5 Digit Password Security System

DSD Project Report

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by

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Abstract

The system designed is a simple circuit that mimics a password security system. Basic logic gates have been used to check the password entered and the stored password. A counter is also present to count the number of times the password has been entered incorrectly which in turn triggers an alarm when the password is entered incorrectly 3 times. The counter is reset when the password is entered correctly.

There are also the extra features of motion sensor, motion sensor triggered light bulb and air conditioning system based on the temperature. If motion is sensed in the room without the password being entered the alarm will go off. If motion is sensed in the room once the correct password is entered the light bulb switches on. If the temperature is above room temperature once the correct password is entered the air conditioning is turned on.

In this way the system mimics a typical security system connected to various facilities in the house.

Contents

Introduction

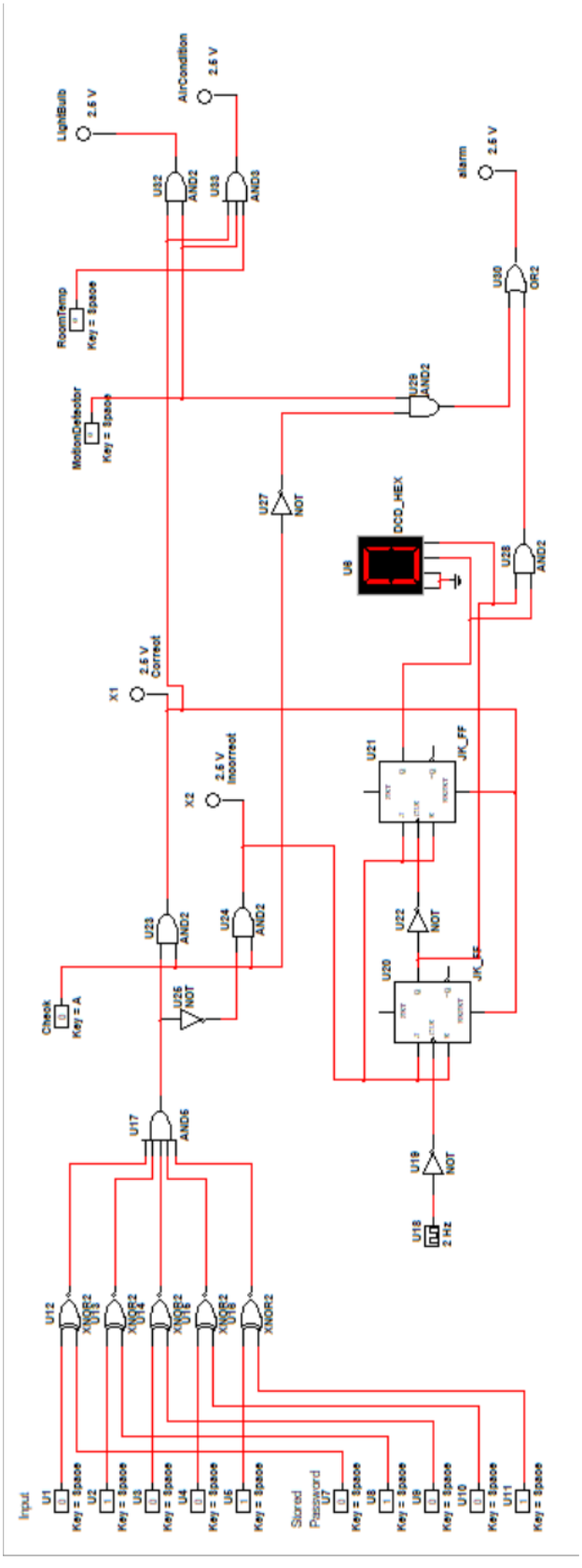
The Password Security System works on a very basic principle. There is a stored password in the system. It compares the password that is input with what is stored using XNOR gates. This output of comparing each bit of the password is then passed to an AND gate which gives us the output as to whether the password entered is correct. This output is also sent to a green LED that glows when the password is correct or a red LED when the password entered is incorrect.

The output of whether or not the password entered is correct is also sent to a counter. The counter counts the number of times the password is entered incorrectly. The counter has been made using JK flip-flops and is a mod 3 counter. The counter resets once the password is entered correctly. It is also connected to a Led so one can see how many time they have entered the password incorrectly. Once it has been entered incorrectly thrice, the alarm will go off. To turn off the alarm the password should be entered correctly.

The extra features of the system includes a motion sensor, a motion controlled light bulb and a temperature detector. If the motion sensor detects motion when password has either been entered wrong or not at all, the alarm will go off else when motion is detected and the password is correct the light bulb will turn on. If the temperature sensor detects a temperature above room temperature then, when the password is entered correctly the air conditioning system is turned on. We use AND gates for the functionalities of these features.

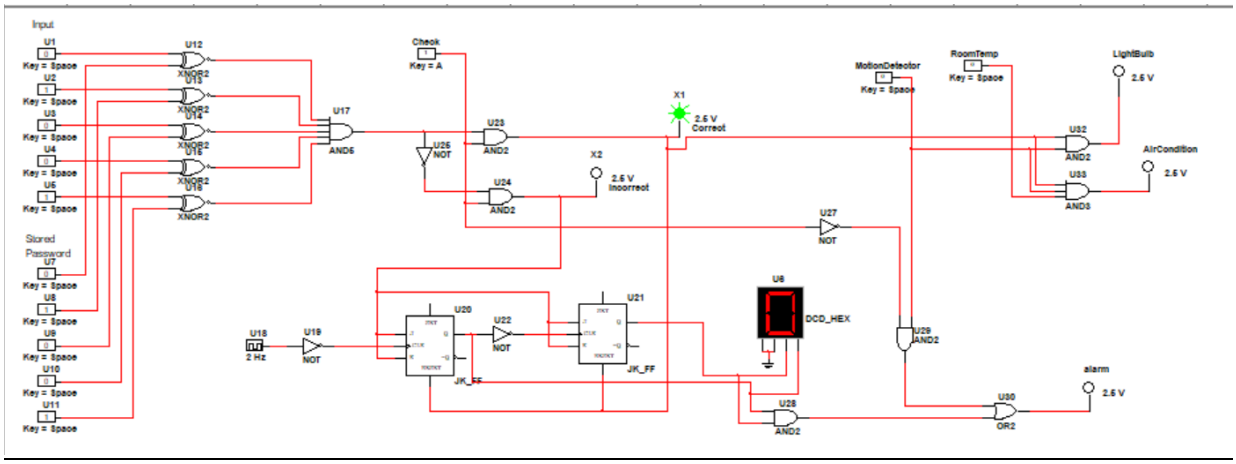
Design

Gate Level Circuit System made on Multisim

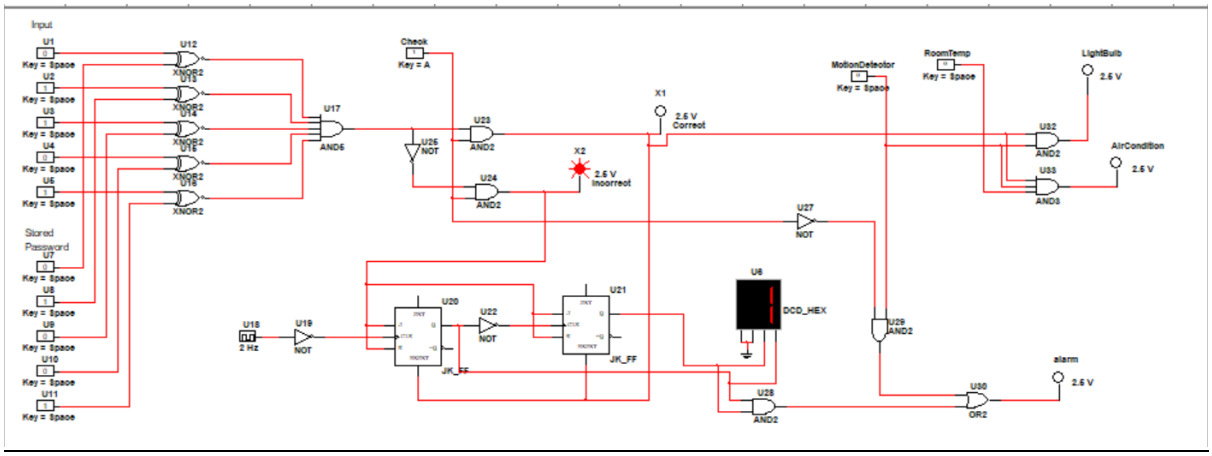


Implementation

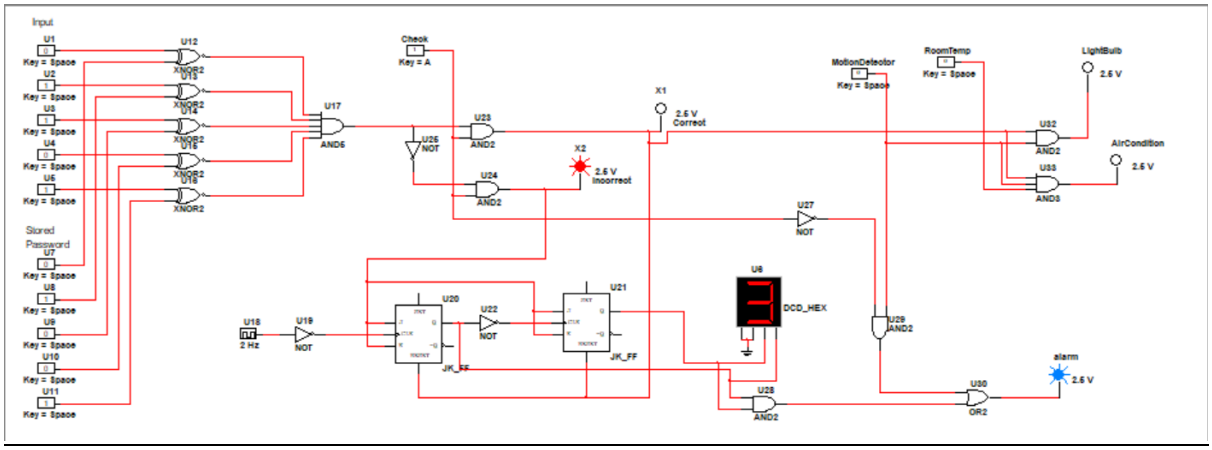
- When password is entered correctly



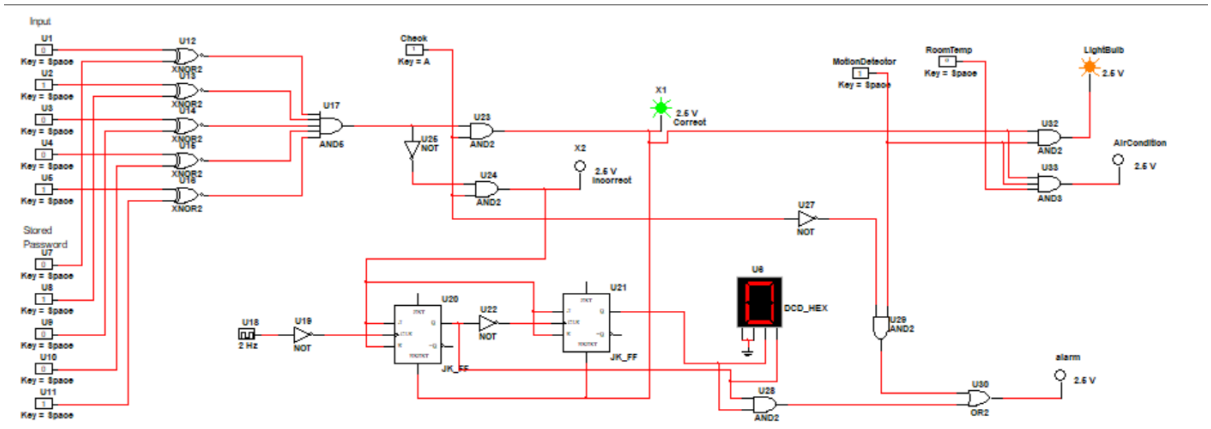
- When password is entered incorrectly



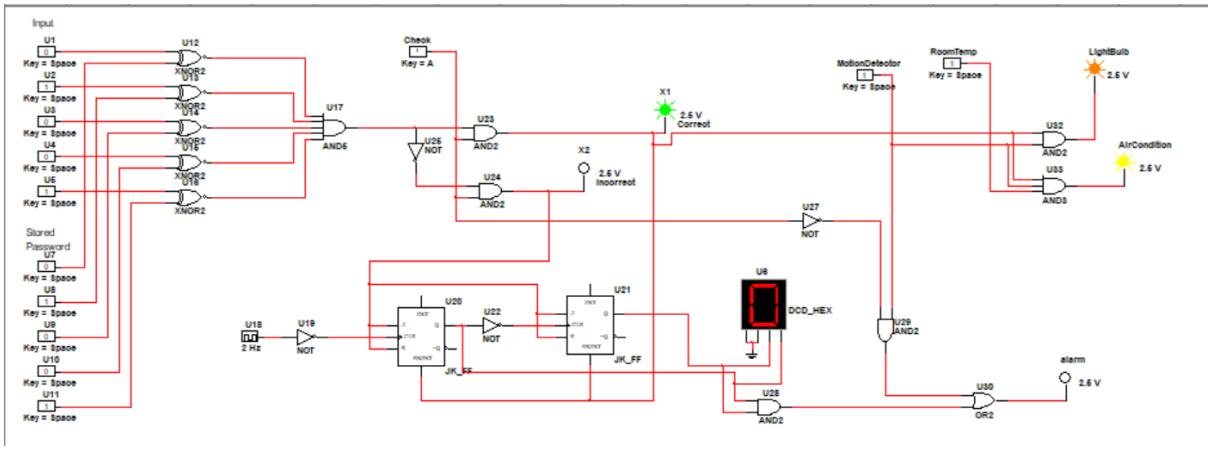
- When password is entered incorrectly thrice



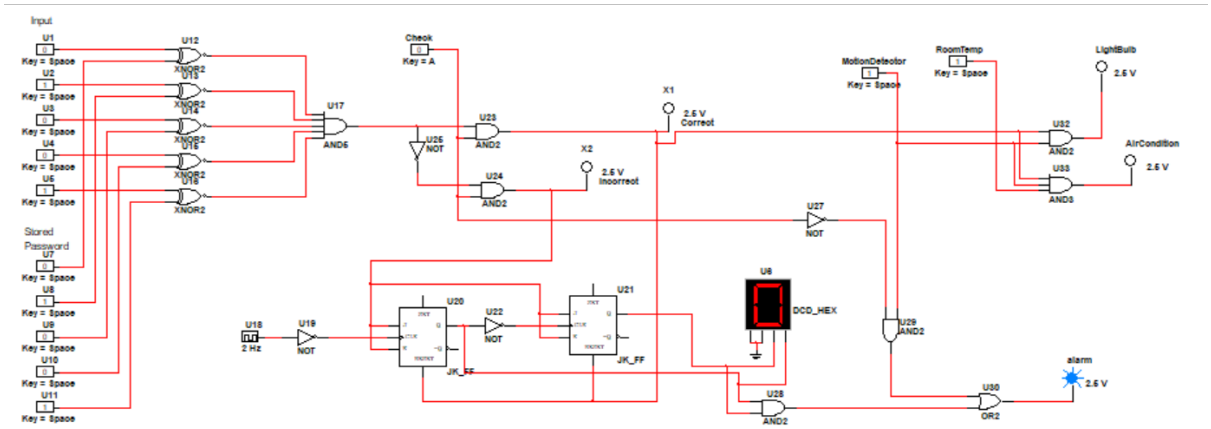
- When password is entered correctly and motion is detected



- When password is entered correctly, motion is detected and temperature sensor activated and above room temperature



- When no password is entered but motion is detected in the room



Result and Discussion

The simulated system on Multisim gives us insight into the working of the basic security system. It shows how the password is checked with the stored password. The correct password is indicated by green light and the incorrect with red. The number of times the password is entered incorrectly is also displayed on the LED screen. Once the password is wrong thrice we see that the alarm goes off.

We also see that when the motion sensor is triggered and the password is entered correctly, the light bulb turns on. If the motion sensor is triggered when password isn't entered the alarm goes off. Another feature integrated in the system is the air conditioning system. When the password is detected correctly, the motion sensor triggered and the temperature sensor detects a temperature above room temperature the air conditioning system is turned on.

Conclusion

The created Password Security System is a combination of the basic logic gates, flip flops used to design the counter, sensors and LEDs to display the output. It has the ability to check the password entered against the stored password. It has LEDs to show whether the password entered is incorrect or correct.

The counter counts the number of times the password is entered incorrectly. This count is also displayed on the LED screen. Once the count reaches 3 the alarm goes off. When the motion sensor is triggered it either turns on the light bulb or setting off the alarm. The temperature sensor if triggered also controls the air conditioning system.

In conclusion we see a simple security system can be formulated using logic gates.

References

- Fundamentals of Logic Design - By Charles H. Roth