

Digital Home Alarm System

DSD Project Report

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BACHELOR OF TECHNOLOGY in
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by

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Abstract Contents

Abstract:

In this project, we present the design and implementation of a Digital Home Alarm system using Logisim, a digital simulation software. The system consists of multiple entrance points into the house, and for the main door it features a decade counter, that allows the owner to turn the alarm off within a period of 10 seconds.

It also covers other entry points such as the windows and the back door. However these points don't have a decade counter associated with them.

The design is implemented in Logisim.

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INTRODUCTION:

This home alarm system, is set up at all the various entry points of a house, such as the main door, multiple windows, the back door etc. when an entry point is triggered, the buzzer switches on.

But, in this system when the main door entry point is triggered, there is a delay of 10 seconds before the buzzer goes off. This allows the owner of the house to switch the system off. A failure to do so will result in the alarm being triggered.

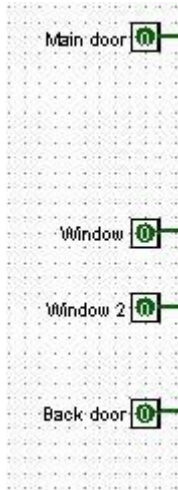
The other entry points, will not have a delay as such.

This system is built using combinational and sequential logic.

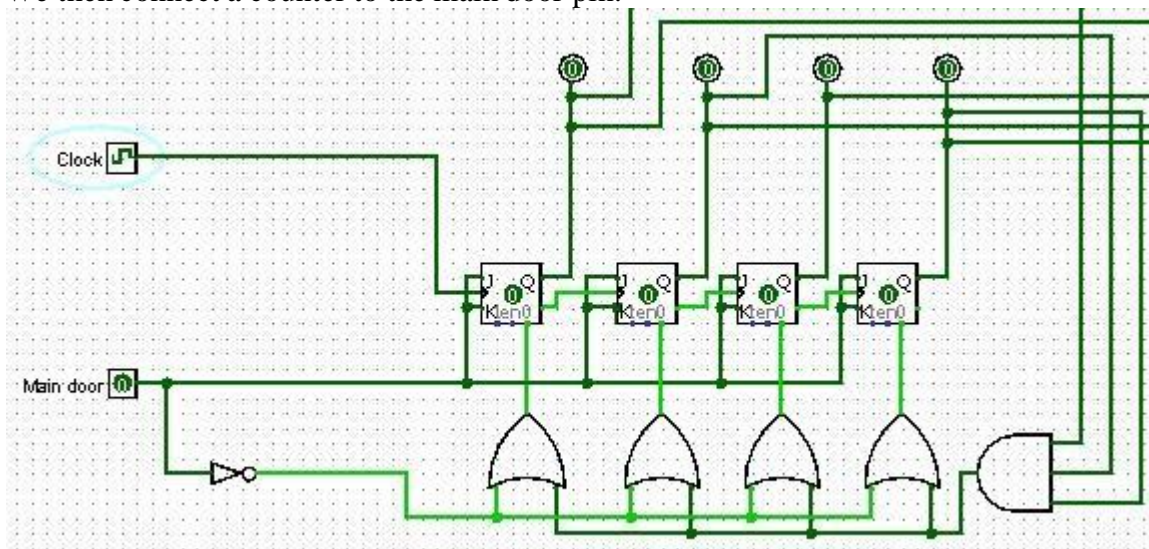
It uses a decade counter and a combination of gates to achieve the desired output.

DESIGN:

We take each entry point into the house as a pin in Logisim, as shown below

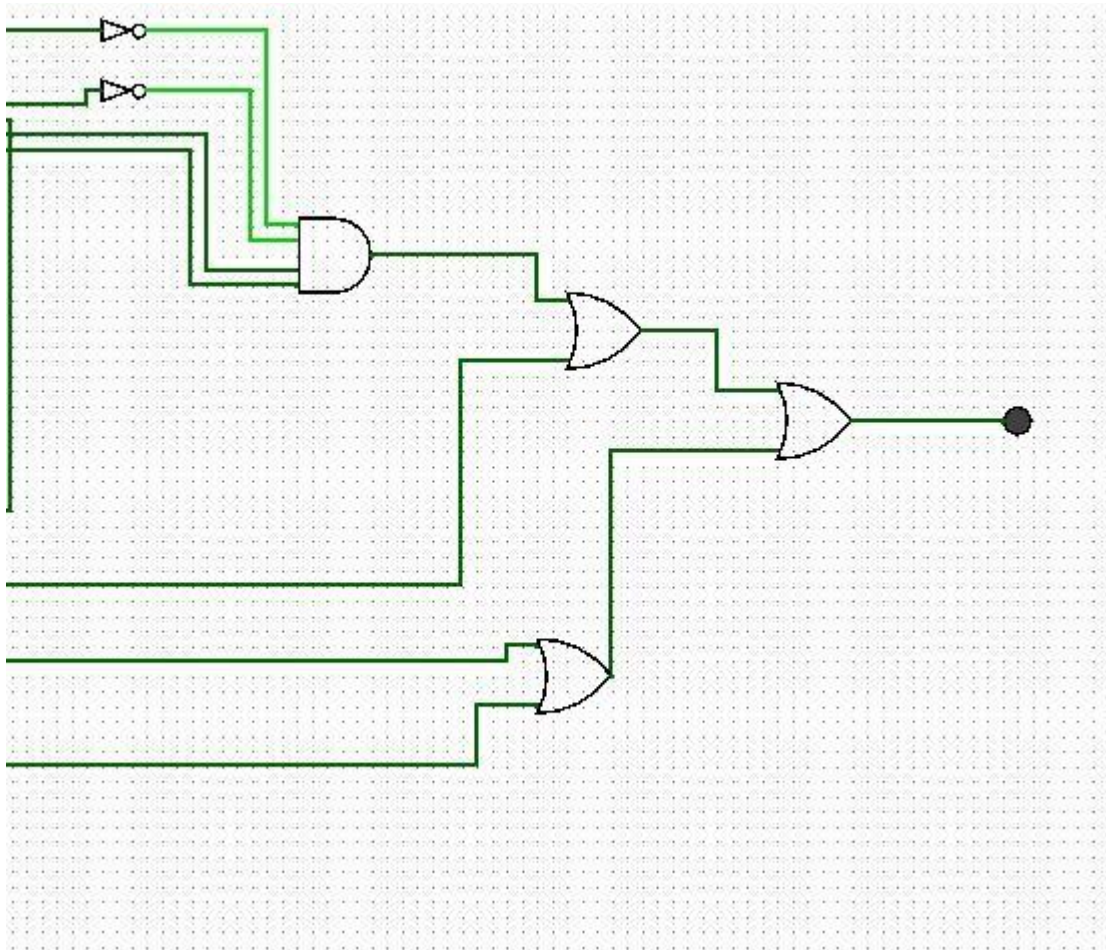


We then connect a counter to the main door pin.



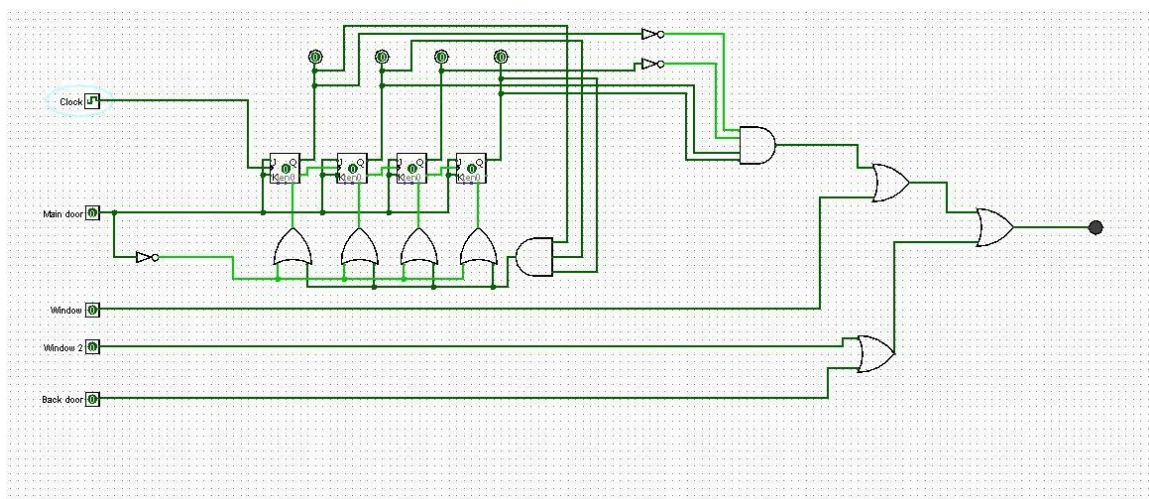
This counter, is modified such that when switched off before the count reaches 10, it resets back to 0 .

Then, with a combination of gates the other entry points are also incorporated as such



IMPLEMENTATION:

The implementation of the above design has been done using Logisim. A screenshot of the circuit is shown below.



RESULTS AND DISCUSSIONS:

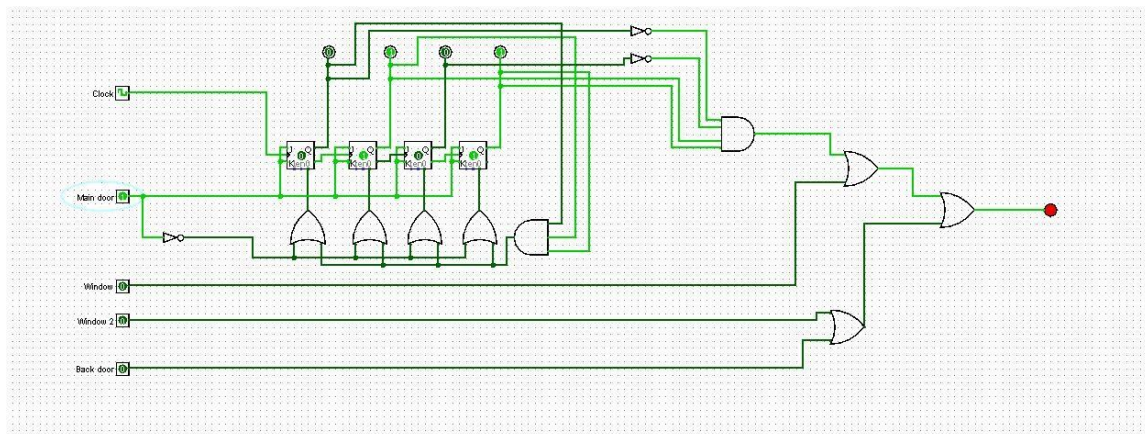
Circuit explanation:

When the count of the counter reaches 10 (1010), the AND gate connected to the output goes to logic 1, which in turn changes the subsequent OR gates to logic 1 as well. The most significant bit in this counter is the right most one, and the least significant bit is the left most one. So, when the 2nd and 4th outputs are high and the negation of the 1st and 3rd outputs are taken, we get logic 1.

If the owner turns the input off at any time, the counter is reset as the negation of the input is fed back into the resets of the flip flops.

The output of the counter is then ORed with the other entry points of the house, giving us our required output even if one of the entry points is triggered.

SAMPLE OUTPUT:



Here it can be seen that the counter attains a value of 10, and the final buzzer is turned on, while the other inputs have not been triggered.

CONCLUSION:

Using the Logisim software, a Digital Home Alarm system has been made. More features such as connecting a display can be added as well.

REFERNCES:

<https://technologystudent.com/elec1/dig5.htm>

for learning Logisim:

<https://sweetcode.io/logisim-software-digital-clock/>

https://www.youtube.com/watch?v=cMz7wyY_PxE