CENG3420 Lab 2 Report

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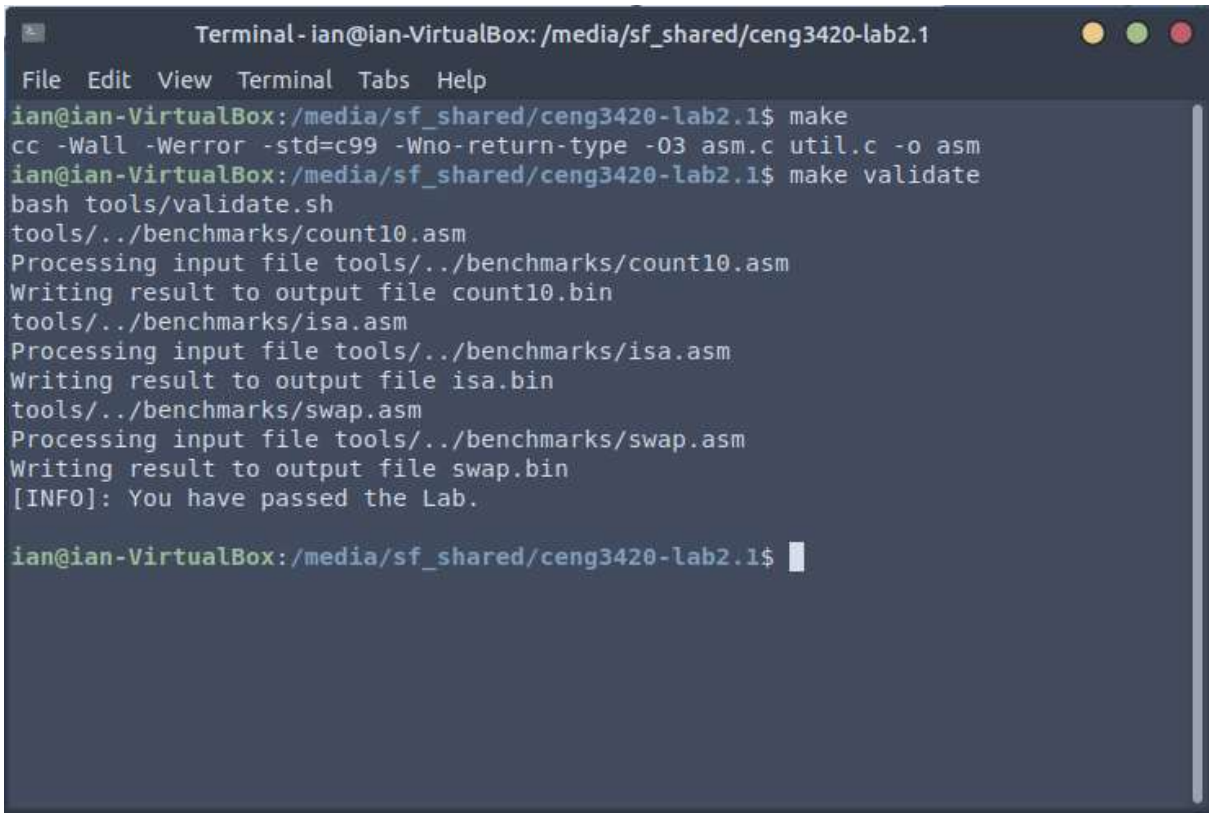
Lab 2-1:

I implemented the missing part in the asm.c according to the reference documents given. I have encountered a problem when implementing the LUI instruction. I cannot get the immediate value to encode right, I have noticed that in the reference answer provided, the top 20 bits of LUI instructions is always all zeros, but when I use the handle_label_or_imm() function, it always return a non-zero value. At the end, I commented out the line and the output of my assembler can match the reference answer.

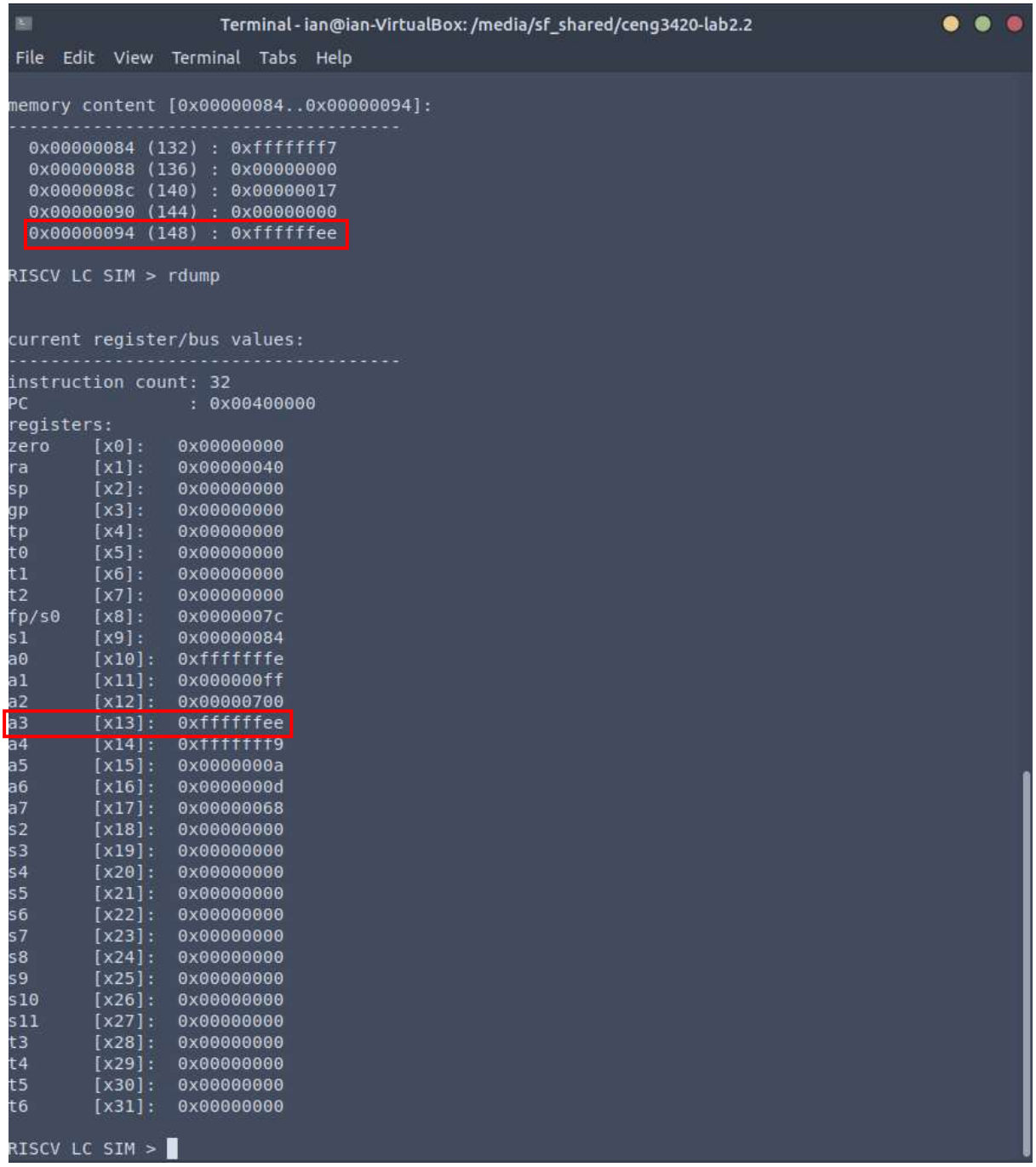
Result:



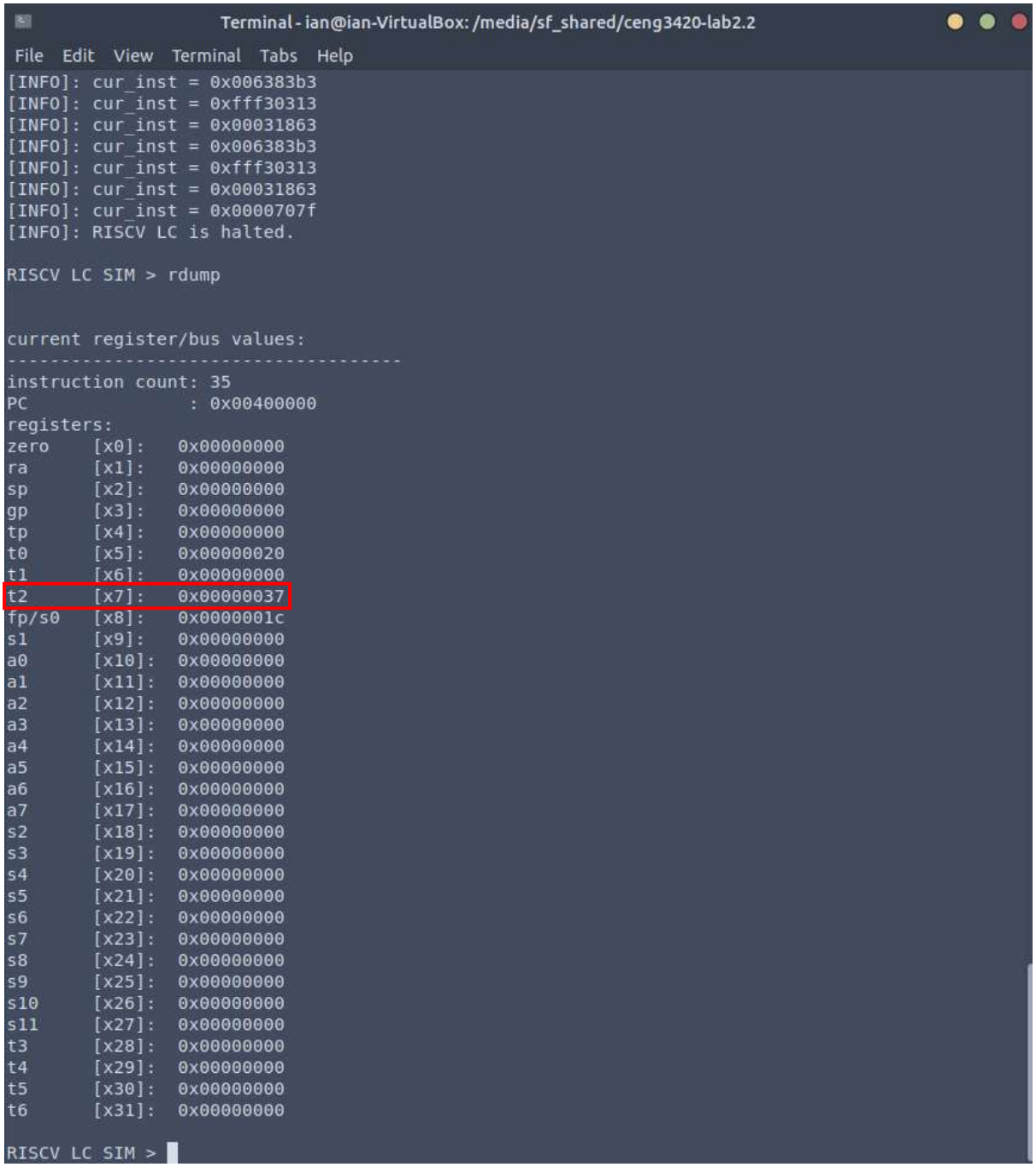
Lab 2-2:

I implemented all the missing functions opcode decoding function in the sim.c file. I encountered a problem where the load and store instructions only load/store 1 byte, so I wrote the code to load/store them byte by byte. I also encountered a problem where the load/store function would produce results with many leading 1s, i.e 0xffffxxxx. I figured out this might be due to the value is sign extended instead of zero extended. I do not understand why the example LB instruction that is already implemented use sign-extended value. So I stopped using sext() function in other load and store instructions and the simulator outputs the correct answer.

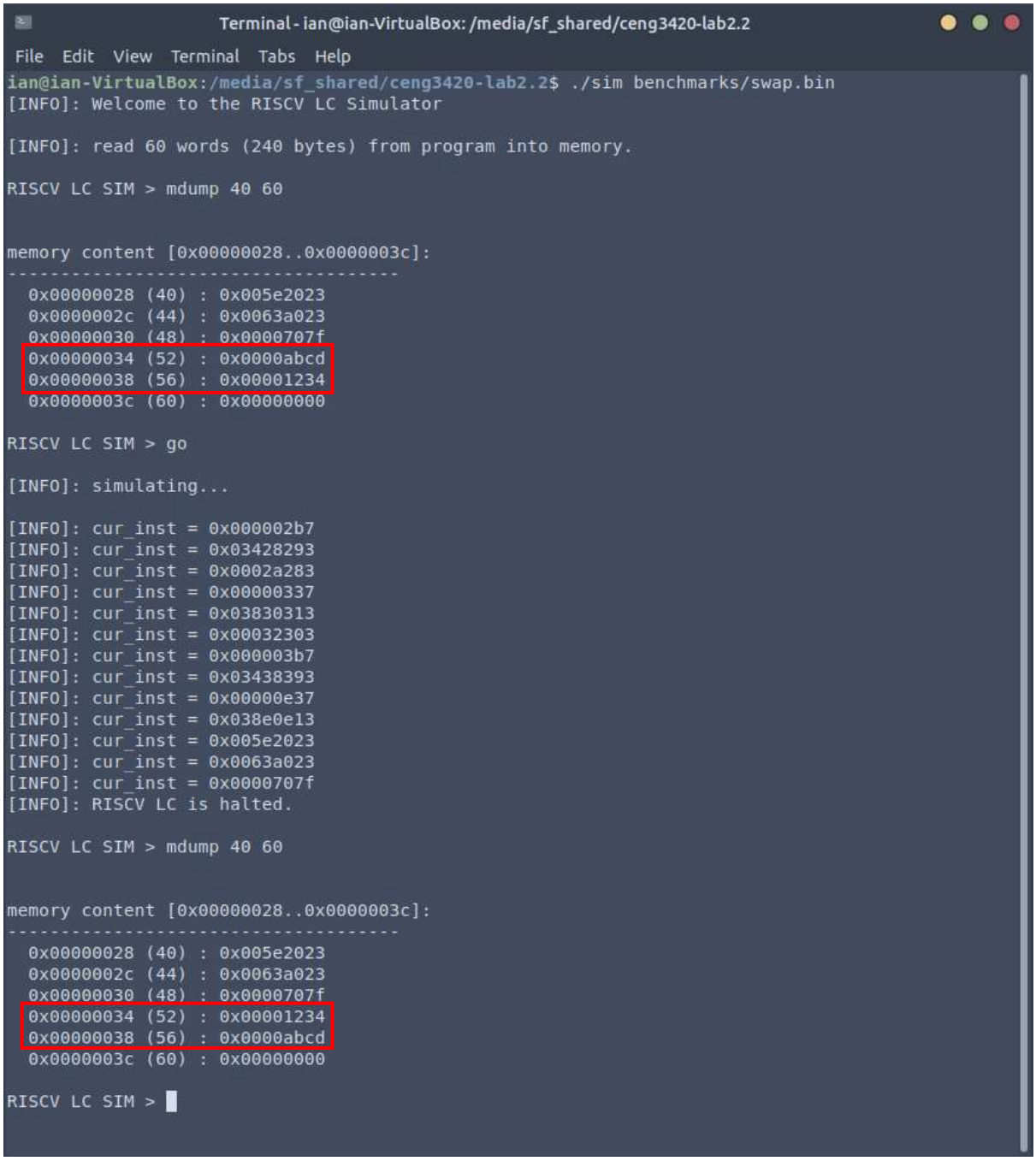
Results:



Output of isa.bin



Output of count10.bin



Output of swap.bin