To do: Make a submission

Opened: Thursday, 20 June 2024, 12:05 AM
Due: Thursday, 27 June 2024, 11:55 PM

Assignment Instructions:

This assignment will enhance your understanding of practical applications of Boolean algebra and logic gates in electronics, fostering problem-solving, critical thinking, and communication skills while emphasizing efficiency in circuit design.

In this learning journal assignment, we immerse ourselves in the world of electronics by creating digital circuits using Boolean algebra and logic gates. This assignment challenges you to fulfill specific conditions, such as ensuring the light bulb turns on when the switch is closed (ON position) and off when the switch is open (OFF position), while using the fewest possible logic gates for simplicity and efficiency.

Scenario:

John is an electronics enthusiast who loves designing and building digital circuits using Boolean algebra and logic gates. He has been tasked with creating a simple circuit that can turn on a light bulb using a switch. John wants to utilize his knowledge of Boolean algebra and logic gates to design an efficient and reliable circuit for this purpose.

Assignment:

Using Boolean algebra and logic gates, design a digital circuit that can control a light bulb with a switch. The circuit should meet the following conditions:

1. The light bulb should turn on when the switch is closed (ON position) and turn off when the switch is open (OFF position).

2. Use the fewest number of logic gates possible to keep the circuit simple and efficient.

3. Clearly depict the logic gates you choose to use and explain the reasoning behind your choices.

Please provide a step-by-step explanation of your circuit design based on the following steps below.

1. Identification of input and output signals.
2. Application of Boolean algebra laws, and
3. The depiction of the final circuit.

Submission Instructions:

- Submit the solution in a word document.
- Make sure your submission is double-spaced, using Times New Roman, 12-point font, with 1" margins.
- Use sources to support your arguments. Add a reference list at the end of the submission. For assistance with APA formatting, view the Learning Resource Center: Academic Writing.
- Your submission should be clearly written, concise, and well organized, and free of spelling and grammar errors. Read the grading rubric to understand how your work will be evaluated.

This assignment will be assessed by your instructor using the rubric below.

Add submission

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Submission status

Attempt number	This is attempt 1.
Submission status	No submissions have been made yet
Grading status	Not graded
Time remaining	4 days 22 hours remaining

Grading criteria

Q1. Identification of Input and Output Signals	Accurately identifies input and output signals with deep understanding. **25 points**	Identifies both input and output signals. **20 points**	Identifies either the input signal or the output signal. **12 points**	The identification is incorrect or does not identify either of the signals. **0 points**
Q2. Application of Boolean Algebra Laws	Demonstrates Boolean algebra laws with exceptional simplification. **25 points**	Demonstrates Boolean algebra laws with effective simplification. **20 points**	Demonstrates Boolean algebra laws but with some errors. **12 points**	Attempts but with significant errors. **0 points**
Q3. Efficiency of Circuit Design	Designs a highly efficient circuit meeting all conditions minimally. **20 points**	Designs an efficient circuit with reasonably low gates. **16 points**	Design circuit that meets conditions but with excessive gates. **10 points**	Design circuit that does not meet conditions. **0 points**
Explanation and Reasoning	Provides comprehensive, clear explanation with justified choices. **20 points**	Provides detailed explanation with logic gate choices. **16 points**	Provides basic explanation with unclear reasoning. **10 points**	Gives unclear or insufficient explanation. **0 points**
Sources and Evidence	Demonstrates consistent use of credible, relevant sources to support ideas that are situated within the discipline and genre of the writing. **10 points**	Demonstrates an attempt to use credible and/or relevant sources to support ideas that are appropriate for the discipline and genre of the writing. However, the use of credible and relevant sources is not consistent. **8 points**	Demonstrates an attempt to use sources to support ideas in writing. Yet, most sources provided are not credible / relevant to the discipline and genre. **5 points**	Uses no sources to support ideas in writing. **0 points**