I showed Bryan the program made. There are still some minor modifications that need to be made.

I showed him the example with the (~(a.b)) and we tried two more examples x inhibiting itself and a reprecillator. We also discussed the fundamentals of the dynamic circuit project. We talked about the cases where there are two promoters and one is activated while the other is repressed. We also discussed the idea of defining what is considered an ‘on’ and what is considered an ‘off’ and why an OR is allowed only at the end of a circuit. He described how we switch from looking at the states of the promoters to the state of the protein at the end of a circuit.

The seems to work for sequential circuits. There was one thing that we noticed though. For x inhibiting itself, there was no oscillation. When x reached equilibrium, it stayed there. For the three item circular inhibition, there was no oscillation if all three inputs started with the same concentration of protein and mRNA; however, if even one of them was slightly off from the others, the circuit would not be stable and start building momentum until it reaches a maximum oscillation. The amplitude of the oscillation seemed to be the same no matter the inputs along with the period. The time it took to reach the maximum oscillation, however, was a function of the inputs. If the protein concentrations were high (100000) and one of them was slightly off (100001) then it would take much longer to reach max oscillation compared to something were they were (100) and one was (101). I guess this is to say if x is the value of two of the three and y is the change from the two that the third is. In the example y=1. Then x/y is proportional to the time it takes to reach maximum oscillation.

There are a couple of goals now. I still need to find an odeint that would work for java. Then I would need to keep this put aside so that we won’t need to search for it later. I also need to comment the code thoroughly to improve its readability. Then I need to figure out how to import json objects and define the properties in a json file and import them into python. Another thing I need to do is figure out how to get graph keys. And finally, I would need to incorporate buffers into this circuit design.

I’ll start by spending a couple minutes searching for a differential equations solver for java and then work on commenting the code better.

<http://commons.apache.org/proper/commons-math/userguide/ode.html>

That link seems to give a guide of how to solve differential equations in java. Next I will work on adding better comments to the code.

I completed the commenting and added a BUFFER gate option. The group meeting is about to start so I will need to put a pause on things, but when I get back I will look into making more graph keys. Then I will look into putting the inputs in a Json file format and importing Json objects to python.

I was able to figure out some complicated method for determining colors and symbols for graphing. There shouldn’t be any repeated graph line patterns unless we use more than 476 things being graphed (7\*4\*17). I now have to look into using Json files for python.

I learned how to use the json module a bit. I can write things to json files using pretty print. I wrote the two exmples, repressilator and (~(a.b)) so they can be used as examples. Now I need to write something that can open those files and create the necessary data from them.

I successfully wrote something that can open the json file and create a graph. The next step is to be able to go from a library of inputs (IPTG, etc), logic (repressors), outputs (YFP) to the json file. The steps would require first to pick a logic implementation, and then convert it to a DAG. Then, choosing a set of inputs and outputs and logics, plug in values into the DAG. Then convert that DAG into the Json format and create a graph for it.

The first thing I will look into is converting the logic implementation into a DAG. The representation of the DAG will be like a python version of what Caddie is working on. It’s the end of the day though, so I will think about this over the weekend and hopefully make a plan for it by then.