American International University- Bangladesh

LAB ASSIGNMENT

COURSE TITLE: DIGITAL LOGIC & CIRCUITS LAB

SECTION: M

Group No. 06

Submitted To

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Purpose:

The purpose of this experiment is to create a COVID Vaccination Center crowed maintenance system. This system will give a warning if 3 or more than 3 people try to enter the vaccination center at a time. Which means, if 1 person tries to enter, it won't give any warning, if 2 people try to enter together, again it won't give any warning but if 3 people try to enter together it will give a warning and if 4 people try to enter together, again it will give a warning. This system will help to maintain the COVID-19 health & safety protocols.

Equipment:

i. Digital trainer board
ii. Integrated Circuits (ICs)
iii. Power supply
iv. Connecting wires

Integrated Circuits (ICs)

AND Gate: IC7408 -1 pcs
OR Gate: IC7432 -1 pcs

Procedure:

1. We made a truth table for given conditions

2. Following that truth table we made a K-map and an SOP expression.

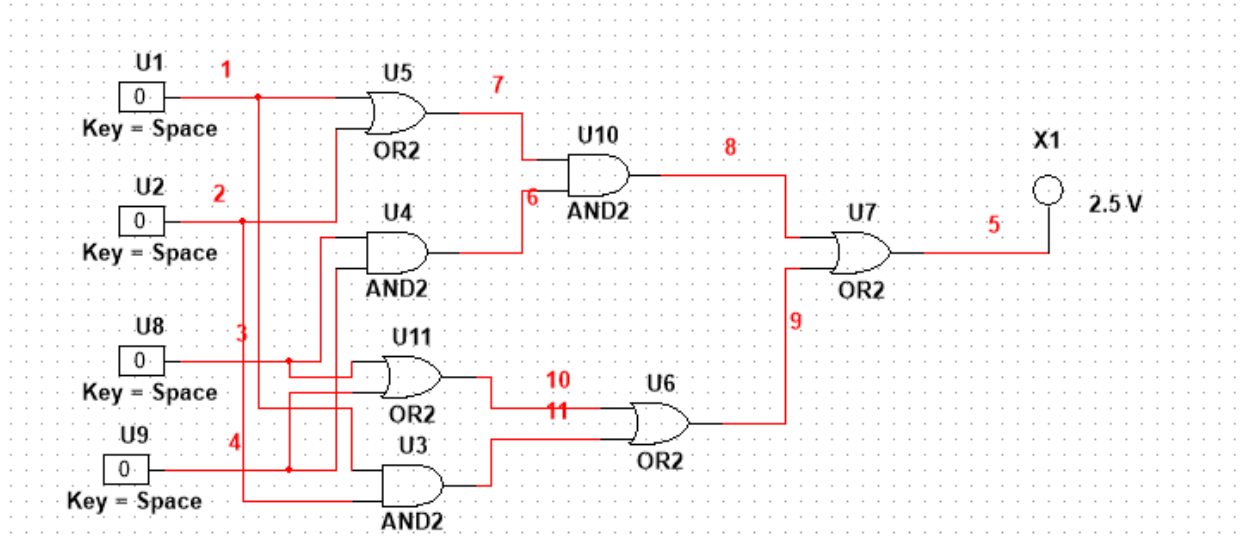
3. Based on that expression, we designed a logic circuit

4. We needed two ICs for the OR gate and AND gate. We took IC-7408 and IC-7432 for our experiment.

5. Following the logic circuit design, we developed a logic circuit on the trainer board by connecting the two ICs and providing a power supply.

6. We matched the outputs of the truth table by observing the LEDs by turning on and off the switches.

Simulation: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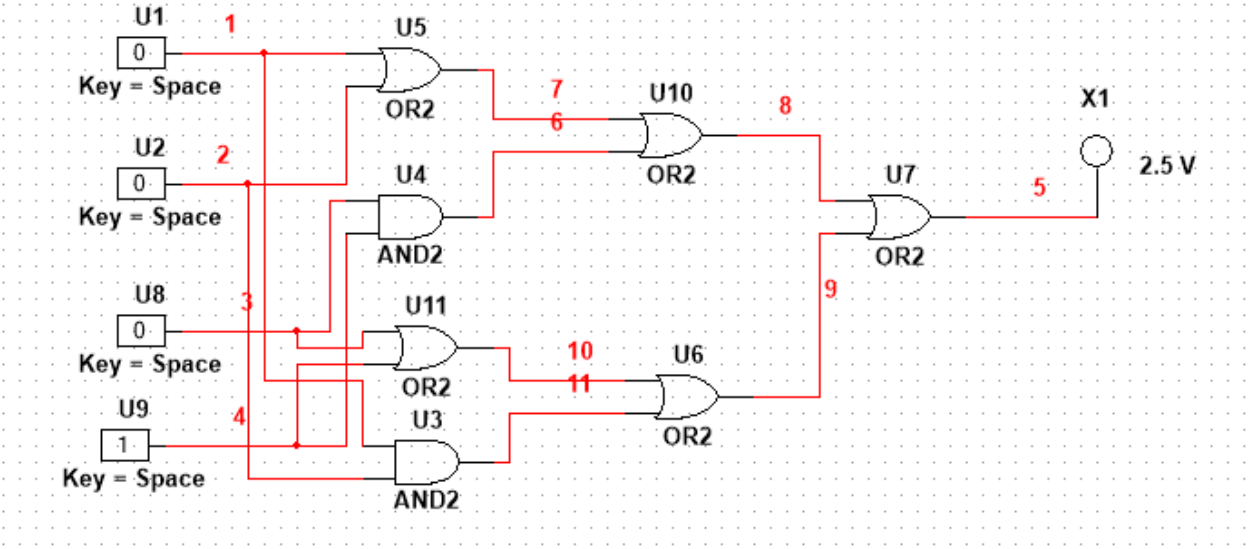
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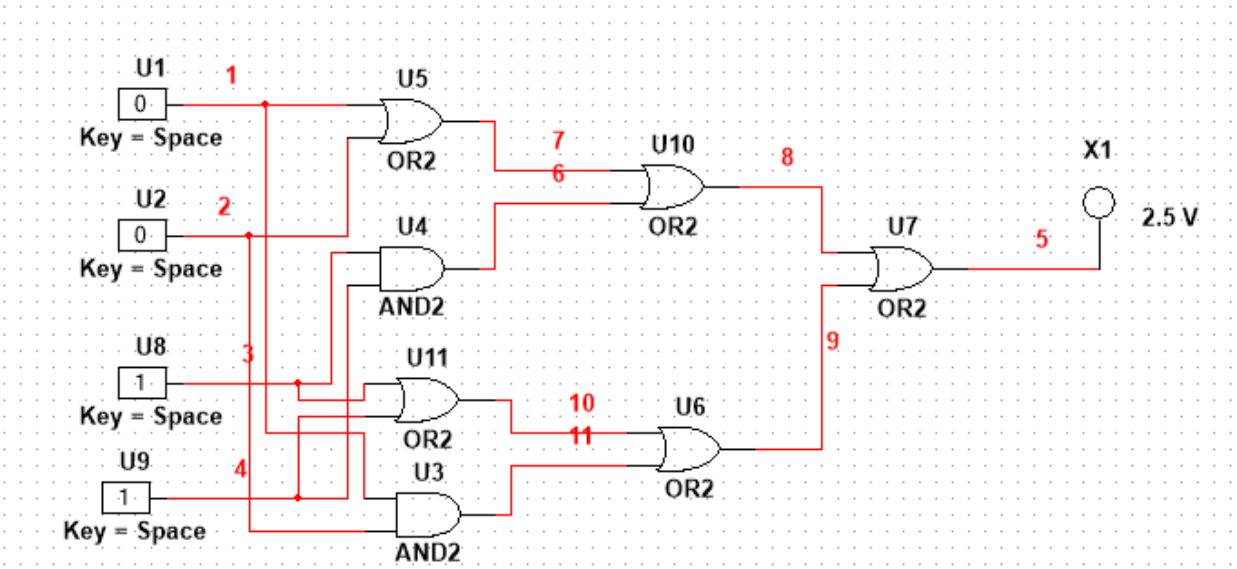
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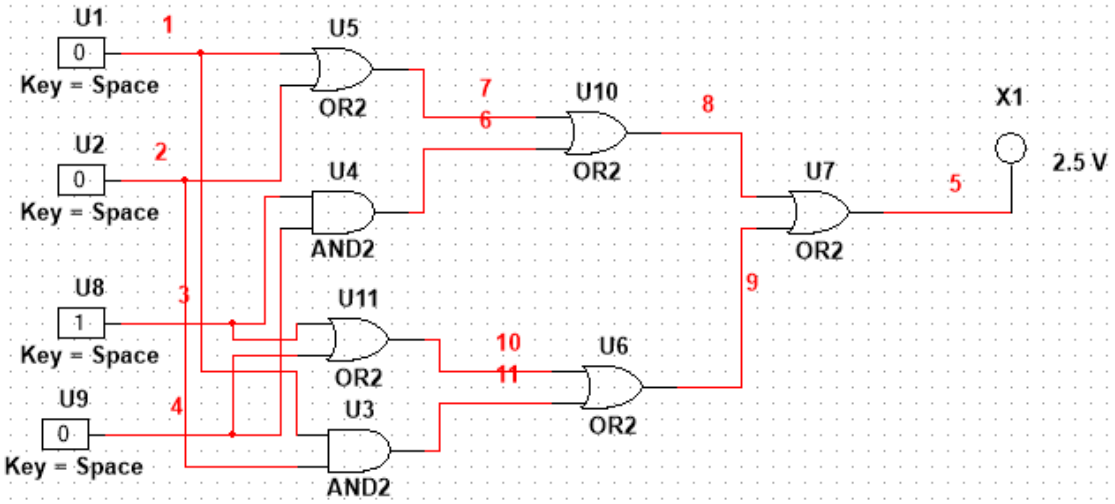
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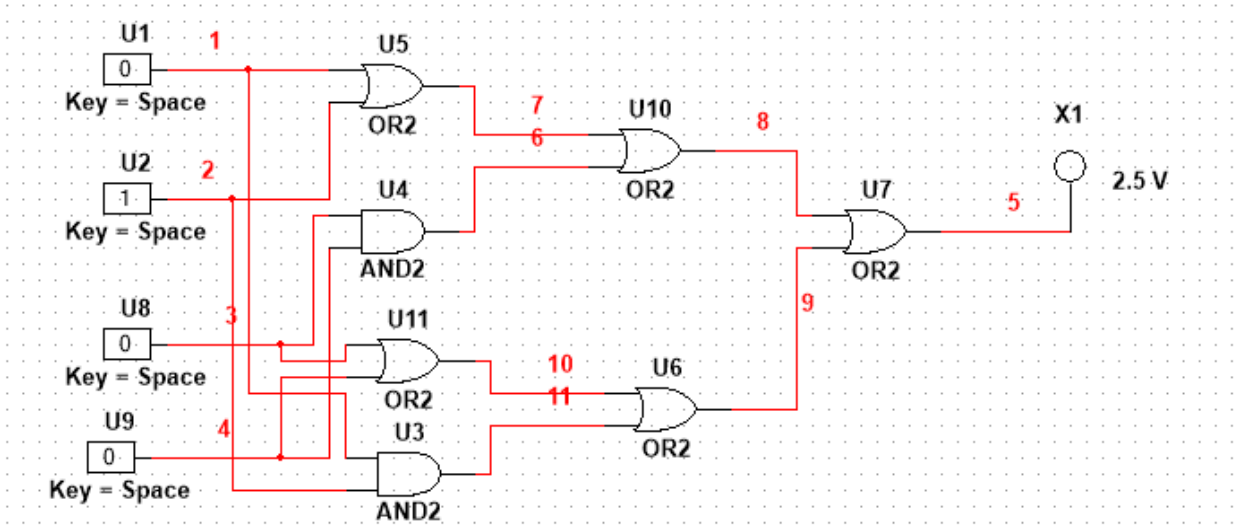
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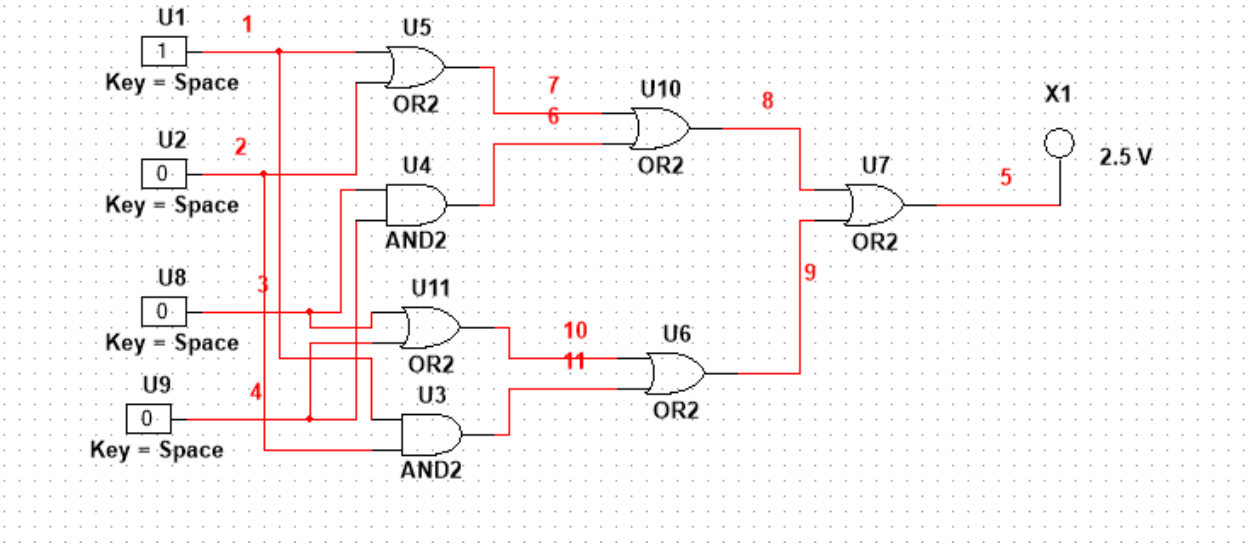
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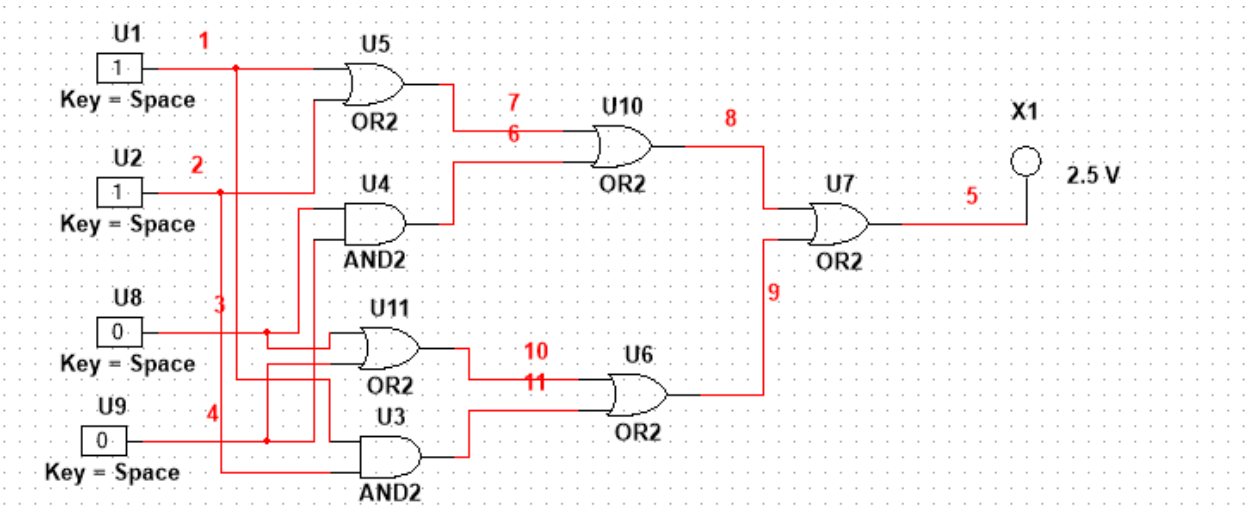
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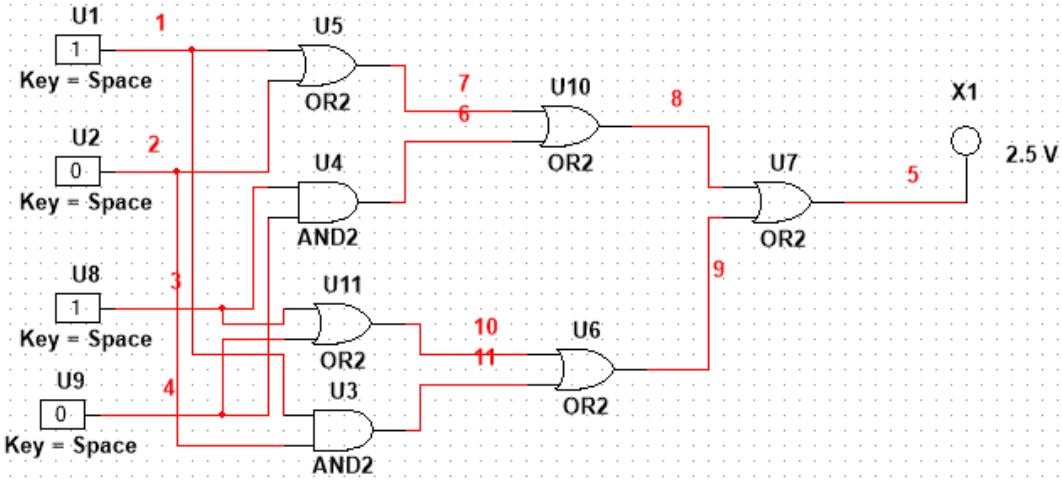
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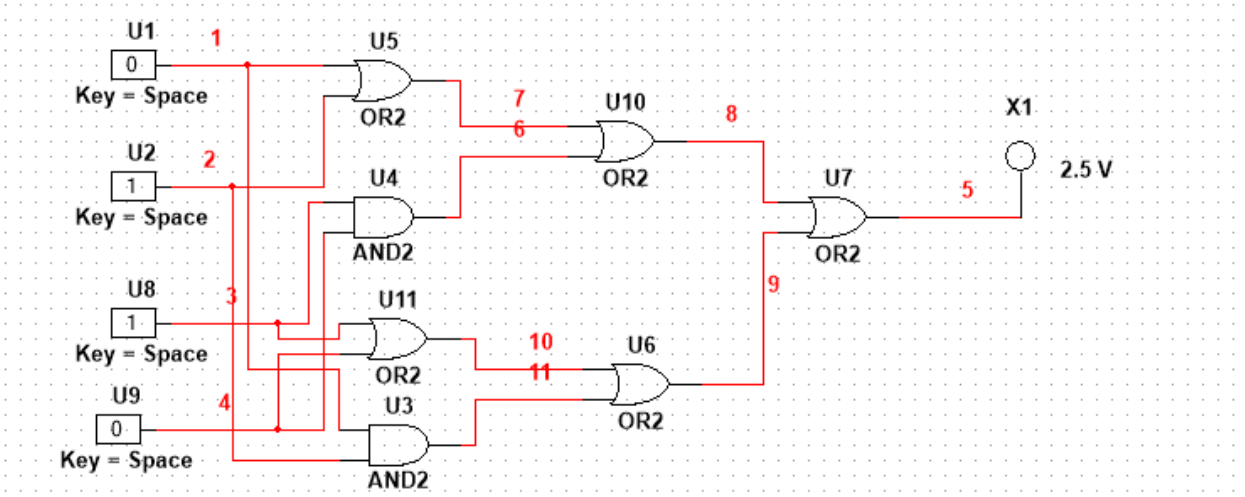
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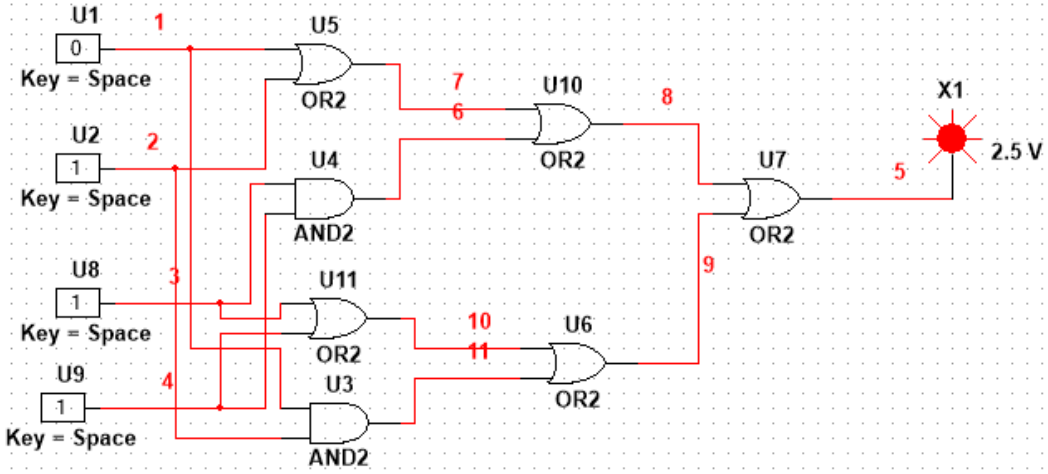
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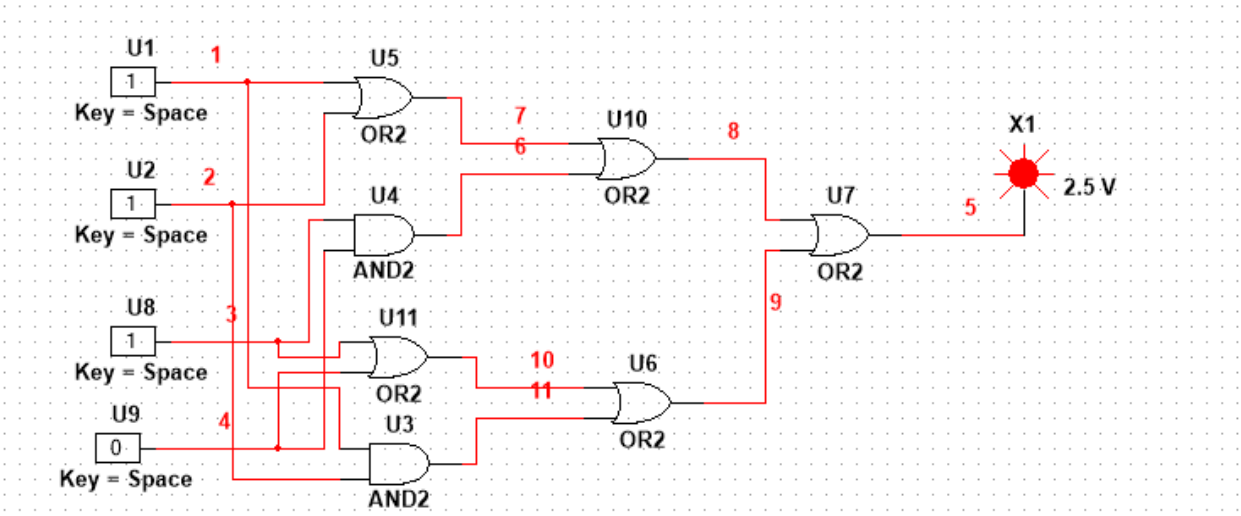
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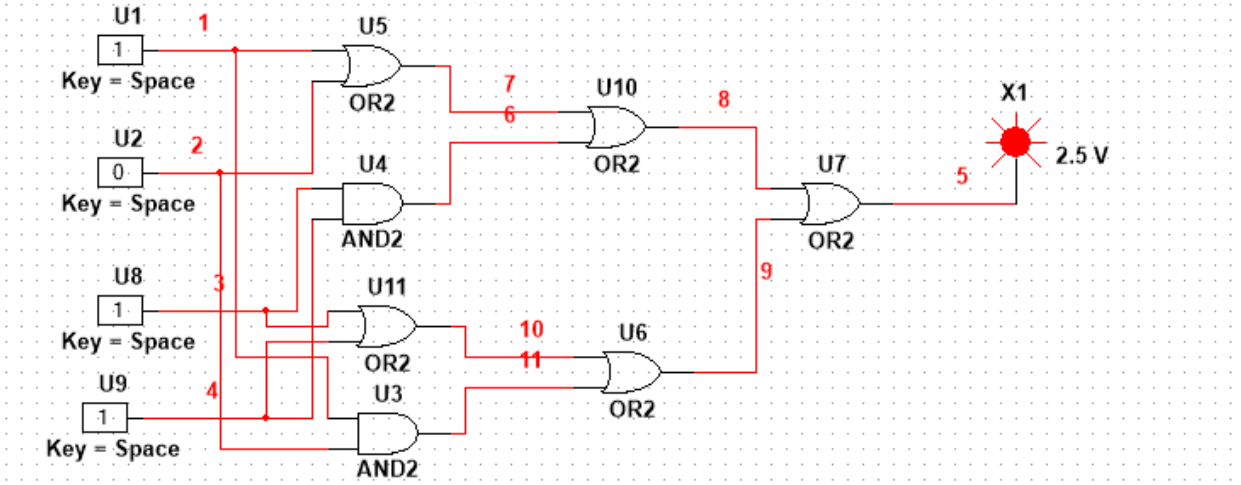
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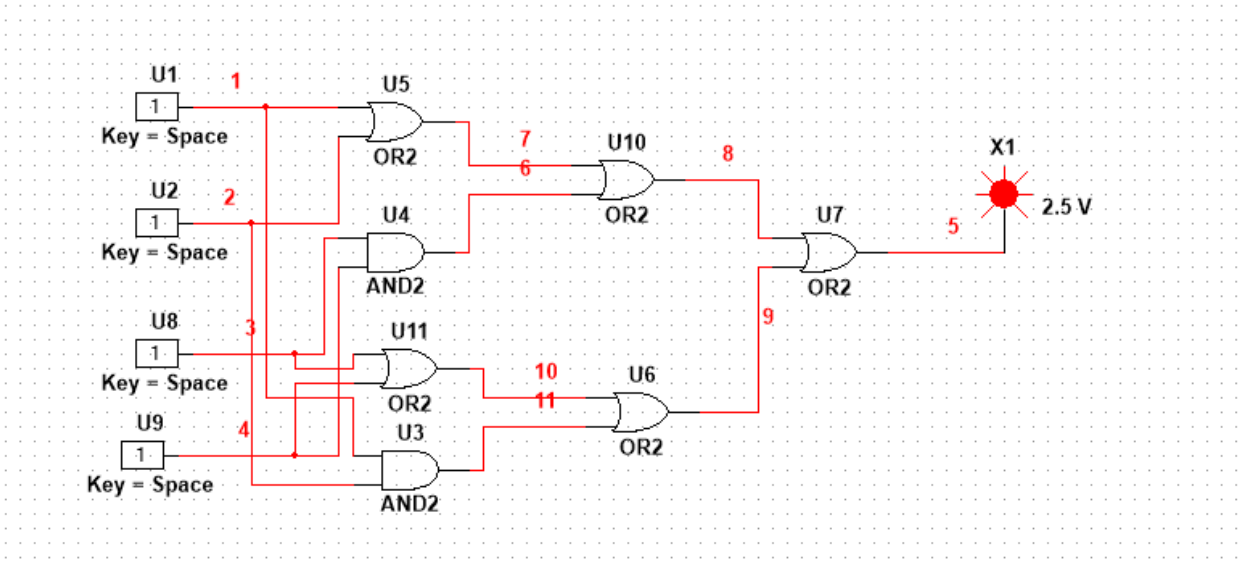

Discussion and Conclusion:

We developed a crowd management system for the vaccination center where the alarm will go off if more than two persons enter through the entry gate of the center. For that, we developed a logic circuit. We used Integrated Circuits (IC) for developing the circuit. Integrated circuits are mini circuits consisting of resistors, capacitors, diodes transistors, and many other electronic particles.

We have used two types of circuits containing two kinds of logic gates. We had to face some difficulties during the experiment. Some pins of the ICs were broken or defective. We had some issues with the built-in breadboard of the trainer board as we had some connection problems. So, we had to bring an extra breadboard to the circuit. There were some problems with the LED lights of the trainer board also as they were not turning on properly. We had too many wires, which made the circuit a bit confusing.

In spite of some problems, our experiment was quite successful as we got our expected outputs. So, we hope that, if our idea can be implemented in the vaccination centers, it will be effortless to maintain social distancing in a pandemic situation.

Literature Review:

Corona virus is a virus that was first detected in late December 2019, in Wuhan, Hubei province, China. It is a group of diverse and single standard Ribonucleic Acid viruses [1]. Countries all over the world have taken the policy of "social distancing" for controlling the spread of the virus. Its

goal is to keep people apart from each other to reduce the contact rate with each other [2]. This project's main contribution is to provide an effective way to alert the people affected by the crowd level increasing danger in certain location [3]. It takes two logic gates AND and OR to represent the logic operation [4]. Integrated Circuits contain logic gates. To make a semiconductor integrated circuit, millions of electric devices are made simultaneously in a series by very complex processing steps. [5]

References:

[1] Feng, H., E. Yu, D. and Weina,L. (2020) "Coronavirus disease 2019: What we know?" , "Journal of Medical Virology". [https://onlinelibrary.wiley.com/doi/full/10.1002/jmv.25766]

[2] Michael, G. and Vishan, N. (2020) "Does Social Distancing Matter?" "Brecker Friedman Institution, institute for economics working paper No. 2020-26". [https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3561244]

[3] Wafaa, M., S. Alia, A., H. and Basma, A., Z. (2017) "A Mobile Based Crowd Management System" "International Journal of Advanced Research in Computer and Communication Engineering"
[https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=crowd+alarm&btnG=]

[4] Kompa, K., L. and Levine, R., D. (2000) "A Molecular Logic Gate" "PNAS" [https://www.pnas.org/doi/10.1073/pnas.98.2.410]

[5] Stapper, C., H. Armstrong, F., M. and Saji, K. (1983) "Integrated circuit yield statistics" "IEEE Xplore"
[https://ieeexplore.ieee.org/abstract/document/1456887/authors#authors]