# CIS4930 Datapath Synthesis Tool

My Experience

Implementing the Datapath synthesis process for any given expression in an AIF file format with C# was fairly simple. Since several input examples were provided, it was easy to setup integration testing to test each input in an automated way using NUnit. The provided completed example was enough to reverse engineer the process for writing the VDHL files after the function, register, and multiplexor allocation was completed.

Automated testing was used to write unit tests for each step in the process. Furthermore, lots of VHDL comments were embedded into the generated files to help with debugging the finished files in case the files fail their test benches.

The provided VHDL components (i.e. register, multiplexor, multiplier, etc.) did have some issues that were difficult to debug. There was a race condition with using the “clock’event” latch in the register component that resulted in values not being assigned to the register depending the compile order of the code when the value is changing in relation to when the clock is changing. The subtract component allowed for overflow, while the other components did not. This inconsistency would be difficult to find without first looking at the code, which creates a bad user experience. In addition, there was an index issue with clique code where a value was being set that was outside of the array bounds.