CSE260 Final Project

Group-04

Section: 01

Experiment Name: Password Security System

Submitted by

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Introduction:

As the world becomes more technologically advanced, cybersecurity has become an integral element of daily life. What would you do if you awoke tomorrow morning to find an unethical person obtaining your personal information from social media? Perhaps you should try to recover your data and strengthen your password because passwords act as the first line of security against illegal access to your device and personal information. William Henry Gates III, a software developer said, “Because of all the great things you'll be able to do with technology -organizing your lives, getting in touch with others, being creative - if we don't overcome these security challenges, people will be hesitant to utilize them.” So, it is mandatory to secure our personal information from unethical persons or you can call them hackers. That’s why we are highly interested in working on “Password Security System”.

Name of the Experiment: Password Security System

Objective:

To design and implement a checker which can check if two 4-bit binary numbers are equal or not; using 4-Input AND gate(74LS21), 3-Input AND gate(74LS11), NOT(7404), XNOR(4077) gate. The circuit will be able to give notification.

Required components & Equipment:

(1) 4077 (XNOR)
(2) AND_3 (74LS11)
(3) AND_4 (74LS21)
(4) NOT (7404)
(5) LOGIC PROBE
(6) LOGICSTATE
(7) LED_BIBY
(8) LED_GREEN
(10) LED_RED
(11) LED_PURPLE

Experimental Setup:

Equipment’s:

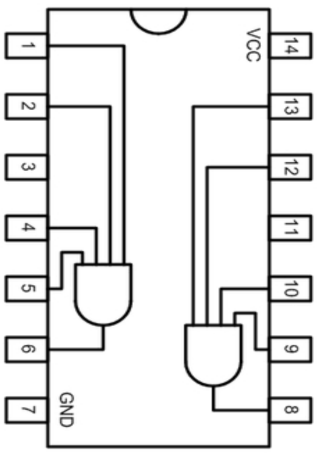
4-Input AND gate(74LS21)

3-Input AND gate(74LS11)

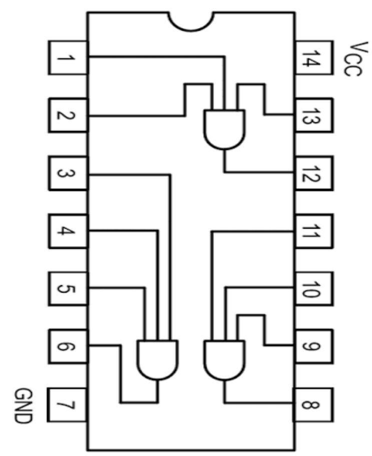
NOT gate(7404)

XNOR gate(4077)

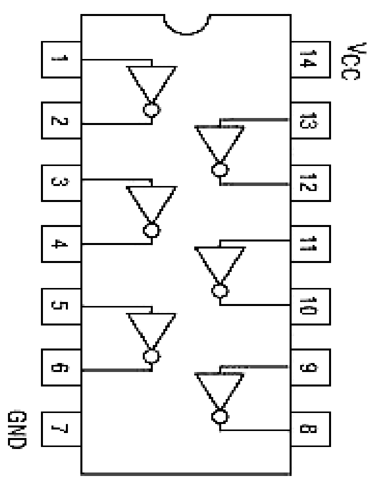
<u>IC Diagram:</u> 4-Input AND gate(74LS21), 3-Input AND gate(74LS11), NOT(7404), XNOR(4077)



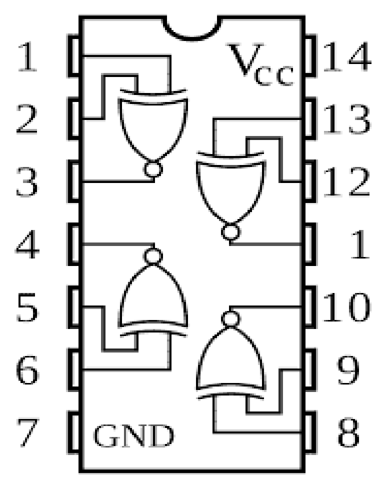
Pin layout of 74LS21



Pin layout of 74LS11

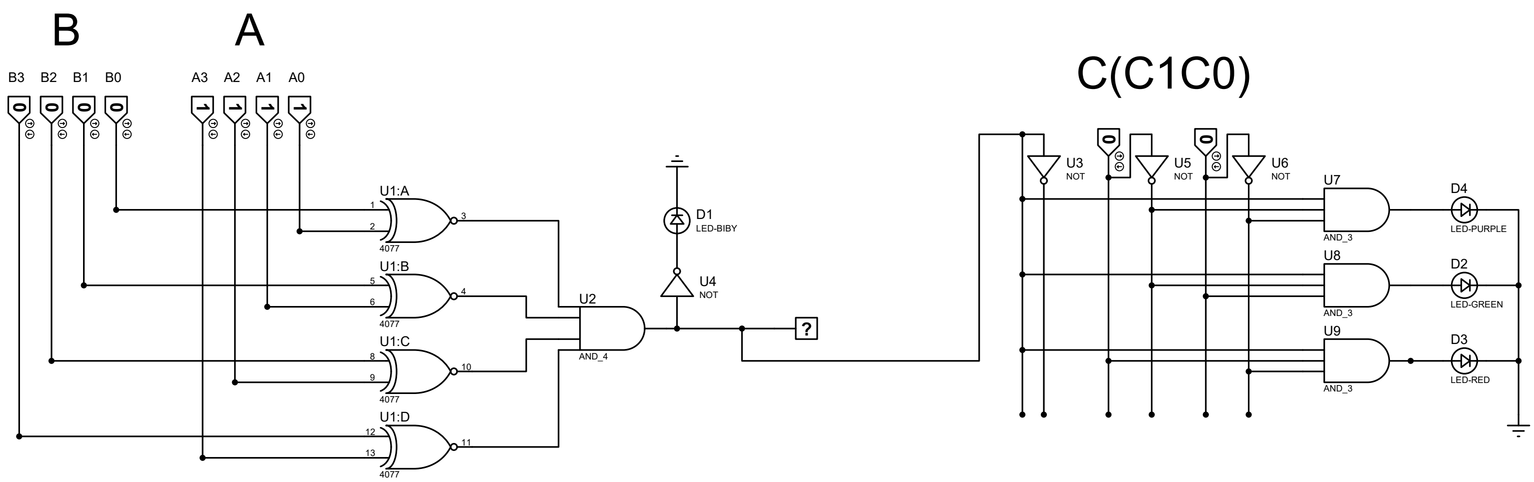


Pin layout of 7404



Pin layout of 4077

Circuit Diagram:



Proposed Model:

Input:

(1) $A(A_3A_2A_1A_0)$= 4-bit fixed owner password and $B(B_3B_2B_1B_0)$= 4-bit user input

(2) $C(C_1C_0)$=01(decimal 1) if the owner give the password and wants to go into the file or use the files

(3) $C(C_1C_0)$=10(decimal 2) if the owner doesn't give the password and doesn't want to go into the file or use the files

Output:

(1) Y=Yellow Light
(2) P=Purple Light
(3) G=Green Light
(4) R=Red Light

Condition:

(1) Y=1 If owner set password(A) and user input(B) is not equal;
Y=0 otherwise

(2) P=1 If owner set password(A) and user input(B) is equal and $C(C_1C_0)$=00;
P=0 otherwise

(3) G=1 If owner set password(A) and user input(B) is equal and $C(C_1C_0)$=01;
G=0 otherwise

(4) R=1 If owner set password(A) and user input(B) is equal and $C(C_1C_0)$=10;
R=0 otherwise

Applications:

(1) Bank Balance Security
(2) Any kind of website Security
(3) Mobile Phone Lock
(4) Computer Lock

Result and Discussions:

Procedure:

(1) If the owner's fixed password $A(A_3A_2A_1A_0)$ and user input $B(B_3B_2B_1B_0)$ are not equal then the Yellow light will come 'ON'. It means our fixed password and users' entered password are not the same bits. There at least one given bit is different from the fixed password(A). So, "Yellow Light" represents the user can't enter the system.

(2) If the owner's fixed password $A(A_3A_2A_1A_0)$ and user input $B(B_3B_2B_1B_0)$ are equal then Purple light will come 'ON'. It means our fixed password and users' entered password's four bit match each other. After matching all 4-bit, it's time to verify yourself and "Purple Light" represents that. This "Purple Light" works like a notification signal for verification which is the next step.

(3) After notification, now it's time to decide whether the user can get in the system or not. It works depending on the input of C where C is a 2-bit binary number. Here, $C(C_1C_0)$. Initially, $C(C_1C_0)$=00. After notification, if the password giver is the right person that means the owner entered the password to log in the system, then the owner has to input C_1C_0=01(Decimal in 1). When the owner input C_1C_0=01 then the Green light will come 'ON' and you enter the system. Here, entering C_1C_0=01 means you are verifying and the "Green Light" represents, you get access to your file or system.

(4) After notification, if the password giver is not the right person that means the owner didn't give the password to log in the system. Someone was trying to log in your system. Then as the owner, you have to input C_1C_0=10(Decimal in 2) so that that person can't access your file. After putting C_1C_0=10, the Red light will come 'ON'. Here, entering C_1C_0=10 means the owner didn't log in his system and the owner didn't want to give access to others in his file or system. Also "Red light" represents an unknown person detector.

Details for the purpose of understanding the truth table:

In the truth table, First row A=1 , B=0 these different bits represent that the all bits (four bits) of the owner set password(A) and user input(B) are not the same. It means at least 1 bit of $A(A_3A_2A_1A_0)$ and $B(B_3B_2B_1B_0)$ don't match each other. So, A=1,B=0 represent $A \neq B$
On the other hand, A=1 , B=1 these same bits represent that the all bits (four bits) of the owner set password(A) and user input(B) are the same. It means all the bits of $A(A_3A_2A_1A_0)$ and $B(B_3B_2B_1B_0)$ fully match each other. So, A=1,B=1 represent A=B

Truth Table:

Input				Output			
A=1,B=0 represent A≠B A=1,B=1 represent A=B		C					
$A(A_3A_2A_1A_0)$	$B(B_3B_2B_1B_0)$	C_1	C_0	Y	P	G	R
1	0	0	0	1	0	0	0
1	1	0	0	0	1	0	0
1	1	0	1	0	0	1	0
1	1	1	0	0	0	0	1

Equations of output:

$$Y = AB'C_1'C_0'$$
$$P = ABC_1'C_0'$$
$$G = ABC_1'C_0$$
$$R = ABC_1C_0'$$

Limitation:

- ☐ This system works for only 4-bit binary numbers.
- ☐ We cannot use it as a door lock.
- ☐ Without recognizednal device, owner cannot access this security system.

Conclusion:

- ☐ We spent more time deciding whether the yellow light, purple light, red light, or green light should take precedence. Finally, because the red light represents an unknown person detector, we opted to prioritize it.
- ☐ We were able to have a good understanding of the security mechanism.
- ☐ We couldn't employ any form of sound system in the proteus simulation because of some limitations with the simulation software.
- ☐ We made a 4 bit password security system which is optimal for almost any kind of digital security system or device.
- ☐ We tasted different types of variation of 4-bit binary numbers and our system was successfully able to handle all types of variation without any errors.