HW2 Write-up

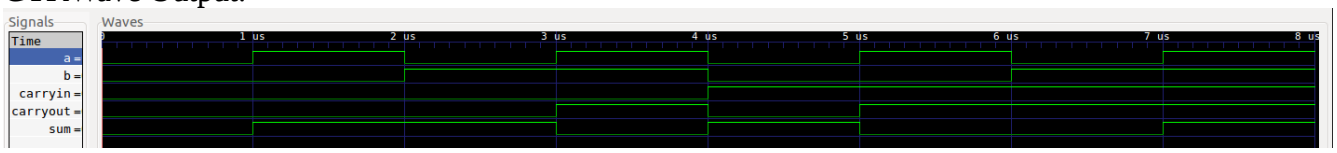
Verifying My Adder

My adder takes in three inputs – a (the first bit), b (the second bit), and carryin (the overflow from a OR b). I derived the sum and carryout variables from testing out all the input combinations in this circuit based on rows with 1s for each case.

Truth Table:

a	b	carryin	sum	carryout
0	0	0	0	0
1	0	0	1	0
0	1	0	1	0
1	1	0	0	1
0	0	1	1	0
1	0	1	0	1
0	1	1	0	1
1	1	1	1	1

GTKWave Output:



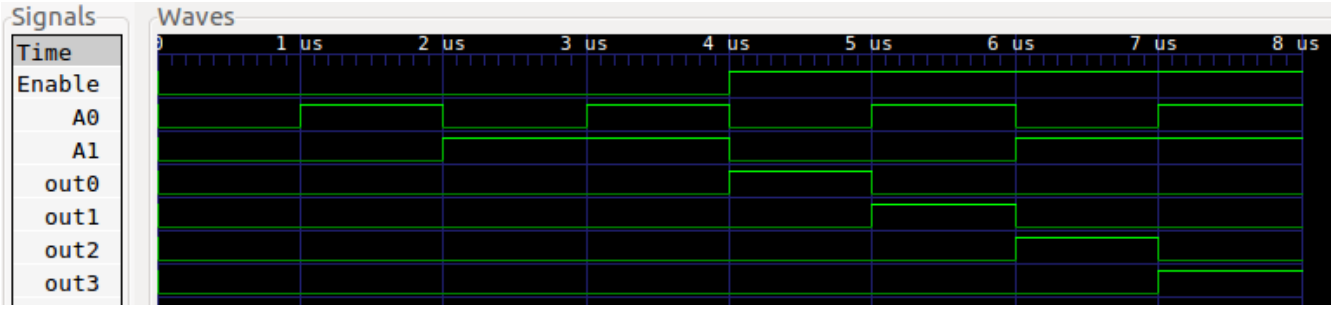
Verifying My Decoder

My decoder takes in three inputs—Enable, A0 and A1. These bits determine which of the 2^2 inputs (a0, a1, a2, and a3) is selected. If the Enable is 0 then we will get a False output. If the Enable is 1 then the A0 and A1 determine the input, like normal.

Truth Table:

En	A0	A1	O0	O1	O2	O3	Expected Output
0	0	0	0	0	0	0	All false
0	1	0	0	0	0	0	All false
0	0	1	0	0	0	0	All false
0	1	1	0	0	0	0	All false
1	0	0	1	0	0	0	O0 Only
1	1	0	0	1	0	0	O1 Only
1	0	1	0	0	1	0	O2 Only
1	1	1	0	0	0	1	O3 Only

GTKWave Output:



Verifying My Multiplexer

My multiplexer takes in just two inputs: A0 and A1 and determines which input (in0, in1, in2, or in3) becomes the official output. It basically acts as a decoder without the extra Enable input.

Truth Table:

addr1	addr0	in0	in1	in2	in3	Expected Output	Actual Output
0	0	1	0	0	0	1	1
0	1	0	1	0	0	1	1
1	0	0	0	1	0	1	1
1	1	0	0	0	1	1	1

GTKWave Output: