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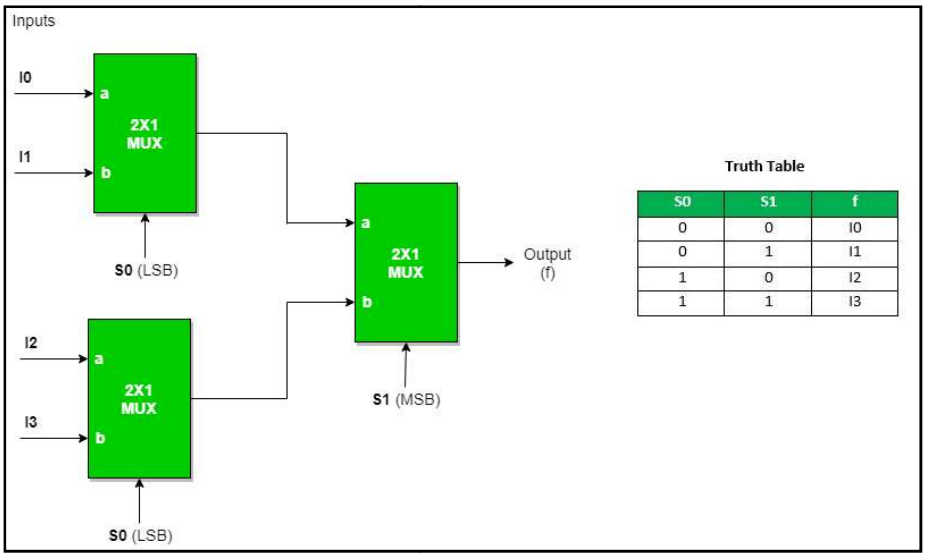
ECE311

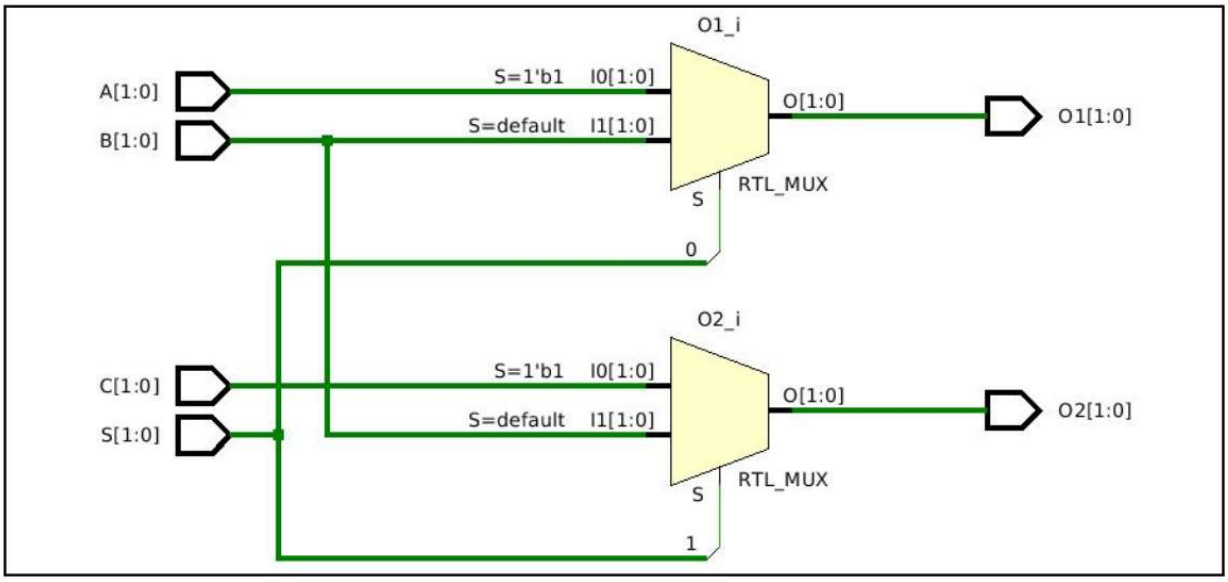
Lab2 Report

MUX 3 to 2 bit using 2 to 1 bit Multiplexers

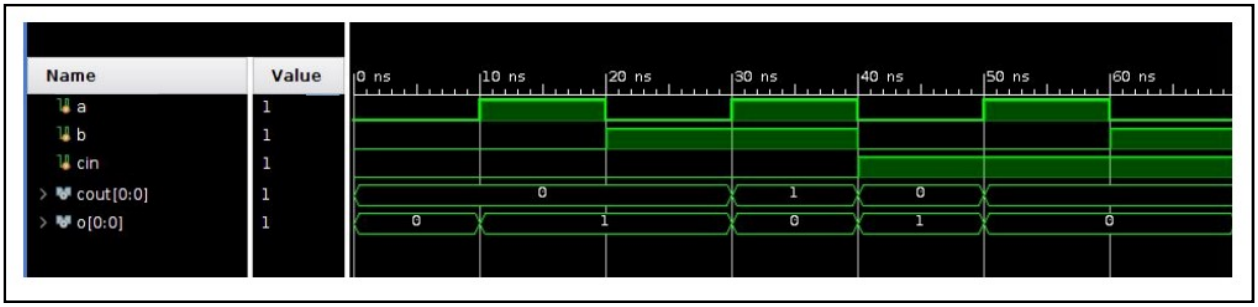
(source: https://www.geeksforgeeks.org/multiplexers-in-digital-logic/)



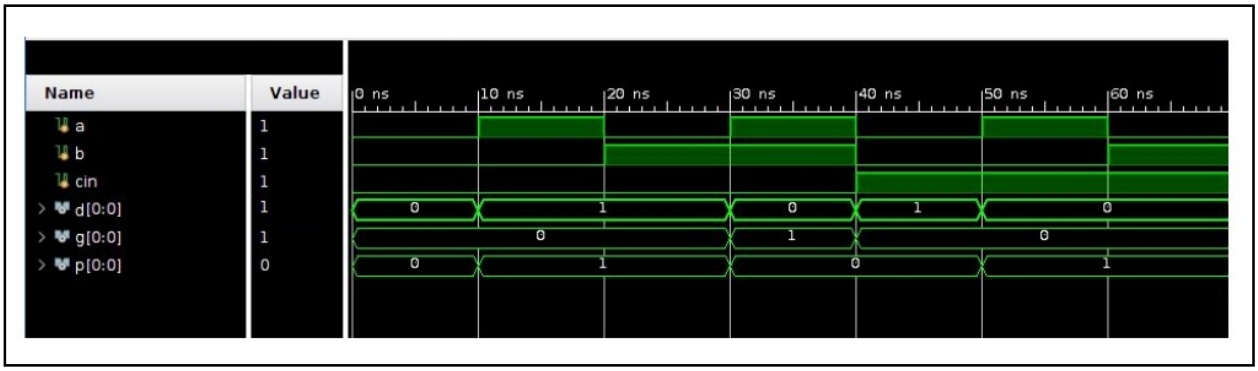
Vivado Schematic Displaying 3 to 2 bit MUX bit using 2 to 1 bit Multiplexers



Timing Diagram for Ripple Carry Adder



Timing Diagram for Look Ahead Adder



Analysis:

Since it takes less time to identify the carry bit thanks to the logic, a carry look ahead adder should operate more quickly than a ripple carry adder. In a ripple carry adder, the carry bit is calculated with the output bit while a carry look ahead adder minimizes the wait time for calculation by calculating the carry bit ahead of the output bit. However, it seems that there is no difference in the speed performance between a ripple carry adder and a look ahead adder based on the timing diagrams of the adders that were simulated in Vivado. Additionally, the look ahead adder and ripple carry adder also have zero propagation delays. When the two adders were evaluated using the identical simulation test bench, both of them attained the final simulation values at 80 seconds to the point. As soon as the input changes, the output changes instantaneously. There may not be a difference in speed performance between the two adders as a result of the straightforward test bench conditions.