B.Sc. Engg. Report

A Report on Password Door Lock Security System using Tinkercad

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Abstract

The need of safety can be achieved by making locks which can be electrical or mechanical with one or a few keys, but for locking a big area many locks are required. As everyone knows old fashioned locks are heavy weight and fragile also depending on the tools therefore electronic locks are given more value than those of mechanical locks. Nowadays every device's operation is based on digital technology. For example, technology based identity devices are used for automatic door unlocking or locking.This project presents a microcontroller based digital door lock security system using keypad which will provide complete security solution to lives and properties at homes, schools and offices. These locking systems are used to control the movement of door and are functional without requiring a key to lock or unlock the door and these systems are controlled by a keypad and are installed at the side hedge of the door. The objective of this project is to provide such a security system which is highly secure for Commercial, Residential, Industrial areas, etc. The system comprises of a keypad and 16x2 LCD along with a 8051 microcontroller. 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 entered Password doesn't matched with the predetermined Password then no input signal generates from the micro-controller to activate the dc motor drive. Hence the door remains unlock.The aim of this project is to make such type of lock which will ensure security as well as cost efficient implementation.It is also system is cheap, affordable, small and relatively easy enough to install with just a couple of steps.

Declaration

We hereby declare that the report on Password Door Lock Security System using Tinkercad submitted in partial fulfillment of the requirements for the degree of Bachelor of Science in Computer Science and Engineering of Bangladesh University of Business and Technology (BUBT) is our own work and that it contains no material which has been accepted for the award to the candidate(s) of any other degree or diploma, except where due reference is made in the text of the project. To the best of our knowledge, it contains no materials previously published or written by any other person except where due reference is made in the project.

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Copyright

Dedication

Dedicated to our parents, teachers, friends and who loved us for all their love and inspiration.

Certificate

This is to certify that Asrful Islam(ID-18192103070),S M Masfequier Rahman (18192103087),Mafuja Akter Mitu (ID-18192103068)and Nurain Suzana (18192103049) were belong to the department of Computer Science and Engineering, have completed their Report on Password Door Lock Security System satisfactorily in partial fulfillment for the requirement of Bachelor of Science in Computer Science and Engineering of Bangladesh University of Business and Technology in the year 2021.

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Chapter 1

Introduction

1.1   Introduction

In day to day life security of any object or place is plays a major role. Many times we forgot to carry the key of our home. Or sometimes we come out of our home and door latch closes by mistake. As thefts are increasing day by day security is becoming a major concern nowadays. Often times, we also need to secure a room at our home or office so that no one can access the room without our permission and ensure protection against theft or loss of our important accessories and assets.

Doors locked using conventional locks are not as safe as they used to be, anyone can break in by breaking these locks. We therefore need to make a framework that will give 24/7 benefit. So a digital code lock can secure our home or locker easily. It will open the door only when the right password is entered. There are so many types of security systems present today.This project is designed to solve this purpose. Main concept behind this project is of a door-latch opening using a password entered through keypad. As well as turning on the Buzzer when password is entered wrong for multiple times. User can change this password anytime he/she wish using a keypad. Off all the solutions the low-cost one is to use a password or pin-based system. So, in this project, we have built a Password Based Door Lock System which can be mounted to any of our existing doors to secure them with a digital password. The password based door lock system promises a bold step to the future where mechanical door locks will be substituted by electronic door locks

This project has considered about that and created a secure access for a door which needs a password to open the door. Using keypad it enters a password to the system and if it is entered correctly door is open by motor which is used to rotate the handle of the door lock. It will give three attempts to enter the password when it is entered incorrectly a t the first time. Some features like adding new users and changing old password are configure by the keypad. LCD module is used to display messages to the user.Now a day's most of the systems are automated in order to face new challenges and present day requirements to achieve good results. Automated systems have less manual operations, so that the flexibility, reliabilities are high and accurate. Hence every field prefers automated control systems, especially in the field of electronics.

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1.2 What is Door Lock

As the world grows to be digitally dependent, even doors can now be designed to be secure and safe. The digital version of the lock and key holds a lot of promising features. The digital door lock is securely placed with passwords. However, this may also attract unethical hackers, therefore, an extra layer of security is also required. In this electronics project-based article, we have created a digital door lock that is controlled using a basic controller, the 8051 microcontrollers. The aim of this article is to understand the fundamental working principle behind a digital door lock.

The Digital Door Lock in general is a password-based electronic code lock. In this project, we have designed the digital door lock using an 8051 microcontroller, a keypad, and a buzzer. In this article, we have designed a simple digital door lock using 8051 -which can be used as a security checking system to limit access to an area/room only for certain individuals with the password. So our digital door lock project can be called with a very wide range of names like a digital combination lock using 8051 or a digital security code lock using 8051 microcontrollers or a password security system using 8051 or an electronic code lock or a digital code lock using 8051. People call this kind of a "security system" with different names, though all of them mean to build a basic password-based security system using a microcontroller like 8051 or AVR or PIC or Arduino (a controller of choice) with extra features like automatic door lock/opening

facility, sound alarm, GSM based SMS alert, etc.

1.3   Working system of password door lock

Password Based Door Lock System is designed using ARDUINO UNO where in once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area.   Password Based Door Lock System using Arduino UNO is a simple project where a secure password will act as a door unlocking system.   Old fashioned lock systems use mechanical locking and these can be replaced by new advanced techniques of locking systems.   These methods are a combination of mechanical and electronic devices and are highly intelligent.   One of the distinct features of these intelligent lock systems is their simplicity and high efficiency.   Such an automated lock system consists of electronic control assembly, which controls the output load through a password.   The example of this output load can be a motor or a lamp or any other mechanical/electrical load.   Here, we made an electronic code lock system using Arduino UNO, which provides control to the actuating the load. It is a simple embedded system with takes input from the keyboard and the output being actuated accordingly.   This system demonstrates a Password based Door LockSystem using Arduino UNO, wherein once the correct code or password is entered, the door is opened and the concerned person is allowed access to the secured area. If another person arrives, it will ask to enter the password again.   If the password is wrong, then door would remain locked, denying access to the person.

Main idea behind this project is of a door-latch opening using a password entered through keypad. As well as turning on the Buzzer when passcode is entered wrong for multiple times. User can modify this password anytime he/she wishes using a keypad.   The main component in the circuit is Arduino UNO which is basically used to send a text message to owner of the house about the breach of security.4*4 keypad is used to enter the password.   The entered password is compared with the known password. If it is correct password, the system opens the door by servo motor and displays the status of door on LCD. If the password is wrong then door remains closed and displays "WRONG PASSWORD" on LCD.

1.4   Background Information

The earliest lock in existence is the Egyptian lock, made of timber, determined with its key in the Palace ruins in Nineveh, in ancient Assyria[10]. Within the 19th century, stage locks, cylinder locks and keyless locks have been invented and stepped forward upon [12]. The primary successful steel key changeable mixture lock was invented by way of James Sargent in 1857[13]. This lock became the prototype of those being utilized in current bank vaults.

In 1958, the first electronic aggregate lock become invented[14]. As next traits were alongside the strains, the locks were advanced upon by way of the improvement of substances and increasing complexity of the operating mechanisms which includes the increasing use of automatic electronic alarm and safety devices[14]

Conventional lock structures using mechanical lock and key mechanism are being changed by using new advanced strategies of locking gadget [1]. those techniques are an integration of mechanical and digital gadgets and extraordinarily sensible. One of the prominent capabilities of those revolutionary lock structures is their simplicity and excessive efficiency. Such an automatic lock gadget includes electronic manipulate assembly which controls the output load through a password. This output load may be a motor or a lamp or some other mechanical/electric load. Here I advanced an electronic code lock machine the use of 8051 microcontroller, which offers manage to the actuating the burden. It's far a simple embedded machine with enter from the keyboard and the output being actuated hence. This device demonstrates a password based totally door lock system wherein once the correct code or password is entered, the door is opened and the involved character is authorized get entry to the secured region. once more if every other character arrives it'll ask to enter the password. If the password is wrong then door could remain closed, denying the get admission to the man or woman [11]. Principle at the back of the Circuit: the principle aspect in the circuit is 8051 controller. In this challenge four×three keypad is used to go into the password. The password that is entered is as compared with the predefined password. If the entered password is correct then the machine opens the door by rotating door motor and presentations the status of door on liquid crystal display. If the password is incorrect then door is stay closed and displays "pwd is inaccurate" on lcd.

Security has become a major concern in the twenty first century; everybody wants to feel safe

at his or her own home, workplace and a safe environment as a whole. Smartdoor security system using Arduino and Bluetooth application is a project aimed at increasing and advancing the safety and security of lives and property of the people. The project deals primarily with the protection of doors and making it more secured within our houses, office or public related buildings. With the help of smart door, when indoors or while you are away from your home and workplace, the doors are protected primarily to grant access to only authorized persons using their smartphone and Bluetooth application. With the advancement of technology smartphone has become a household requirement. As of 2007 smartphones were not more than two percent of phone industries, but in 2009 the smartphone world has taken more than fifty percent of phone market (www.Wikipedia.com/android developers) With this it is quite logical to say that there is at least a smartphone owner in every house. With this smartphone we can simply interface it with a arduino (micro-controller) to keep our houses and offices safer and more secure with a single click to lock or unlock the resulting door. The micro-controller will be mounted on the door which will then communicate with the device through a Bluetooth module which will be connected to the micro-controller. This project is aimed at making security better and securing the lives and properties of people at home or their work places.

1.5 Background of The Study

Issues of theft and burglary increases with high rate as such door security is a necessity, Door safety is now of paramount importance which triggers the need for project such as "smartdoor security system" to provide a more safe and secure environment in generally.

1.6 Existing System of Password Door Lock

As a result of increase in the use of internet today as make the world to become a global Connectivity . Other forms of advancements in science and technology have also contributed more in this development. It should also be noted that due to this advancements, there is an increasing rate in crime, attacks by thieves, vandals and intruders. Despite all the necessary forms of security that has been put in place for the security of information over the internet and

properties at homes, more still needs to be done most especially in the security of properties and lives at homes, shops and offices. If we take the US as example, the FBI has reported that there were almost 1.4 million violent crimes in 2005 and more than 10 million property crimes (Gwehof, 2016). Gadgets and locks still need more attention from researchers to ensure a long lasting solution for the security of our lives and properties. This therefore calls for the necessity of ensuring the security of lives and personal belongings. In most countries that are involved with the use of mechanical locks, the crime rate has increased because these locks are easily broken. It is difficult to always identify who actually had access in to a home or apartment illegally with the mechanical locks, recently the insurance companies are complaining that rate of stolen vehicles has increased tremendously , despite the better and advanced locking system. There is therefore the need for the use of other types of locks especially the use of electronic locks. (Gwehof, 2016).In the previous paper written by (Musa Baba Lawan Ibrahim Tijjani, 2018).He designs electronic security system capable of detecting an intruder and reporting to security personnel. The construction of an electronic digital lock using micro-controller based with security information using a four-digit pass key for its operation. The operation involves opening the door, closing the Door, changing of password and alarm upon wrong password entry. The research objectives were achieved with the use of micro-controller which programs the ATMEGA328P microprocessor and interfaces it with all the other components in the circuit. In the end, the circuit was able to activate the relay and burst out alarm. (Aarfin Ashraf, 2016) Previously design Password Protected Lock System using 8051 micro-controller, with, 4×3 keypad used to enter the password. The entered password is compared with the predefined password. If the password is right the system unlocked the door by rotating door motor and displays the status of door on LCD. But , when the password is incorrect then door remains locked and shows password is wrong‖ on LCD. The information will be stored in data base. However, when the correct password to be received, the controller will give instruction to dc motor accordingly. Dc motor will perform the action on door unlocking. (Md. Maksudur Rahman, 2018)He designs Password Protected Electronic Lock System,in which an electronic lock allows activation of an electric appliance only on entering the correct password.in this research we have choose such an electronic locking system in which a 8051 micro-controller plays the role of the processing Unit. The MCU is interfaced with a 4×4 matrix keypad and a

16×2 LCD to the user interface. The door lock system is secured with password which is known by the user. The door lock will be opened only when the right password is input. However, option of Password changing looked more secured, that only authorized person can do it. in the case of password changing a fixed security code (known to authorized user) together with the old password is required. (Ushie James Ogri, 2013) Design and Construction Of Door locked system, This research presents a prototype security door locked that can be remotely controlled using a GSM module as a sender with another GSM module set with a dual tone of multi-frequency (DTMF) connected to the door motor using a DTMF decoder interfaced, micro-controller unit and a stepper motor. The codes used for this project research was written in an assembly language with Visual basic software and compiled with M-IDE studio for MC-compiler which work perfectly with Window XP environment, this program was run without error before it was installed onto the micro-controller by a device called the (programmer) by placing the micro-controller on it socket equal to the pin number. Having run through previous researches on Design and Construction of Micro-controller Based, Password Enabled Door Lock System as a result of security challenges, we decided to design a Door Lock System with enabled password using Micro-controller 8051 with computer software called PROTEUS, at Low Voltages and this enhance the Security system.

1.7   Problem Statement

In order to make sure that every door is safe people now look for counter measures to protect their doors. With the vast and different forms of keeping doors locked from unauthorized persons many people tend to use low means of protection. Meanwhile the deployment is of more advanced technology like the use of smartdoor security is a step forward. This project aims to keep doors safe and also ease access. T

1.8   Aim and Objectives

The aim of this project is to design and implement a smart door security system using arduino and Bluetooth application that could help advance the protection of doors at home and public buildings

- Designing of a smartphone application to control the movement of doors

- Interfacing of arduino uno with the smartphone via Bluetooth module to establish a connection between the arduino the smartphone

- Controlling the position of a servo motor to open or close a door which I controlled and processed due to the response of the microcontroller

1.9   Scope of The Project

The project is about interacting with component and devices with the help of Arduino uno. The project is limited to performing the task of opening and closing of doors precisely main entrance doors of a building. It is not designed for the purpose of surveillance in a home or any building nor is it a burglar alarm that alarms you in any case of perimeter bridging it's only limited to performing the task of opening and closing.

1.10   Applications and Advantages

1.This project can be used in offices, companies also at home. It will provide keyless entry.

2. This can be used in Banks for safety lock.

3. User don't have to carry keys along with him.

1.11   Aim and Objectives

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1.12 Organization of This Project Report

The rest of the book is organized in the following way. In Chapter 1, we will show the background and related project studies. After that,

- **In Chapter 2,** describes Existing System, existing or supporting literature and review of existing system. In existing system, we will discuss about the history . Moreover, in this part we will also discuss about the many types of existing way . In supporting literature, we will describe about the all types of tools that we have used in our system.

- **In Chapter 3,** consists of our Proposed Model. The algorithm and flow chart and also step by step discussion and figure will be provided there. In this chapter first we discuss the full procedure with figures. The result is shown at the end.

- **In Chapter 4,** consists of our Implementation. The implementation and Processing will be shown step by step discussion and figure will be provided there. In this chapter first we discuss the full Implementation system.

- **In Chapter 5,** explains about the Experimental Results of our project. In result analysis part we will discuss about the report or output of our system.

- **In Chapter 6,** concludes the Report of Our Project. In this chapter we will discuss about limitations and future works. In limitation part we will discuss about the limitations of our system. In future works we will discuss about the modules which we will develop in future.

1.13 Conclusions

n this way we have design the security based doorlock system using microcontroller 8051 which is particularly based on four digit password. It asks for four digit password, if password is correct then, door will be automatically opened.if password is wrong then, door will be automatically closed.Hence it is one of the efficient technique.

Chapter 2

LITERATURE REVIEW AND THEORITICAL BACKGROUND

2.1   Introduction

This chapter comprises of the literature review and theoretical background of the project. The literature review deals basically with related project written by other researchers, the difficulties they encountered, limitations and modifications that should be made. Theoretical background explains in details some of the most important component used in the project.

2.2   Review of Relevant Literature

Smartdoors have been implemented using different methods such as Radio frequency identification (RFID) and Biometric lock to unlock and lock door. Both the RFID and biometric lock are real ideal and smart ways to make a door smart, due to necessity and limitations such as cloning of biometric prints or card. The use of Bluetooth and smartphone is much simpler and easier to adapt and use. It gives you more access to communicate with the door and it also give access to physically challenged persons that might not have a finger to use for biometric lock or is crippled to use RFID but with respect to this project physically challenged can simply open their door by single click in device. Adarsh V Patil et al (2008) did a similar project Android

based smart door locking system which also employed the use of android phone which is also a smartphone and also a GSM module to access the door. Also Agbo David et al (2017) did a somewhat similar project based on door locking system using android application. Shafarana A.R.F et al (2017) did android based automation and security system for smart homes. There are many other 5 projects done on smartdoor in different countries. They are all different from each other in terms of designs, features, devices, and algorithm. They are mostly designed according to specific needs and availability of components in the respective areas. Some of them are cheap; some of them are very expensive. Availability of both hardware and software is necessary to work. After a long searching, I have found a lot of articles. Searching for security purpose articles, also found some projects done for door security. These are mainly done in western countries. Many projects are done only for security purpose With Arduino or Raspberry Pi. Again, the projects are done only for controlling home Appliances using Arduino or Raspberry Pi. Most of the previous researches encountered problems in their design especially in terms of cloning by other third party and availability of components .

2.2.1   Justification

n general terms my project is a more user friendly project with easy access to users. People that have problems physically like cripples or half paralysis can have access to doors without the help of anybody not even an assistant, as long as they are in position of smartphone. The physically challenged persons can open or lock any door they have permission to, or even lock or unlock a door while sitting on their wheel chairs, resting sofas or sleeping bed.

2.3   Theoretical Background

2.3.1   Smartdoor

Smart and door are two different words with different meanings. Advanced oxford dictionary has given a clear and precise definition of both words smart meaning intelligent while a door is any metal, glass, wood etc. that is opened and closed so that people can get in and out of a room, building, car etc. by definition of smart and door smartdoor can easily be referred

to as doors that can be accessed easily without having to touch it physically. Smartdoors are intelligent doors that can be controlled with any other external force to grant access in or out of the building, car etc.

2.3.2   Smartphone

The first smartphones, the IBM Simon and Nokia communicator 9000 were released way back in 1994 and 1996 respectively, and integrated the features of a mobile phone and a personal digital assistant (PDA) for managing calendars and contacts both were larger than regular phones. It wasn't until 2000 that first real smartphone, the Ericson r380, was released. It wasn't any larger than a regular phone, and in the early 2000s many other followed suit, with phones like blackberry and palm achieving big success. In 2007, apple released iphone, which eschewed hardware buttons for full touchscreen control and has since been the template of smartphone ever since. Phones used to be all about making calls, but now your mobile phones have more application. The range of new touchscreen smartphones allows you to access the internet, use social media, get live news or sport updates, play music and video, and more. Smartphones can do so much more than just make phone calls, many things can be done such as play games, access the internet and browse the web, make video calls, navigate with GPS (global positioning system) send and receive emails, manage contacts and make appointments, send and receive large files through Bluetooth or mobile hotspot. Below are the examples of smartphones interface.

Figure 2.1: Smartphone Interface

Figure 2.2: Smartphone Interface

2.3.3   Arduino Uno

The Arduino Uno is a microcontroller board based on the ATmega328p. It is simple, inexpensive, open source prototyping platform extensible to hardware and software. 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, and a reset button. It contains everything

needed to support the microcontroller. We either need to connect it to a computer using a USB cable or power it with an AC-to-DC adapter. The Arduino circuit acts as an interface between the software part and the hardware part of the project.

Figure 2.3: Arduino
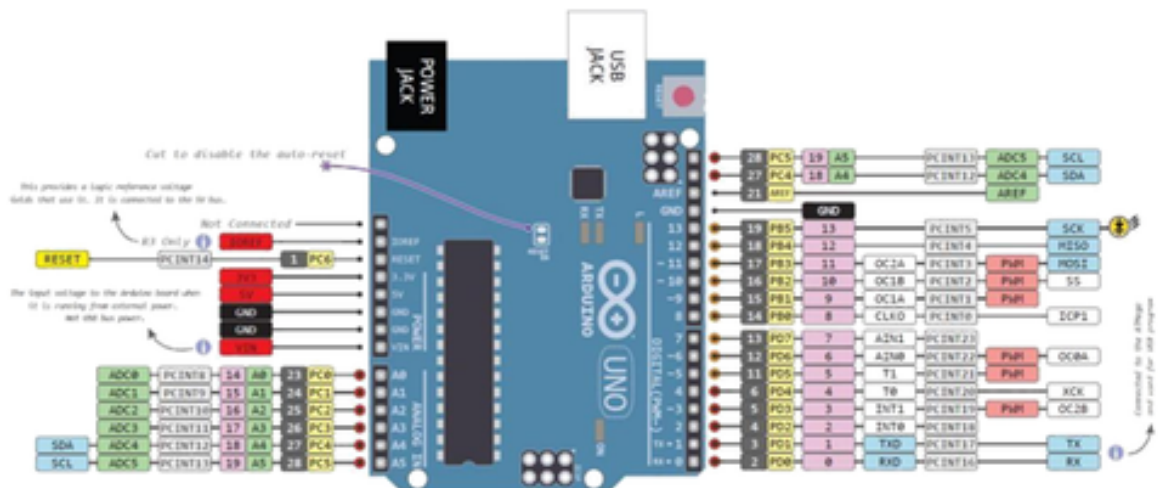
Figure 2.4: Arduino

•Specification of Arduino Uno

•Microcontroller ATmega328p

•Operating Voltage 5V

•Input Voltage (recommended) 7-12V

•Input Voltage (limit) 6-20V

•Digital I/O Pins 14 (of which 6 provide PWM output)

•PWM Digital I/O Pins 6

•Analog Input Pins 6

•DC Current per I/O Pin 20 mA

•DC Current for 3.3V Pin 50 mA

•Flash Memory 32 KB (ATmega328P)

•SRAM 2 KB (ATmega328P)

•EEPROM 1 KB (ATmega328P)

•Clock Speed 16 MHz

•IO with built-in LED 1 (on pin 13) 10

•Length 68.6 mm

•Width 53.4 mm

•Weight 25 g

2.3.4   Bluetooth Module

Bluetooth is a wireless technology standard for exchanging data over short distances (using short-wavelength UHF radio waves in the ISM band from 2.4 to 2.485 GHz) from fixed and mobile devices and building personal area networks (PANs). The Bluetooth module being used allows us to transmit and receive signals. It receives the text from the Android phone and transmits it to the serial port of the Arduino Uno. The Bluetooth module being used here is the HC- 05 module, shown below. It is an easy to use Bluetooth SPP (Serial Port Protocol) module, designed for transparent wireless serial connection setup. The Bluetooth module HC-05 is a master/slave module. By default the factory setting is slave. The Role of the module (Master or Slave) can be configured only by at commands. The slave modules

cannot initiate a connection to another Bluetooth device, but can accept connections. Master module can initiate a connection to other devices.
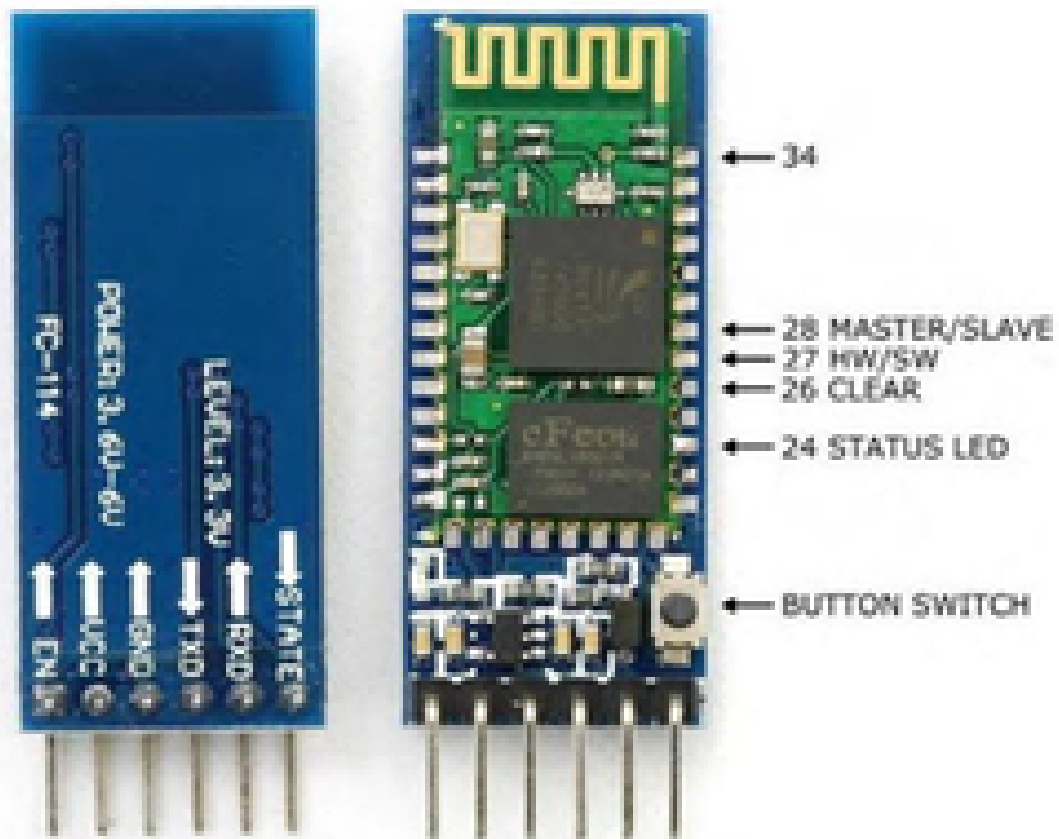

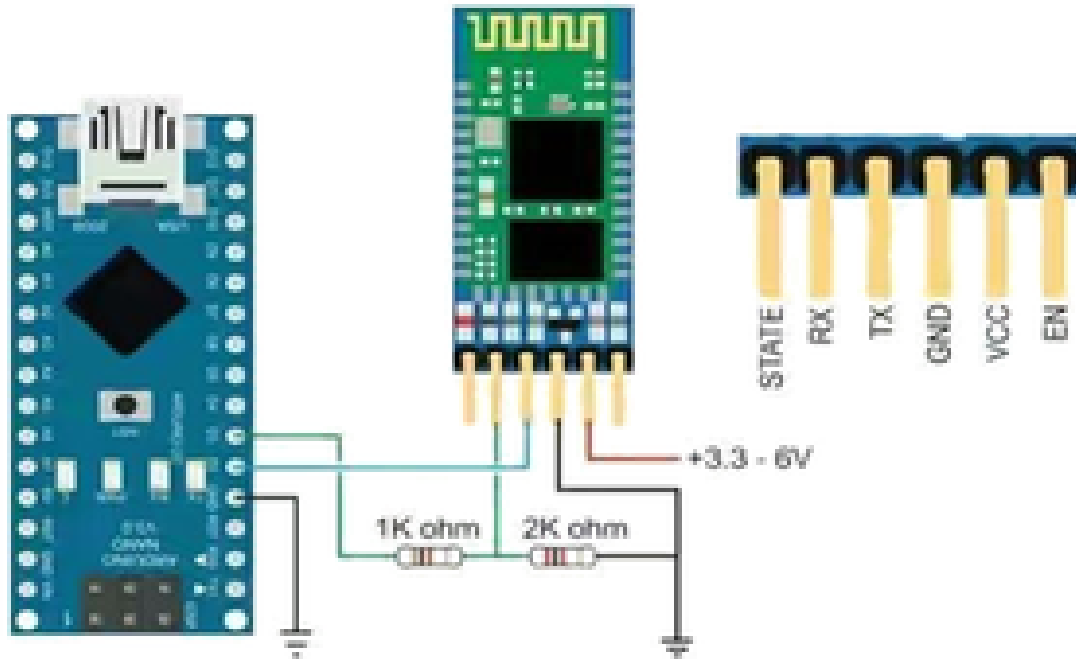Figure 2.5: Bluetooth Module

Figure 2.6: Bluetooth Module

2.3.5 T Bluetooth Module

Pin Number-1

Pin Name-Enable/key

Description-This pin is used to toggle between data mode (set low) and AT command mode (set high) by default it is in data mode.

Pin Number-2

Pin Name-Vcc

Description-Powers the module. Connect to +5v supply voltagee.

Pin Number-3

Pin Name-Ground

Description-Ground pi to module, connect to system ground.

Pin Number-4

Pin Name-TX-Transmitter

Description-Transmit serial data. Everything received via Bluetooth will be given out by this pin as serial data.

Pin Number-5

Pin Name-RX-Receiver

Description-Receive serial data. Every serial data given to this pin will be broadcasted via Bluetooth.

Pin Number-6

Pin Name-State

Description-he state pin is connected to on board LED it can be used as a feedback to check if Bluetooth is working properly.

Pin Number-7

Pin Name-LED

Description-Indicate module status.

Software Features

• Slave default Baud rate: 9600 • Data bits: 8. • Stop bit: 1. • No parity. • b. PIO9 and PIO8 can be connected to red and blue led separately. When master and slave are paired, red and blue led blinks 1time/2s in interval, while 13 disconnected only blue led blinks 2times/s. Auto- connect to the last device on power as default. • c. Permit pairing device to connect as default. • d. Auto- pairing PINCODE:"1234" as default. • e. Auto- reconnect in 30 min when disconnected as a result of beyond the range of connection

2.3.6 Servo Motor

A servo motor is an electrical device that can be used to push or rotate an object with great precision. If you want to rotate an object at some specific angle or distance, then servo motor can be used easily for that purpose. Servo motor can rotate ninety degrees in both directions. They can be used to move many equipment that require moving at any angle Servo mechanism.

It consists of three parts-

• Controlled device

• Output sensor

• Feedback system

It is a closed loop system where it uses positive feedback system to control motion and final position of the shaft. Here the device is controlled by a feedback signal generated by comparing output signal and reference input signal. The reference input signal is compared to reference output signal and the third signal is produced by feedback system. And signal third signal acts as input signal to control device. This signal is present as long as feedback signal is generated or there is difference between reference input signal and reference output signal. So the main task of servomechanism is to maintain output of a system at desired value. Controlling servo motor All motors have three wires coming out of them. Out of which two will be used for supply (positive and negative) and one will be used for signal that is sent from the microcontroller. Servo motor is controlled by PMW (pulse width modulation) which is provided by control wires. There is a maximum pulse and a repetition rate. Servo motor can turn 90 degree from either direction from its neutral position. The servo motor expects to see a pulse every 20 milliseconds (ms) and the length of the pulse will determine how the motor turns.
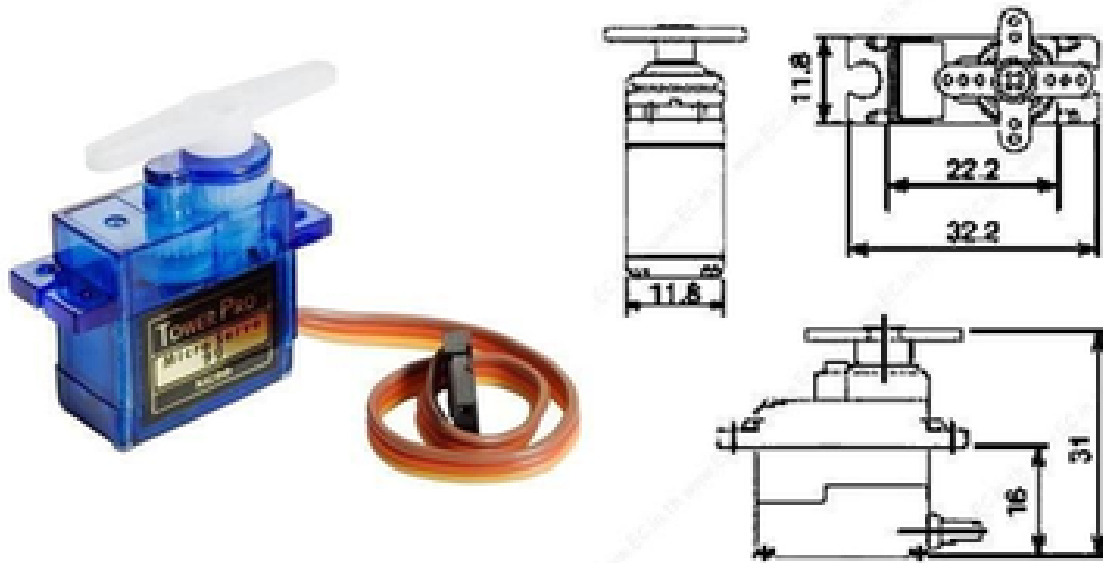
Figure 2.7: Servo Motor

- Weight: 9g

- Dimension: 22.2 x 11.8 x 31 mm approx.

- Stall torque: 1.8 kgf cm

- Operating speed: 0.1 s/60 degree

- Operating voltage: 4.8 V (5V)

- Dead band width: 10s 15

- Temperature range: 0 ºC – 55

Chapter 3

Proposed Model

3.1 Introduction

Password based door lock system using Arduino' is used in places of restricted access. It can be also used to secure lockers and valuable things and confidential information. Keypad and motor are connected to Arduino. Arduino continuously monitors the keypad and any password entered is compared with the stored password, if matched provides access to the person who entered password, it will not unlock the door if password entered is wrong. The system provides access only to the people who know password. It doesn't provide access to people who don't know password.

3.2   Block diagram

A block diagram is a diagram of a system in which the principal parts or functions are represented by blocks connected by lines that show the relationships of the blocks. They are heavily used in engineering in hardware design, electronic design, software design, and process flow diagrams
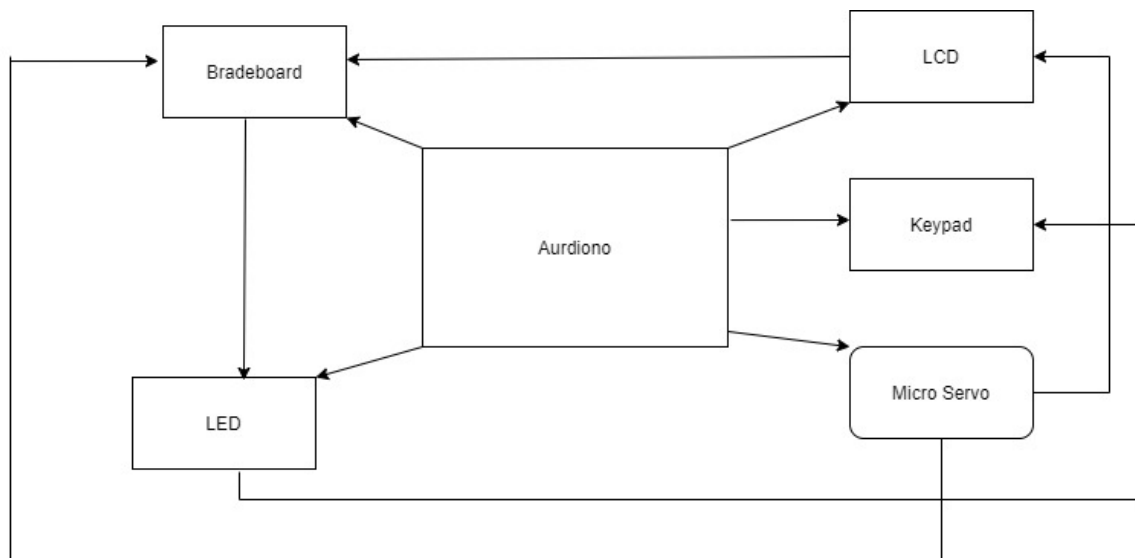
Figure 3.1: Password Based Door Locking Block Diagram

3.3   Data Flow Diagram

The data flow diagram is also known as "bubble chart" has the purpose of clarifying system requirements and identifying major transformations that will become programs in system design so it is the starting point of specification down to the lowest level of detail. A DFDs consists of a series if bubbles joined by lines. The bubbles represent data transformation and the lines represent the data flow in the system.

3.4 Symbols of data flow Diagram

- A system defined a source or destination of data.

- An arrow identifies data flow, data in motion.

- A circle represents the process that transforms incoming data flow to outgoing data flow.

- open rectangular is data store-data at rest or a temporary repository of data
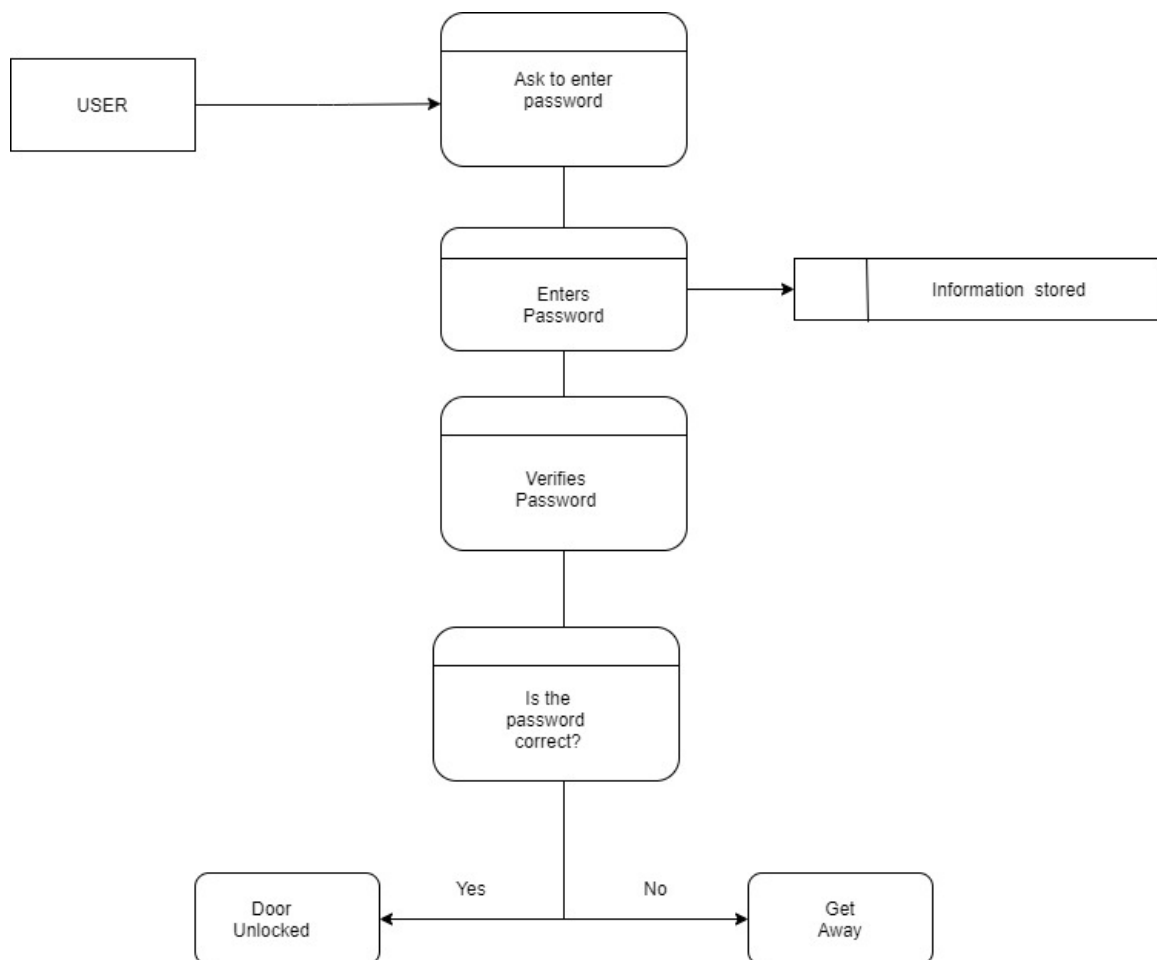
3.5 data flow Diagram Of our system

Figure 3.2: Password Based Door Locking data flow Diagram

Chapter 4

Implementation of Our System

4.1 Introduction

This project contains these following components 4x4 Keypad ,Micro Servo, Arduino UNO,Lcd 16x2,led, Bradeboard etc.

4.1.1 4x4 Keypad

A 4×4 matrix keypad is used to give commands and the password to the MCU. It consists of 16 keys (S2-S17 arranged in the form of a square matrix of four rows and four columns). Each key in the matrix is labeled according to the operation assigned to it. The connections from the pin-outs of the keypad to the MCU pins . Above figure shows the diagram of the keypad we have used.
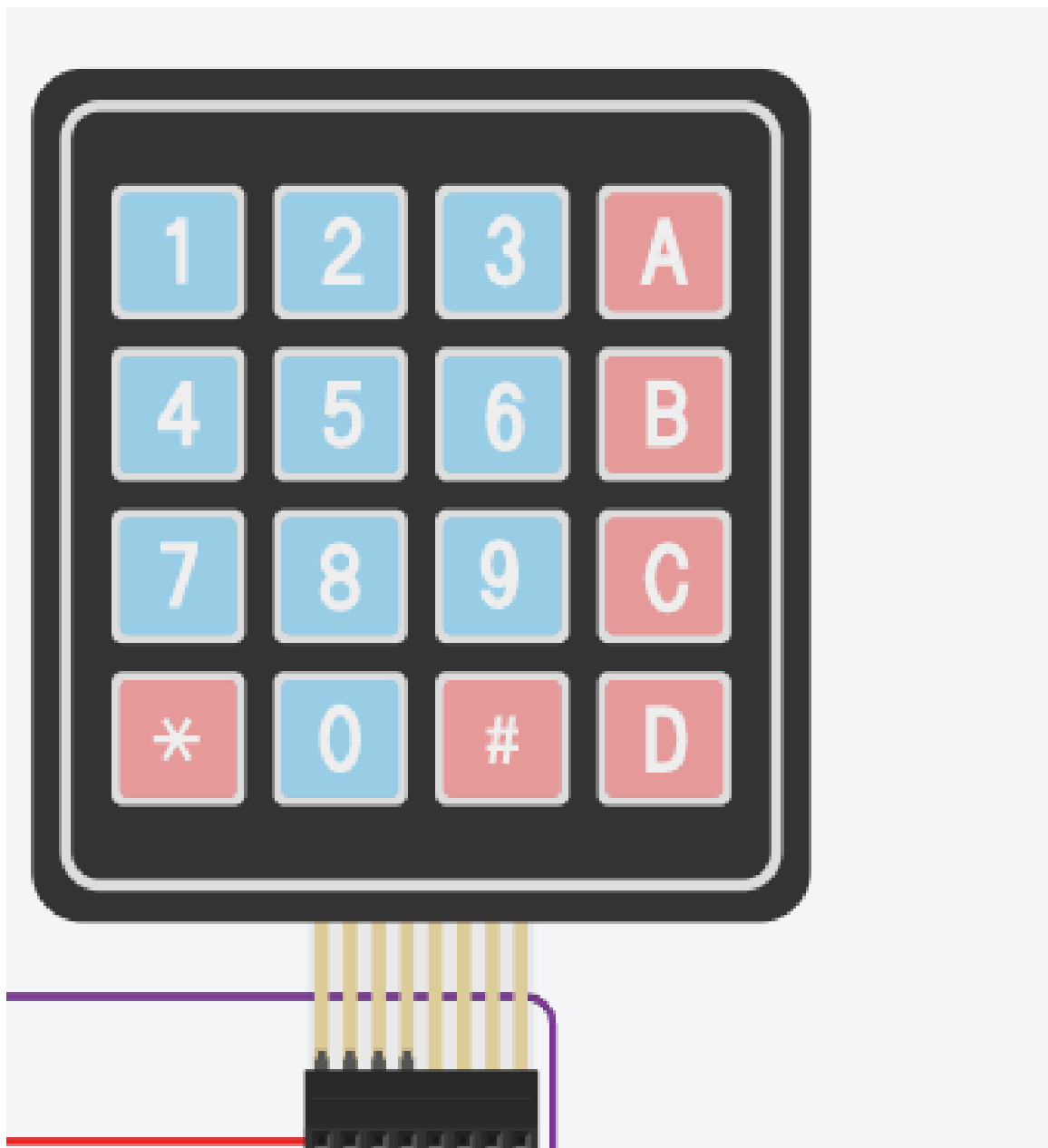
Figure 4.1: 4x4 Keypad

4.1.2   Micro Servo

A servomotor is a rotary actuator or linear actuator that allows for precise control of angular or linear position, velocity and acceleration. It consists of a suitable motor coupled to a sensor for position feedback.
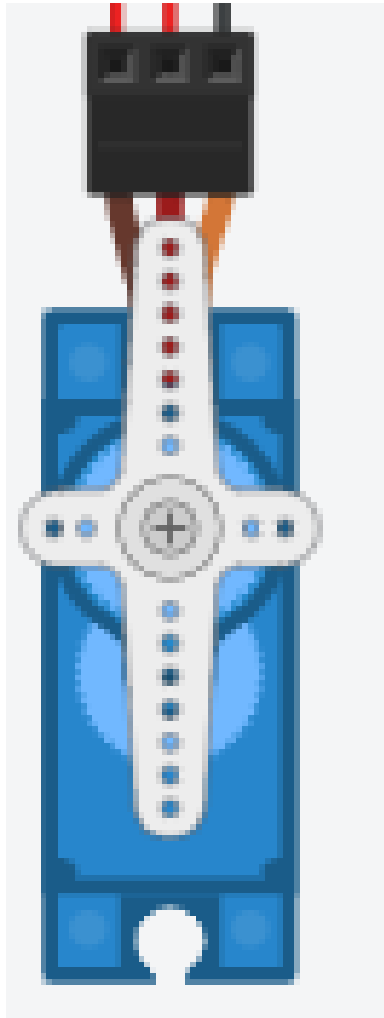
Figure 4.2: Micro Servo

4.1.3   Arduino UNO

This is the most impotent part of this project. Arduino controls the complete processes like taking a password from the keypad module, comparing passwords, driving led, rotating servo motor, and sending status to the LCD display. The keypad is used for taking the password. The led is used for indications. Micro servo is used for opening the gate while rotating and LCD is used for displaying status or messages on it.
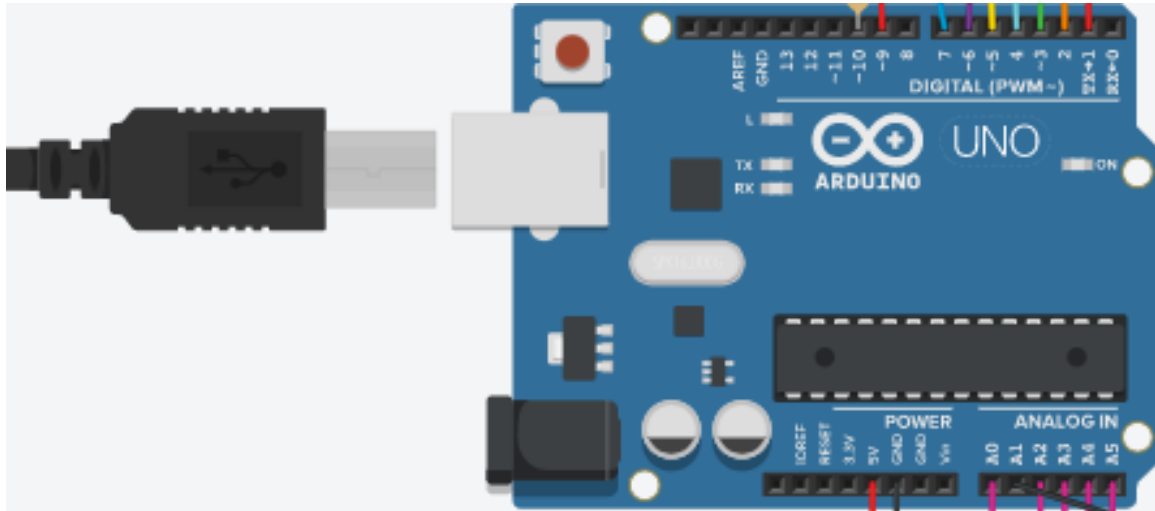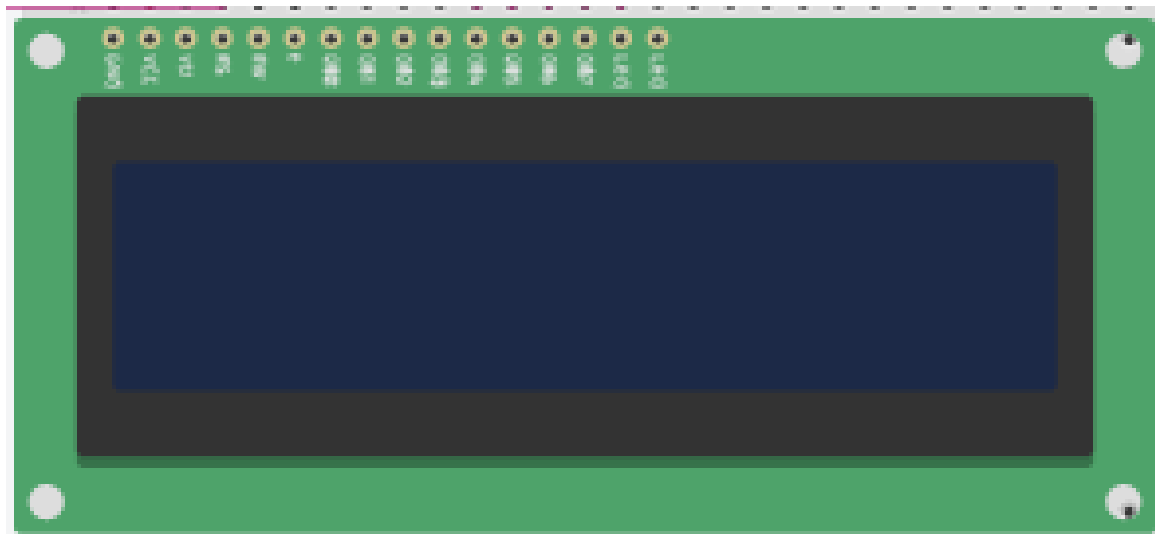
Figure 4.3: Arduino UNO

4.1.4 LCD 16x2

Figure 4.4: LCD

The term LCD stands for liquid crystal display. It is one kind of electronic display module used in an extensive range of applications like various circuits and devices like mobile phones, calculators, computers, TV sets, etc. These displays are mainly preferred for multi-segment light-emitting diodes and seven segments. The main benefits of using this module are inexpensive; simply programmable, animations, and there are no limitations for displaying custom characters, special and even animations, etc.

LCD display is used for showing the status of if the door is unlocked or not and also how many key is pressed.
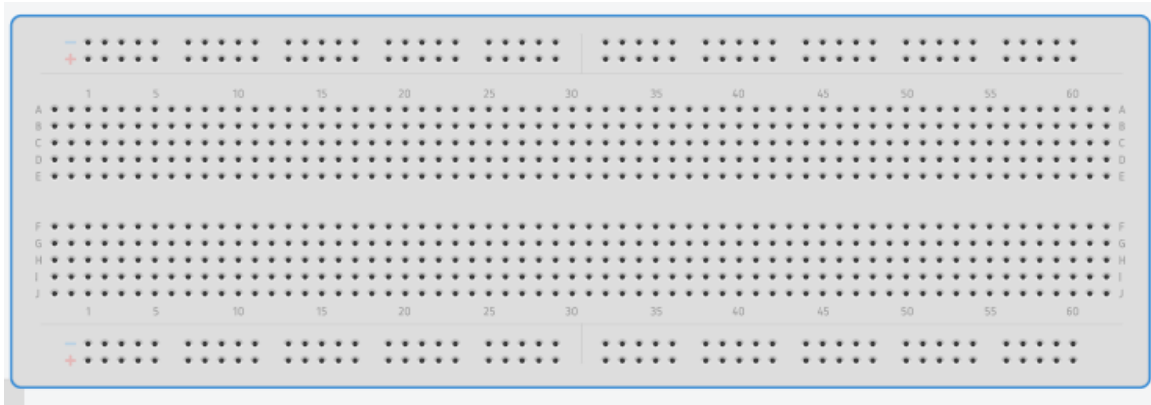
4.1.5   Breadboard

Figure 4.5: Breadboard

A breadboard is a solderless device for temporary prototype with electronics and test circuit designs. Most electronic components in electronic circuits can be interconnected by inserting their leads or terminals into the holes and then making connections through wires where appropriate. The breadboard has strips of metal underneath the board and connect the holes on the top of the board. The metal strips are laid out as shown below. Note that the top and bottom rows of holes are connected horizontally and split in the middle while the remaining holes are connected vertically.
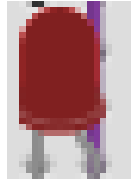
4.1.6 LED

Figure 4.6: LED

Red led was used for this project .The led status becomes high if user has put any inputs and it stays high if and only if the password is correct and if password is incorrect then led status becomes low.
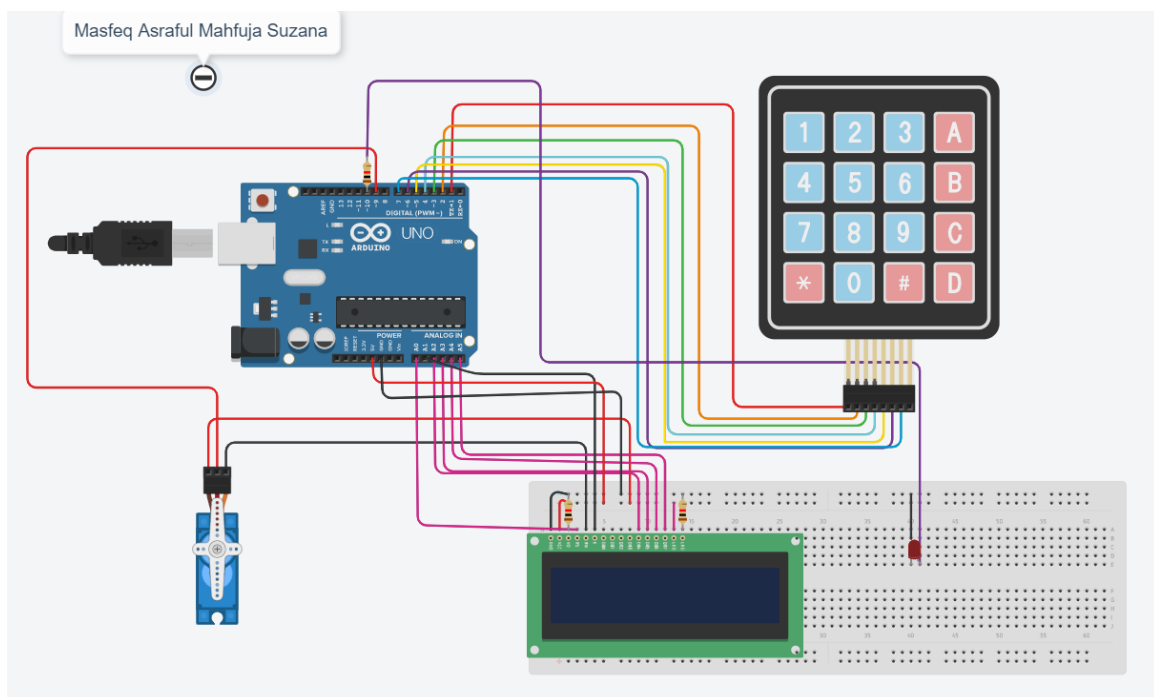
4.1.7 Hardware design

Figure 4.7: Circuit design

The circuit of this project is very simple which includes Arduino, keypad module, Micro servo and LCD. Arduino controls the entire process, such as taking the password from a keypad

module, comparing passwords, changing passwords, turning the Micro servo, and sending the status to the LCD display. The keypad is used to enter the password. 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.
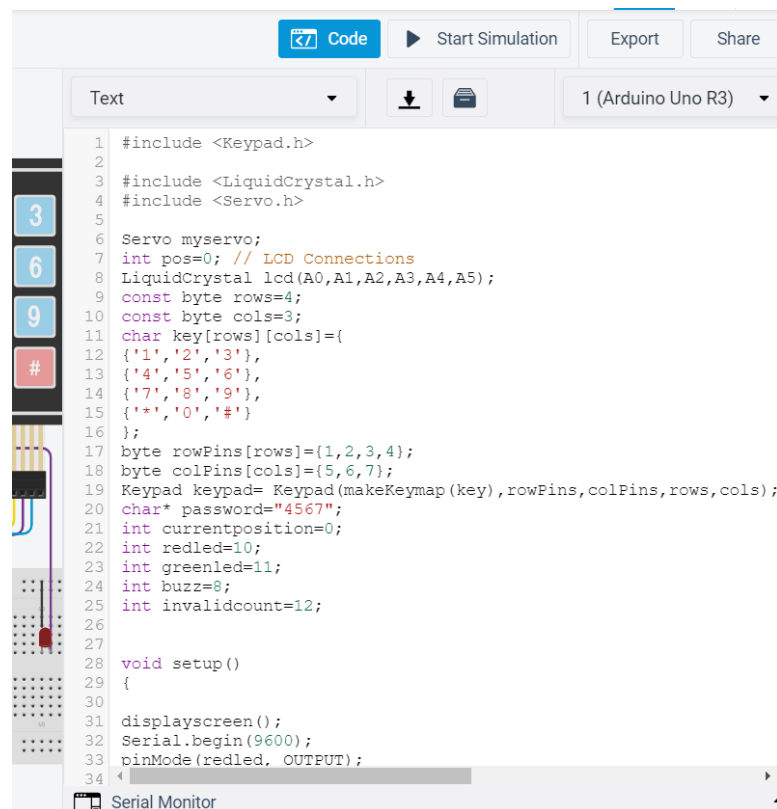
4.1.8 Working software

Figure 4.8: Tinkercad

Tinkercad is a powerful and enriched tool for web based micros.It has been designed to provide easiest possible solutions for developing applications for embedded system in this project.WE have been using it to develop the software and perform the operation.

Chapter 5

Experimental Results

5.1 Result

As we can see the practical implementation of this paper is given in Fig. 4.7 and Fig. 4.8. Now let us discuss about the results or how the system behaves when we are using it. When the power button is switched ON; microcontroller, Micro servo, LCD gets power. Now to OPEN the lock enter password when LCD displays "Enter the code" as shown in Fig. 5.1.

Figure 5.1: Enter Code in the lcd display

If password is correct, "Access Granted Welcome" will be displayed in the LCD as shown in Fig. 8 and the lock will be opened which is showed in Fig. 5.2.

Figure 5.2: Correct Password in the LCD display

On the other hand, if password is wrong, "Get away" will be displayed,and the led status will go low the lock will remain closed which is showed in Fig. 5.3.

Figure 5.3: Wrong Password in the LCD display

If correct password is given then lcd status becomes high and if wrong password is given the lcd status becomes low as shown in Fig. 5.4.
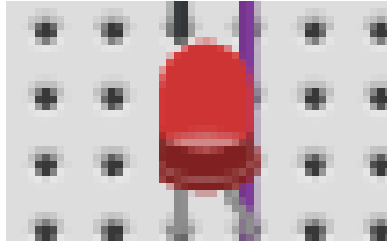

Figure 5.4: Correct password and LCD
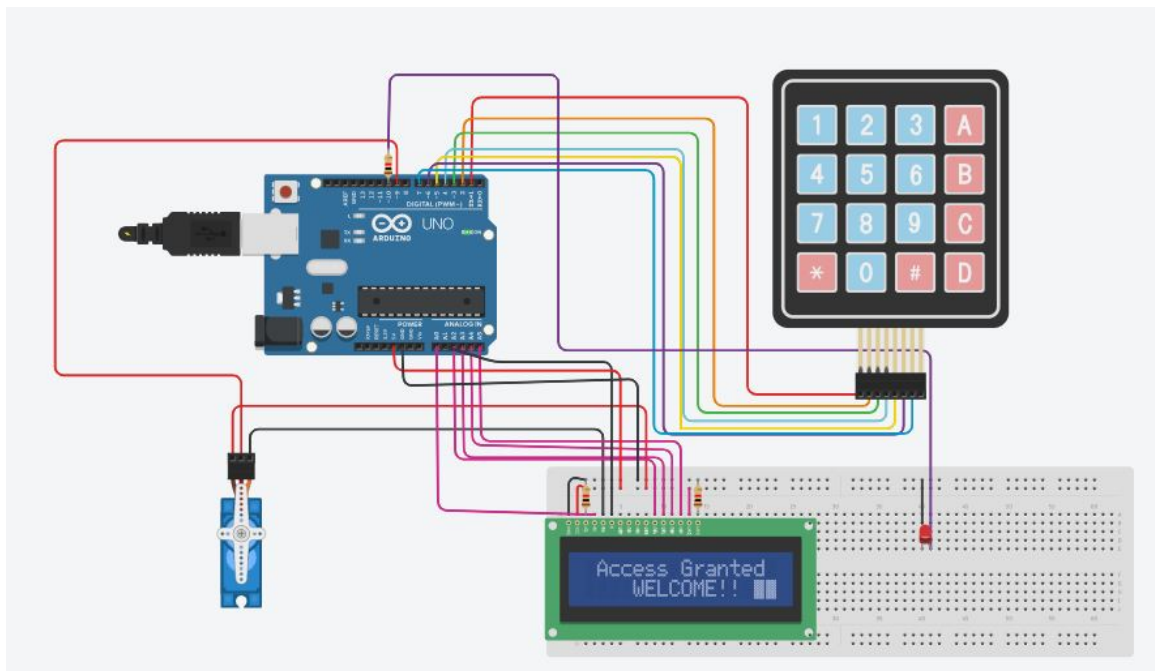
5.2 Full Project Result

Figure 5.5: Total Result Outpur

Chapter 6

Conclusion and Future Work

6.1 Summary

Recently proposed door lock systems based on Biometrics Techniques, Password Based and RFID have been studied and developed. This project is centered on door locking system via smartphone controlled locking system with the help of arduino and Bluetooth module.

6.2 Conclusion

The main aim of this paper is to design a smartdoor security system using Arduino and Bluetooth application, so that people can feel safe about their home whether they are away from home or are in the house. This project is based on Arduino, and the coding is done on Arduino ide platform using the arduino application. At the end of this project the aim and objectives of the project was achieved. People can now feel more secure about their doors all the time. Doors can be controlled conveniently to those with access. Physically challenged people can open or lock doors from their fingertips without asking help of anybody. It is safe to say that the main objectives and the aim of the project were achieved at the end of the project.

6.3 Recommendation

During this project some of the problems I came across were the inability of the door to close automatically after been open for a while unless locked from the application. For future project purpose I recommend other teammates to make a room to make the doors lock automatically after a certain time delay. The door can only be accessed at a particular distance for future work the distance can be put into consideration and made to be longer