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Garden of Knowledge and Virtue

MCTE 2332

DIGITAL SYSTEM AND MICROPROCESSOR

SECTION 1

Semester I, 2020/2021

DLD Project Title :

Luggage Security Alarm

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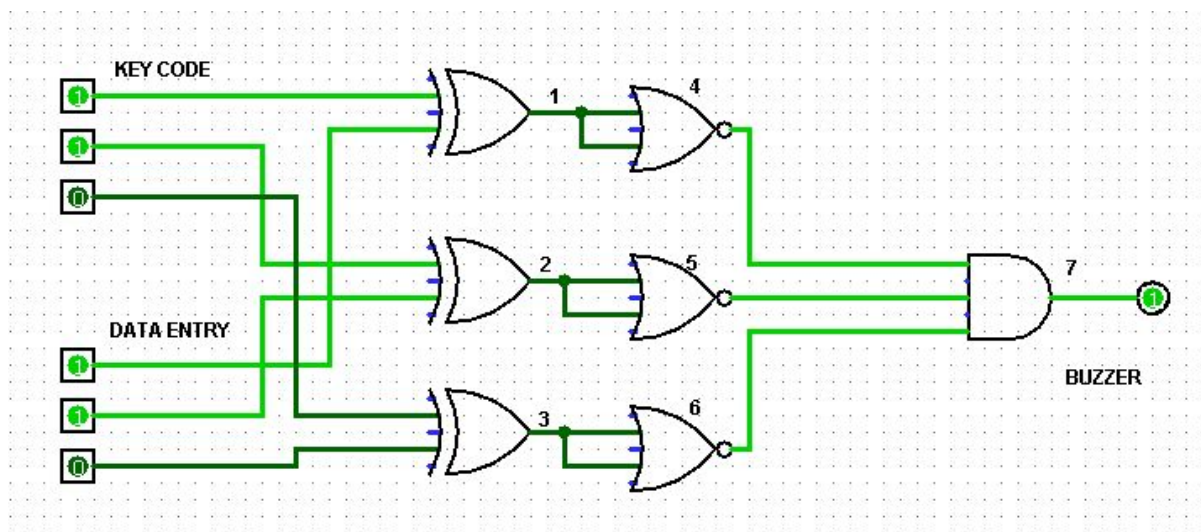
Matric Number: 1918534

Lecturer's name: Dr. Hazlina binti Md. Yusof

GOAL OF THE PROJECT:

The objective for this project is to protect the things inside the baggage from getting stolen. As we know, when we are travelling by bus, train or flight, we carry a lot of important things all the time and at the same time we might fear if someone might lift our luggage. Hence, the implementation of this project generates a warning alarm which is very helpful during the journey as we can detect the sound of its alarm based on the three combinations which are XOR, NOR and AND gates in this circuit.

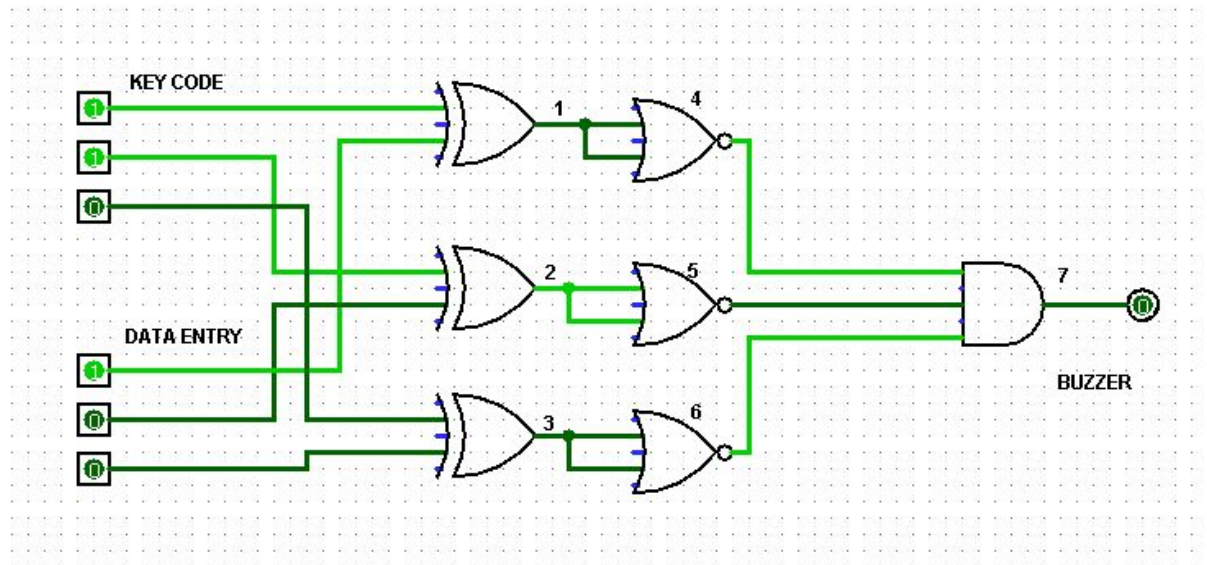
DESIGN PROCESS:



The keycode is the password of the luggage while the data entry is the password that is entered by person. In this circuit, I include three combination gates which are XOR, NOR and AND gates. For the XOR gate, the output will be high when both inputs are different and the output will change to low if the both inputs are the same condition. For the NOR gate which implies OR function with an inverted output, the output will be high only when both inputs are in low condition and for the AND gate, the output will be high only when both inputs are in high condition.

The output is based on point 7. From the circuit above, we can see that when the data entry is synchronized with the password of the luggage, point 7 will become 1 which is in high condition and the security lock will open and the alarm will not turn on. This is because at point 1, 2 and 3 will be low when the inputs go through the XOR gate as the both inputs are in the same condition. Then, the point at 4, 5 and 6 will be high because the inputs that are

passed through NOR gate are in low condition. After going through AND gate, the output at point 7 will be high because the inputs are in the same condition, which means the lock of luggage is open with the correct password and it will not receive the alarm from the buzzer. This means the luggage is secure from the thief.



When someone is attempting to take our luggage and enter the wrong password which is not the same with the luggage's password, the point at 1,2 and 3 will turn into high condition because the inputs that go through XOR gate are different. Then, the point at 4,5 and 6 will be in low condition after passing through NOR gate when at least on inputs at point 1,2 and 3 are 1. After passing through AND gate, point 7 will turn into low condition when at least on inputs at point 4,5 and 6 are 0. Because of that, the lock of luggage will not open as the password is not the same and it will receive an alarm from the buzzer. The alarm will not stop until we enter the correct password.

DETAILED DESIGN:

Truth Table:

a	b	c	d	e	f	x
0	0	0	0	0	0	1
0	0	0	0	0	1	0
0	0	0	0	1	0	0
0	0	0	0	1	1	0
0	0	0	1	0	0	0
0	0	0	1	0	1	0
0	0	0	1	1	0	0
0	0	0	1	1	1	0
0	0	1	0	0	0	0
0	0	1	0	0	1	1
0	0	1	0	1	0	0
0	0	1	0	1	1	0
0	0	1	1	0	0	0
0	0	1	1	0	1	0
0	0	1	1	1	0	0
0	0	1	1	1	1	0
0	1	0	0	0	0	0
0	1	0	0	0	1	0
0	1	0	0	1	0	1
0	1	0	0	1	1	0
0	1	0	1	0	0	0
0	1	0	1	0	1	0
0	1	0	1	1	0	0
0	1	0	1	1	1	0
0	1	1	0	0	0	0
0	1	1	0	0	1	0
0	1	1	0	1	0	0
0	1	1	0	1	1	1
0	1	1	1	0	0	0
0	1	1	1	0	1	0
0	1	1	1	1	0	0
0	1	1	1	1	1	0
1	0	0	0	0	0	0
1	0	0	0	0	1	0
1	0	0	0	1	0	0
1	0	0	0	1	1	0
1	0	0	1	0	0	1
1	0	0	1	0	1	0
1	0	0	1	1	0	0
1	0	0	1	1	1	0
1	0	1	0	0	0	0
1	0	1	0	0	1	0
1	0	1	0	1	0	0
1	0	1	0	1	1	0
1	0	1	1	0	0	0
1	0	1	1	0	1	1

1	0	1	1	1	0	0
1	0	1	1	1	1	0
1	1	0	0	0	0	0
1	1	0	0	0	1	0
1	1	0	0	1	0	0
1	1	0	0	1	1	0
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1	1	1	0	0	0	0
1	1	1	0	0	1	0
1	1	1	0	1	0	0
1	1	1	0	1	1	0
1	1	1	1	0	0	0
1	1	1	1	0	1	0
1	1	1	1	1	0	0
1	1	1	1	1	0	0
1	1	1	1	1	1	1

The truth table above shows that the output of three combination gates goes “HIGH” when the keycode and the entry data is synchronized. There are eight possible passwords for this mini project.

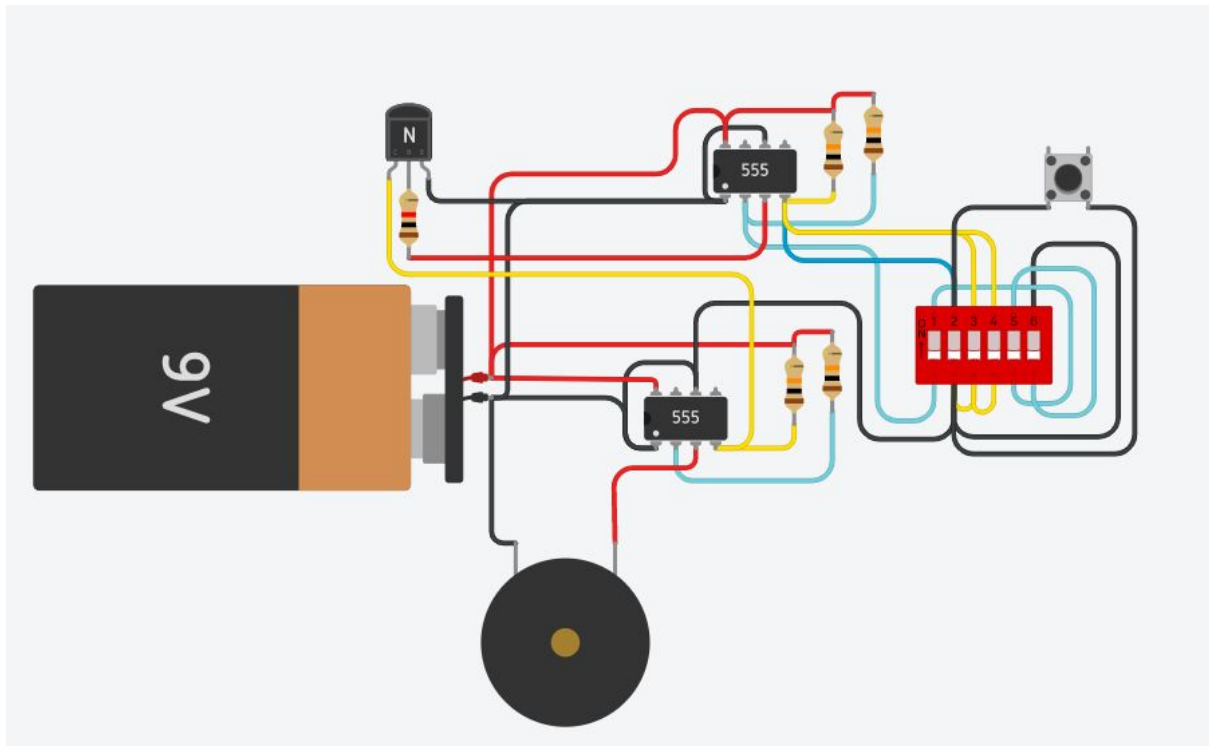
Logic Equation:

Output:

$$\bar{a}\bar{b}\bar{c}\bar{d}\bar{e}\bar{f} + \bar{a}\bar{b}\bar{c}\bar{d}\bar{e}f + \bar{a}\bar{b}\bar{c}\bar{d}e\bar{f} + \bar{a}\bar{b}\bar{c}d\bar{e}\bar{f} + \bar{a}\bar{b}\bar{c}d\bar{e}f + \bar{a}\bar{b}c\bar{d}\bar{e}\bar{f} + \bar{a}\bar{b}c\bar{d}\bar{e}f + \bar{a}\bar{b}cd\bar{e}\bar{f}$$

This ability of these gates produce an output value dependent upon the input condition is very useful in computational logic circuits as it gives the logic equation as the above.

DESIGN VERIFICATION:



We used a tinkercad to verificate the design. The components that are being implemented in this mini project are piezo, pushbutton, four 10k ohm resistors, one 1k ohm resistor, NPN transistor, DIP switch SPSTx6, 9V battery and two timers. When we start to simulate the circuit, the buzzer will turn on if someone enters the wrong password. This will help the victim to know the location of his luggage. Then, to turn it off, we need to press the correct password which is 156 as the wire is linked to a timer that is connected to the 9V battery and NPN transistor. After that, press the push button. Automatically, the lock of the luggage will open and the buzzer will stop.

Conclusion:

My aim is to propose a small project using Logisim which is a luggage security alarm to save the important things from robbery with the help of the easy circuit which is by using three combinations of gates which are XOR, NOR and AND gate. It produces a warning beep, when someone tries to unlock the lock, it will give the effect of its wire loop will split and alarm is produced. I believe that with this existence of luggage security alarms can be beneficial to others. Hence, the objective for this mini project is achieved.