



# **NEW HORIZON COLLEGE OF ENGINEERING**

Autonomous College Permanently Affiliated to VTU, Approved by AICTE & UGC  
Accredited by **NAAC** with '**A**' Grade.

## **“SIMPLE CODE LOCK”**

**A MINI PROJECT**

**REPORT**

Submitted by:

**Rohit M (1NH18EC062)**

**Rohan S Patil (1NH18EC097)**

**Ravi N (1NH18EE033)**

**Rupendran A M (1NH18EE047)**

in partial fulfilment for the award of the degree of

**BACHELOR OF ENGINEERING  
IN  
ELECTRONICS AND COMMUNICATION ENGINEERING**

# NEW HORIZON COLLEGE OF ENGINEERING

## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING



### CERTIFICATE

Certified that the mini project work entitled “**SIMPLE CODE LOCK**” carried out by **Rohit M (1NH18EC062), Rohan S Patil (1NH18EC097), Ravi N (1NH18EE033), Rupendran A M (1NH18EE047)**, Bonafede students of Electronics and Communication Department, New Horizon College of Engineering, Bangalore.

The mini project report has been approved as it satisfies the academic requirements in respect of mini project work prescribed for the said degree.

Project Guide

HOD ECE

Ms.NAYANA

-----

-----

### External Viva

Name of Examiner

Signature with Date

1.

2.

# ACKNOWLEDGEMENT

The satisfaction that accompany the successful completion of any task would be, but impossible without the mention of the people who made it possible, whose constant guidance and encouragement helped us succeed.

We thank **Dr. Mohan Manghnani**, Chairman of **New Horizon Educational Institution**, for providing necessary infrastructure and creating good environment.

We also record here the constant encouragement and facilities extended to us by **Dr. Manjunatha**, Principal, NHCE and **Dr. Sanjeev Sharma**, head of the department of Electronics and Communication Engineering. We extend sincere gratitude to them.

We sincerely acknowledge the encouragement, timely help and guidance to us by our beloved guide Ms. **Nayana** to complete the project within stipulated time successfully.

Finally, a note of thanks to the teaching and non-teaching staff of electronics and communication department for their co-operation extended to us, who helped us directly or indirectly in this successful completion of mini project.

**Rohit M (1NH18EC062)**

**Rohan S Patil (1NH18EC097)**

**Ravi N (1NH18EE033)**

**Rupendran A M (1NH18EE047)**

# TABLE OF CONTENTS

ABSTRACT

## CHAPTER 1

INTRODUCTION.....8

## CHAPTER 2

LITERATURE SURVEY.....11

## CHAPTER 3

PROPOSED METHODOLOGY.....

## CHAPTER 4

PROJECT DESCRIPTION .....12

HARDWARE DESCRIPTION.....14

## CHAPTER 5

RESULTS AND DISCUSSION.....26

## CHAPTER 6

CONCLUSION AND FUTURESCOPE.....29

REFERENCES.....32

APPENDIX.....33

## LIST OF FIGURES

<b>SL No</b>	<b>FIGURE No</b>	<b>FIGURE DESCRIPTION</b>	<b>Page No</b>
1	1	First type of combination lock	8
2	2	Modern electronic combinational lock	9
3	3	Improvements in the lock	10
4	4	Circuit diagram of simple code	12
5	5	Push button	14
6	6	Resistor	15
7	7	Diode	16
8	8	Types of led	17
9	9	9v power supply	18
10	10	IC pin diagram and top view	19
11	11	Connecting wires	22
12	12	Bread board	23
13	13	Internal connections of bread board	24
14	14	change the password of the lock	28
15	15	Project on completion	32

## **ABSTRACT**

At present day we are confronting numerous security issues all over world, today security is the most fundamental issue on the planet; so, security for everything has increased higher significance in the ongoing years. In certain papers, the creators have introduced entryway lock security checking framework dependent on inserted and now and then the lock is ensured via programmed secret key subsequently it couldn't without much of a stretch hack by programmers, likewise the improved security frameworks which are currently accessible depend on android stage, remote strategies and installed frameworks. A ton of alteration has occurred in different Door lock security throughout the previous barely any years, and in next coming a very long time there will be numerous progressions that will happen. Code locks are utilized for wellbeing reason, there are numerous sorts dependent on their intricacy and level of security they give. In this report we are going to study and manufacture a straightforward code storage utilizing decade counter IC CD4017. It just requires insignificant segments and simple to fabricate .it is equipped for giving great degree of security to the client and cost effective.

**Keywords:**

- Switch
- Resistor
- Diode
- Led
- Dc power supply
- IC(CD4017)
- Connecting wires
- Bread board

# CHAPTER 1

## INTRODUCTION

Indeed, even with the utilization of mechanical locks, the wrongdoing, thefts get occurred because of the way that such bolts were effectively broken. Security speaks to assurance of our life and resources. Guaranteeing wellbeing of people groups and their significant things is significant for the counteractive action of unlawful dealing with. Thus, essentially concentrating on entryway lock security or door security is imperative to stay away from the further issues in checked zone. In this way, numerous creators present various types of advanced entryway locks, programmed secret word-based entryway locks, programming-based entryway locks and so on. A mix lock is a sort of securing gadget which arrangement of images, normally numbers, is utilized to open the lock. The grouping might be entered utilizing a solitary turning dial which interfaces with a few circles or cams, by utilizing a lot of a few pivoting plates with recorded images which legitimately collaborate with the locking component, or through an electronic or mechanical keypad. Types extend from reasonable three-digit baggage locks to high-security safes. Not at all like normal latches, mix locks don't utilize keys.



Figure 1: First type of combinational lock



## ELECTRONIC COMBINATION LOCK:

A combinational code lock is required to expand the wellbeing of our home or our cycles and security storage around the world. The storage security innovation containing entryway locking structures which can be with or without a lot of a stretch, started, confirmed and approved by the approved individual. Electronic locks can likewise be remotely observed and controlled, both to bolt and to open. It opens the storage entryway progressively way. An electronic clock is a locking gadget which works by methods for electric flow. Electric locks are now and again remained solitary with an electronic control get together mounted legitimately to the lock.



Figure 2: Modern electronic combinational lock

## NEED OF A CODE LOCK:

A code lock is required to increase the safety of our home or to our cycles and safety lockers. It enhances the safety of our locker. Those key lockers we used are easily breakable but the code lock can't be unlocked by normal people who do not know coding. so it is a better to use combinational code locks when compared to normal locks.



Figure 3: Improvements in the lock

## CHAPTER 2

### LITERATURE SURVEY

- [1] Graw-Hill, M.C. (1985), "Encyclopedia of Science and Technology (5<sup>th</sup> Edition)", Cambridge University Press 1985, ISBN 042507843, pp. 2-253.
- [2] Weber, & Thad-L. (1985), "Alarm Systems and Theft Protection", 2<sup>nd</sup> edition, Stonham, MA: Utterworth, pp. 7-8.
- [3] Koenig, J.A., & Taylor, L. (1998), "Perimeter Security Sensor Technology Handbook", Electronic Security Systems Engineering Division, North Charleston, U.S.A, pp. 67-86.
- [4] The raja, B. L., & The raja, B.K (2002), "*A textbook of Electrical Technology*", S. Chand and Company Ltd. New Delhi, India 2002, pp. 220, 920, 924, 1712 – 1716.
- [5] Mehta, V.K., & Mehta, S. (1993), "Principles of Electronics", S. Chand and Company Ltd. New Delhi, India 2002, pp. 149-166.

## CHAPTER 3

### PROPOSED METHODOLOGY

#### CIRCUIT DESCRIPTION:

The circuit diagram is shown below:

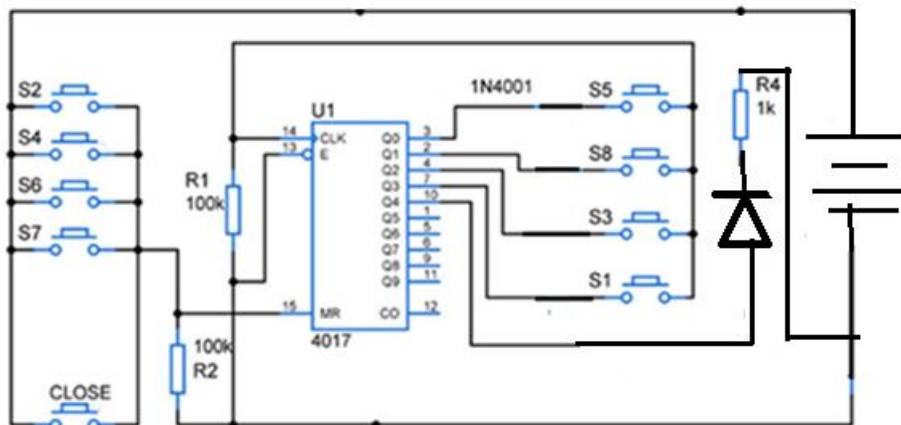


Figure 4: Circuit diagram of simple code lock

The utilization of electronic blend secures cutting edge innovation can't be overemphasized. They avoid robbery, security, etc. Being that they are electronically fueled, they give a superior

and more secure security framework than every other lock. In any case, the electronic mix lock however awesome has a few downsides which are being that they are controlled by electronic methods, they don't work when there is a power disappointment. To stay away from this, the circuit needs to utilize both AC fundamental stockpile and furthermore D.C. supply from a battery or different sources. Since it must be mounted at a point outside the structure, a great deal of nuisances might be discovered tapping on the catches and in any event, bringing about the harm of the control unit mounted with it. To maintain a strategic distance from this, the control units should be set away from the info unit. The venture comprises of straightforward segments (like resistor, diode IC, push catches and a LED). We can utilize either 2 stick or 4 stick push fastens as keypad. At the point when you press the correct secret key the IC gives a yield from the stick 10 which is bolstered to the LED and the LED sparkle in the event that it's an off-base secret key, at that point the LED doesn't shine. The working of the circuit is portrayed approaching pages top to bottom.

## CHAPTER 4

### HARDWARE DESCRIPTION

#### 1.Push button switch :



Figure 5: Push button

A push button switch is a little fixed component that finishes an electric circuit at the point when you press on it. At the point when it's on a little metal spring inside reaches two wires, enabling power to stream. At the point when it's off the spring is detached from the two wires; contact is halted and current doesn't stream. We utilize the push catch to enter the design so lock gets open.

## 2. Resistors:



Figure 6 : 1k and 100k ohm resistor

A conductor has low opposition, while an encasing has a lot higher obstruction. Gadgets called resistor let us present definitely controlled measures of opposition into electrical circuits. A resistor works by changing over electrical vitality into heat, which is disseminated into the air. The principle capacity of resistors in a circuit is to control the progression of current to different segments. Take a LED (light) for instance. On the off chance that an excess of current courses through a LED it is obliterated. In this way, a resistor is utilized to confine the current.

### 3. Diode (1N4001):

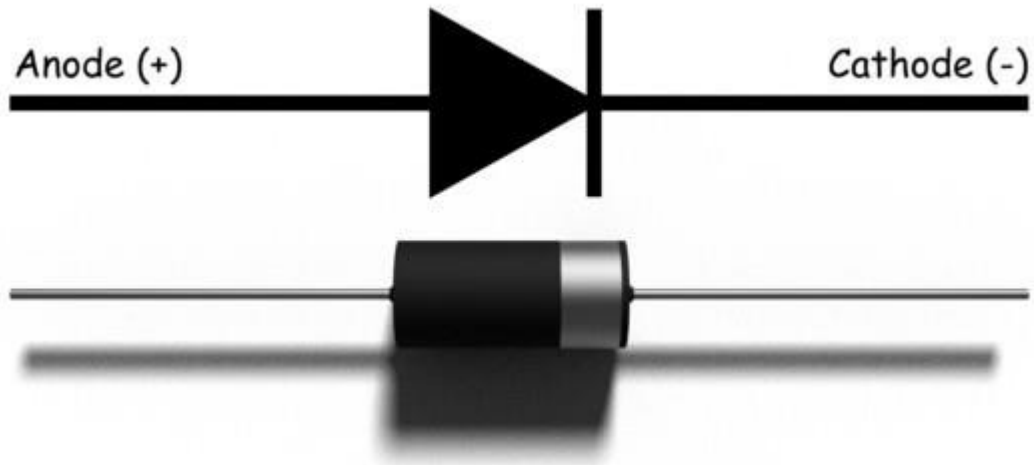


Figure 7: Diode 1n4001

Diodes can be utilized as rectifiers, signal limiters, voltage controllers, switches, signal modulators, signal blenders, signal demodulators, and oscillators. The key property of a diode is its propensity to channel electric flow in just a single heading. 1N4001 Diode, the greatest current conveying limit is 1A it withstands tops up to 30A. subsequently we can utilize this in circuits that are intended for under 1A. The turnaround current is 5uA which is unimportant. It can withstand turn around voltage top up to 50V.



#### 4. LED (light emitting diode):



Figure 8: Types of LED colors available.

**LED** Stands for "Light-Emitting Diode". An LED is an electronic device that emits light when an electrical current is passed through it. In our project we are going to show the locking system with the help of LED. It means when the LED is off the lock is off when the LED is on the lock is on.

## 5. Dc power supply:



Figure 9: 9V power supply

The 9v battery is used to give the required power supply to the circuit. The nine-volt battery format is commonly available in primary carbon-zinc and alkaline chemistry, in primary lithium iron disulfide, and in rechargeable form in nickel-cadmium, nickel-metal hydride and lithium-ion. Mercury-oxide batteries of this format, once common, have not been manufactured in many years due to their mercury content.

## 6. IC CD 4017:

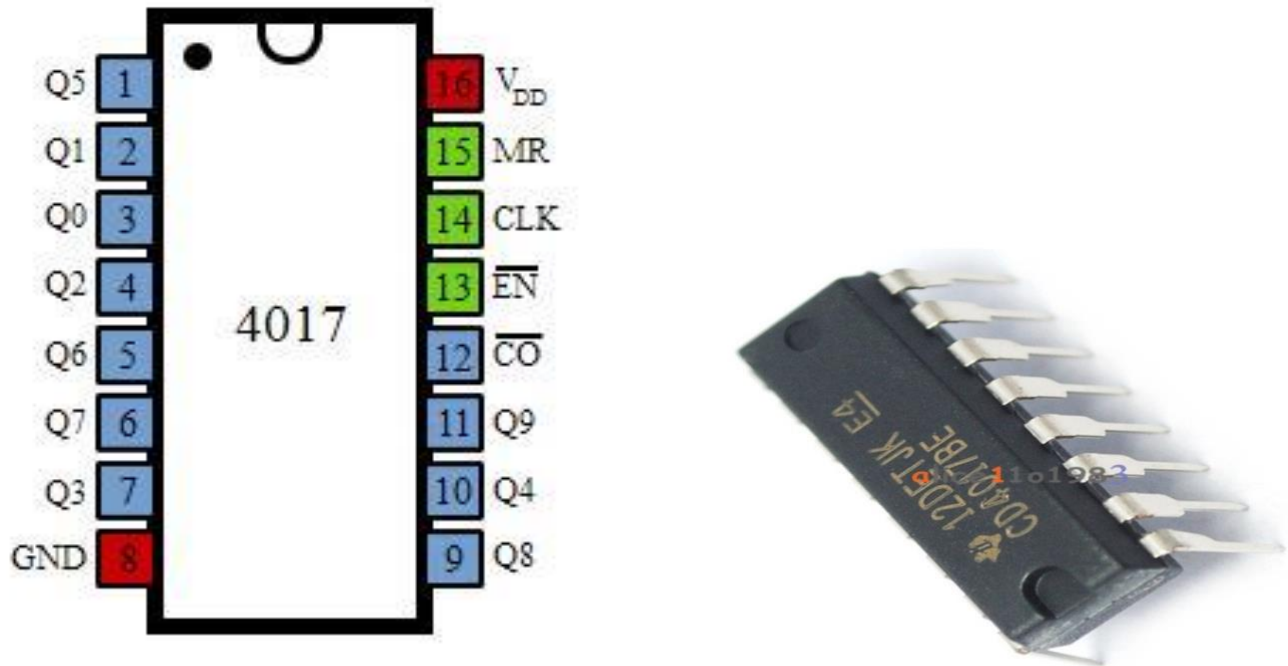


Figure 10: IC 4017 Pin Diagram and top view of IC

We are increasingly OK with 1, 2, 3, 4... instead of 001, 010, 011, 100 the decimal coded yield much of the time as opposed to a crude twofold yield. There are many counter ICs accessible however the vast majority of them produce twofold information as a yield. So, we will again need to process that yield by utilizing decoders or some other hardware to make it usable for our application in the vast majority of the cases, and makes the circuit entangled and coast will increment than the monetary allowance/expressed expense, because of increment in parts and intricacies in the circuit.

We need to get familiar with the IC named IC 4017 which we are going to use in this venture. It is a CMOS decade counter cum decoder circuit which can work out of the crate for the greater

part of the low range checking applications. It can tally from zero to ten and its yields are decoded. This spares a ton of load up existence required to construct our circuits when our application requests utilizing a counter pursued by a decoder IC. This IC likewise rearranges the structure and makes investigating simple.

This IC 4017 has 16 pins and the usefulness of each stick is clarified as following:

- Pin-1: It goes about as yield 5. It is high when the counter peruses 5 tallies.
- Pin-2: It goes about as yield 1. It is high when the counter peruses 0 tallies.
- Pin-3: This is yield 0. It is high when the counter peruses 0 tallies.
- Pin-4: This is yield 2. It is high when the counter peruses 2 tallies.
- Pin-5: This is yield 6. It is high when the counter peruses 6 tallies.
- Pin-6: This is the yield 7. It is high when the counter peruses 7 tallies.
- Pin-7: This is the yield 3. It is high when the counter peruses 3 tallies.
- Pin-8: This is the Ground stick which ought to be associated with a LOW voltage (0V).
- Pin-9: This is the yield 8. It is high when the counter peruses 8 checks.
- Pin-10: This is the yield 4. It is high when the counter peruses 4 checks.
- Pin-11: This is the yield 9. It is high when the counter peruses 9 checks.
- Pin-12: This is separated by 10 yield which is utilized to course the IC with another Counter to empower tallying more noteworthy than the range upheld by a solitary IC 4017. By falling with another 4017 IC, we can tally up to 20 numbers. We can build the scope of tallying by falling it With increasingly number of IC 4017's . Each extra fell IC will build the check extend

by 10. Be that as it may, it isn't prudent to Cascade multiple ICs as It might diminish the dependability of the tally because of the event glitches. On the off chance that you need an including range more than twenty or thirty, I encourage you to go with regular technique of utilizing a paired counter pursued by a relating decoder.

- Pin-13: This stick is the handicap stick. In ordinary method of activity, this is associated with ground or rationale LOW voltage. In the event that this stick is associated with rationale HIGH voltage, at that point the circuit will quit accepting heartbeats thus it won't progress the check independent of number of heartbeats got from the clock.
- Pin-14: This stick is the clock input. This is the stick from where we have to give the input clock heartbeats to the IC so as to propel the check. The tally progresses on the rising edge of the clock.
- Pin-15: This. is the reset stick which ought to be kept LOW for ordinary activity In the event that you need to reset the IC, at that point you can interface this stick to HIGH voltage.
- Pin-16: This is the power supply (Vcc) stick. This ought to be given a HIGH voltage of 3V to 15V for the IC to work.

This IC is helpful and furthermore easy to use. To utilize the IC, simply interface it agreeing the details portrayed above in the stick setup and give the beats you have to check to the stick 14 of the IC. At that point you can gather the yields at the yield pins. At the point when the check is zero, Pin-3 is HIGH. At the point when the check is 1, Pin-2 is HIGH, etc. as depicted previously.

## 7. Connecting wires:

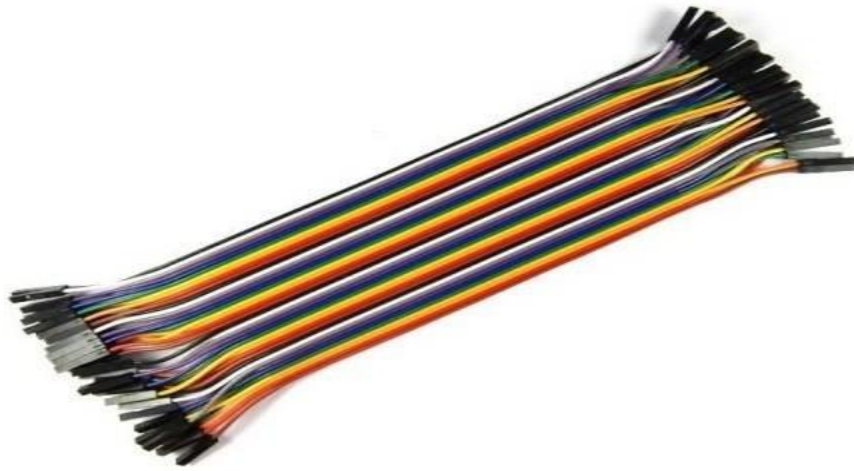


Figure 11: Connecting wires

Connecting wires provide a medium to an electrical current so that they can travel from one point on a circuit to another. In the case of computers, wires are embedded into circuit boards to carry pulses of electricity. In this project we are using jumping wires which are easy to connect on the Breadboard and easy to detach if alternation is required in the middle of the project. These are single strand wire with flexibility to adjust and bend naturally, and it is user friendly to use.

## 8. Breadboard:



Figure 12: Top view of Breadboard

A breadboard is a bind less gadget for brief model with hardware and test circuit structures. Most electronic segments in electronic circuits can be interconnected by embeddings their leads or terminals into the openings and afterward making associations through wires where fitting. Breadboards are utilized for testing and exploring different avenues regarding electronic circuits. You will discover them amazingly advantageous in light of the fact that they are no requirement for patching inside, or remotely and you need to simply connect the parts to the little openings that are given on the breadboard. In any event, when there is blunder in arrangement of the parts they can be separated and reattached to the board appropriately.

## The internal connections of breadboard:

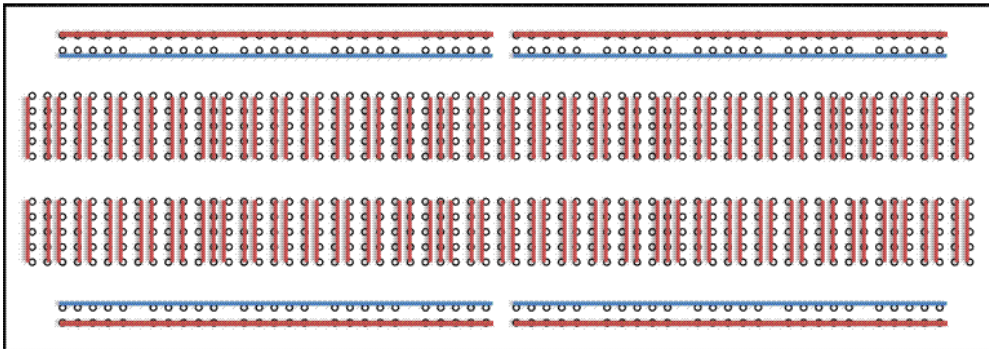


Figure 13: Internal connections of breadboard

A breadboard has many tiny sockets or holes that are arranged on a 0.1" grid. The leads of most components can be pushed straight into the holes. ICs are inserted across the central gap with their notch or dot to the left. Wire links can be made with single-core plastic-coated wire of 0.6mm diameter or the standard size, which is known as 1/0.6mm wire. The above fig shows us the inter connections of the holes throughout the board so that it is easy for connections. Many components can be interconnected or shorted easily without any struggle/tension.



## **Advantages:**

- Simple and cost-effective.
- Minimal components required.
- Many switches can be added to increase complexity.

## **Limitations:**

Complex make and hard to handle design.

# CHAPTER 5

## RESULTS AND DISCUSSION

### Construction:

The control unit was first or briefly developed on a breadboard with all parts set up to test how well they would work as a unit. This is with the goal that it is simpler to design as some wrongly situated segments were re-orchestrated tidiness. It is additionally tried utilizing a +12V/9V D.C power supply unit and saw as filling in true to form. In the format of the segments, certain variables were placed into thought. They incorporate dispersing, shape and size of the parts, jumpers utilized and the quantity of segments. The control circuit, the power supply circuit and the yield circuit (less the solenoid) are built on a similar breadboard. The IC CD4017 and resistors are mounted on the breadboard and associations are given as in the Figure 4, legitimate biasing is provided to the circuit for appropriate capacity of the circuit and for better proficiency of the item.

## Working of code lock circuit:

In this circuit we are going to utilize Q0, Q1, Q2, Q3, Q4 and MR pins for our code storage application. Switches S1, S2 to S7 will be utilized to bolster the secret key info though Close switch is intended to deactivate the storage after utilization. As expressed as of now that with progressive clock heartbeats encouraged to the CLK stick the IC begins tallying from 0 to 9 by means of Q0 to Q9. Here the Switches S5, S8, S3 and S1 are the right secret word succession for this storage. These switches are wired in such a manner to give progressive clock heartbeats to the CLK stick of the IC. At the point when the client presses S5 first it sustains a clock heartbeat to fourteenth stick which makes the IC to increase the check. This thusly gives high yield at Q1 (second stick). At right now when S8 is squeezed it encourages the following heartbeat to CLK stick and afterward the yield goes high in Q2 (fourth stick). Along these lines squeezing the right succession S5, S8, S3, S1 will move the yield from Q0, Q1, Q2, Q3 lastly comes to Q4 where the transistor switch is associated. High in Q4 will actuate the transistor which thusly the transfer and storage ON. Squeezing switches other than the right succession that is S2, S4, S6 and S7 will trigger a reset to CD4017. Likewise, off-base arrangement of S5, S8, S3 and S1 won't make any reaction from the circuit. A nearby switch which likewise triggers a reset was utilized to close the storage after utilization. A LED was added to show actuation/deactivation of the storage. We can even add a bell to the circuit for additional security.

## How to set the code on button keys:

When we need any code, we can connect the code number to switch positions. The order of the codes is not the order of the switches. For example, we need code is 2468. We have to connect as follows:

- First, CODE 2 to Switch 1 (A) at pin 3 of IC1
- Second, CODE 4 to Switch 2 (B) at pin 2 of IC1
- Third, CODE 6 to Switch 3 (C) at pin 4 of IC1
- Fourth, CODE 8 to Switch 4 (D) at pin 7 of IC1
- Fifth, other CODEs to Switch 5 to 10, to connect to pins of IC1

Setting of code diagram is given in the below fig.

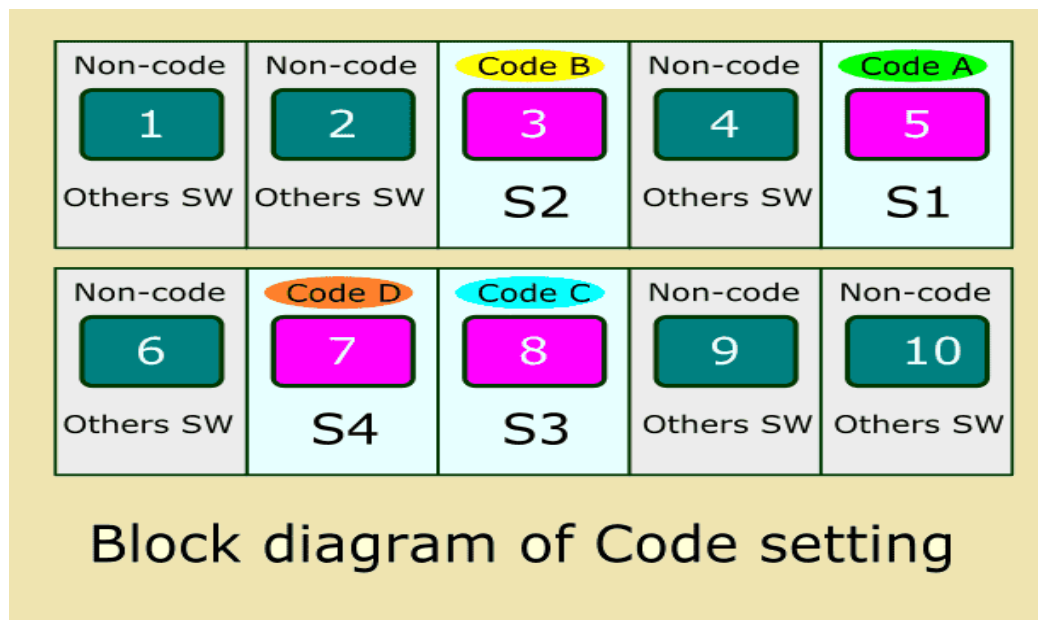


Figure 14: To change the password of the lock

## **Results Obtained:**

On completing the construction, voltage readings (using a digital Multimeter) were taken at Various points with both the right combination and with the wrong combinations of numbers made. Various number combinations were made and the circuit was observed at various points. The Deductions made based on this are shown below:

During correct password = 11.5V

During incorrect password = 0V

## Our project on completion

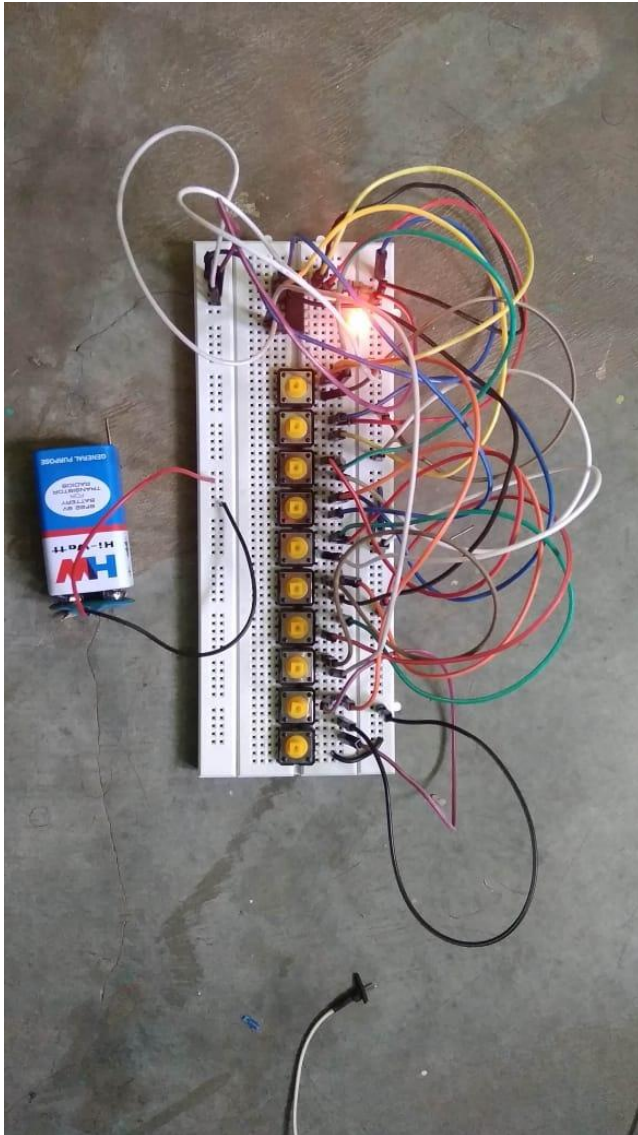


Figure 15: project on completion

## **CHAPTER 6**

### **CONCLUSION**

The expanding pace of wrongdoing, assaults by criminals, gatecrashers and vandals, in spite of all types of Security devices bolts still need the consideration of specialists to locate a changeless answer for the prosperity of lives and properties of people. Accordingly, we plan a modest and viable Security framework for structures, autos, safes, entryways and doors, in order to keep unapproved individual from approaching ones properties using codes, we along these lines test the Application of electronic gadgets as locks. The framework works by blend lock which was isolated into units and every unit planned independently before being coupled to shape an entire useful framework. Twenty tests were led to find out the unwavering quality of the plan with the initial eight blends being four in number, the following seven tests being five and the last five mixes being six. This was done as a result of the consolidation of 2 sham switches in the mixes. From the outcome acquired, blends 8, 11, 13 gave the right yield mix. Be that as it may, 8 as the genuine blend gave the necessary yield. The general 12 activity of the framework and execution is reliant on the key mixes. The general framework was built and tried and it works consummately.

## **FUTURESCOPE**

The security level can be expanded by including a biometric unique mark scanner, we can interface the sensors like Fire, PIR movement finder to the circuit if there should arise an occurrence of any mishap with the goal that entryway will open naturally additionally we can introduce face perceive camera to it so it could catch the image of the criminal who are attempting to break the lock. This basic circuit can be utilized at individual spot like home to guarantee better security. With a slight adjustment, this venture can likewise be utilized to control the exchanging of burdens through secret key which is utilized at associations to guarantee approved access to exceptionally verified spots/records/venture. This venture is a minimal effort and should be possible in home with customization to the lock as per clients wish.



## **REFERENCE**

- [www.alldatasheets.com](http://www.alldatasheets.com)
- [www.digikey.com](http://www.digikey.com)
- [www.wikipedia.com](http://www.wikipedia.com)
- [www.electronicslab4u.com](http://www.electronicslab4u.com)
- <https://www.gadgetronicx.com/simple-code-locker-circuit-cd4017/>

## **APPENDIX**

### **Components List:**

#### **RESISTORS:**

RESISTOR NO	VALUE	RATING
R1	1K	1/4W
R2	100K	1/4W
R3	100K	1/4W

#### **INTEGRATED CIRCUITS:**

I.C1 - CD4017

#### **MISCELLANEOUS**

10 PUSH ON/RELEASE OFF MINIATURE BUTTON SWITCHES 12V SECONDARY WINDING.