Post Lab For Lab 7
ECEN 350

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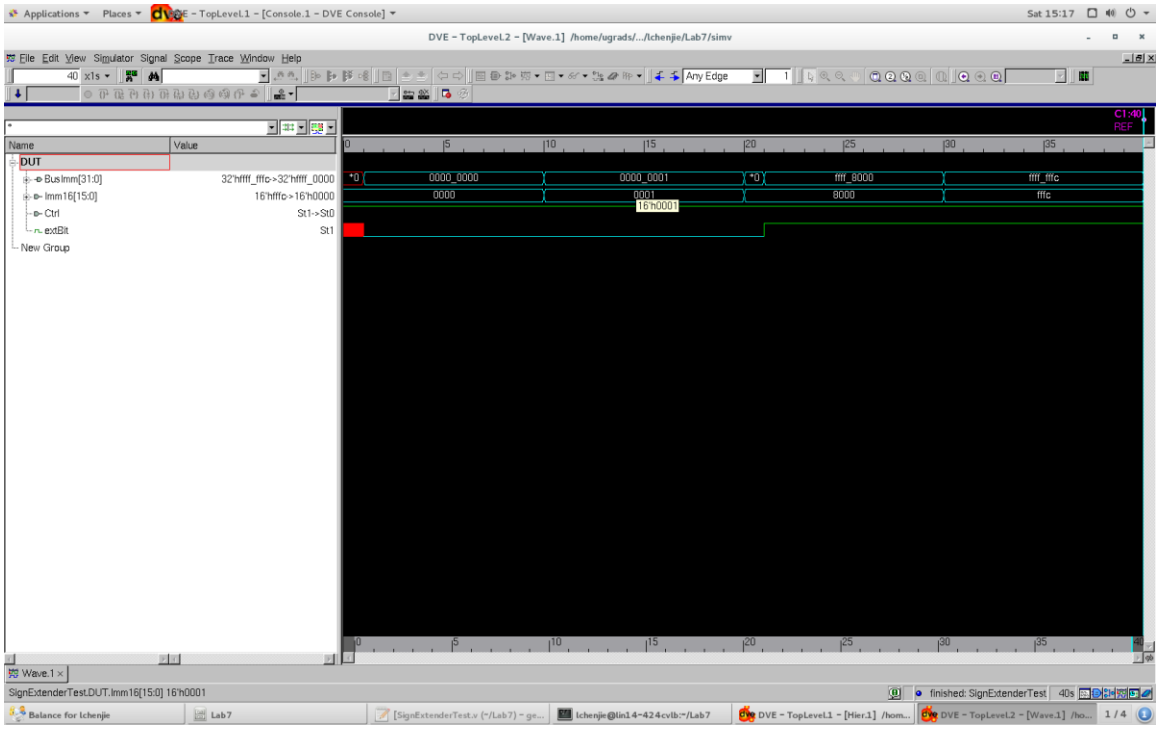
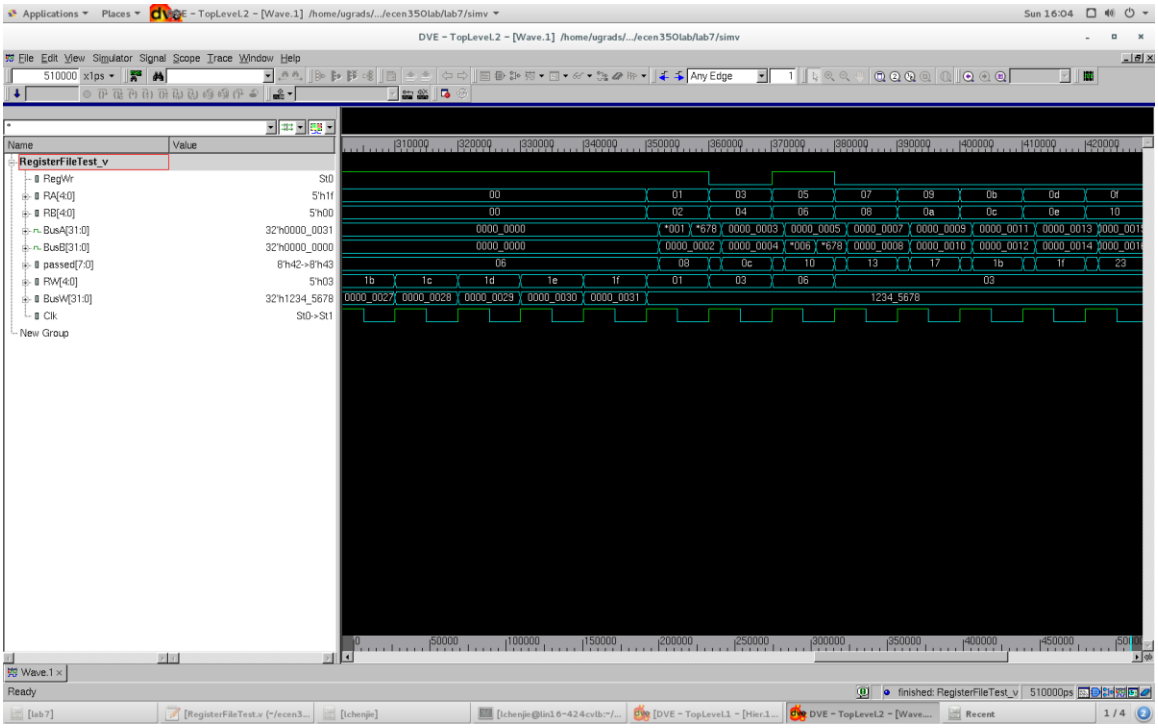
1. Sign Extender:



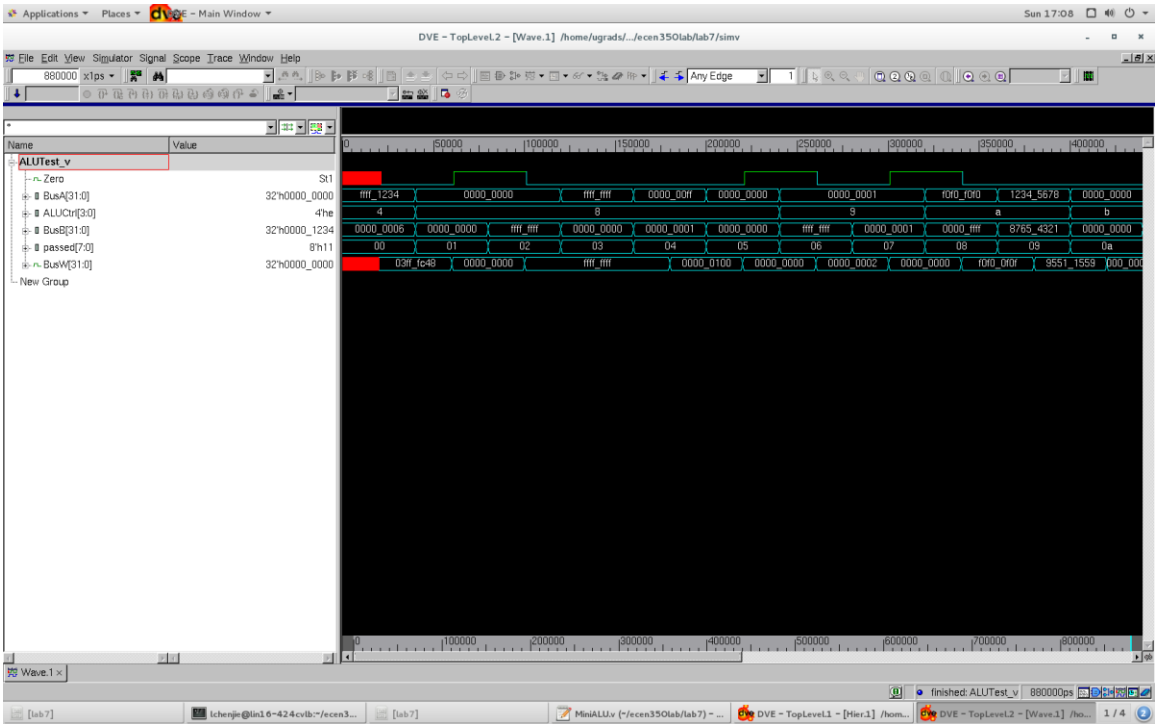
The sign extender basically realize extension of bits. And it is mainly for instructions related to address, such as beq and bne. When Ctrl is 1, the machine will extend the 16-bit input into 32-bit with its most significant bit. For example, if input is 0x0001, the output will be 0x00000001. If the input is a negative number, such as 0xfffc, the output will be 0xfffffffc.

2. Register File:



Register file's functionality is to access the values stored in certain registers. Its input is the number of registers and output will be the read values from matched registers. Besides, there is a control unit called RegWrite. If RegWrite is 1, value transmitting into "Write Data" port will be stored in certain register named in WriteRegister. During the demo, there are two periods which RegWrite is 1. For the first period, value in BusW will be written into register1 after 3 unit of time, which is BusA. For the second period, value in BusW will be written into register6 after 3 unit of time, which now is BusB.

3. ALU:



ALU is working to implementing different functions like addition or logic AND. ALU has three inputs and two outputs. Inputs are: Read Data1 Read Data2 and ALUCtrl. Outputs are ALUresult and Zero. The demo basically tests the table given in the Prelab7 and through that we can verify if our manually calculated values are correct. For example, for the third instruction, we need to implement add 0, 1, so the BusA equals 0x00000000 and BusB equals 0xffffffff. And the output should be -1, which is 0xffffffff . According to the requirement, data will transmit to output after 3 unit of time. Besides, port “Zero” will be 1 and the result in ALU is 0.