Smart Home Automation

**A project report submitted in partial fulfillment of the requirements for
The Award of degree of
Bachelor of Science in electrical and electronics engineering**

Submitted by
Md.Harunur Rasid
ID: 153-33-3071
Tanvir Ahammed
ID: 153-33-2974

Supervisor By
Md.Mortoza Beg
**Lecturer
Department of Electrical and Electronics Engineering
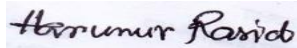Faculty of Engineering**

**Department of Electrical and Electronics
Engineering
Faculty of Engineering**
DAFFODIL INTERNATIONAL UNIVERSITY

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Certification

This certify that this project entitled "**Smart Home Automation**" is done by the following student under my direction supervision and this work has been carried by the laboratories of the department of Electrical and Electronics Engineering under the Faculty of Engineering of Department of Daffodil International University in partial fulfillment of the requirements for the degree of Bachelor of science in Electrical and Electronics Engineering.
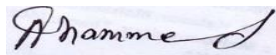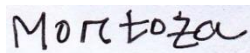
Signature of the candidates

……………………………….
Md.Harunur Rasid
ID: 153-33-3071

…………………………………..
Tanvir Ahammed
ID: 153-33-2974

……………………………………
Md. Mortoza Beg
Lecturer
Department of Electrical and Electronic Engineering
Faculty of Engineering
Daffodil International University.

Dedicated to

Our Parents

CONTENTS

LIST OF FIGURE

LIST OF TABLE

LIST OF ABBREVIATIONS

IC	Integrated Circuit
LDR	Light Dependent Resistors
LED	Light Emitting Diode
SW	Switch
DC	Direct Current
AC	Alternating Current
PCB	Printed Circuit Board
uF	Micro Farad

Acknowledgement

Firstly we express our satisfaction to almighty Allah for give us blessing to make our project successfully. We are thankful to our respective supervisor **Md.Mortoza Beg, Lecturer, Department of Electrical and Electronic Engineering, Daffodil International University,** For his Formative suggestion, guidance, encouragement, valuable advices and cooperation for the successful finished of work on "**Smart Home Automation**". It would not have been possible without his help. We also wish to complement all our respective teachers and staffs of our department of their direct or indirect assistance at different times.

ABSTRACT

This paper represents the advancement of both Home and Industry appliance automatic control by smart phone or remote system. The main destination of our project the security system of home. It has a fire detector sensor, automatic pump controller, night light sensor and password system door lock. The fire detector sensor will sense the fire and give the alarm. The function of automatic pump controller is to turn off the motor when the tank is full and turn on the motor when the water level is lowered. The function of night light sensor turning off the light when the sun light through the LDR and turning on the light when the sun light is goes down. The system is compact with different types of IC and Arduino.

CHAPTER-1
INTRODUCTION

1.1 Introduction

The 21st century is the time of sharp development. It wound up said that existence is incomprehensible without best but it this articulation has changed. Through and via state each day approaches of existence is mind boggling without net. Current development has superior to any other length of modified and wise structures. There's no convincing cause to show the development of improvement in slicing side activities. As we absolute confidence and cognizant, the development has long gone far and almost has gone to its apex of modernization. Now a day's enhancement has changed over into an intentional piece of human beings lives. It has and keeps impacting numerous segment of assessment through evaluation life style and has approved better social association, directly imposition of transportation, the ability to grasp energy and media and has helped inside the movement in pharmaceutical. A champion many to the maximum severe primary devices of bleeding edge occasions is cellphone. A few different essential element of bleeding area age to the web. The best technique to cheek into the universe of changed manage framework is the mixture of mobile of the net. Thusly, with the assistance of those and microcontroller home mechanization change into practical. Presently we will oversee television, fan, refrigerator, and so forth with android telephones. This test is ready simple and modest smart home automation system and security system.

1.2   Objective

i.   To design a multiple circuit for smart Home automation system.

ii. To make a circuit that could practically control and managed to the smart control system.

iii. To create a system which could automatically control and cheek the home state and security system.

iv. The main goal to our project is to reduce the electricity consumption.

1.3   Methodology

i.   At first carefully analyzed to layout the home automation device.

ii. Next step of this challenge may be divided into two part; hardware and software.

iii. Then Information has been collected from different books and websites.

iv. Hardware accessories that is collected from nearby electronics store.

1.4   Summery

This project is to control the home security and automation system. All the system is creating by the IC based and Microcontroller based. We have used many types of sensors here that sensor will send signals to the microcontroller or IC by sensing at all condition. The main scope of this project is automatic control all home appliances.

CHAPTER-2
LITERATURE AND REVIEW

2.1 Introduction

Smart home automation system is most important in our daily life. The designed and developed system can be installed in the home. This project deals with the design and development of password system door lock which is protect our house from thief at the same time reduce electricity consumption and occur accidental house fire it will notify us through an alarm. With this project we can control light, fan, motor, TV and all electrical appliances of the house through smart phone as well as remotely.

2.2 Old System

The traditional door knob has a bolt or spindle running through it that sits just above a cylinder, to which the spindle is connected. Turning the knob pulls the cylinder in the direction of the turn. The end of the cylinder is the "latch bolt" (more simply known as the "latch"), which protrudes into a space carved out of the door frame and which prevents the door from being opened if the knob is not turned.

Fig: 2.1 Old door lock system

In the previous motor control system of the house if the motor switch on and did not switch off after turning on the motor, the water tank would be overload fill-up the tank due to a lot of water wastage and a lot of electricity consumption.

Fig: 2.2 Old switching system

In front of the house we keep the light on full night and forget to turn off in the morning, it on during the day that's why wastage electricity.

2.3 Smart home automation system

Smart door lock system we can easily open the door by password. Smart door lock system does not require any key separately. There is no fear of losing the key. The door can only be opened with a secret password.

Fig: 2.3 Smart door lock system

We can easyly control our room light, fan, TV, AC, fridge etc by our smart phone with connect bluetooth.

Fig: 2.4 Android control system

We can easyly control our room light, fan, TV, AC, fridge etc by a remote.
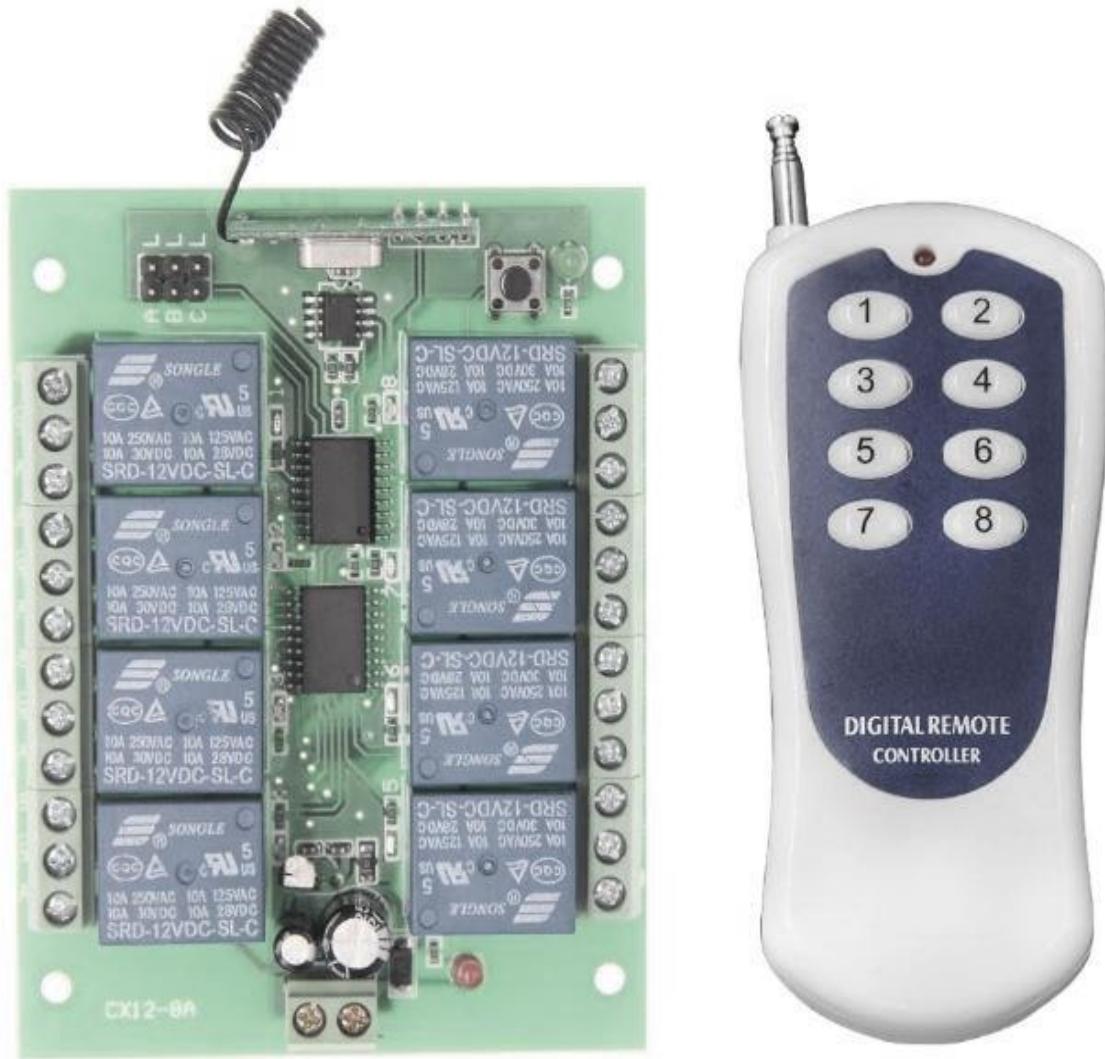
Fig: 2.5 Remote control system

2.4 Some of the limitations faced smart automation system

While there are many benefits to including a keyless door lock system in your home, there are also some major drawbacks to consider as well. While Smart door lock systems are generally safe and designed to alert police or other authorities if incorrect codes are entered too many times, it is nonetheless possible that an intruder may be able to gain access to your home through

this system by guessing or hacking the code. Just as you can forget your keys and be locked out of your home, you can also forget the passcode to access your Smart entry system and be locked out. One main limitation of keyless door locks is that electrically-powered systems may not function properly when power failure.

Android control system cannot work outside the range of Bluetooth modules, since it is connected via Bluetooth. There is a certain range of Bluetooth connection that is 10 meter. Outside the Bluetooth range it's not working.

2.5 Some of the facilities of smart automation system

One of the main advantage of smart home automation system is it can control automatically and hare no need a key for open the door. Here our water pump can control automatic by level of water. When the tank water level is down then the pump automatically on and when the water tank is fill-up the water then the pump is automatically off. When an accidental fire hits our house, we will receive an alarm and through that alarm we will be alert and we protect our home from fire.

2.6 Summary

The summary of main contributions in this project is controlling appliances based on different modes, every modes reduces power consumption, A real life home automation solution which can be implemented at home and need not to be tensed about controlling, Android based control system which is more user friendly than web pages, Useful user interface.

CHAPTER-3

EQUIPMENT

3.1 Introduction

Smart home automation system is very important in modern life. This project deals with the design & development of a password system for home, which is being used to prevent/control any theft attempt and protect our house from fire and reduce electricity bill.

3.2 Arduino UNO R3

The Arduino UNO R3 is frequently used microcontroller board in the family of an Arduino. This is the latest third version of an Arduino board and released in the year 2011.

Fig: 3.1.1 Arduino UNO R3

The main advantage of this board is if we make a mistake we can change the microcontroller on the board. The main features of this board mainly include, it is available in DIP (dual-inline-package), detachable and ATmega328 microcontroller. It has 20 digital input/output pins (of which 6 can be used as PWM outputs and 6 can be used as analog inputs).The programming of this board can easily be loaded by using an Arduino computer program. This board has huge support from the Arduino community, which will make a very simple way to start working in embedded electronics, and many more applications.

3.2.1 Arduino Uno R3 Specifications

i. It is an ATmega328P based Microcontroller

ii. The Operating Voltage of the Arduino is 5V

iii. The recommended input voltage ranges from 7V to 12V

iv. The i/p voltage (limit) is 6V to 20V

v. Digital input and output pins-14

vi. Digital input & output pins (PWM)-6

vii. Analog i/p pins are 6

viii. DC Current for each I/O Pin is 20 mA

ix. DC Current used for 3.3V Pin is 50 mA

x. Flash Memory -32 KB, and 0.5 KB memory is used by the boot loader

xi. SRAM is 2 KB

xii. EEPROM is 1 KB

3.2.2 Arduino UNO R3 pin diagram
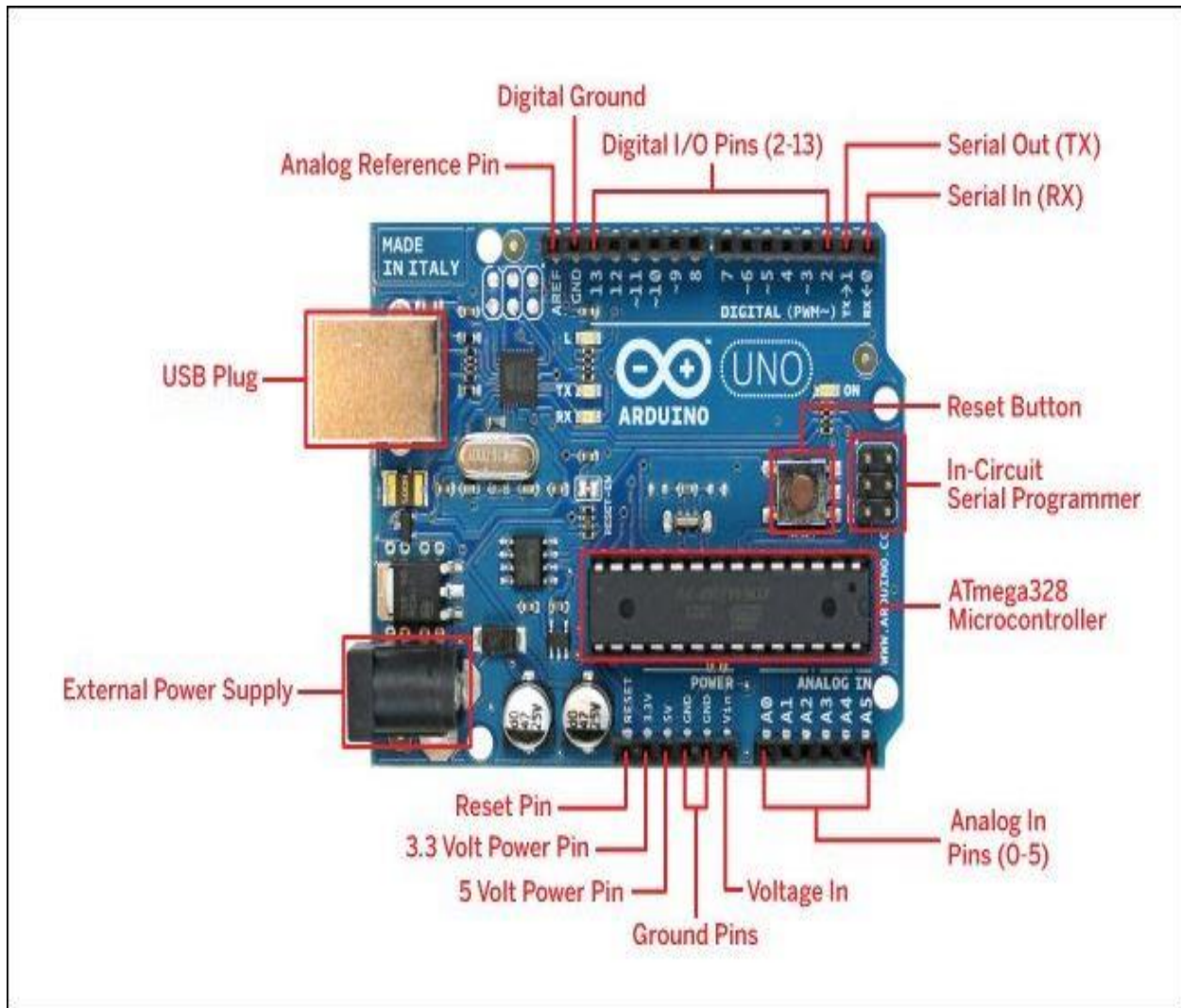
Fig: 3.1.2 Arduino UNO R3 pin diagram

3.2.3 Arduino UNO R3 pin description

Pin Category	Pin Name	Details
Power	Vin, 3.3V, 5V, GND	Vin: Input voltage to Arduino when using an external power source. 5V: Regulated power supply used to power microcontroller and other components on the board. 3.3V: 3.3V supply generated by on-board voltage regulator. Maximum current draw is 50mA. GND: ground pins.
Reset	Reset	Resets the microcontroller.
Analog Pins	A0 – A5	Used to provide analog input in the range of 0-5V
Input/output Pins	Digital Pins 0 - 13	Can be used as input or output pins.
Serial	0(Rx), 1(TX)	Used to receive and transmit TTL serial data.
External Interrupts	2, 3	To trigger an interrupt.
PWM	3, 5, 6, 9, 11	Provides 8-bit PWM output.
SPI	10 (SS), 11 (MOSI), 12 (MISO) and 13 (SCK)	Used for SPI communication.
Inbuilt LED	13	To turn on the inbuilt LED.
TWI	A4 (SDA), A5 (SCA)	Used for TWI communication.
AREF	AREF	To provide reference voltage for input voltage.

Table no: 3.1 Arduino UNO R3 pin description

3.2.4 Arduino UNO R3 technical specification

Microcontroller	ATmega328p-8 bit AVR family microcontroller
Operating Voltage	5V
Recommended Input Voltage	7-12V
Input Voltage Limits	6-20V
Analog Input Pins	6 (A0 – A5)
Digital I/O Pins	14 (Out of which 6 provide PWM output)
DC Current on I/O Pins	40 mA
DC Current on 3.3V Pin	50 mA
Flash Memory	32 KB (0.5 KB is used for Boot loader)
SRAM	2 KB
EEPROM	1 KB
Frequency (Clock Speed)	16 MHz

Table no: 3.2 Arduino UNO R3 technical specification

3.2.5 Arduino Uno to ATmega328 Pin Mapping

Arduino function						Arduino function
reset	(PCINT14/RESET) PC6	1	28	PC5 (ADC5/SCL/PCINT13)		analog input 5
digital pin 0 (RX)	(PCINT16/RXD) PD0	2	27	PC4 (ADC4/SDA/PCINT12)		analog input 4
digital pin 1 (TX)	(PCINT17/TXD) PD1	3	26	PC3 (ADC3/PCINT11)		analog input 3
digital pin 2	(PCINT18/INT0) PD2	4	25	PC2 (ADC2/PCINT10)		analog input 2
digital pin 3 (PWM)	(PCINT19/OC2B/INT1) PD3	5	24	PC1 (ADC1/PCINT9)		analog input 1
digital pin 4	(PCINT20/XCK/T0) PD4	6	23	PC0 (ADC0/PCINT8)		analog input 0
VCC	VCC	7	22	GND		GND
GND	GND	8	21	AREF		analog reference
crystal	(PCINT6/XTAL1/TOSC1) PB6	9	20	AVCC		VCC
crystal	(PCINT7/XTAL2/TOSC2) PB7	10	19	PB5 (SCK/PCINT5)		digital pin 13
digital pin 5 (PWM)	(PCINT21/OC0B/T1) PD5	11	18	PB4 (MISO/PCINT4)		digital pin 12
digital pin 6 (PWM)	(PCINT22/OC0A/AIN0) PD6	12	17	PB3 (MOSI/OC2A/PCINT3)	digital pin 11(PWM)
digital pin 7	(PCINT23/AIN1) PD7	13	16	PB2 (SS/OC1B/PCINT2)	digital pin 10 (PWM)
digital pin 8	(PCINT0/CLKO/ICP1) PB0	14	15	PB1 (OC1A/PCINT1)		digital pin 9 (PWM)

Digital Pins 11,12 & 13 are used by the ICSP header for MOSI, MISO, SCK connections (Atmega168 pins 17,18 & 19). Avoid low-impedance loads on these pins when using the ICSP header.

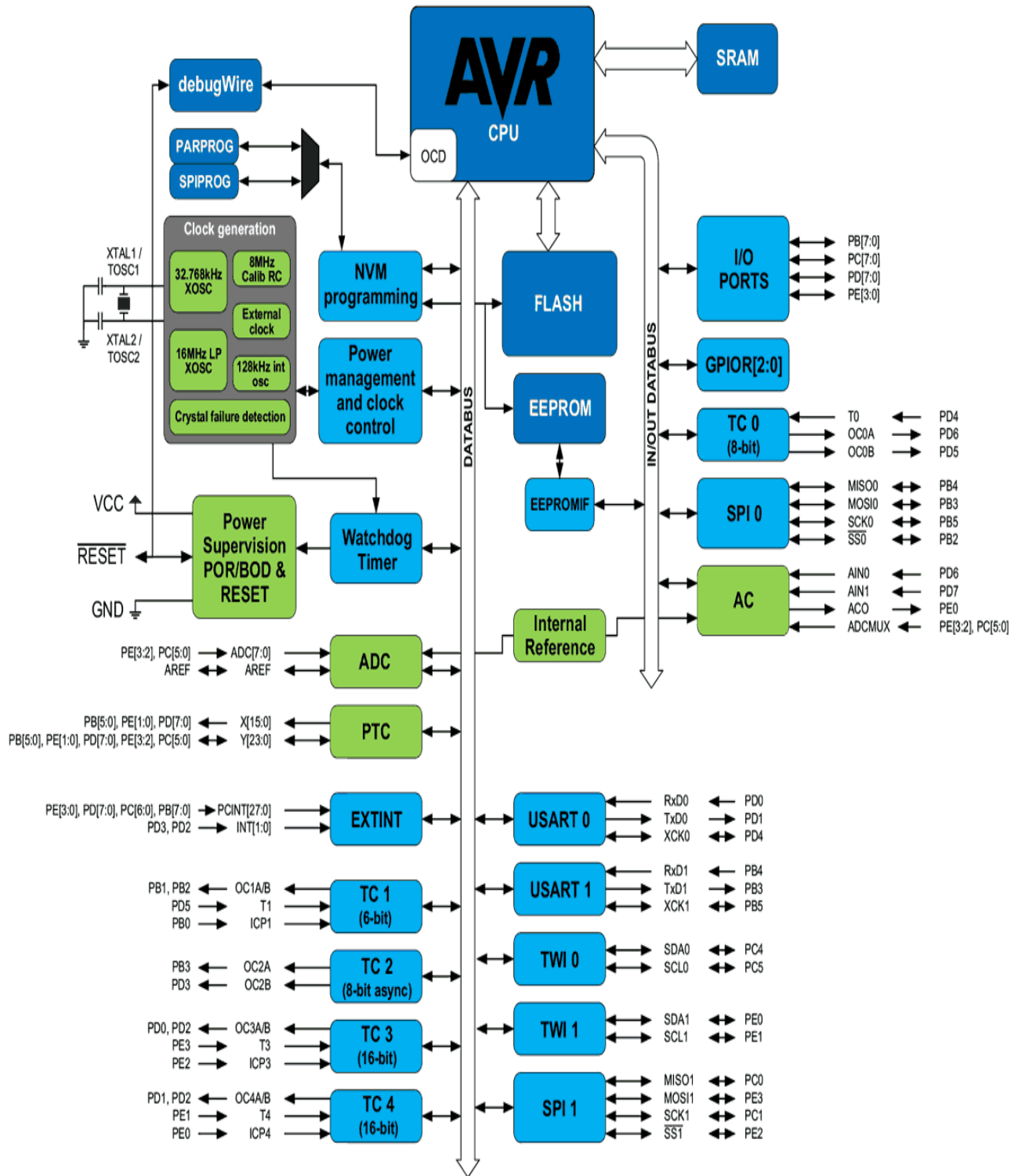Fig: 3.1.3 ATmega328 pin mapping

3.2.6 ATmega328 block diagram

Fig: 3.1.4 ATmega328 block diagram

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3.2.7 Arduino UNO programming

At first installed Arduino IDE on the computer, connect the Arduino Uno with computer using USB cable. Open the Arduino IDE and select the board by selecting Tools>Boards>Arduino/Genuino Uno, and select the correct Port by selecting Tools>Port. Arduino Uno is programmed using Arduino programming language based on Wiring. To get it started with Arduino Uno board and blink the built-in LED. Once the code is loaded into your IDE, click on the 'upload' button given on the top bar. Once the upload is finished, you should see the Arduino's built-in LED blinking

Five steps to program an Arduino

   i.   Programs written in Arduino are known as sketches. A basic sketch consists of 3 parts
- a. Declaration of Variables
- b. Initialization: It is written in the setup () function.
- c. Control code: It is written in the loop () function.

   ii.   The sketch is saved with .ino extension. Any operations like verifying, opening a sketch, saving a sketch can be done using the buttons on the toolbar or using the tool menu.

  iii.   The sketch should be stored in the sketchbook directory.

  iv.   Chose the proper board from the tools menu and the serial port numbers.

   v.   Click on the upload button or chose upload from the tools menu. Thus the code is uploaded by the bootloader onto the microcontroller.

Few of basic Arduino functions are:

   i.   digitalRead(pin): Reads the digital value at the given pin.

   ii.   digitalWrite(pin, value): Writes the digital value to the given pin.

  iii.   pinMode(pin, mode): Sets the pin to input or output mode.

  iv.   analogRead(pin): Reads and returns the value.

   v.   analogWrite(pin, value): Writes the value to that pin.

  vi.   serial.begin(baud rate): Sets the beginning of serial communication by setting the bit rate.

3.2.8 Application

    i.   Prototyping of Electronics Products and Systems

   ii.   Multiple DIY Projects.

  iii.   Easy to use for beginner level DIYers and makers.

  iv.   Projects requiring Multiple I/O interfaces and communications.

3.3 Relay

A relay is a switching device as it works to isolate or change the state of an electric circuit from one state to another.

The relay is a device that open or close the contacts to cause the operation of the other electric control. It detects the intolerable or undesirable condition with an assigned area and gives the commands to the circuit breaker to disconnect the defected area. Thus protects the system from damage.

Working principle: It works on the principle of an electromagnetic attraction. When the circuit of the relay senses the fault current, it energizes the electromagnetic field which produces the temporary magnetic field. This magnetic field moves the relay armature for opening or closing the connections. The small power relay has only one contact, and the high power relay has two contacts for opening the switch.

It has an iron core which is wound by a control coil. The power supply is given to the coil through the contacts of the load and the control switch. The current flows through the coil produce the magnetic field around it.

Due to this magnetic field, the upper arm of the magnet attracts the lower arm. Hence close the circuit, which makes the current flow through the load. If the contact is already closed, then it moves oppositely and hence opens the contacts.
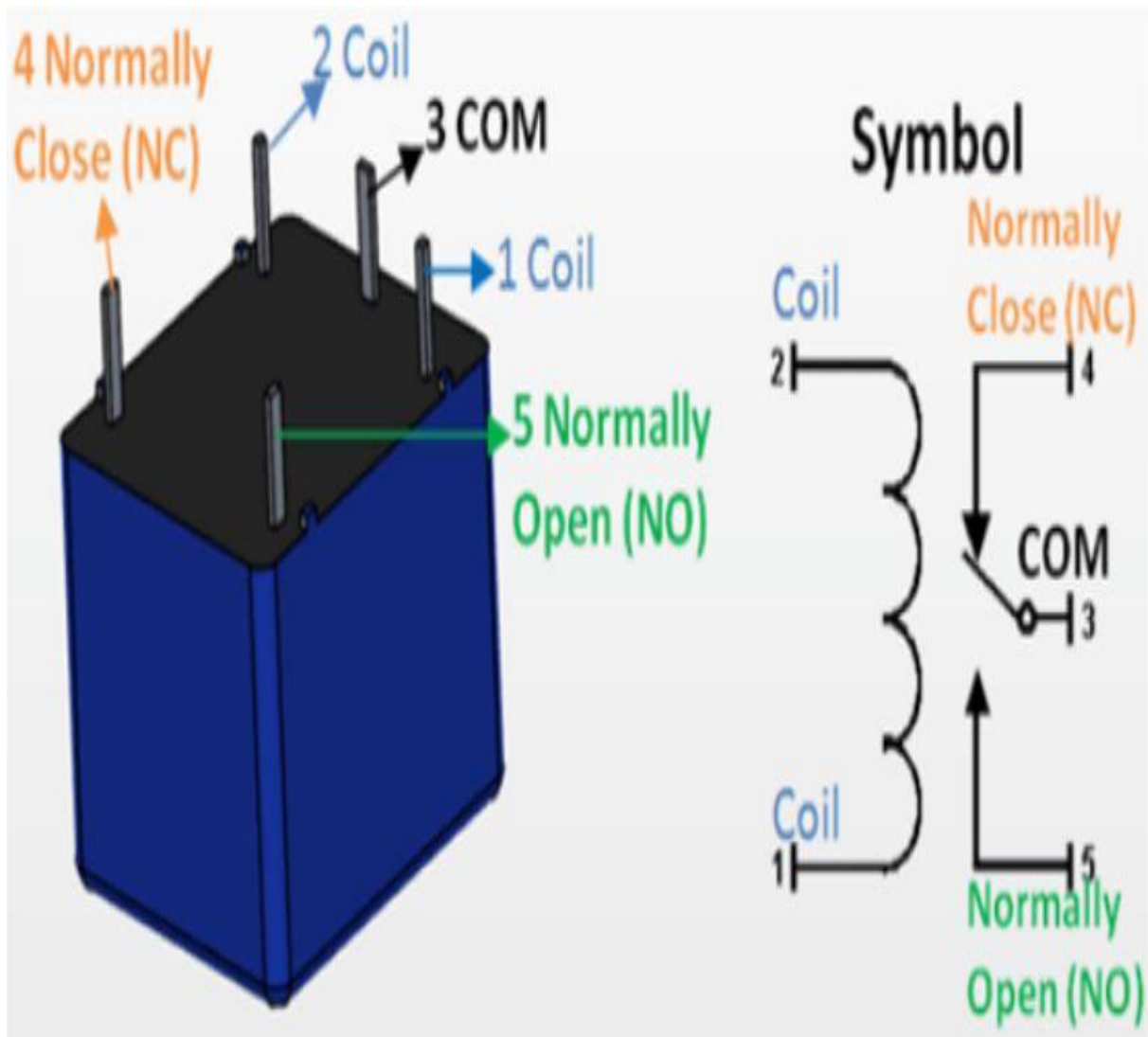
Fig: 3.2 Relay

Fig: 3.3 Relay working principle

3.4 Bluetooth module

Bluetooth module is a basic circuit set of chip which integrated Bluetooth functions and which can be used in wireless network transmission. Generally, the Bluetooth module can be divided into the following types: data transmission module, remote control module, etc.
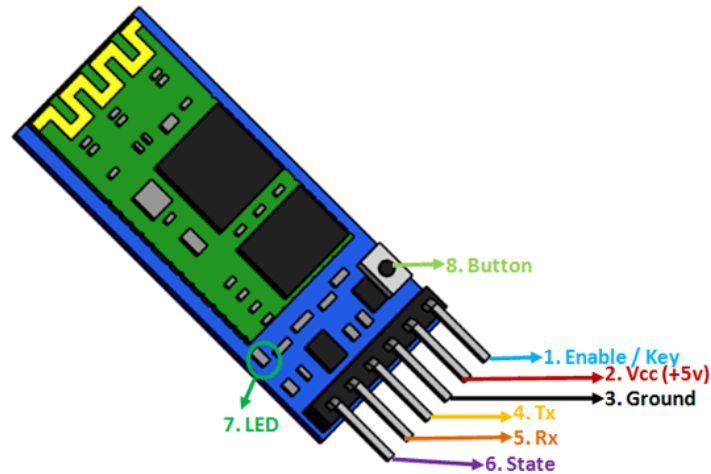
Fig: 3.4 Bluetooth Module

3.4.1 Bluetooth Module pin Configuration

Pin no	Pin name	Details
1	Enable / Key	This pin is used to toggle between Data Mode and AT command mode. By default it is data mode.
2	Vcc	Powers the module. Connect to +5V Supply voltage
3	Ground	Ground pin of module, connect to system ground.
4	TX-Transmitter	Transmits Serial Data. Everything received via Bluetooth will be given out by this pin as serial data.
5	RX-Receiver	Receive Serial Data. Every serial data given to this pin will be broadcasted via Bluetooth
6	State	The state pin is connected to on board LED it can be used as a feedback to check if Bluetooth is working properly.

Table no: 3.3 Bluetooth module pin configuration

3.5 LED

Light emitting diode (LED) is an electronic device that emits light when an electrical current is passed through it. Early LED produced only red light, but modern LEDs can produce several different colors, including red, green, and blue (RGB) light. Recent advances in LED technology have made it possible for LEDs to produce white light as well.

Fig: 3.5 Red LED

3.6 Resistance's

The electrical resistance of an object is a measure of its opposition to the flow of electric current. The inverse quantity is electrical conductance, and is the ease with which an electric current passes. Electrical resistance shares some conceptual parallels with the notion of mechanical friction.

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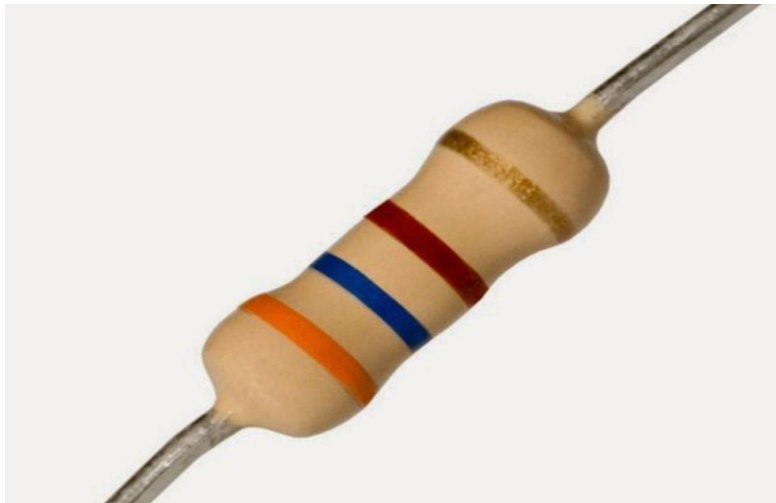
Fig: 3.6.1 Resistance

3.6.1 Resistor color code chart

Color	Value	Multiplier	Tolerance
Black	0	$\times 10^0$	± 20%
Brown	1	$\times 10^1$	± 1%
Red	2	$\times 10^2$	± 2%
Orange	3	$\times 10^3$	± 3%
Yellow	4	$\times 10^4$	- 0, + 100%
Green	5	$\times 10^5$	± 0.5%
Blue	6	$\times 10^6$	± 0.25%
Violet	7	$\times 10^7$	± 0.10%
Gray	8	$\times 10^8$	± 0.05%
White	9	$\times 10^9$	± 10%
Gold	–	$\times 10^{-1}$	± 5%
Silver	–	$\times 10^{-2}$	± 10%

4-band resistor

270 ohms ± 5%

5-band resistor

100k ohms ± 1%

Fig: 3.6.2 Resistor color code chart

3.7 Transistor

A transistor is a device that regulates current or voltage flow and acts as a switch or gate for electronic signals. Transistors consist of three layers of a semiconductor material, each capable of carrying a current.

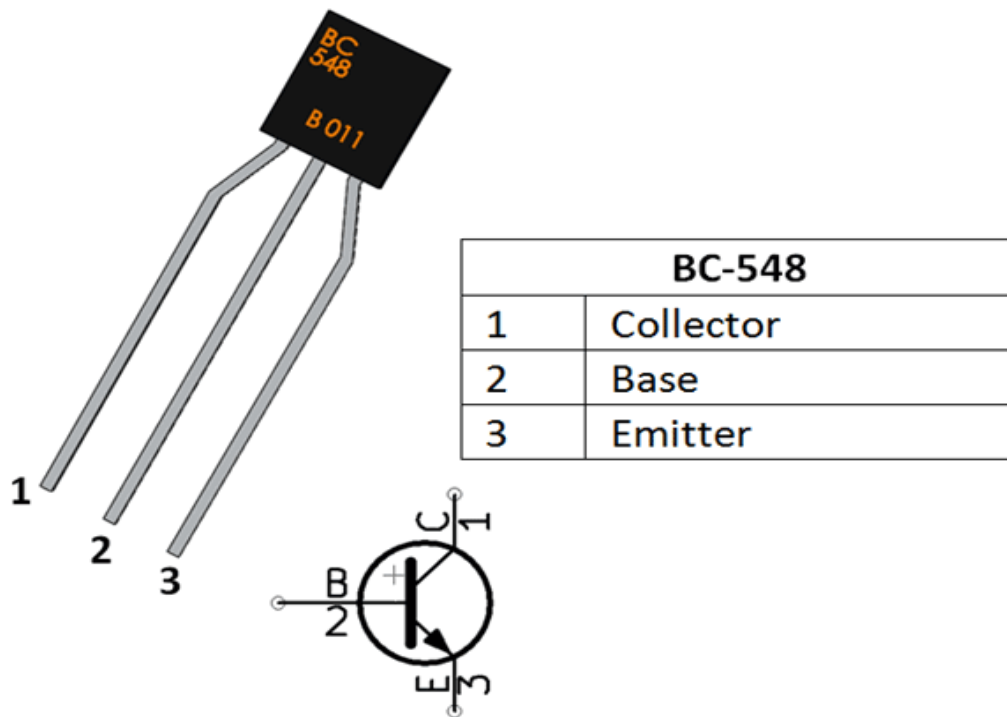| BC-548	
1	Collector
2	Base
3	Emitter

Fig: 3.7 Transistor pin diagram

There are different types of transistor available in the market, but for sake of understanding, we will consider a common emitter mode of NPN transistor. For this let us recall the basic structural features of npn bipolar junction transistor. Its emitter region is heavily doped and wider hence the number of free electrons (majority carriers) is large here. The collector region is also wider but it is moderately doped hence the number of free electrons is not as much as the emitter region. The base region is diffused in between the wider emitter and collector region but the base region is quite thin compared to the outer emitter and collector region and also it is very lightly doped so the number of holes (majority carriers) is quite small here.

3.8 Buzzer

A buzzer or beeper is an audio signaling 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.

Fig: 3.8 Buzzer

3.9 Transformer

A transformer is a static device which transfers electrical energy from one circuit to another of the same frequency through the process of electromagnetic induction. It is most commonly used to increase (step up) or decrease (step down) voltage levels between circuits.

Working principle: The working principle of a transformer is very simple. Mutual induction between two or more windings (also known as coils) allows for electrical energy to be transferred between circuits. The main principle of operation of a transformer is mutual inductance between two circuits which is linked by a common magnetic flux. A basic transformer consists of two coils that are electrically separate and inductive, but are magnetically linked through a path of reluctance. The working principle of the transformer can be understood from the figure below.
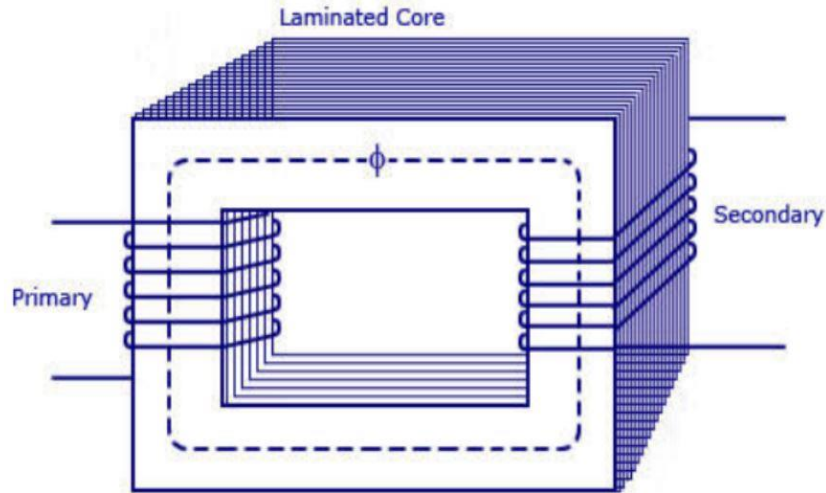
Fig: 3.9 Transformer Constructions

3.10 Diode

Diode an electrical component that allow the flow of current in only one direction. The most common type of diode uses a p-n junction. In this type of diode, one material (n) in which electron are charge carriers abuts second material (p) in which holes (place depleted of electrons that act as positively charge particles) act as charge carriers.
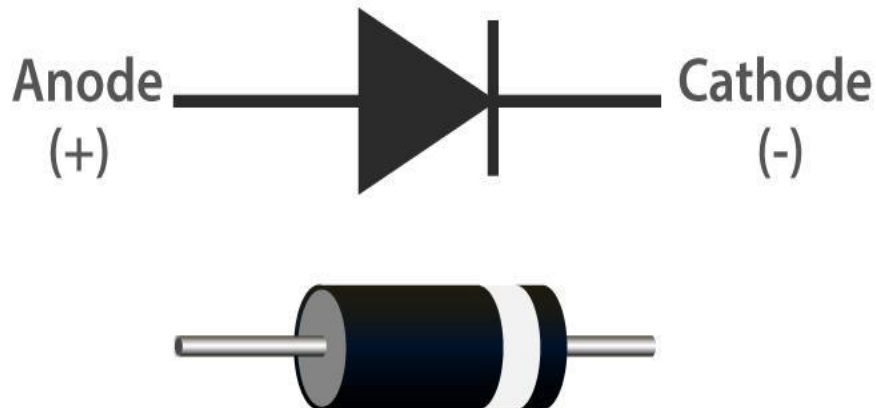

Fig: 3.10 Diode

3.11 Sensor

LDR: A Light Dependent Resistor (LDR) is also called a photo resistor or a cadmium sulfide (CdS) cell. It is also called a photoconductor. It is basically a photocell that works on the principle of photoconductivity. The passive component is basically a resistor whose resistance value decreases when the intensity of light decreases. This optoelectronic device is mostly used in light varying sensor circuit, and light and dark activated switching circuits. Some of its applications include camera light meters, street lights, clock radios, light beam alarms, reflective smoke alarms, and outdoor clocks.
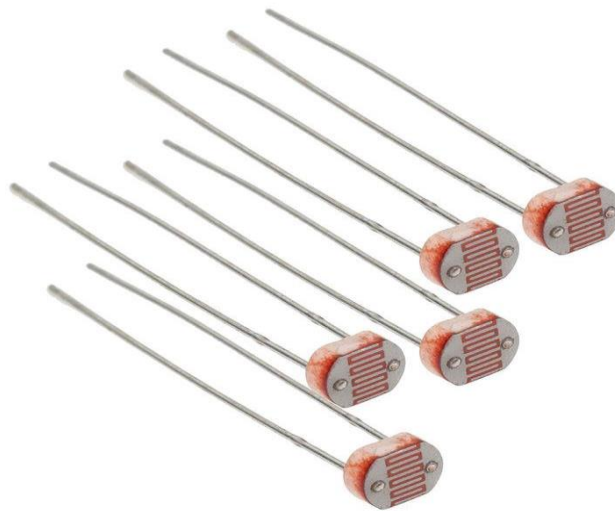
Fig: 3.11.1 LDR

Flame detector sensor: A flame detector is a designed to detect and respond to the presence of a flame or fire, allowing flame detection.

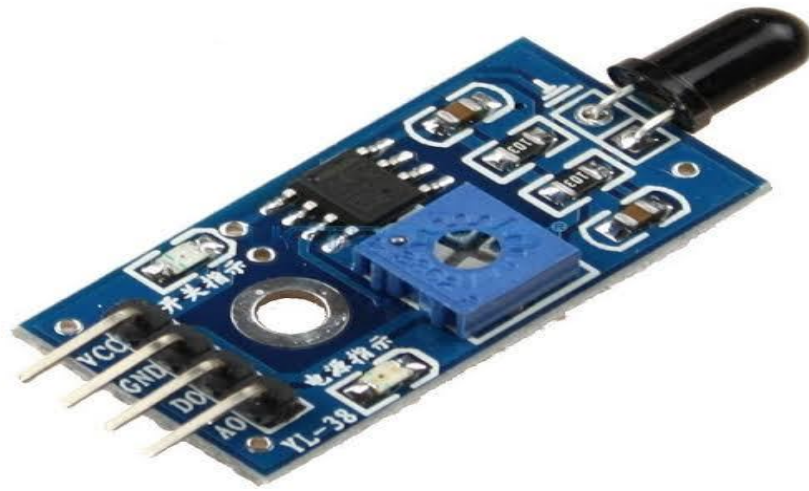© Daffodil International University

Fig: 3.11.2 Flame detector sensor

3.12 Switches

The definition of a switch is a device used to make or break a connection in a circuit so you can turn power on and off to something, or a change in attitude or policy.
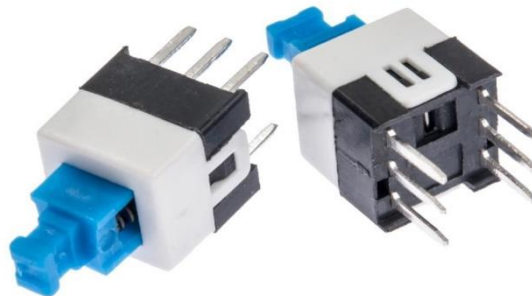

Fig: 3.12 Switches

3.13 IC

555 Timer IC: The 555 timer IC is an integrated circuit used in a variety of timer, pulse generation, and oscillator applications. The 555 can be used to provide time delays, as an oscillator, and as a flip-flop element. Derivatives provide two or four timing circuits in one package.

LM358 IC: The LM358 IC is a great, low power and easy to use dual channel op-amp **IC**. It is designed and introduced by national semiconductor. It consists of two internally frequency compensated, high gain, and independent op-amps.

An integrated circuit, or IC, is small chip that can function as an amplifier, oscillator, timer, microprocessor, or even computer memory. An IC is a small wafer, usually made of silicon, that can hold anywhere from hundreds to millions of transistors, resistors, and capacitors. These extremely small electronics can perform calculations and store data using either digital or analog technology.

Fig: 3.13 IC

3.14 Keypad

A keypad is a set of buttons or keys bearing digits, symbols and/or alphabetical letters placed in order on a pad, which can be used as an efficient input device. A keypad may be purely numeric, as that found on a calculator or a digital door lock, or alphanumeric as those used on cellular phones.

Fig: 3.14 Key Pads (4*3)

3.15 Servo Motor

The servo motor is most commonly used for high technology devices in the industrial application like automation technology. It is a self-contained electrical device that rotates parts of a machine with high efficiency and great precision. The output shaft of this motor can be moved to a particular angle. Servo motors are mainly used in home electronics, toys, cars, airplanes, etc. This article discusses about what is a servo motor, servo motor working, servo motor types and its applications.

Fig: 3.15 Servo Motor

3.16 Vero board

As with other strip boards, in using Vero board, components are suitably positioned and soldered to the conductors to form the required circuit. Breaks can be made in the tracks, usually around holes, to divide the strips into multiple electrical nodes enabling increased circuit complexity.

A printed circuit board (PCB) mechanically supports and electrically connects electronic components or electrical components using conductive tracks, pads and other features etched from one or more sheet layers of copper laminated onto and/or between sheet layers of a non-conductive substrate. Components are generally soldered onto the PCB to both electrically connect and mechanically fasten them to it.
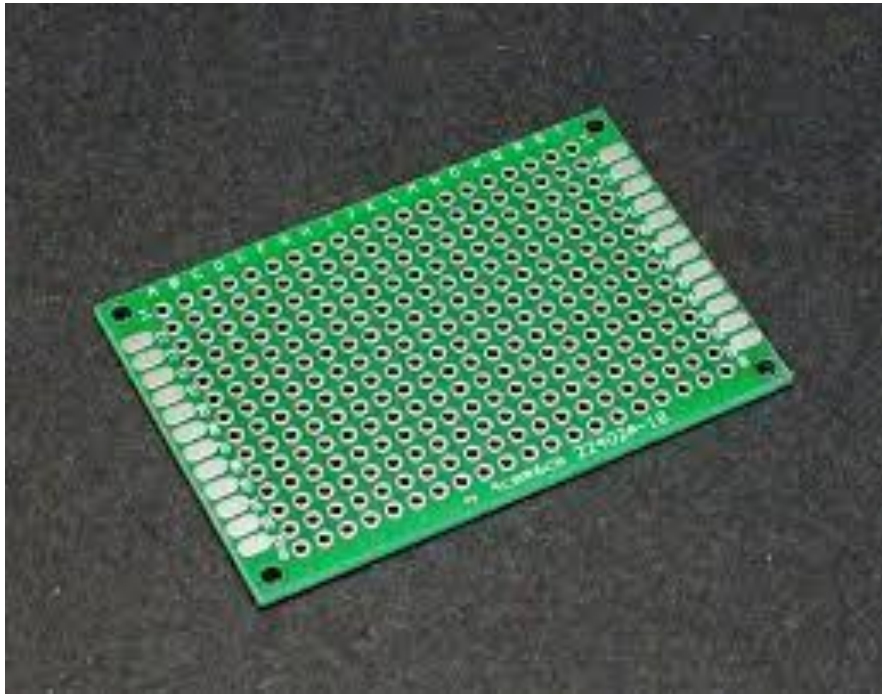

Fig: 3.16 Vero board

CHAPTER-4
THEORETICAL MODEL

4.1 Circuit diagram and explanation

Hare given our project circuit diagram bellow:

4.1.1 Password base door lock system

Equipment needed: Here we using one Arduino Uno r3, one servo motor, one 4*3 keypad.

Working principle: At first all equipment are connect flow the circuit diagram. Such as Keypad have 7 pin that are connect with Arduino 1, 2, 3, 4, 5, 6 and 7 no pin. Servo motor has 3 pin that are Vcc, ground and PWM pin than connect the servo motor Vcc and ground pin with Arduino pin 5V and ground pin. Servo motor PWM pin connect the Arduino pin no 9. Connect the Arduino with computer by using USB cable. Install the IDE file on computer than show the board and port no from tools settings. Keyboard library function paste Local Disk (C)>Program file (x86)>Arduino>Libraries write the code and verify the code than upload the code. Finally supply power 5~ 9 volts with the Arduino the input pin and ground pin.
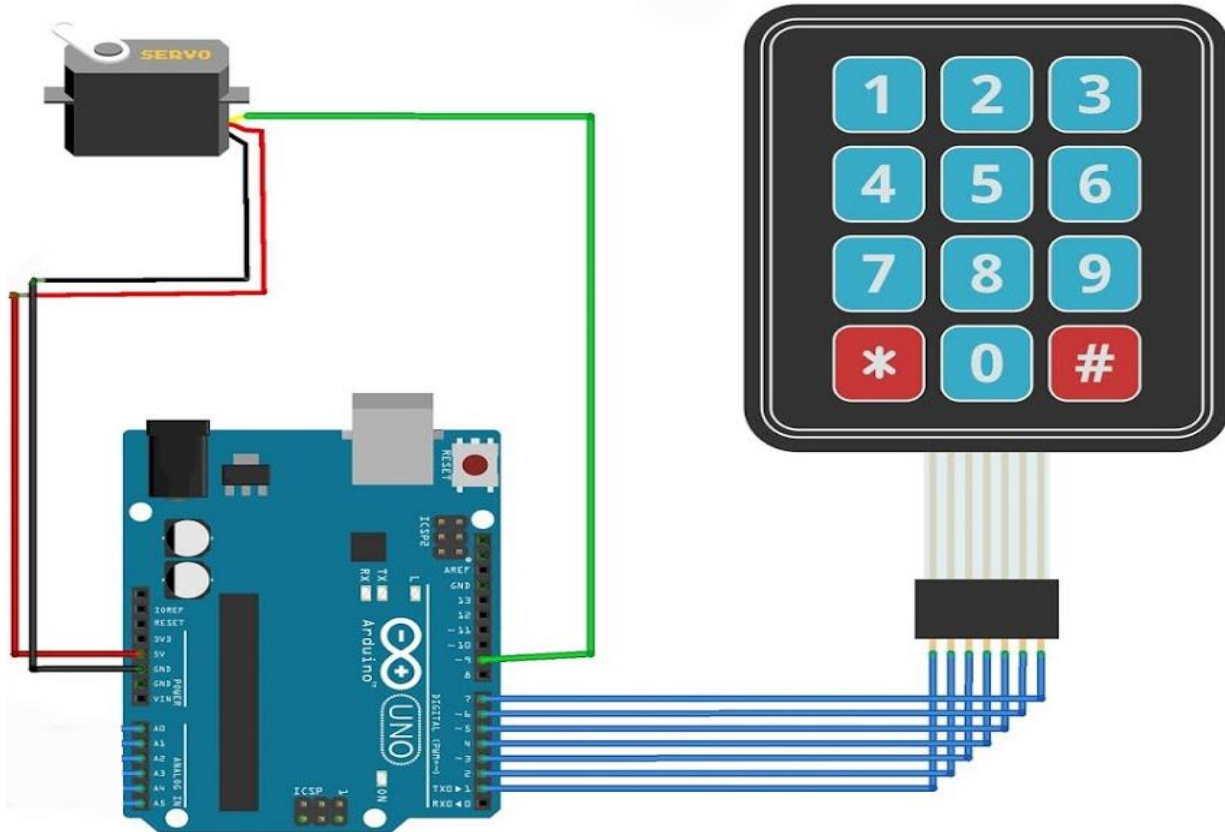
Fig: 4.1.1 Password system door lock

4.1.2 Night light sensor

Equipment needed: Here we use three resistance 100 ohm, 330ohm, 1k ohm two NPN transistor, one LDR sensor, one diode, and one 5 volts relay and 5 volts power supply.

Working principle: At first connect a LED indicator because when supply voltage the LED is blink and connect a 100 ohm resistance for safe the LED from supply. The LDR one pin connect the positive center and another pin connect ground with one 330 ohm resistance for protect the LDR from supply. Connect a transistor. Transistor base point connect between the LDR and resistance, emitter connect to the ground point and collector point connect to the Vcc with one 1k ohm resistance for protect the transistor. Another transistor base point connects between the collector and resistance point. The emitter point connects to the ground and collector to the relay and another point of the relay connect to the Vcc point. A diode is connect between to the relay

supply for protect the back current. Here we use transistor BC547 that is NPN when transistor base point response a positive volts from LDR sense sum light then the transistor negative supply by emitter to collector.
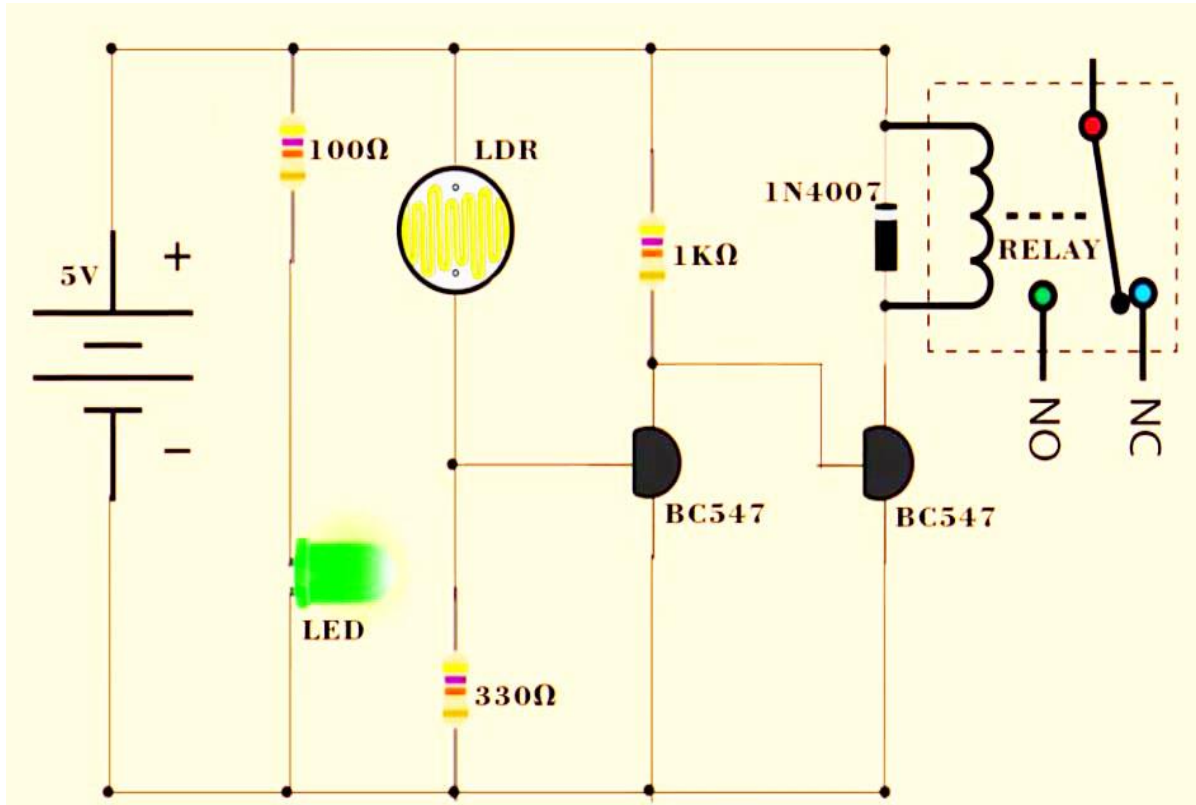
Fig: 4.1.2 Night light sensor

4.1.3 Remote control switching system

Equipment needed: Here we use six resistance 750k ohm, 470 ohm, 33k ohm, LED indicator, RF module 433 MHz, 4 switches HT 12D, HT 12E IC and voltage source.

Working principle: We are dividing this system by two parts one is the transmitter circuit and another are the receiver circuit.

At the sender side we use an encoder IC that is HT12E. It is an IC with 18 pins. Its works at 5 volts supply. First we will shorten pins 1 to 9 from the IC. Connect a resistance between the IC

pin no 15 and 16. Provide positive supply to the IC pin no 18 and provide negative supply to the IC pin no 16 and pin no 1 to 9. From the IC pin no 17 is a signal pin that send data to the transmitter. The transmitter has 4 pins Vcc, ground, dada and antenna. HT12E is a encoder IC and from the IC when pin no 10, 11, 12, 13 connect to the ground by push switch than signal pin 17 that send data to the transmitter by the antenna.

At the receiver side we use a decoder IC that is HT12D. It is an IC with 18 pins. Its works at 5 volts supply. First we will shorten pins 1 to 9 from the IC. Connect a indicator with 470 ohm resistance between the IC pin no 17 and ground. Provide positive supply to the IC pin no 18 and provide negative supply to the IC pin no 1 to 9. Connect a resistance between the IC pin no 15 and 16. This IC signal receive pin no is 14. Here we use a receiver module.

Finally HT12E encoder IC send a encoded signal by the transmitter and the receiver receive data and send the encoded value HT12D decoded this value and output found by pin no 10, 11, 12 and 13.
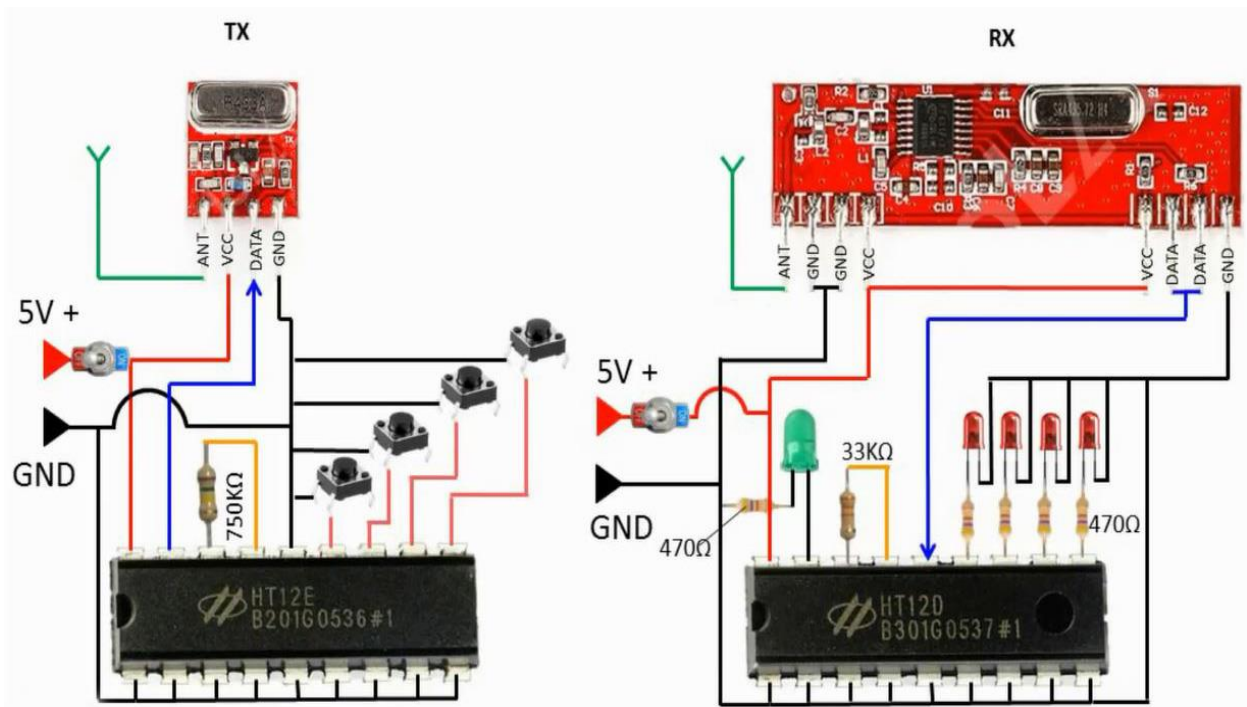

Fig: 4.1.3 Remote control switching system

4.1.4 Bluetooth control switching system

Equipment needed: Arduino Uno, 5 volts relay module, Bluetooth module, voltage regulator IC, LED and voltage source.

Working principle: At first connect all flow the circuit diagram. Take voltage source from the voltage regulator IC. Now relay board pin no 1, 2, 3 and 4 connect to the Arduino pin 10, 11, 12 and 13. Supply the voltage source to the relay board. Now RX from Bluetooth module to the Arduino pin TX and TX from Bluetooth module to the Arduino pin RX and supply to the voltage source to the Bluetooth module. Install the IDE file on computer than show the board and port no from tools settings. Write the code and verify the code than upload the code. Finally supply power 5~ 9 volts with the Arduino the input pin and ground pin.

The LED connection neutral connected to the neutral and line connected to the relay common point. LED another connection to the relay normally open terminal.
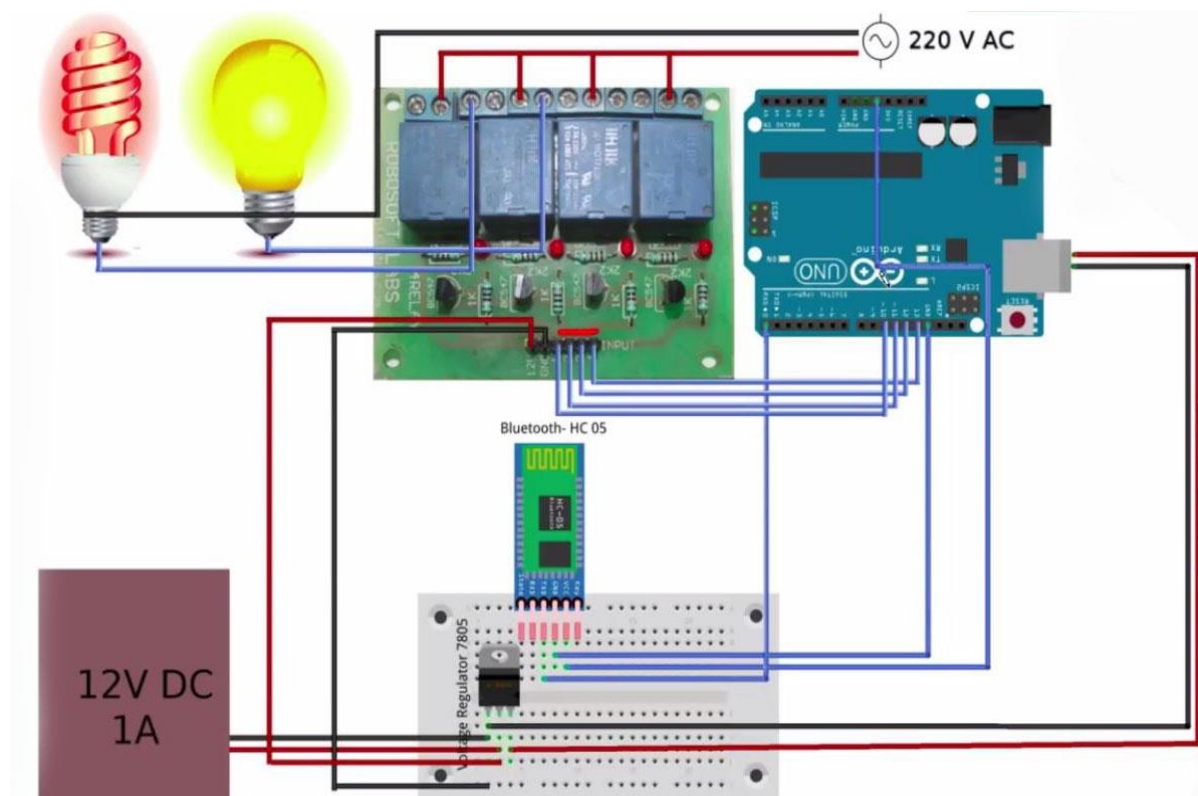

Fig: 4.1.4 Bluetooth control switching system

4.1.5 Automatic water pump controller

Equipment needed: Resistance, capacitor, diode, transistor, relay, 555 timer IC and voltage source.

Working principle: At first take a 555 timer IC it has 8 pins. Pin no 4 & 8 will be shorten and connect to the positive voltage source. IC pin no 1 connected to the ground. We use a capacitor with pin no 5 and ground. Transistor base point connects to the pin no 3 with a 10k ohm resistance and one 100k ohm resistance grounded to the transistor base point. Transistor emitter point connects to the ground point and collector connects to the one terminal to the relay coil. Another terminal of the relay coil connects to the positive supply and a diode connect between the relay coil because of protect the back current. Two resistance 10k ohm & 1M ohm connect to the pin no 6, connected to the another terminal of the 1M ohm resistance is grounded and another terminal of the 10k ohm résistance to the top level of the water tank. Again two resistance 10k ohm & 1M ohm connect to the pin no 2, connected to the another terminal of the 1M ohm resistance is grounded and another terminal of the 10k ohm résistance to the middle level of the water tank. Positive supply connects to the water tank at the lower level.

Finally voltage supply to the circuit the circuit is run. When motor is on water tank fill-up by water touch the top level motor turned off automatically. At the same time when water level cross the top and middle level motor turned on automatically.

Here 555 is an timer IC when gives the positive supply at pin no 2 & 6 at a time by the water tank top and middle level ICs pin no 3 send a positive signal to the transistor base point and relay connect to the ground automatically and motor turned on. When water level cross down the top level and middle level at a same time ICs pin no 3 stop the positive signal to the transistor base point and disconnect ground by the transistor.
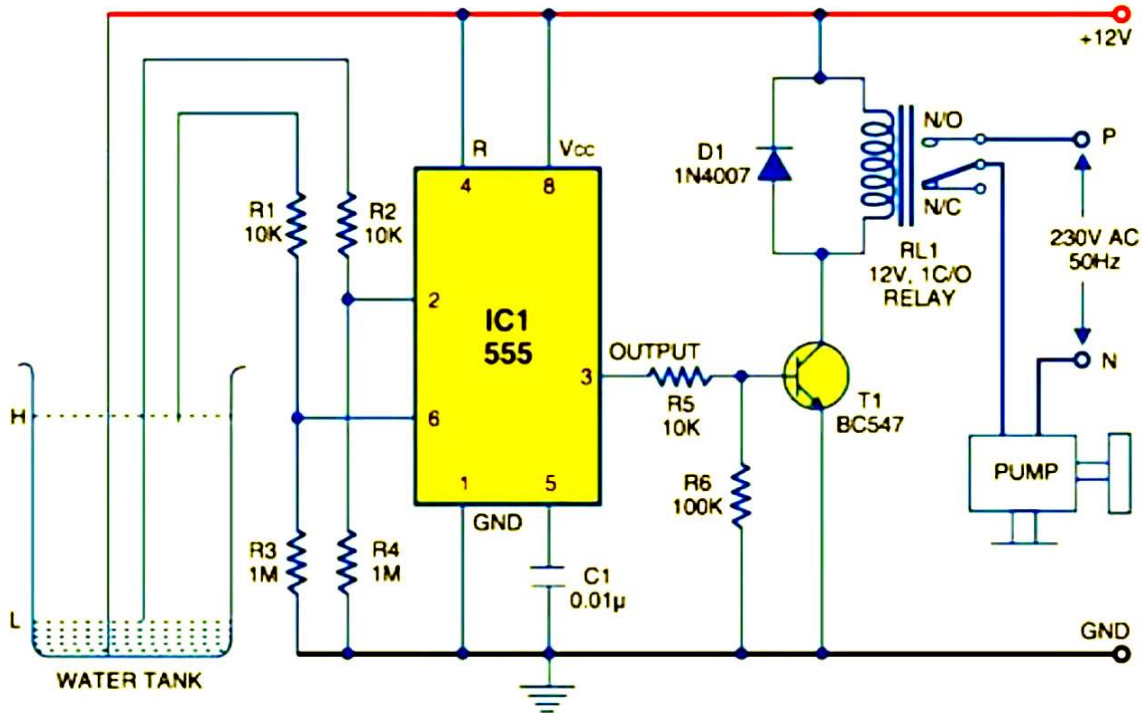
Fig: 4.1.5 Automatic water pump controller

4.1.6 Fire detector alarm system

Equipment needed: Fire detector sensor, resistance, 10k potentiometer, indicator, LM358 IC and voltage source.

Working principle: LM358 is 8 pins prominent IC. There are two op amp in this IC. It has ground voltage at pin no 4 and pin no 8 has a positive supply. Then a fire detector sensor added to the positive supply and negative connect to the ground with a 10k ohm resistance for protect the sensor from supply. Take a potentiometer one pin connect to the positive source and another connect to the ground and the single pin connect to the IC pin no 3. Fire detector sensor negative pin connect to the IC pin no 2.Output we found by pin no 1 that we connect a LED or Buzzer for final output.

When detect fire in front of the sensor its gives a signal pin no 2 and activated the op amp and pin no 1 is high and the buzzer is beeped.
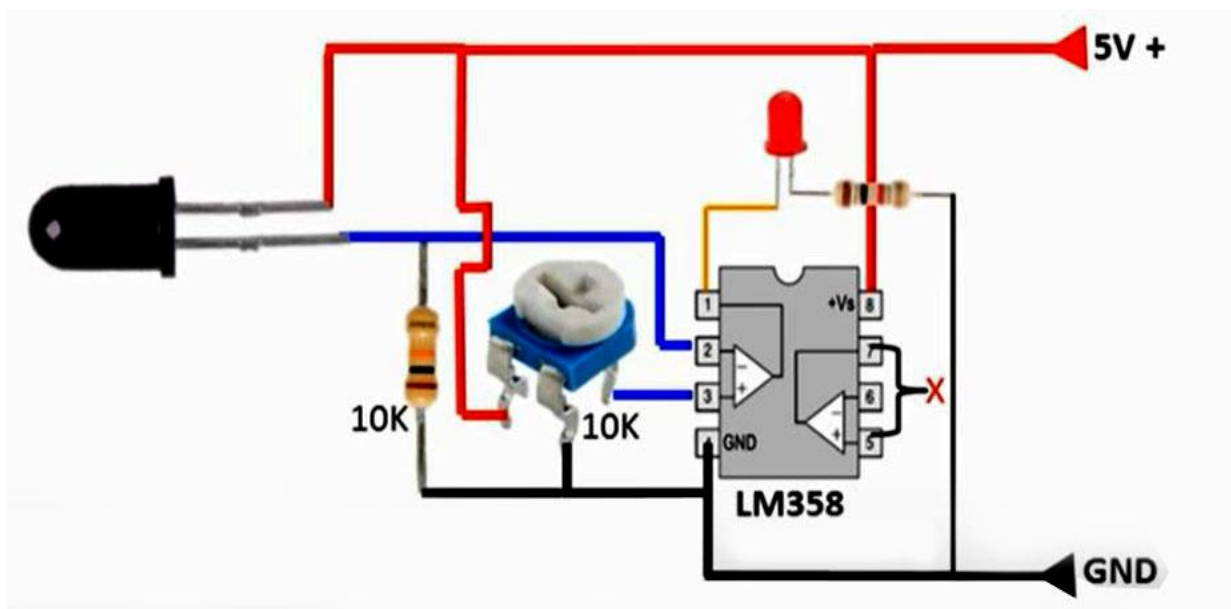
Fig: 4.1.6 Fire detector alarm system

4.2 Advantage

There are a plenty of advantages in our proposed system. The advantages of our project are discussed below:

i.   Intelligent home automation system
ii.   Home appliances can be controlled in just one click
iii. Android based application to control appliances
iv.   Easy user interface of the android application
v.   Multiple modes to control and run appliances when necessary
vi.   Optimum mode for saving consumption of power and also let the appliances to run on its own intelligence.
vii. Auto mode to let the appliances run on its own intelligence where users need not to worry about the appliances and also gives comfort
viii. This system turns a home into a smart home

Chapter 5

RESULT S AND DISCUSSION

5.1 Introduction

In this chapter we have discussed the result of our project. We hope that project will be very useful to us and our country people. There is also much scope to develop that project.

5.2 Our Project

After setup with all equipment of our project the system will run properly. We have used a program to run the system. Our project picture is given below:
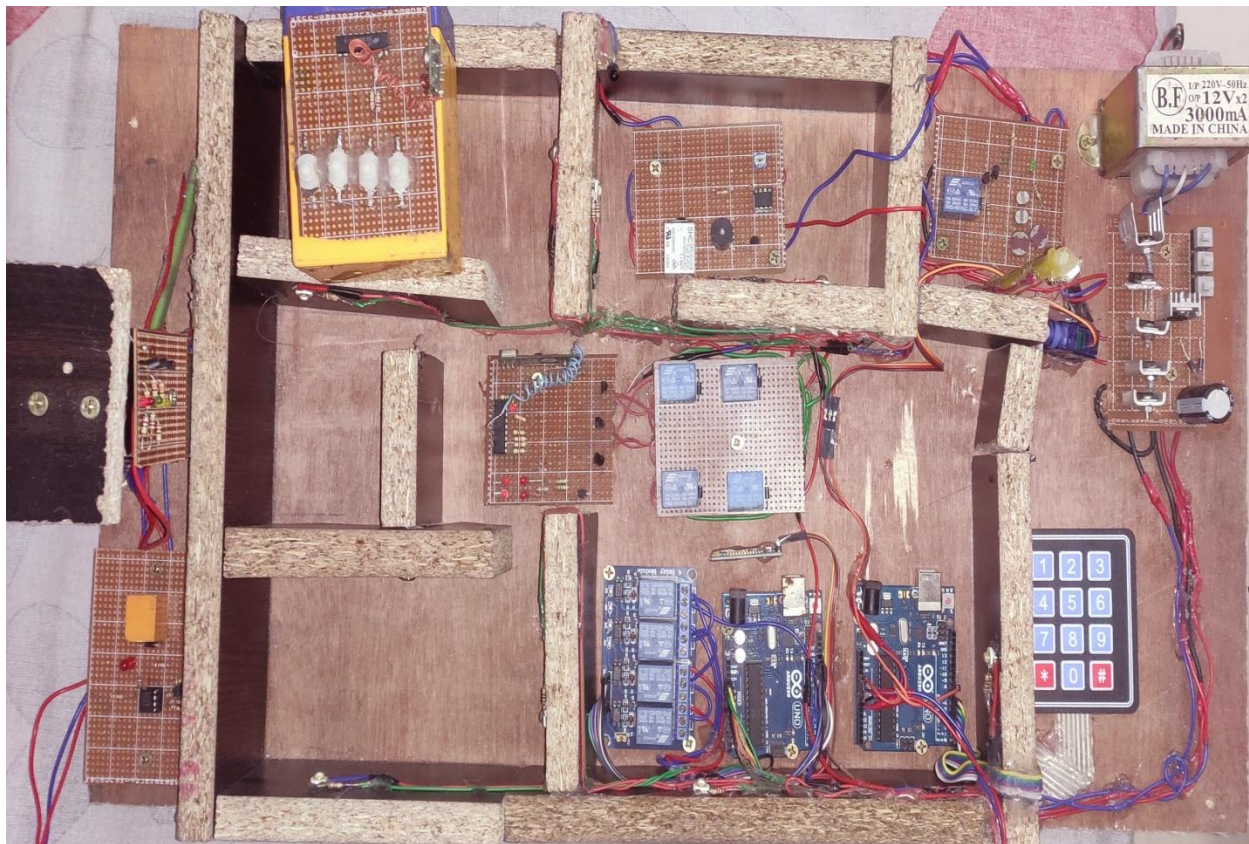
Fig: 5.1 our project top view
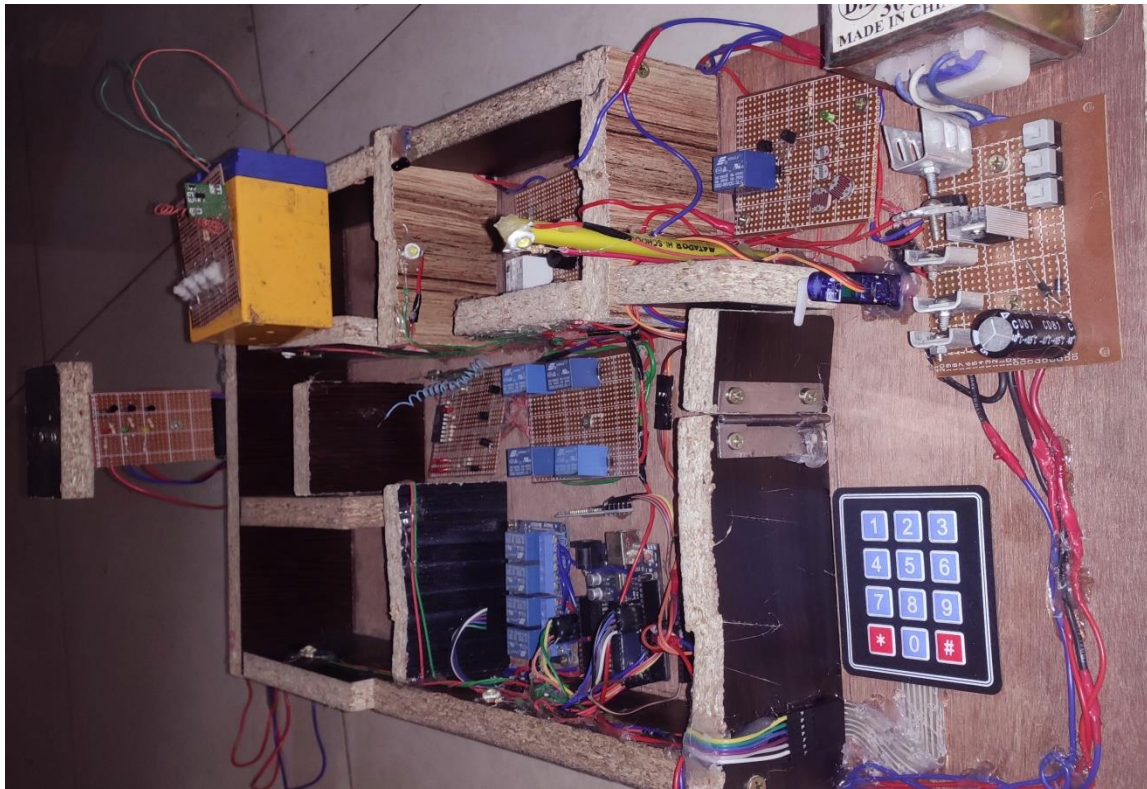
Fig: 5.2 our project side view

5.3 Result

We have encountered a lots of problem when start our project because of many equipment are fault. In the unfailing mercy of Allah through the repeated efforts, finally we finished our project.

5.4 Project cost

Equipment Name	Quantity	Cast
Arduino UNO R3	2	760
Bluetooth Module	1	250
Relay Board	1	250
LED	10	50
Connecting wire	-----	100

Transistor	11	55
Relay	7	140
Indicator	10	10
Resistance	---	20
RX, TX Module	1	160
IC	4	180
Switches	7	70
PCB Board	6	150
Sensor	5	110
Buzzer	1	10
Diode	9	9
Potentiometer	1	3
Servo Motor	1	120
Keypad	1	90
Capacitor	2	10
Transformer	1	145
Hit sink	6	35
Partex Board	-----	250
Glue stick	4	40
Total Cost		**3007Tk**

Table no: 5.1 Project cost

5.5   Summary

In this chapter has discussed about result and discussion. With our project we become successful to exhibit with about the objectives of the project. At last finishing this chapter the project is prepared to use.

Chapter 6

CONCLUSIONS

6.1 Conclusion

In our proposal model a high percentage of accuracy has been achieved though implementation. This system is capable controlling the home appliances based on user's desired mode. All the modes work with a good accuracy which was found during implementation. Our project some side is auto controlling and users only need to select modes from their smart phones. This proposed project is highly reliable. So it can be said that this system has higher accuracy with great efficiency.

6.2 Work Limitations

The working process of this project is very simple but we are encountered some limitation for doing this project. Such as coding problem, program writing, connecting to PCB board, commend following, setup in partex board etc.

6.3 Future scope

This system has huge opportunities to upgrade in future. As mentioned earlier this is the first generation of home automation. It could be upgraded to second generation by storing and analyzing data on the cloud servers. Than using machine learning algorithms, we do not even have to choose modes from smart phones. Rather it might be able to switch modes with its own artificial intelligent.

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Appendix A (Bluetooth control switching System)

```
/*
Relay IN1 connected to PinOut 10 Arduino
Relay IN2 connected to PinOut 11 Arduino
Relay IN3 connected to PinOut 12 Arduino
Relay IN4 connected to PinOut 13 Arduino
--->you can connected to relay modul 4 channel
Serial data sending from Arduino Bluetooth Relay 4CH.apk
data '1'-'4' to on is Ralay CH 1-4
data 'A'-'D' to off is Ralay CH 1-4
data '9' to on ALL CH 1-4
data 'I' to off ALL CH 1-4
*/
int relay1=10;
int relay2=11;
int relay3=12;
int relay4=13;
char val;
void setup() {
pinMode(relay1,OUTPUT);
pinMode(relay2,OUTPUT);
pinMode(relay3,OUTPUT);
pinMode(relay4,OUTPUT);
digitalWrite(relay1,HIGH);
digitalWrite(relay2,HIGH);
digitalWrite(relay3,HIGH);
digitalWrite(relay4,HIGH);
Serial.begin(9600);
}
void loop() {
//check data serial from bluetooth android App
while (Serial.available() > 0){
val = Serial.read();
Serial.println(val);
}
//Relay is on
if( val == '1' ) {
digitalWrite(relay1,HIGH); }
else if( val == '2' ) {
```

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```
digitalWrite(relay2,HIGH); }
else if( val == '3' ) {
digitalWrite(relay3,HIGH); }
else if( val == '4' ) {
digitalWrite(relay4,HIGH); }
//relay all on
else if( val == '9' ) {
digitalWrite(relay1,HIGH);
digitalWrite(relay2,HIGH);
digitalWrite(relay3,HIGH);
digitalWrite(relay4,HIGH);
}
//relay is off
else if( val == 'A' ) {
digitalWrite(relay1,LOW); }
else if( val == 'B' ) {
digitalWrite(relay2,LOW); }
else if( val == 'C' ) {
digitalWrite(relay3,LOW); }
else if( val == 'D' ) {
digitalWrite(relay4,LOW); }
//relay all off
else if( val == 'I' ) {
digitalWrite(relay1,LOW);
digitalWrite(relay2,LOW);
digitalWrite(relay3,LOW);
digitalWrite(relay4,LOW);
}
}
```

Appendix B (Password system door lock)

```
#include <Keypad.h>
#include <LiquidCrystal.h>
#include <Servo.h>
Servo myservo;
#define Password_Lenght 7 // Give enough room for six chars + NULL char
int pos = 0;    // variable to store the servo position
char Data[Password_Lenght]; // 6 is the number of chars it can hold + the null char = 7
char Master[Password_Lenght] = "123456";
byte data_count = 0, master_count = 0;
bool Pass_is_good;
char customKey;
const byte ROWS = 4;
const byte COLS = 3;
char keys[ROWS][COLS] = {
  {'1', '2', '3'},
  {'4', '5', '6'},
  {'7', '8', '9'},
  {'*', '0', '#'}
};
bool door = true;
byte rowPins[ROWS] = {1, 2, 3, 4}; //connect to the row pinouts of the keypad
byte colPins[COLS] = {5, 6, 7}; //connect to the column pinouts of the keypad
Keypad customKeypad( makeKeymap(keys), rowPins, colPins, ROWS, COLS); //initialize an instance of
class NewKeypad
void setup()
{
  myservo.attach(9);
  ServoClose();
  lcd.begin(16, 2);
  lcd.print(" Arduino Door");
  lcd.setCursor(0, 1);
  lcd.print("--Look project--");
  delay(3000);
  lcd.clear();
}
void loop()
{
  if (door == 0)
  {
    customKey = customKeypad.getKey();
    if (customKey == '#')
```

```
  {
    lcd.clear();
    ServoClose();
    lcd.print(" Door is close");
    delay(3000);
    door = 1;
   }
 }
  else Open();
}
void clearData()
{
  while (data_count != 0)
  { // This can be used for any array size,
    Data[data_count--] = 0; //clear array for new data
  }
  return;
}
void ServoOpen()
{
  for (pos = 180; pos >= 0; pos -= 5) { // goes from 0 degrees to 180 degrees
    // in steps of 1 degree
    myservo.write(pos);            // tell servo to go to position in variable 'pos'
    delay(15);                     // waits 15ms for the servo to reach the position
  }
}
void ServoClose()
{
  for (pos = 0; pos <= 180; pos += 5) { // goes from 180 degrees to 0 degrees
    myservo.write(pos);            // tell servo to go to position in variable 'pos'
    delay(15);                     // waits 15ms for the servo to reach the position
  }
}
void Open()
{
  lcd.setCursor(0, 0);
  lcd.print(" Enter Password");

  customKey = customKeypad.getKey();
  if (customKey) // makes sure a key is actually pressed, equal to (customKey != NO_KEY)
  {
    Data[data_count] = customKey; // store char into data array
    lcd.setCursor(data_count, 1); // move cursor to show each new char
    lcd.print(Data[data_count]); // print char at said cursor
```

```
    data_count++; // increment data array by 1 to store new char, also keep track of the number of chars
entered
  }
  if (data_count == Password_Lenght - 1) // if the array index is equal to the number of expected chars,
compare data to master
  {
   if (!strcmp(Data, Master)) // equal to (strcmp(Data, Master) == 0)
   {
    lcd.clear();
    ServoOpen();
    lcd.print(" Door is Open");
    door = 0;
   }
   else
   {
    lcd.clear();
    lcd.print(" Wrong Password");
    delay(1000);
    door = 1;
   }
   clearData();
  }
}
```