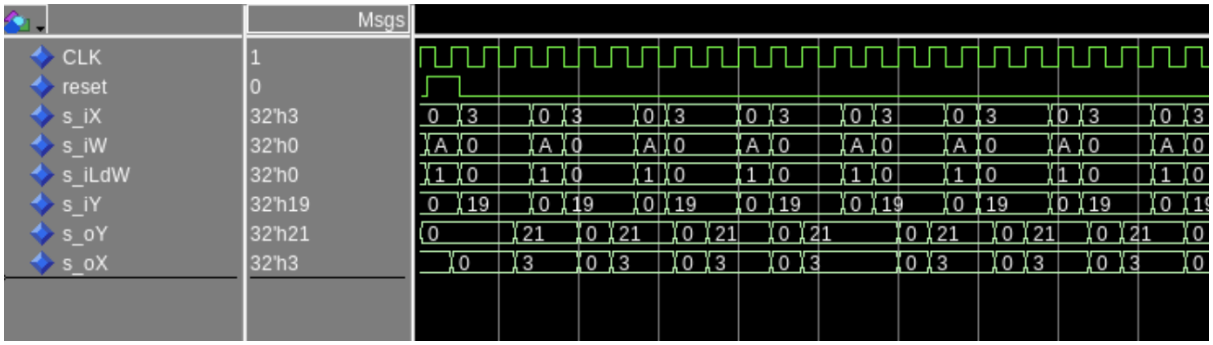
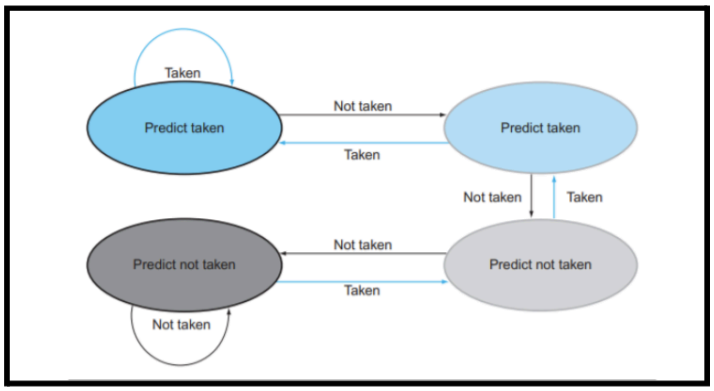
I will always remember CprE 381 to be one of my toughest classes while at Iowa State. This class took us through learning assembly language and how to use it to create the logic that is housed within central processing units (CPUs). This was done in groups of 4 where we began with more simple concepts and ramped them up until we got to more modernly used techniques. We all took similar roles in this project as the vast majority of it consisted of coding components or algorithms. All of these components that we designed during these projects played a fundamental role in the operation of a CPU and provided us great insight into how everything can connect and come together to work as one. These components consisted of registers (to hold data), an ALU (to perform calculations), a control unit (to allocate signals based on the received instruction, and many more. Overall, the main challenge of these projects was the time commitment of it all, as it took many late and stressful nights to properly finish on time. A big chunk of this time spent was on debugging as fixing one problem always seemed to lead to another. Overall, this project was a great learning experience as it taught me a lot about the characteristics and interactions between components, the use of algorithms to test different systems, working with a team to bring our individual parts together into one working model, as well as the large differences in CPUs based on how they are designed.



This is an example of what debugging the CPUs looks like, using signals to verify proper calculations are being made



This is an example of how one of the components within the CPUs works, it is a branch predictor that predicts what the next decision the program will make is