ECE-301-204

Lab6 Adder Circuits

Marcus Domingo

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Objective:

To build and verify the correct operation of a Half Adder, a Full Adder, and a 2-bit Ripple Carry Adder.

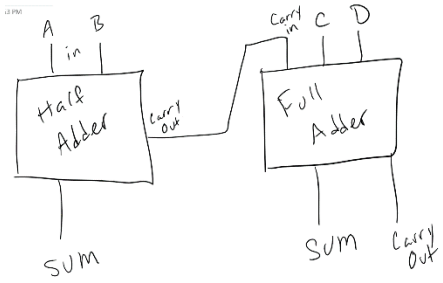
Preparation:

Half Adder:

Input		Output	
A	**B**	**Sum**	**Carry Out**
0	0	0	0
0	1	1	0
1	0	1	0
1	1	0	1

Full Adder:

Input			Output	
A	**B**	**Carry In**	**Sum**	**Carry Out**
0	0	0	0	0
0	0	1	1	0
0	1	0	1	0
0	1	1	0	1
1	0	0	1	0
1	0	1	0	1
1	1	0	0	1
1	1	1	1	1

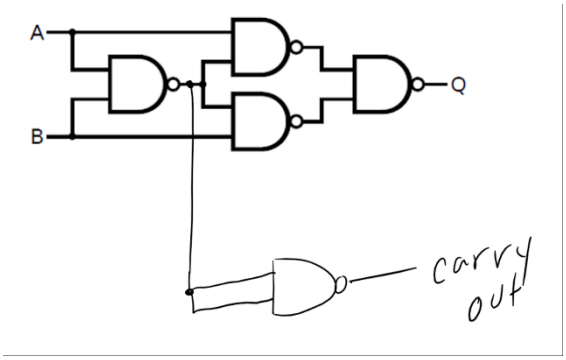


For my part of the Lab I did the 2-bit Ripple Carry with a Half Adder and a Full Adder so above is the block diagram for my portion.

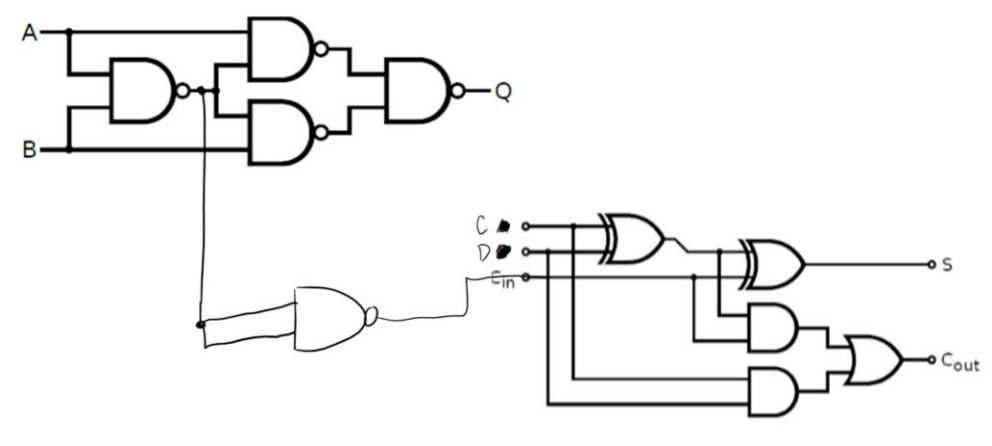
Materials and Equipment:

- ET-1000 Trainer
- Wires
- Breadboard
- 1 74xx08 (AND gates), 1 74xx32 (OR gates), 2 74xx00 (NAND gates), 1 74xx86 (XOR gates)

Laboratory Data:



Above is how to make the half adder out of 5 NAND gates. To get the carry out you just have to NAND the output of (A NAND B).



Above is my version of the 2-Bit Ripple Carry: Half Adder Carry into Full Adder.

- ✓ Both the Half Adder and the 2-Bit Ripple Carry implementations have both been tested in lab experimentation.

Comments and Conclusions:

This is the first lab experiment that we were given to actually manipulate binary digits rather than just sending them through gates and getting specific outputs. Although being taught about both adders in class we actually get a better representation of them through this lab and give us insight on 4-bit, 8-bit, … Ripple Carries. Binary addition is just the beginning to the many things we can do with gates and gives us insight on subtraction, multiplication, and division.