

Name _____

Partner _____

Introduction

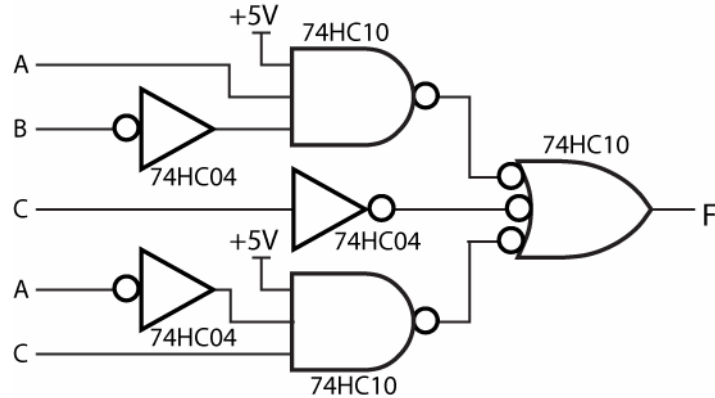
In this lab you will use the analysis techniques covered in class and verify the results by building and testing the circuits to verify the truth table.

Pre-lab Requirements

1. Know your logic analysis techniques including finding the equation from a logic diagram, finding the standard SOP and standard POS equations, and creating a truth table.

Part One – SOP Circuit

In this part of the lab you will be asked to analyze a circuit that implements an SOP Boolean equation.



1.1 Analysis

1. The first step for this part is to find the SOP equation that describes the logic diagram above. Do not reduce the equation with the exception of replacing double NOTs ($X'' = X$).

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2. Expand the equation to its equivalent Standard SOP form. Show both Boolean equation form and shorthand form.

3. Fill the following truth table based on the derived standard form.

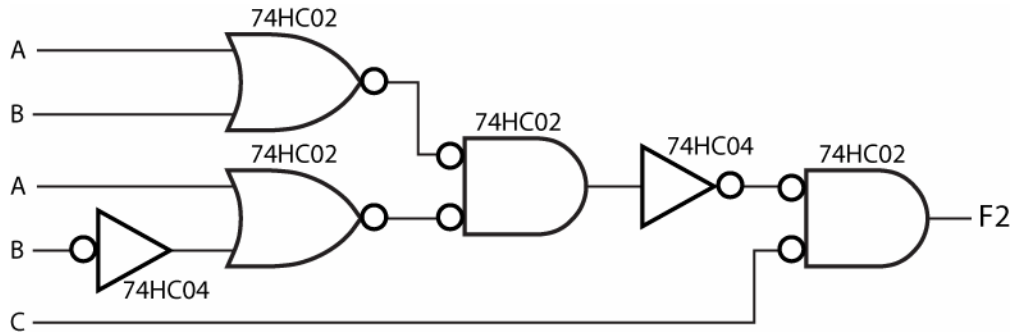
ABC	F (Derived)	F(Measured)
0 0 0		
0 0 1		
0 1 0		
0 1 1		
1 0 0		
1 0 1		
1 1 0		
1 1 1		

1.2 Verification

1. From the data sheets for the 74HC10 and 74HC04, add pin numbers to the logic diagram above to help build the circuit.
2. Build the circuit. Connect the inputs (A,B,C) to switches on the DigiDesigner and connect the output (F) to an LED.
3. Fill out the 'Measured' column in the truth table above.
4. If the two output columns do not agree, troubleshoot the circuit and your analysis until they do.
5. Discuss any errors made or problems encountered.

Part Two – POS Circuit

In this part of the lab you will be asked to analyze a circuit that implements an POS Boolean equation.



2.1 Analysis

1. The first step for this part is to find the POS equation that describes the logic diagram above. Do not reduce the equation with the exception of replacing double NOTs ($X'' = X$).

2. Expand the equation to its equivalent Standard POS form. Show both Boolean equation form and shorthand form.

3. Fill the following truth table based on the derived standard form.

ABC	F2 (Derived)	F2(Measured)
0 0 0		
0 0 1		
0 1 0		
0 1 1		
1 0 0		
1 0 1		
1 1 0		
1 1 1		

2.2 Verification

1. From the data sheets for the 74HC02 and 74HC04, add pin numbers to the logic diagram above to help build the circuit.
2. Build the circuit. Connect the inputs (A,B,C) to switches on the DigiDesigner and connect the output (F2) to an LED.
3. Fill out the 'Measured' column in the truth table above.
4. If the two output columns do not agree, troubleshoot the circuit and your analysis until they do.
5. Discuss any errors made or problems encountered.