



## COA Project

Compiler Engineering (Delhi Technological University)



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# DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

## Computer Architecture



**CO-206**

## 4-Bit Password Security System

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## **ACKNOWLEDGEMENT**

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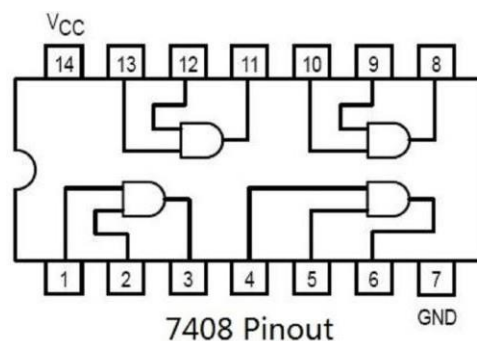
## **Aim**

To use XOR gates as bit comparators and NOR gates as controlled inverters in order to design an electric combination lock and in the process gain knowledge of various components working behind its execution. Also to analyze the real world applications of electronic combination lock and derive conclusion.

## **Introduction**

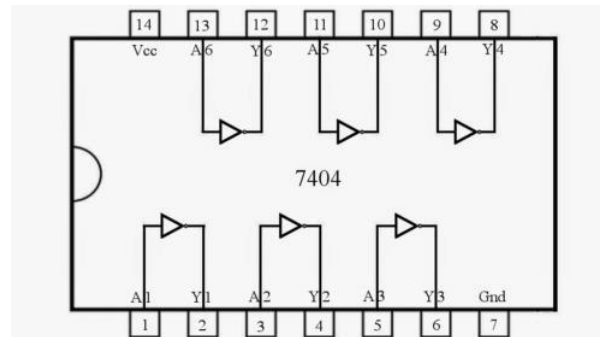
A 4-bit password security system is a type of locking device in which a sequence of symbols, usually numbers, is used to open the lock. The lock circuit that we are using in this project is an electronic combination lock for daily use. It compares and then responds only to the right sequence of four digits that are keyed in remotely. If a wrong key is touched, it resets the lock. We used the following ICs :

1) IC 7408 :



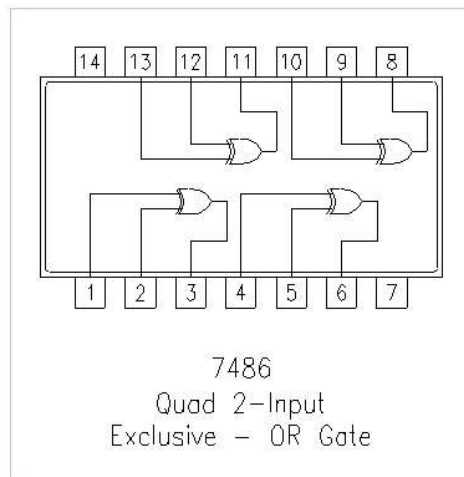
IC 7408 is a logic gate IC. It consists of four two-input AND Gates. The AND gate perform logical AND operation. Logic gates come in form of ICs. The all four AND gates are independent. Each gate has three pins two inputs and one output.

## 2) IC 7404



IC 7404 or IC 74LS04 is a logic gate IC. It consists of six NOT Gates. We know that the NOT gate also called inverters because of it does the complements of the input. When we apply 0 or low signal to the input it gives 1 or high signal in output.

## 3) IC 7486

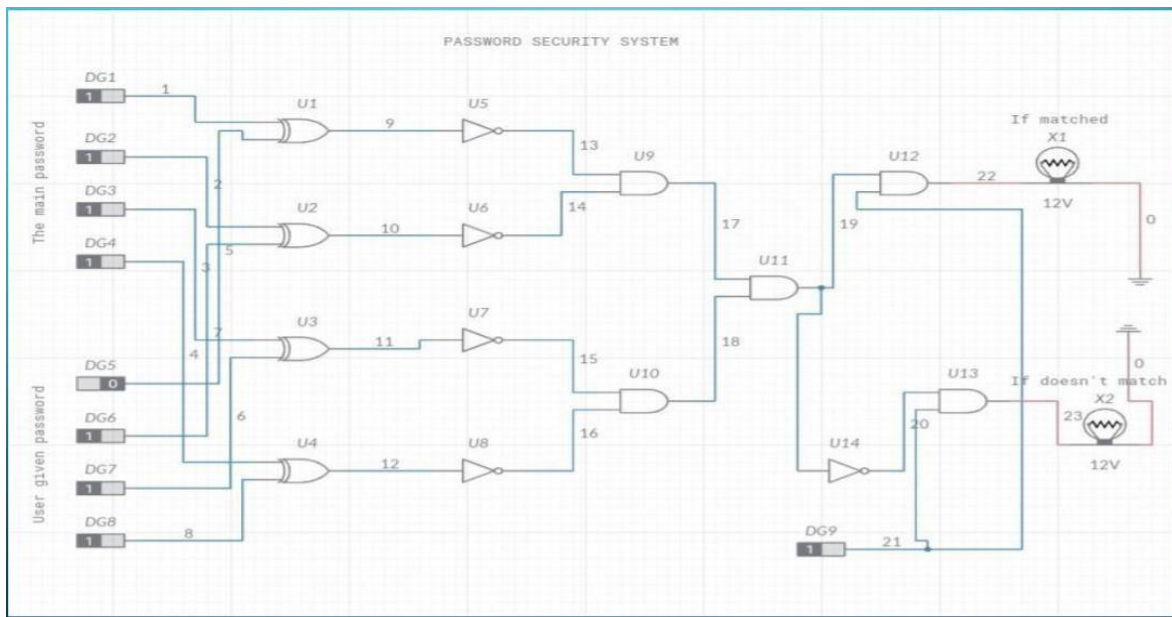


7486 has the functionality of the EX-OR (Exclusive OR) gate or function. 7486 has 4 EX-OR gates of 2 inputs in 1 package. The internal gates in the ICs are made of Schottky Transistor of low power.

## Components Used

- 5 NOT Gates
- 5 AND Gates
- 4 XOR Gate
- 8 Switches
- 2 Light-Emitting-Diodes
- 2 Resistors
- Main Switch

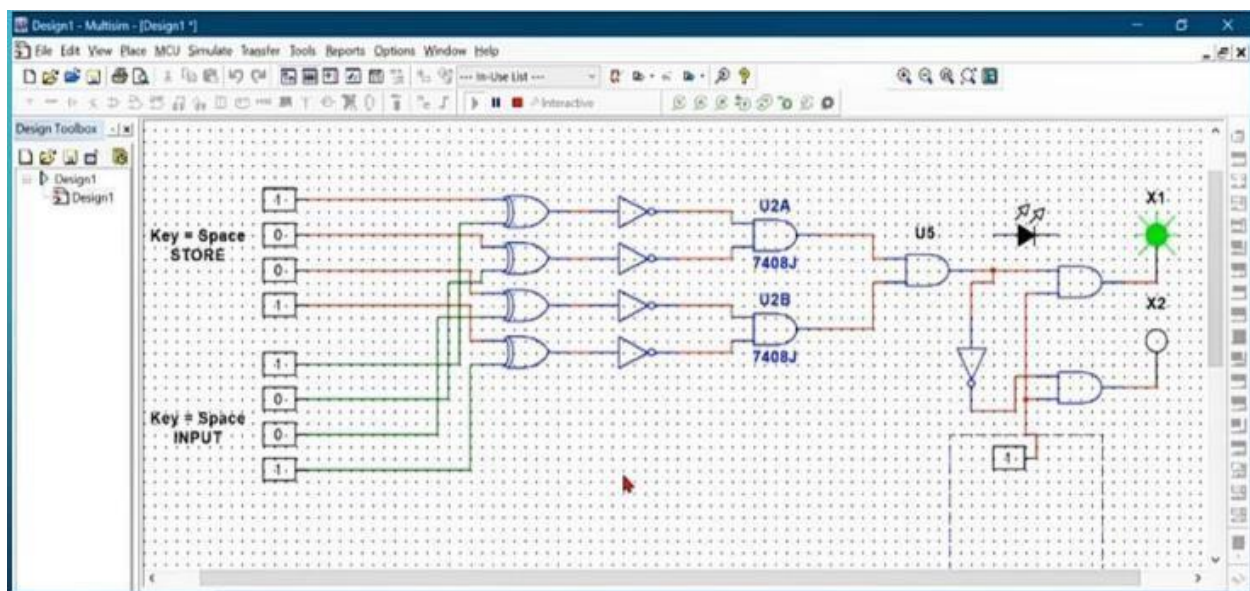
## Circuit Diagram



## Working

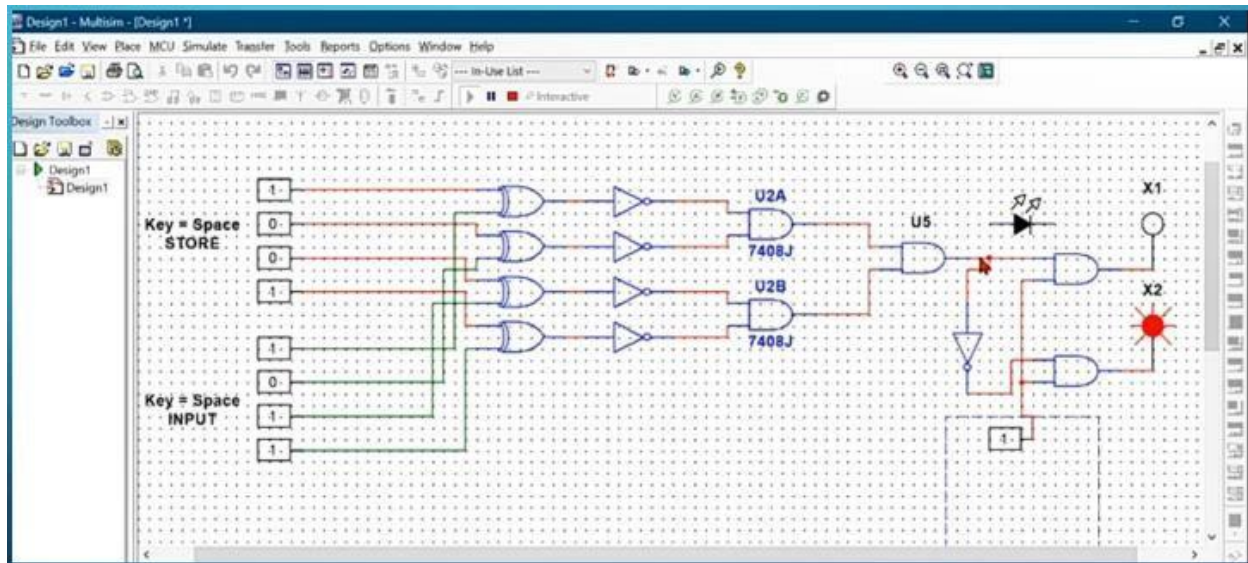
- Four of the given XOR gates compare the respective bits of two 4-unit binary numbers, each number 'entered' into the circuit via a set of switches.
- If the two numbers matched, bit for bit, then the green LED will light up giving a signal for success when the Enter pushbutton is pressed.
- If the two numbers do not exactly match, then the red LED will light up giving a signal for success when the Enter pushbutton is pressed.

## Circuit If The Numbers Match

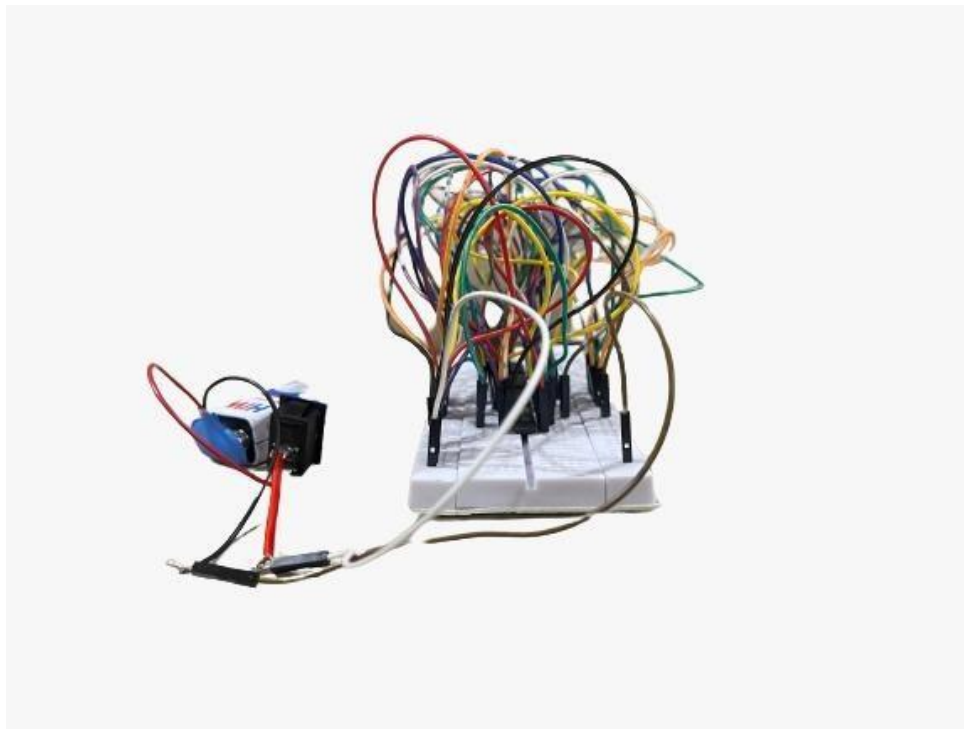


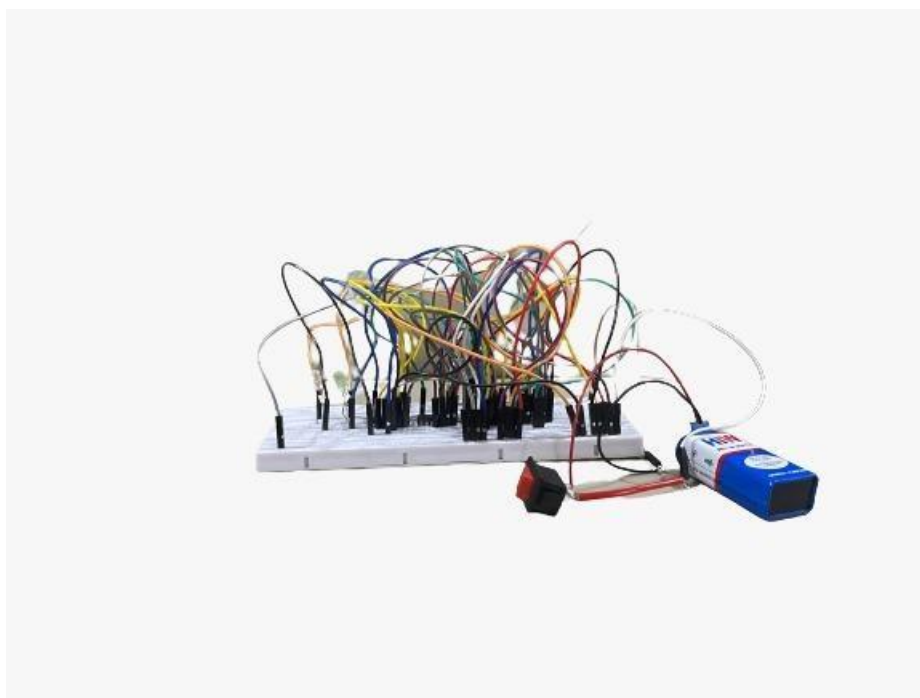
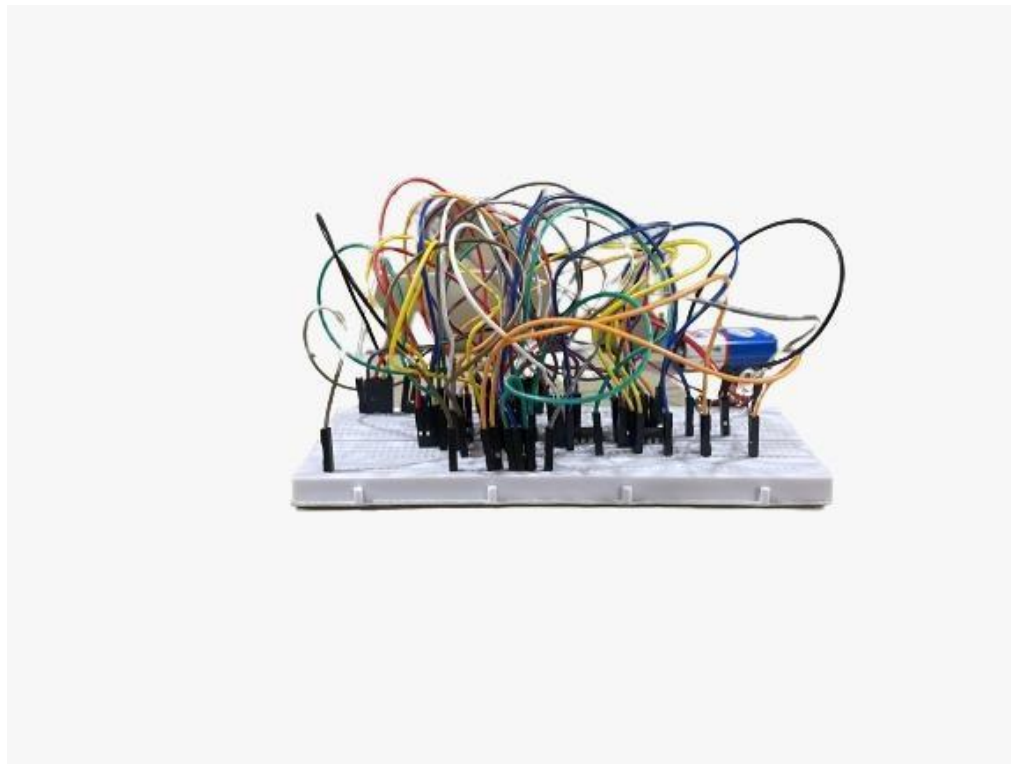


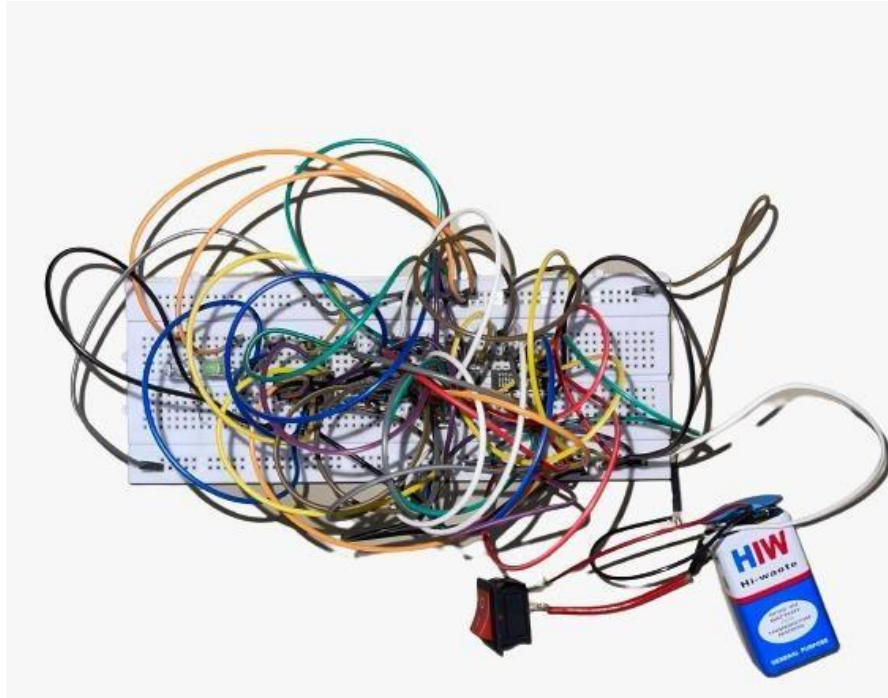
## Circuit If The Numbers Do Not Match



## Our Implementation :







## **Real World Applications**

- Used in electronic safes to safeguard against theft.
- Used after hours in public places such as banks , malls, hotel room, schools etc..
- Used in situations where traditional locks cant be used such as in environments where a very large lock is needed and it is not practical to use a traditional lock that depends on a key to open.

## **Bibliography**

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