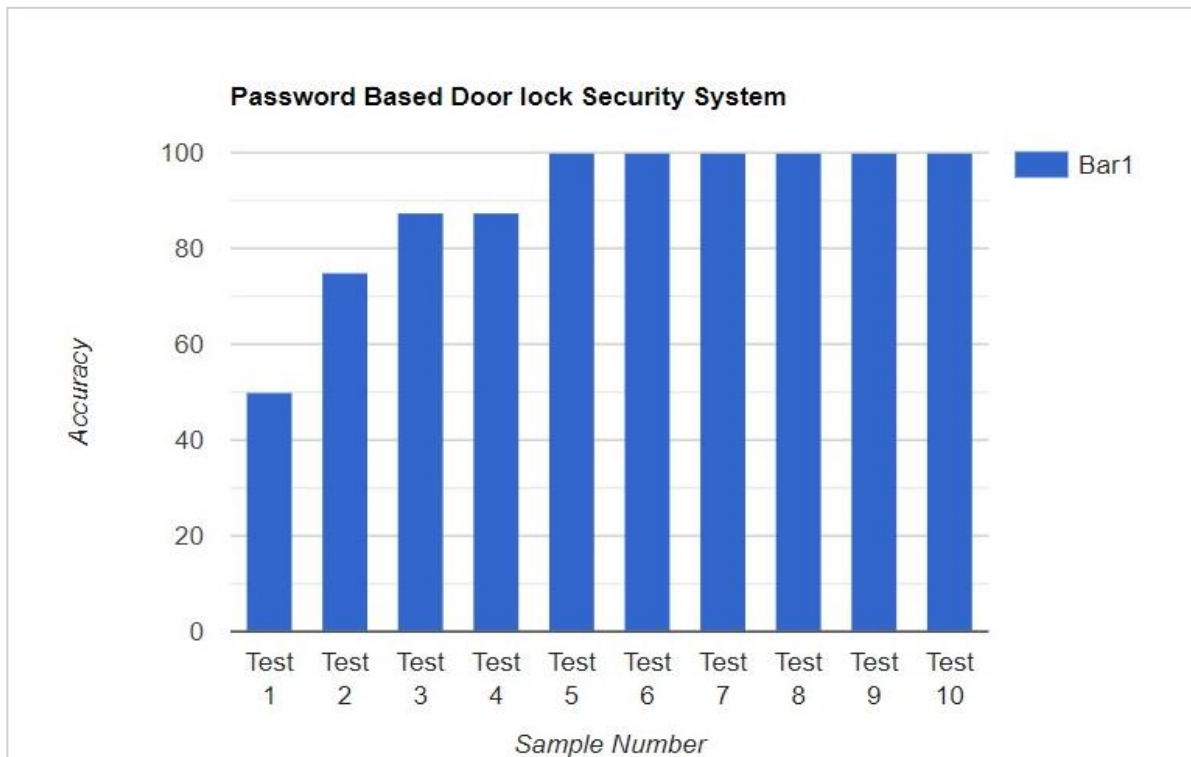
2.0 Real Pic



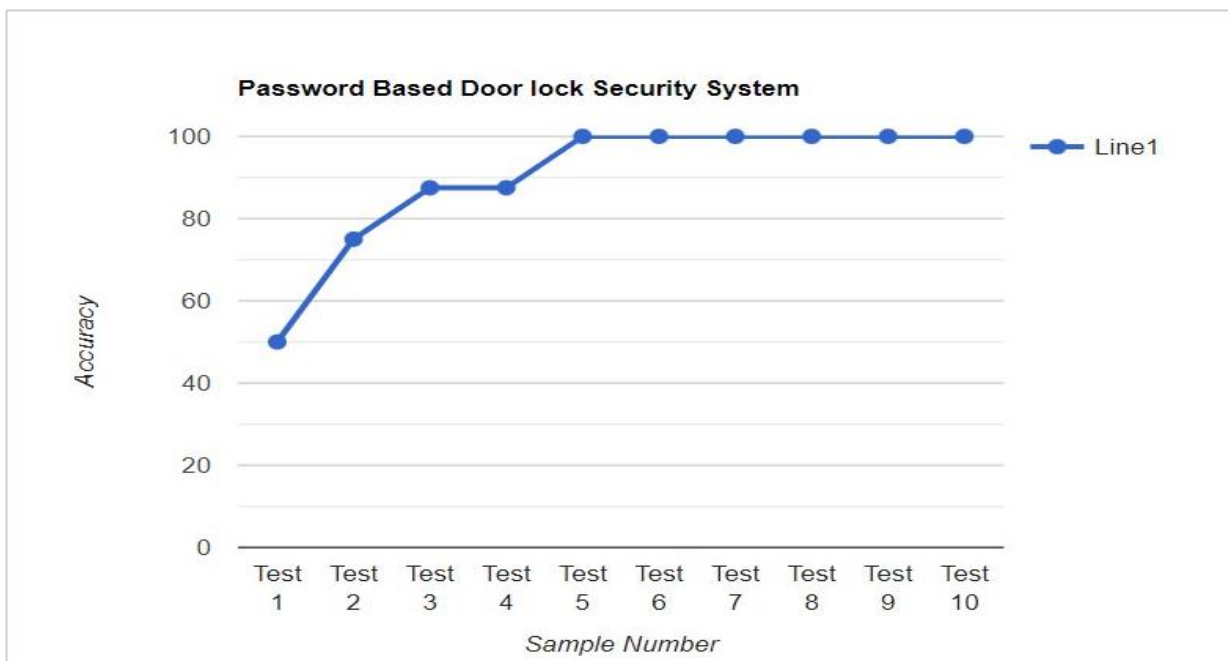
2.1.1 Result analysis

	Parts								
Test No	Arduino Board	Keypad	LCD Display	Poten tiometer	Servo motor	Buzzer	Wires	Bread-board	Remarks
1	✓	✗	✗	✗	✗	✓	✓	✓	50% are working
2	✓	✓	✗	✗	✗	✓	✓	✓	75% are working
3	✓	✗	✗	✓	✓	✓	✓	✓	85% are working
4	✓	✗	✗	✓	✓	✓	✓	✓	85% are working
5	✓	✓	✓	✓	✓	✓	✓	✓	100% OK
6	✓	✓	✓	✓	✓	✓	✓	✓	100% OK
7	✓	✓	✓	✓	✓	✓	✓	✓	100% OK
8	✓	✓	✓	✓	✓	✓	✓	✓	100% OK
9	✓	✓	✓	✓	✓	✓	✓	✓	100% OK
10	✓	✓	✓	✓	✓	✓	✓	✓	100% OK

2.1.2 Bar-Chart Graph



2.1.3 Line chart graph



3. Conclusion

This project is productive in providing enough security as long as the password is not shared. In future this “Password based Door Lock System” can be provided maximum security by the above enhancements in order to completely satisfy user’s needs. Hence, a common man can afford to buy such locking system in minimal cost to keep his valuables safely without any worries.

Reference

- [1] electronics, h., 2021. Password Based Door Lock Security System Using Arduino & Keypad. [online] how2electronics.com. Available at: <<https://how2electronics.com/password-based-security-system-arduino-keypad/>> [Accessed 19 February 2022].
- [2] Nikhil Agarwal, Microcontroller based Home Security System with Remote Monitoring, Department of EC engineering, MIT, Manipal.
- [3] A. Parajuli, “Password Security Lock System Using Arduino & Keypad,” The IOT Projects, 20-Jul-2020. [Online]. Available: <https://theiotprojects.com/password-security-lock-system-using-arduino-keypad/>. [Accessed: 19-Feb-2022].