My computer overheated and turned off while it was trying to get 8 gates for the 3 input NOR and 6 gates for the 3 input AND. I am going to update minCircuitFinder2 to work for AND gates and see if I can find 6 gates and 7 gates using 5gates as a starting point. I made a few adjustments to the minCircuitFinder1 for AND that will slightly improve the speed. I forgot to update the filter for when the level of the beta circuit is not the level of the alpha circuit. I am running the wrapper function that removes unused circuits starting at 5 and ending at 7. It will automatically write the file for 6 gates and 7 gates. Hopefully it won’t lose any truth values. I am hoping to see at what point all 256 are found. While that runs I will try to figure out how to use LogicFriday to find the min circuits for a specified truth value.

Bryan helped me get ABC set up but it seems to have some problems. I need to read the documentation to figure out how things work.

Starting at 5 and going to 6 it found 254 out of 256 truth values. It missed the same two that the nor missed. It missed 01101001 and 10010110. Checked with ABC and these two were supposed to be found with 6 AND gates so I started running the brute force method to go up to 6 gates and write the stock file. Hopefully it will finish in less than 24 hours or at least before the end of the weekend.

I am working on making a python program that can use ABC to get the minimum circuit for each input and count the number of AND gates used. Then I will compare this to what I was able to find. First I will need to figure out how to run ABC in the python IDLE. When I learn to do this I will make a function that writes each truth value as a blif file and then converts it to a bench file and then counts the number of AND gates from there.

There were a lot of differences. In several cases, a 4-AND-gate circuit was found by ABC and a 5-AND-gate circuit was found by my program. In many cases a 7-AND-gate circuit was found by ABC while a 6-AND-gate circuit was found by mine.

There was a problem with the way the truth value was determined which made it ignore some circuits. I fixed it and am refinding the stocks. It seems to still give the same truth value for the circuits that said 7 gates by ABC method. At least for 01101011 and 11101001. When I finish making stocks up to 5 I will make 6 from 5 removing unused and check again to see if those circuits truly are 6 gates and have the correct logic.

With the correction all 256 circuits were found using 6 ANDs or fewer. This bested the ABC on 8 occasions.

>>> x=compareGateCount()

truthVal, ABC : Found

01101011, 7 : 6

01101101, 7 : 6

01111001, 7 : 6

10010111, 7 : 6

10011110, 7 : 6

10110110, 7 : 6

11010110, 7 : 6

11101001, 7 : 6

Bryan suggested another method of gate minimization by finding the optimal up to a certain number of gates and, if what is wanted still isn’t found, find a non-optimal circuit and swap out components as much as possible to minimize the circuit. Another thing to look into is potentially a multiple output circuit. Another is sequential circuits. These are things I will keep on my mind during the weekend.