Class:	CPE100L - 1002	Semester:	Spring 2020

Points		Document author:	Kristy Nguyen
		Author's email:	nguyek20@unlv.nevada.edu
		Document topic:	Postlab 6

Instructor's comments:

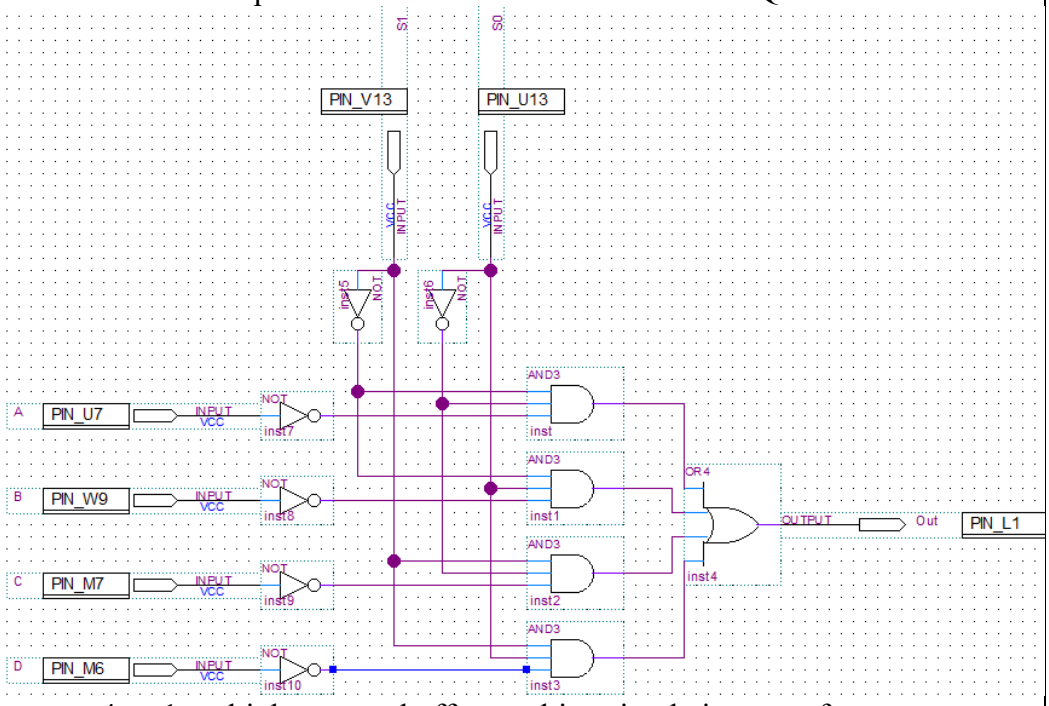
1. Introduction / Theory of Operation

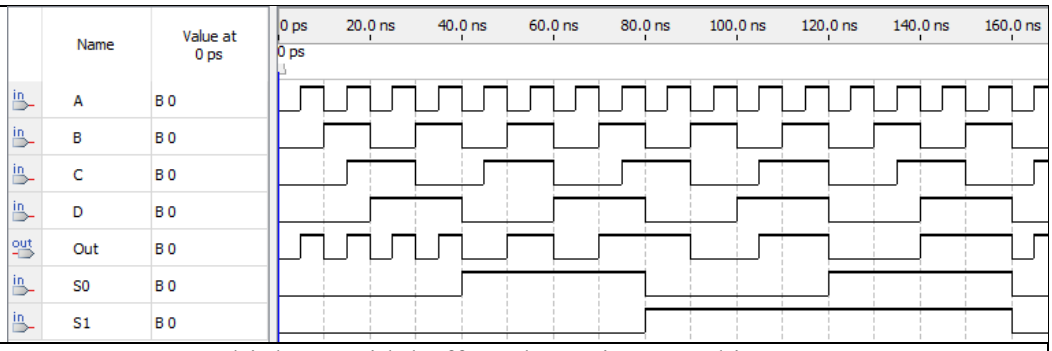
Lab 6 is about multiplexers and demultiplexers, where we will design and implement 4-1 multiplexer and demultiplexer circuits on the DE0 board.

2. Prelab Report

My prelab report will be attached with the submission.

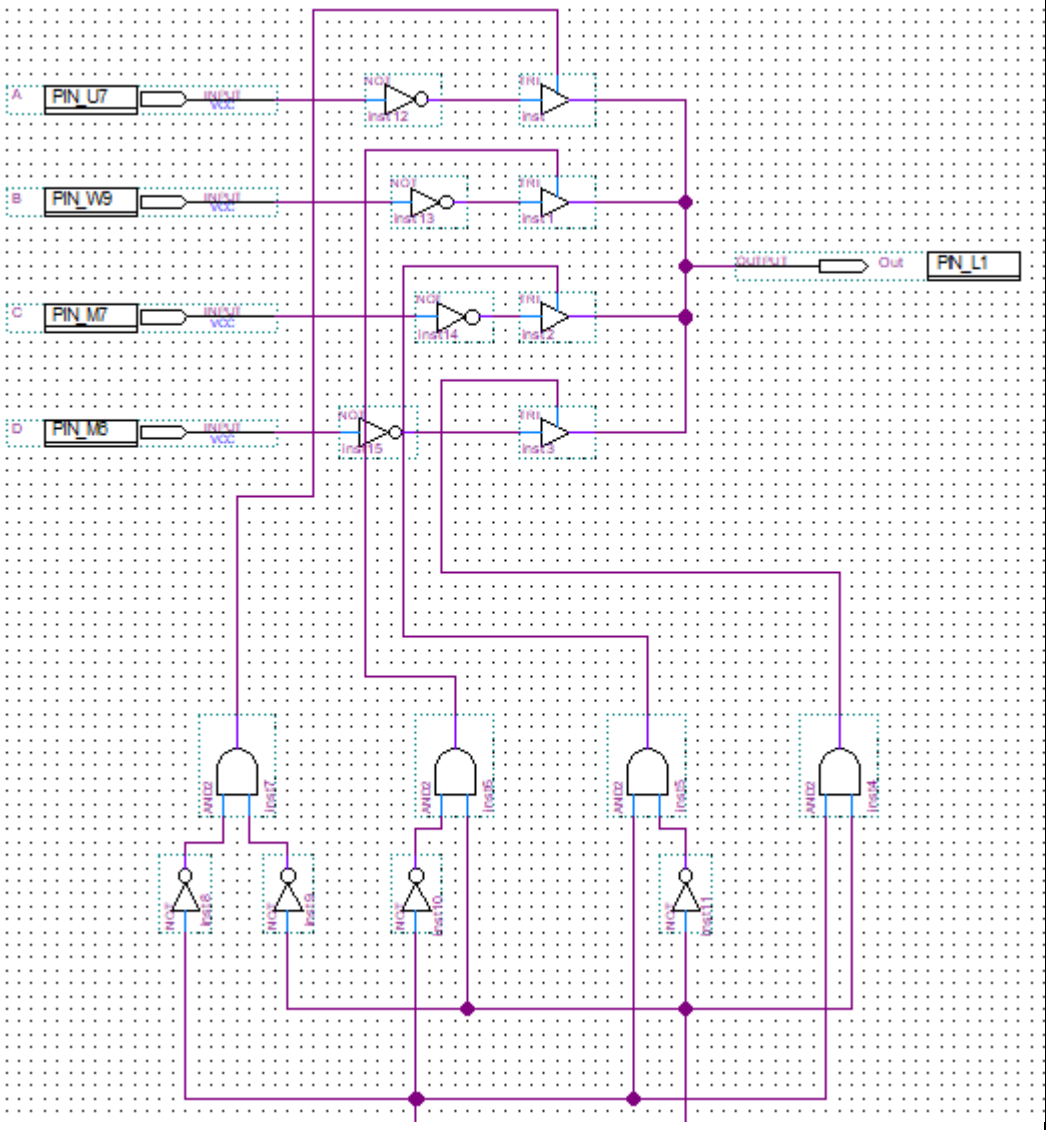
3. Results of the Experiments

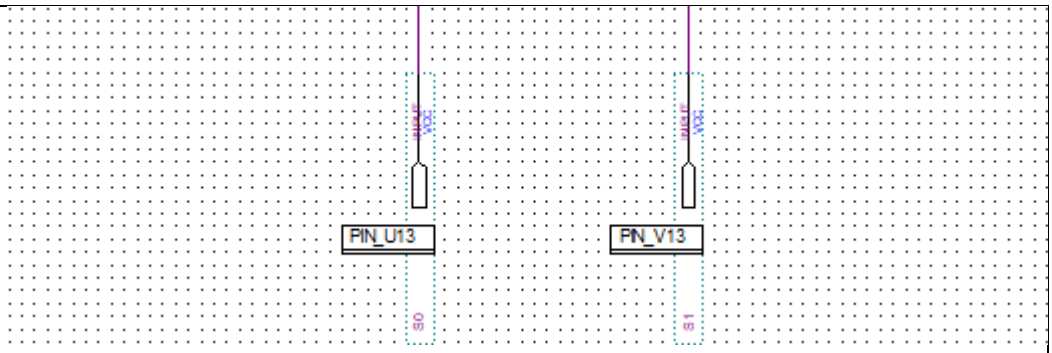
Experiment	Experiment Results
1	a. Minimization of the 4-to-1 multiplexer function $Y = S_1'S_0'A + S_1'S_0B + S_1S_0'C + S_1S_0D$ b. 4-to-1 multiplexer non-buffer schematic created in Quartus  c. 4-to-1 multiplexer non-buffer resulting simulation waveforms



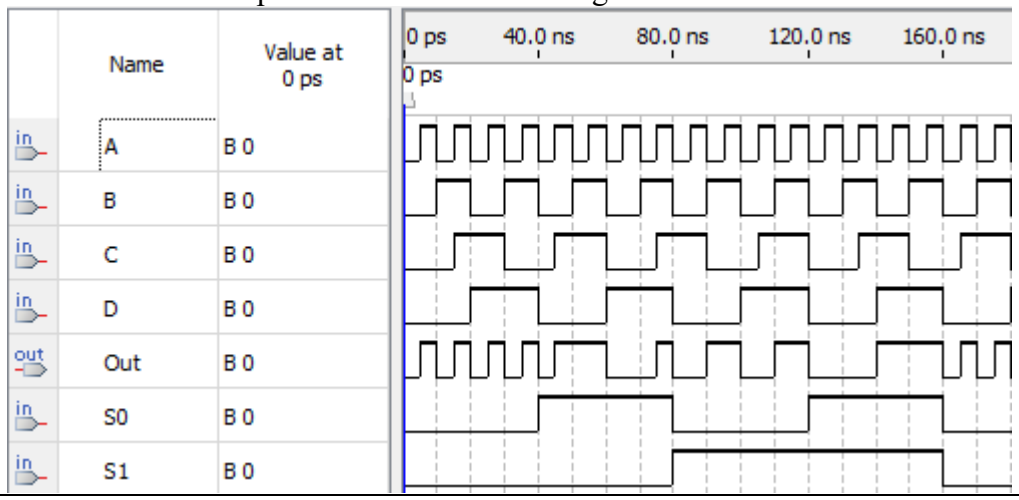
2

a. 4-to-1 multiplexer with buffer schematic created in Quartus

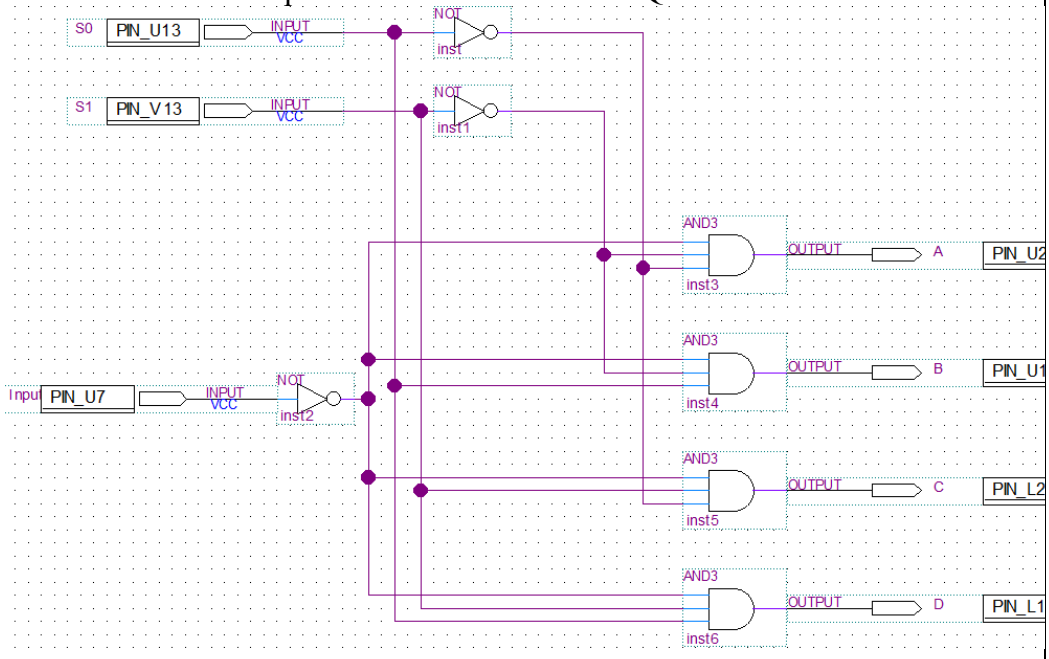


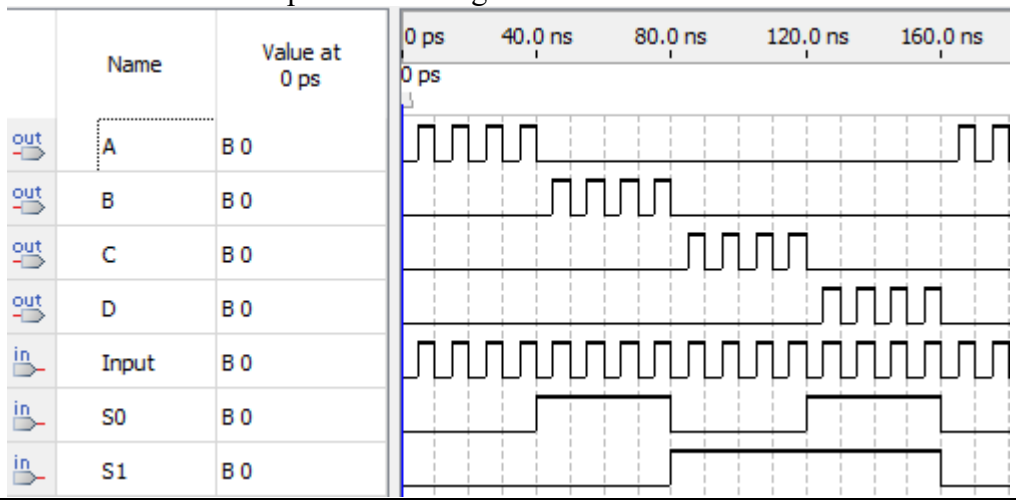
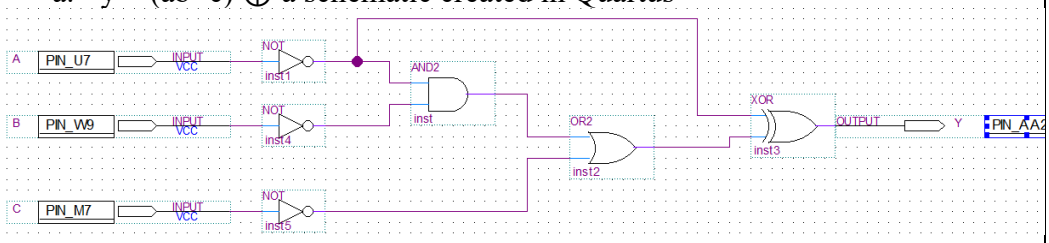


b. 4-to-1 multiplexer with buffer resulting simulation waveform



3 a. 1-to-4 demultiplexer schematic created in Quartus



	b. 1-to-4 demultiplexer resulting simulation waveform 
4	a. y = (ab+c) ⊕ a schematic created in Quartus 

4. Answer the questions

1. The 4-to-1 multiplexer with a tri-state buffer and AND gates is better because it prevents the function from reading excessive input. With more inputs, it is more preferable to use the multiplexer with buffers in order to control the inputs. With less inputs, it is more preferable to use the multiplexers with no buffer because there are not as many inputs.

2. In order to receive four signals again, you would use a 1-to-4 demultiplexer at the receiving unit in order to send 1 input and receive 4 outputs.

3. Buffers controls the on and off of data transmission and isolates the input from the output, either providing no voltage or a voltage that is the same as the input voltage.

5. Conclusions

Prior to this lab, this lab seemed quite difficult because the prelab quartus project with the 4-to-1 multiplexer did not allow me to make the resulting simulation waveform as a result of naming the file with a number at the beginning. After the help of the teaching assistant, we were finally able to relearn and realize that the waveform should be modified in order to receive all the different combinations for a proper output. We learned that selectors allow you to select which output to receive at the end.