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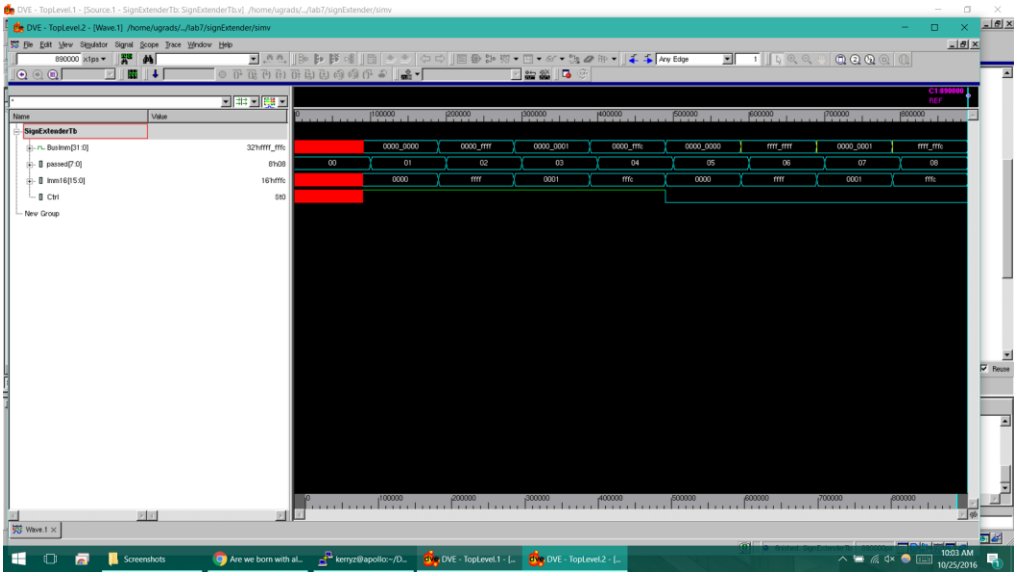
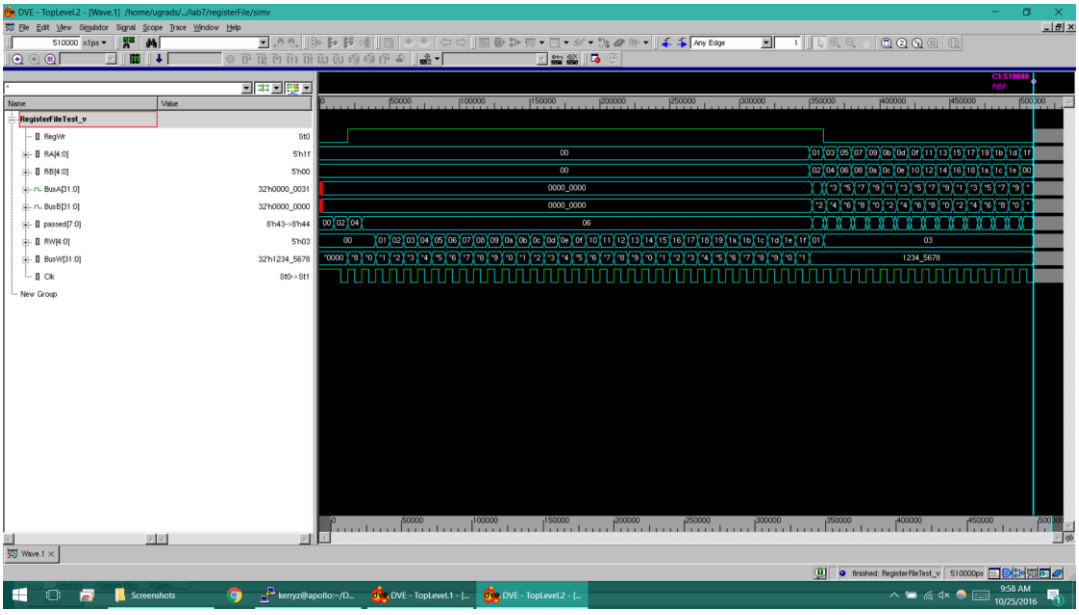
Lab 7

Sign Extender



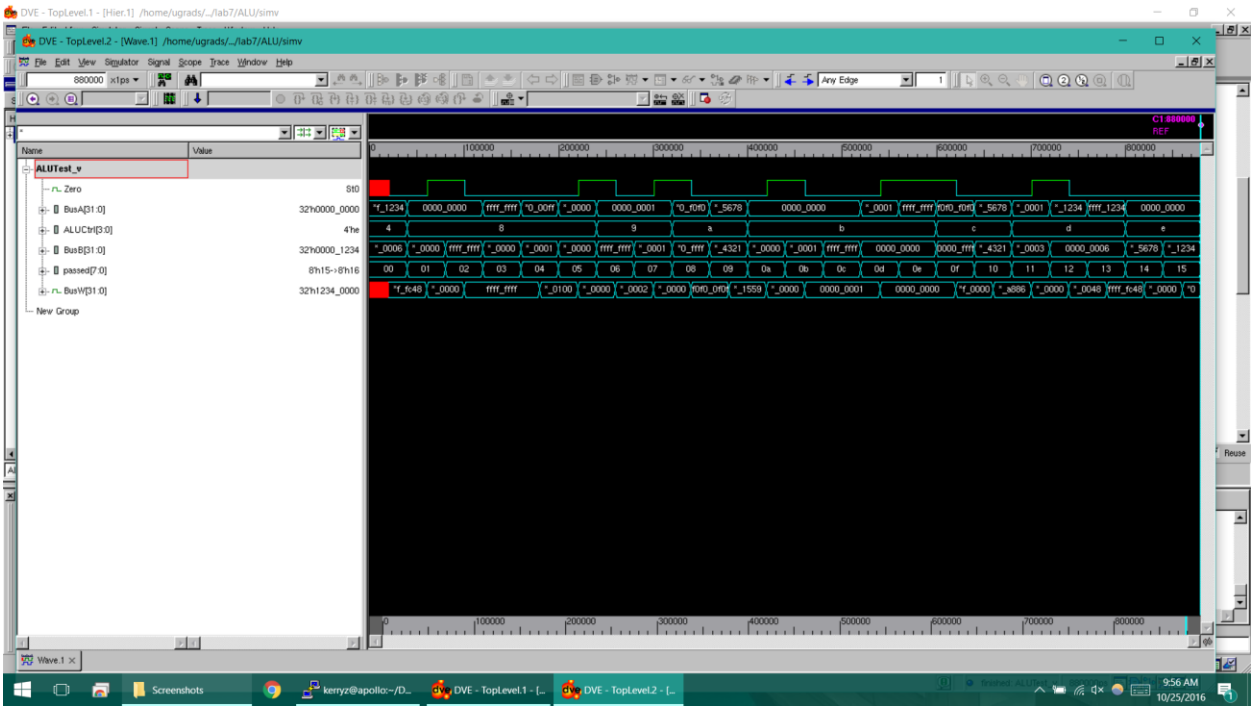
This waveform tests different of 0,-1,1, -4 for Ctrl=0 and Ctrl=1. Ctrl=1 means that it's zero extended so all you have to do is add 4 zeros in front of it to make it a 32 bit number. For Ctrl=0, it's sign extended so you take the MSB and then concatenate it with 4 of them. This waveform is correct because all of the BusImm outputs are sign extended correctly. The first four are zero extended and the last 4 are sign extended.

RegisterFile



This waveform basically tests the ALU by testing it with some initial reads, writing 32'H1 to 32'H32 into registers 0-31. After it writes it, it will test the registers by reading from it and seeing if the registers actually got written to. The output is all correct as you can see from BusA and BusB. BusW is used to write into the register.

ALU



The ALU testbench tests various operations on BusA and BusB. The ALUCtrl determines which operation gets done and the output is put in BusW. The Zero is high if the output is zero otherwise it's low. This testbench is correct because it executes each of the operations correctly, as you can observe from the outputs in busW