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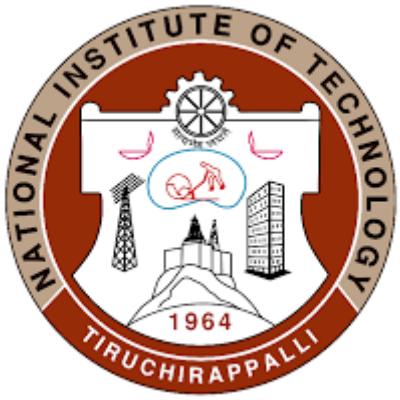

ECLR -11
DIGITAL ELECTRONICS LABORATORY

MINI PROJECT.

Faculty: Dr. R. Malmathanraj.

Mini Project Title: Pin-based password security system.

Section- ECE-A.

Prepared By:

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Aim

The main objective of this project is to provide a passcode-based security system having the provision to change the passcode by the authority only, using XOR Gates as bit comparators and NOR Gates as controlled inverters. If the passcode entered is right, it is indicated by a LED. Any wrong attempt to open the lock (by entering the wrong password), an alert will be actuated, indicated by another LED and a buzzer.

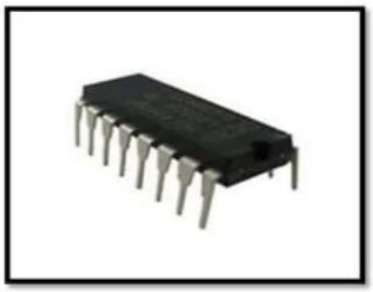
Components Used

1. XOR gate (IC7486)
2. NOR gate (IC7402)
3. Diode (1n914)
4. 10K ohm Resistor
5. 470-ohmohm Resistor
6. Green Led
7. Buzzer

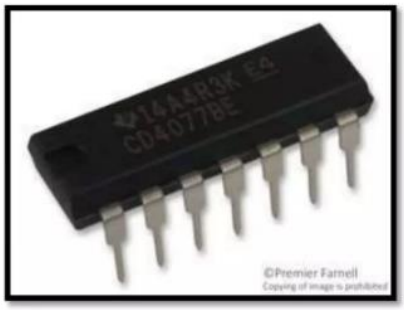
Others:

1. Switches
2. Wires
3. Breadboard

1) NOR Gate:

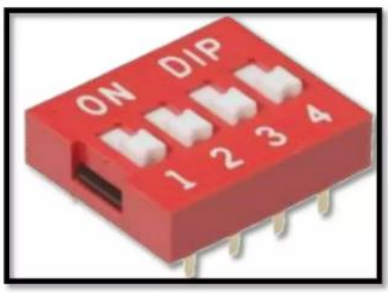


2) XOR Gate:



3) 1N914 Switching Diode:

4) DIP Switches:



4) Resistor	6) Buzzer	7) LED
		

Knowing the components

1) XOR Gate:

An XOR gate (sometimes referred to by its extended name, Exclusive OR gate) is a digital logic gate with two or more inputs and one output that performs exclusive disjunction. The output of an XOR gate is true only when exactly one of its inputs is true. If both of an XOR gate's inputs are false, or if both of its inputs are true, then the output of the XOR gate is false.

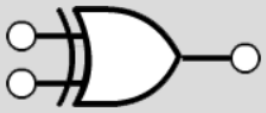
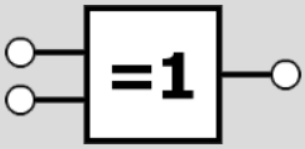
If an XOR gate has more than two inputs, then its behavior depends on its implementation. In the vast majority of cases, an XOR gate will output true if an odd number of its inputs is true. However, it's important to note that this behavior differs from the strict definition of exclusive or, which insists that exactly one input must be true for the output to be true.

Truth table for an XOR gate

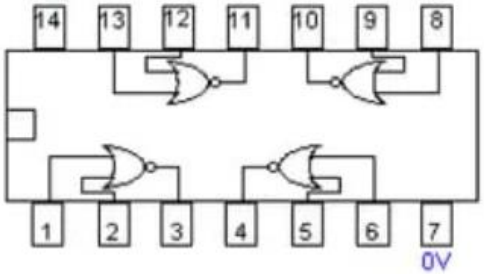
Input A	Input B	Output
false	false	false
false	true	true
true	false	true
true	true	false

Symbol:

Each of the symbols below can be used to represent an XOR gate. There are multiple international standards defined, and one may prefer over the other in your region of the world.

ASNI / IEEE	IEC
	

Pin configuration of XOR Gate:



2) NOR Gate:

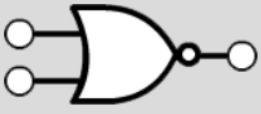
A NOR gate (sometimes referred to by its extended name, Negated OR gate) is a digital logic gate with two or more inputs and one output with behavior opposite to the OR gate. The output of a NOR gate is true
if all of its inputs are false. If one or more of a NOR gate's inputs are true, then the output of the NOR gate is false.

Truth table for a NOR gate

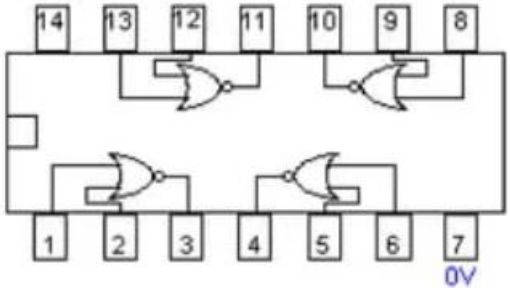
Input A	Input B	Output
false	false	true
false	true	false
true	false	false
true	true	false

Symbol:

Each of the symbols below can be used to represent a NOR gate. There are multiple international standards defined, and one may prefer over the other in your region of the world.

ASNI / IEEE	IEC
	

Pin Configuration of NOR Gate:

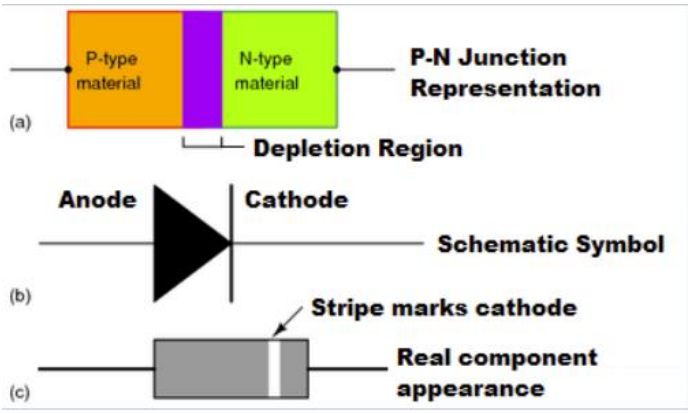


3)Diode:

The operation of a diode can be understood by looking at the flow of positive charges (or holes) and the negative charges (the electrons). Technically, a semiconductor diode is referred to as a p-n junction. These p-n junctions are also important in the operation of a photovoltaic cell. Having the diode work properly requires a process known as doping. Semiconductors can be doped with materials so that they have an excess of easily displaced electrons - generally referred to as a negative or n-type region.

Joining these two types (p and n) creates the p-n junction, and the region between the two sides is called the depletion region, as electrons from the n-type region diffuse and fill some of the holes in the p-type region. This creates negative ions in the p-type region and leaves positive ions in the n-type region behind. This leads to useful electronic behavior depending on which way the voltage (or electric field) is applied, this is called biasing.

Symbol:



THEORY

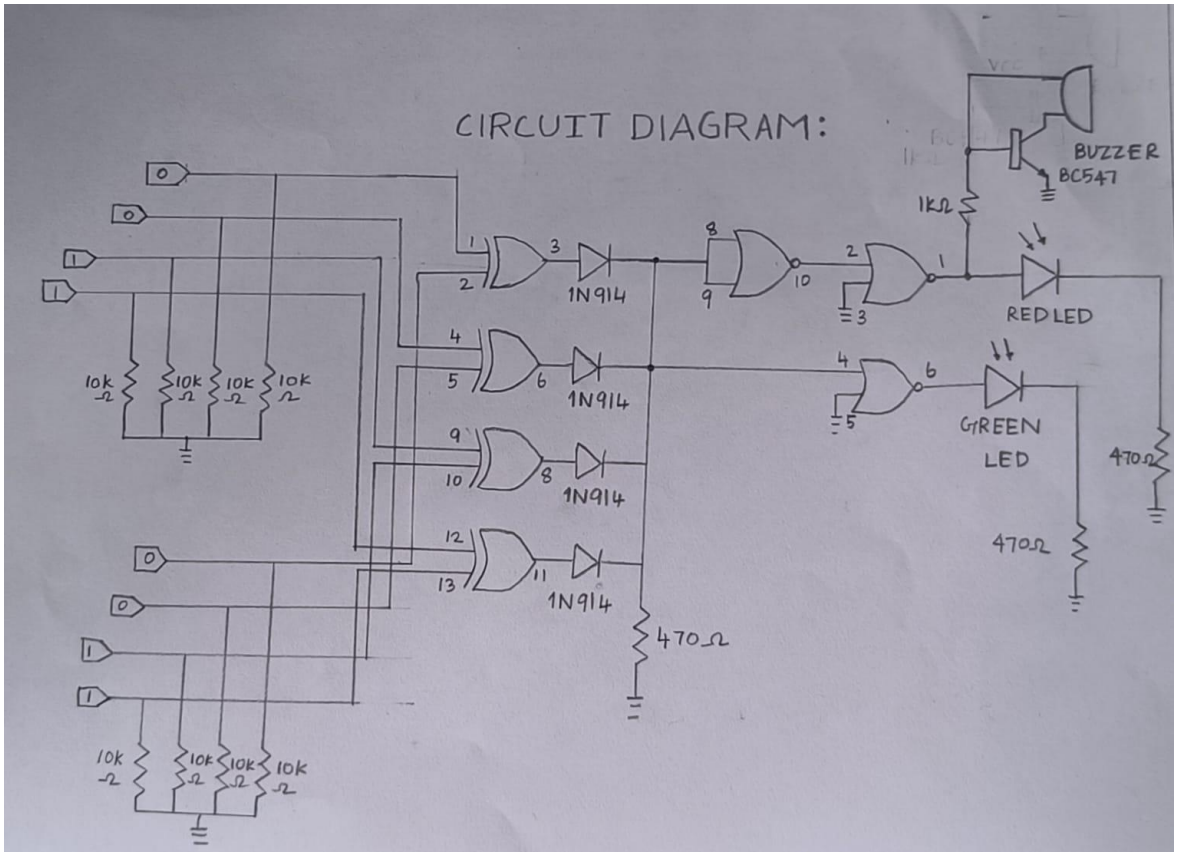
This circuit is used as pin based security system. Four of these XOR gates compare the respective bits of two 4-bit binary numbers. Because four bits provide sixteen possible combinations. In real applications such as a home security system, the “No go” output would have to be connected to some siren or alarming device so that the entry of an incorrect code would deter an unauthorized person from attempting another code of access. The purpose of the experiment is to provide security with cost efficiency.

The idea of this system is that the 4-bit switches, “Key Code Switches’ act as holding the correct password for unlocking the lock. The “Key Code Switches” have static values and are hidden from the person trying to open the lock. If a person tries to unlock by the wrong code then the red LED lights up, along with the alarm. We made this security system with XOR, NOR gate, and other elements.

WORKING

Four XOR gates are used to compare the respective bits of two 4-bit binary numbers. Each number is entered into the circuit using the DIP switches. The main function of the XOR gate is to compare the numbers. If the two numbers match, bit by bit, the green LED will glow, if else red LED glows along with the buzzer ringing. The working of the XOR gate is to output ‘high’ if the input signals are not the same. The four XOR gates’ output terminals are connected through a diode network. If any of the four XOR gates outputs a ‘high’ signal it indicates that the entered code is not the same as the key code, the high signal will be passed on to the NOR gate. If the two 4-bit codes are identical then none of the XOR gate outputs will be high and the pull-down resistor connected to the common sides of the diodes will send a ‘low’ signal to the NOR gate. The NOR gate prevents either of the LEDs from turning on if the switch is not entered. If the switch is applied and the XOR outputs are all ‘low’, then a green LED will glow, indicating the passcode is entered. If the XOR outputs are ‘high’ then the red LED glows along with the buzzer ringing.

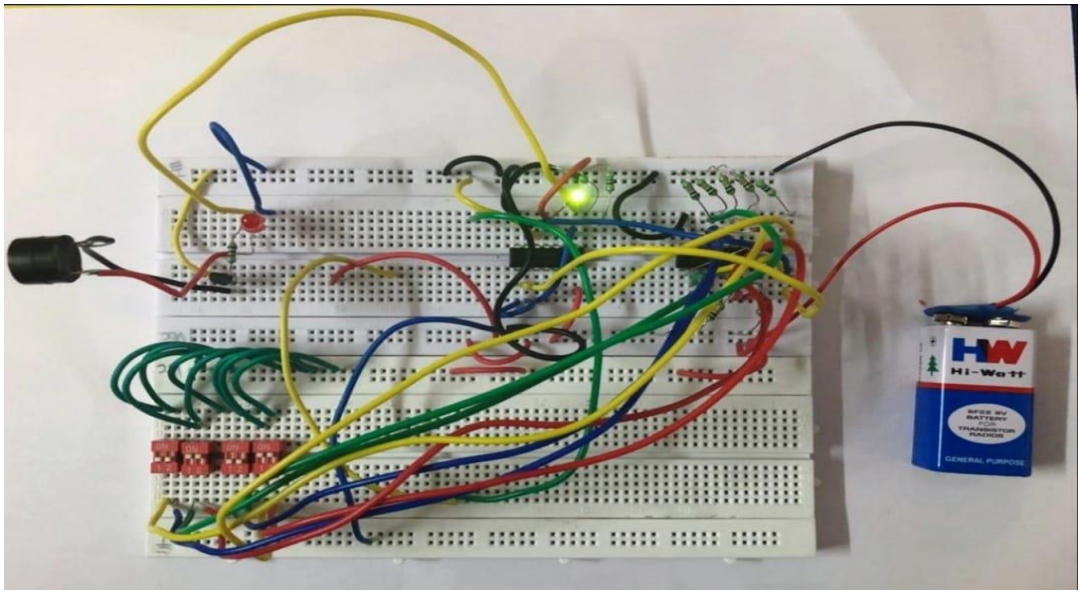
CIRCUIT DIAGRAM

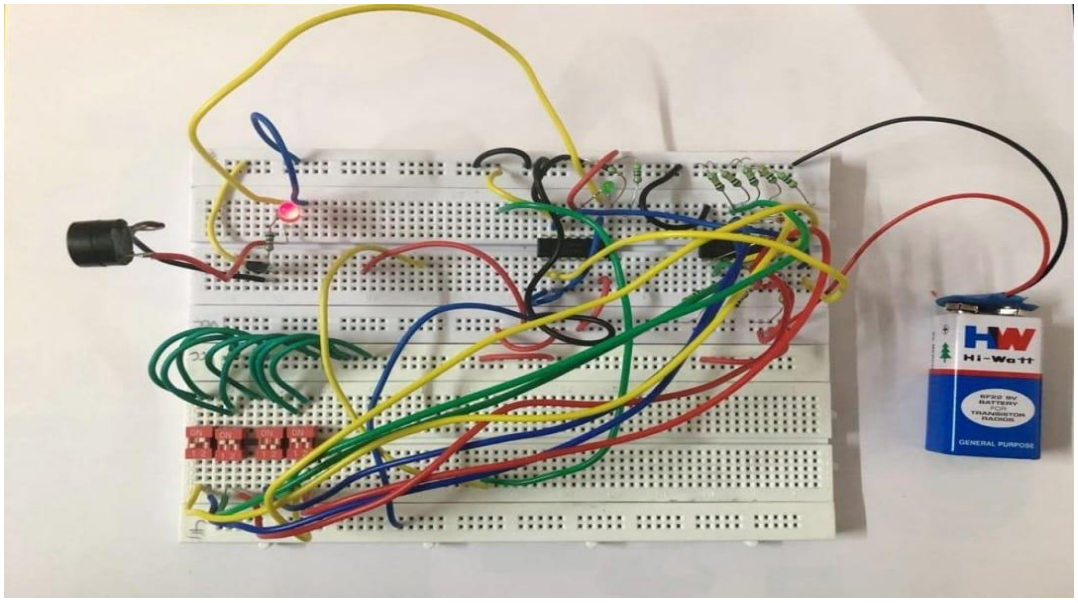


PROCEDURE

1. Install the ICs and resistors neatly on the breadboard.
2. Wire the pins 7 and 14 of both ICs to Vcc and GND, respectively.
3. Wire one end of the switches with Vcc.
4. Wire one end of the resistors to the GND.
5. Now connect the other end of the switches to the resistors and wire it to the gates of the XOR IC.
6. Now the output of XOR is sent as inputs in NOR IC and is grounded with the help of a resistor simultaneously.
7. Connect the LED lights (yellow and red) and ground them with resistors.

IMAGE IMPLEMENTATION





CONCLUSION

In this project, we will locate the two switches on breadboards, which act as holding the correct password for unlocking the lock. We used a sound buzzer for the alarming situation. From this project, we made a security system by using XOR, NOR gate, and other elements. For future development, We can make the locking system more secure by adding more stages. We can use a card authorization system in which the card will be scanned first then the password will be checked later. We can use another technique called biometrics. Biometrics may be a more prominent and recognized means of identification. Their use may enhance security. Some new technologies such as fingerprint scanning, retinal scanning and iris scanning, and voiceprint identification also can be inserted. We can interface a GSM modem which will send an SMS if an invalid attempt is made to open the lock.

REFERENCES

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- ‘Digital Fundamentals Thomas L Floyd