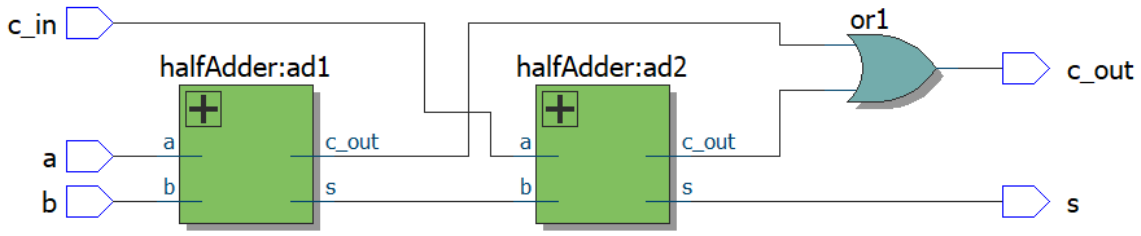
CSE 331 HW2

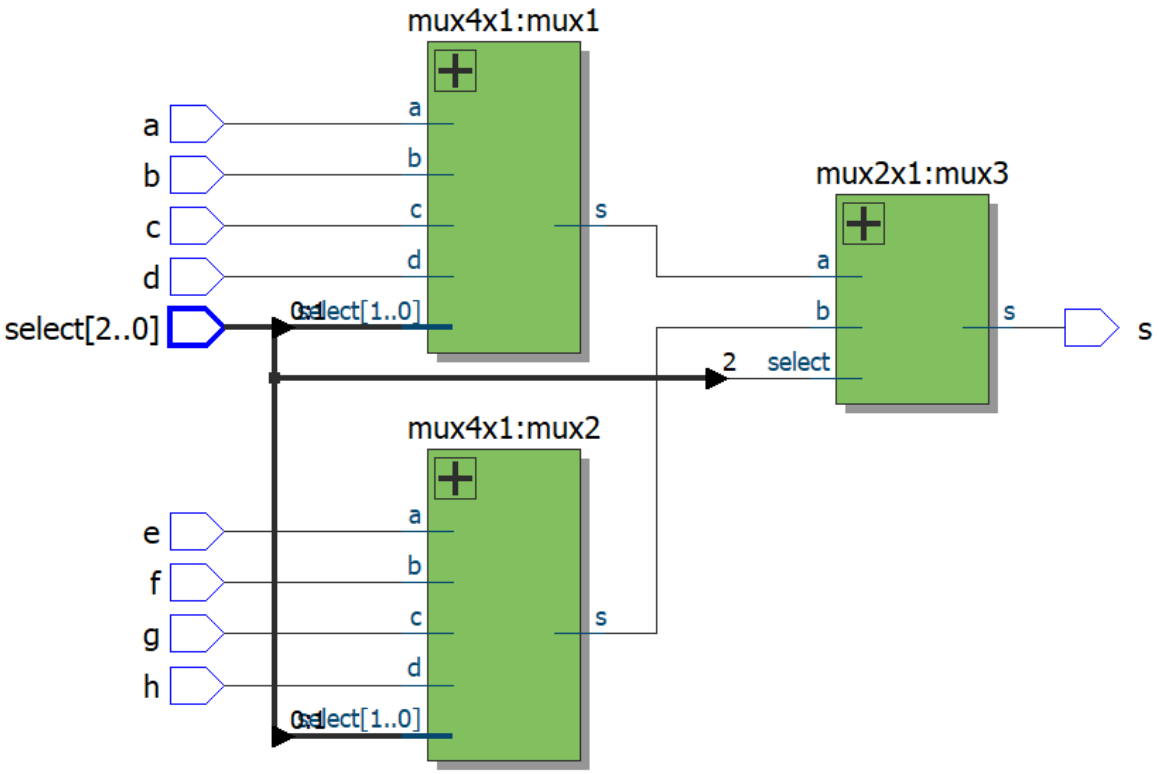
EXPLANATION OF VERILOG FILES

- fullAdder.v



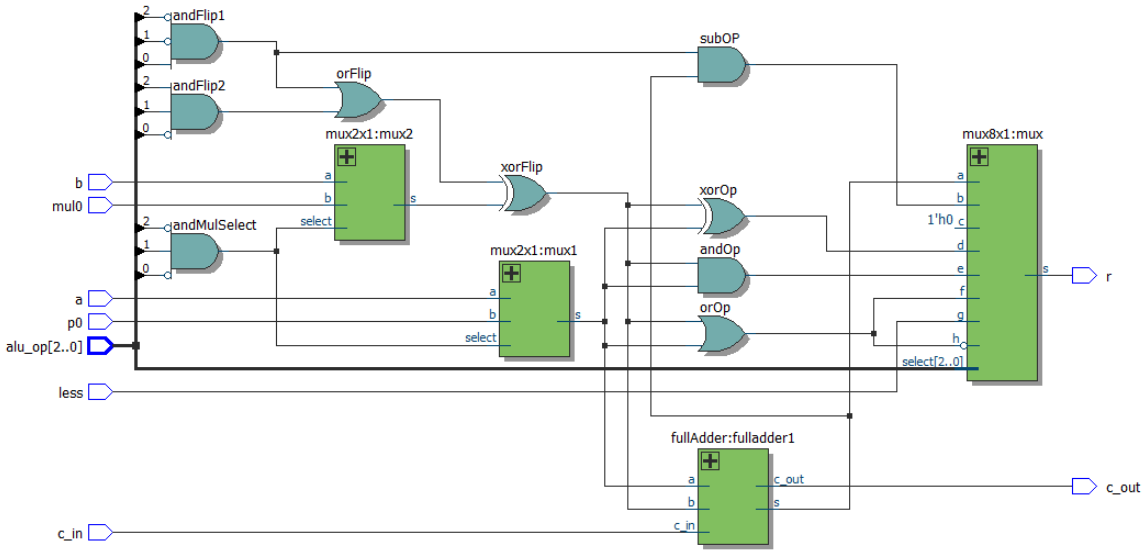
fullAdder module consist of 2 halfAdder module.

- mux8x1.v



The mux8x1 module is consist of 2x mux4x1 module and their output is connected to mux2x1 module to obtain single bit output.

- alu1Bit.v



The alu1Bit module consist of ;

bit fullAdder

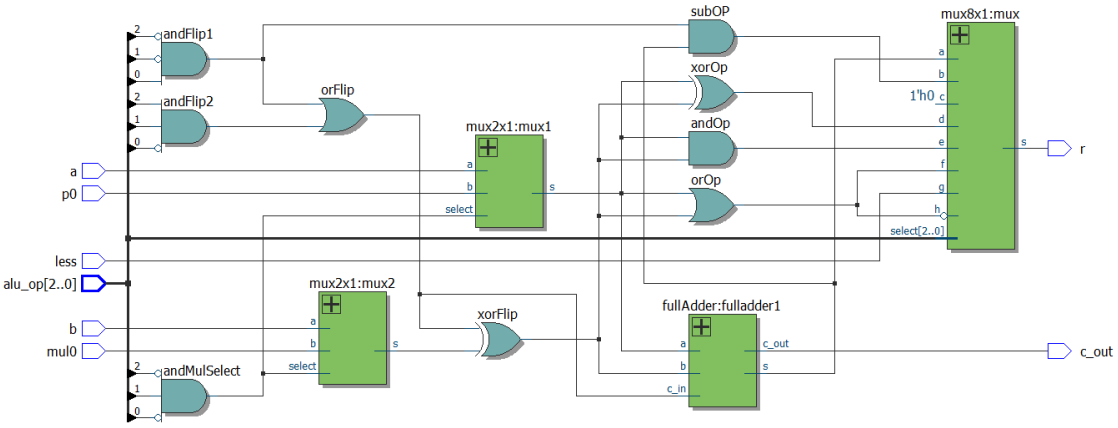
2x mux2x1

mux8x1

The module is similar to alu representation on the lecture. If the substation operation is held , then the “b” bit is inverted. SUB and SLT opcode uses substation operation behind. If these opcode is called then the “b” bit is inverted.

The “less” is input is 0.

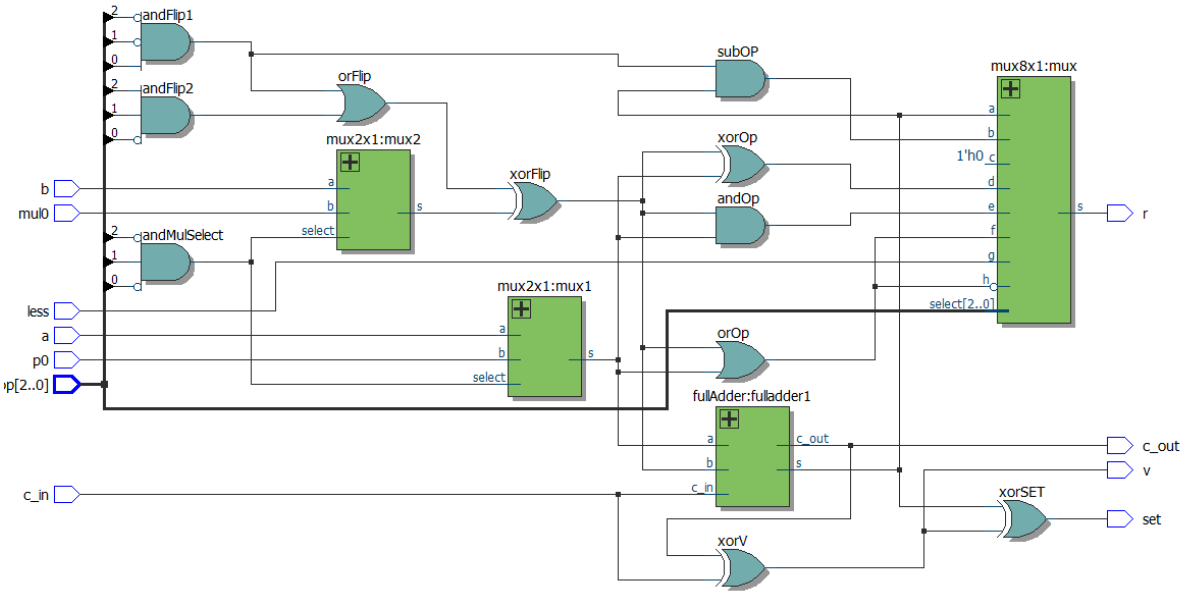
- alu1BitLsb



Essantially, it is same as the alu1Bit. But it's carry in is came from according to aluOp. If the aluOp does the substation in operation then the carry in becames 1 else 0.

Also less input came from alu1BitMsp's "set" output.

- alu1BitMsb.v



The alu1BitMsb module consist of ;

fullAdder

2x mux2x1

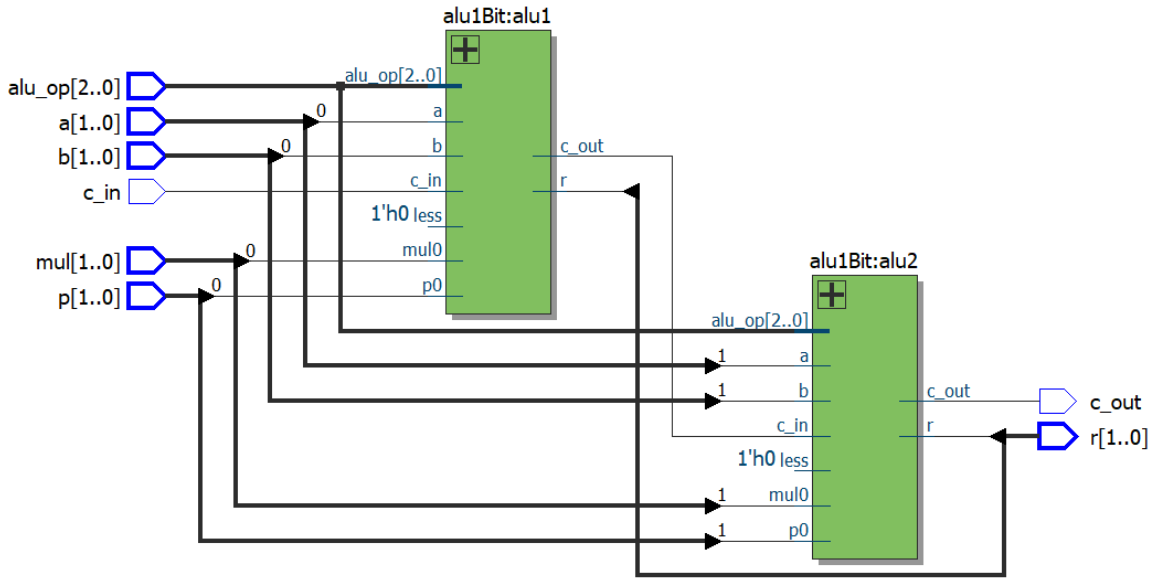
mux8x1

xorV and xorSet gate.

It is almost similar to alu1Bit , but it is using xorV and xorSet gate to detect overflow and indicate the sign of the result.

The “less” input is always 0. Also the value of “set” is directed to least significant bit alu’s carry in input.

- alu2Bit.v



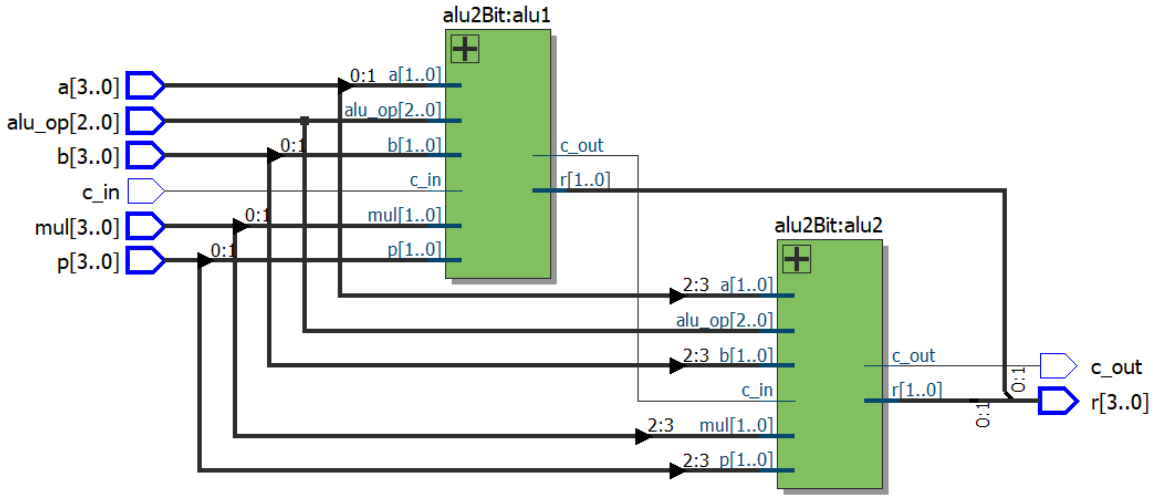
The alu2Bit module consist of ;

2x alu1Bit module.

It is used for create 32xAlu.

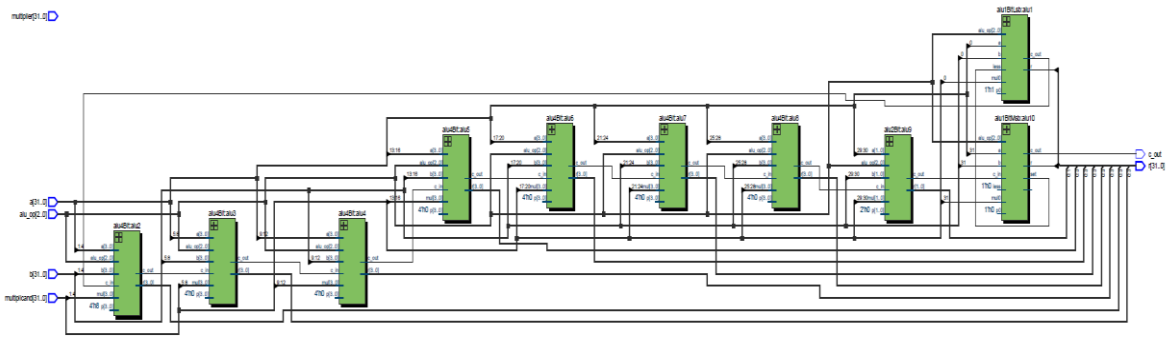
- Alu4Bit.v

  The alu4Bit module consist of ;
  2x alu2Bit module.
  It is used for create 32xAlu.



- alu32.v

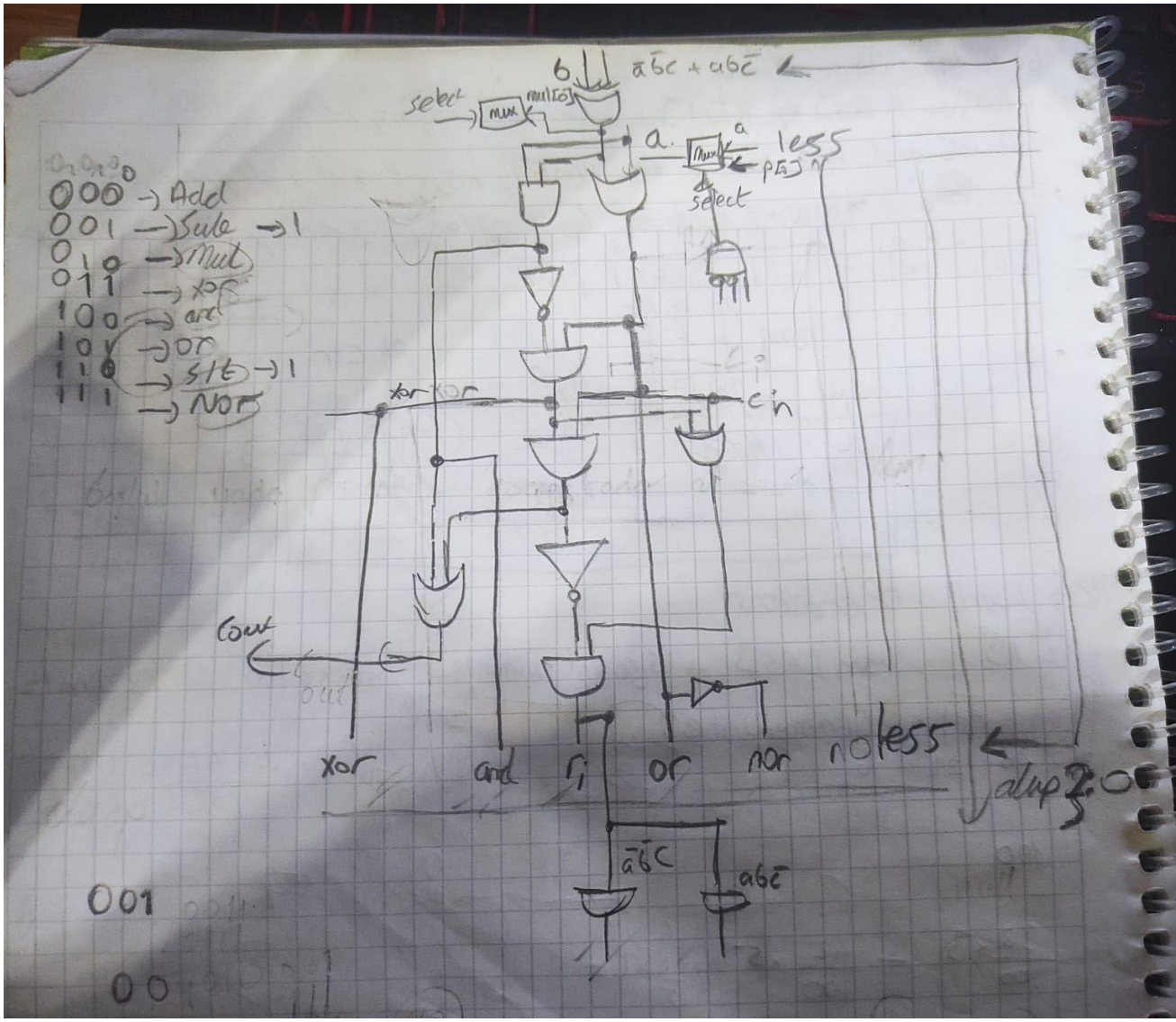
  The alu32 module consist of ;
  alu1BitLsb,
  7x alu4Bit,
  alu2Bit,
  alu1bitMsb



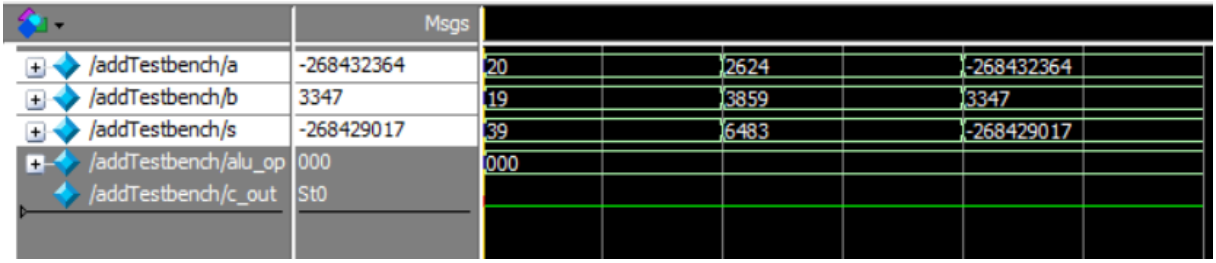
HANDWORKS:

- 1 BIT ALU with MSB:

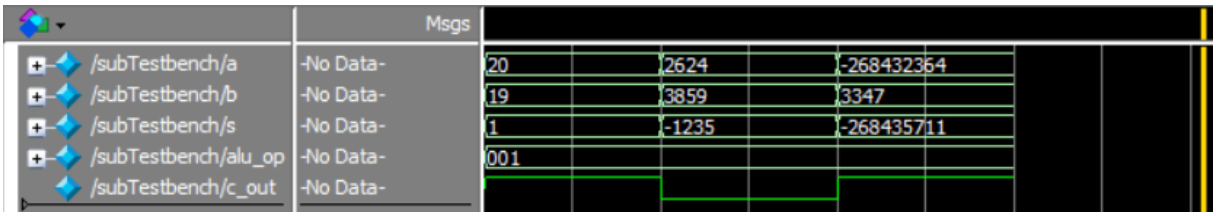
  It contains 2x mux2x1 for multiplication operations but I have not combined it for 32 bit alu.



- ADD OPERATION ->> OPCODE ->> 000



- SUB OPERATION ->> OPCODE ->> 001



- MUL OPERATION ->> OPCODE ->> 010
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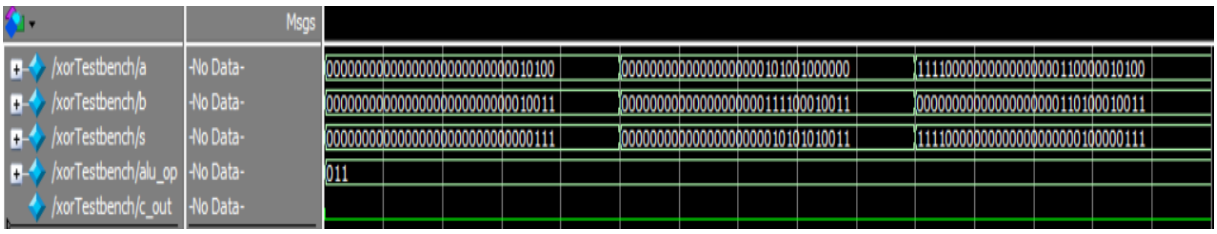
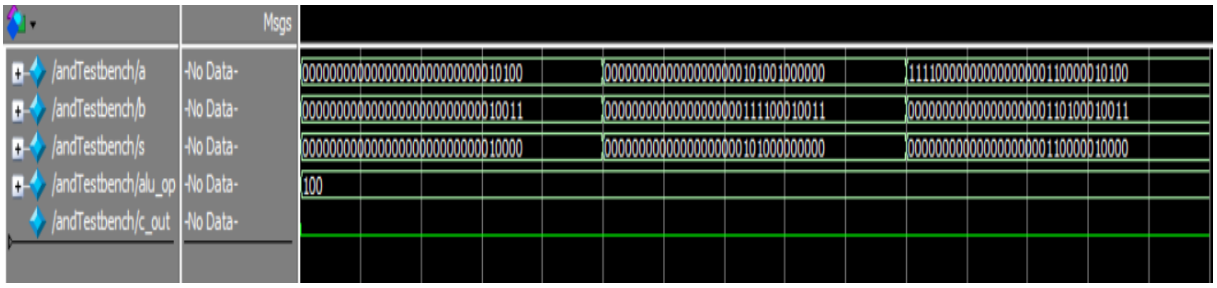
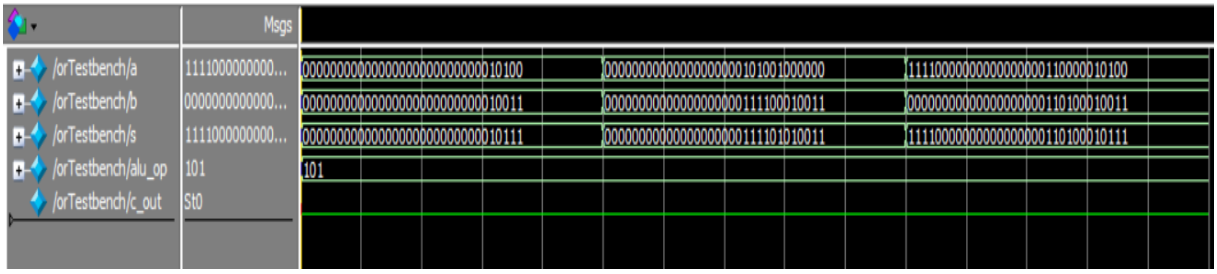
- XOR OPERATION ->> OPCODE ->> 011



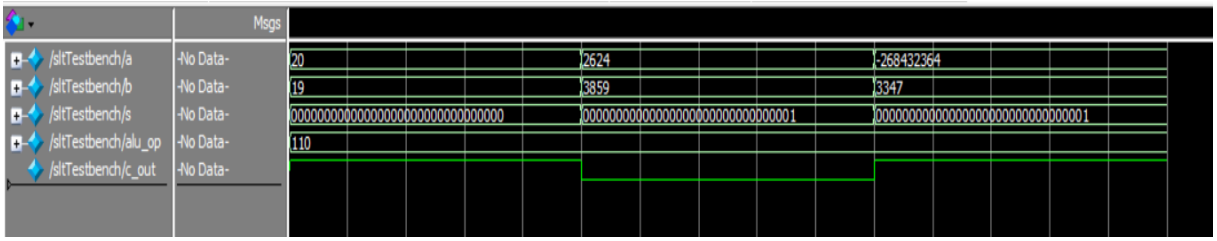
- AND OPERATION ->> OPCODE ->> 100



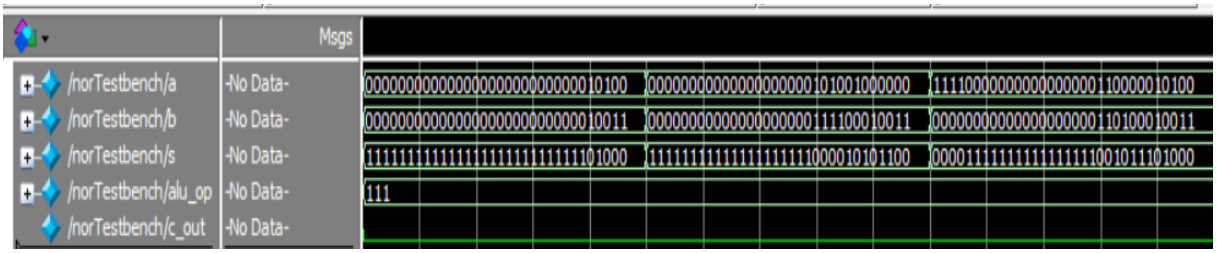
- OR OPERATION ->> OPCODE ->> 101



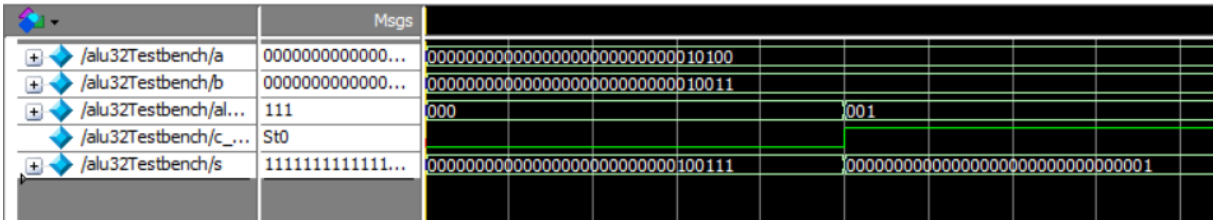
- SLT OPERATION ->> OPCODE ->> 110

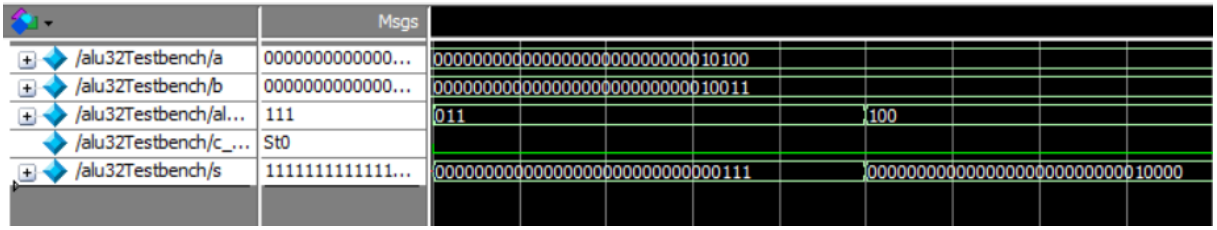


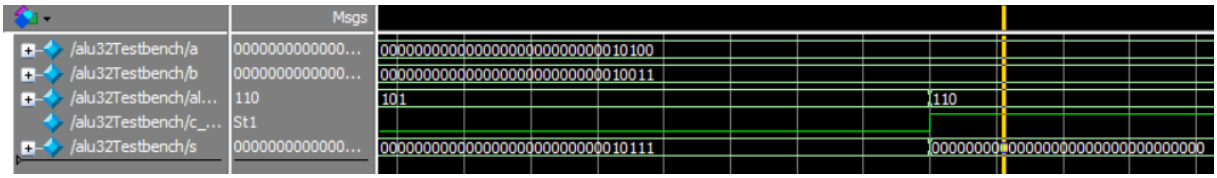
- NOR OPERATION ->> OPCODE ->> 111

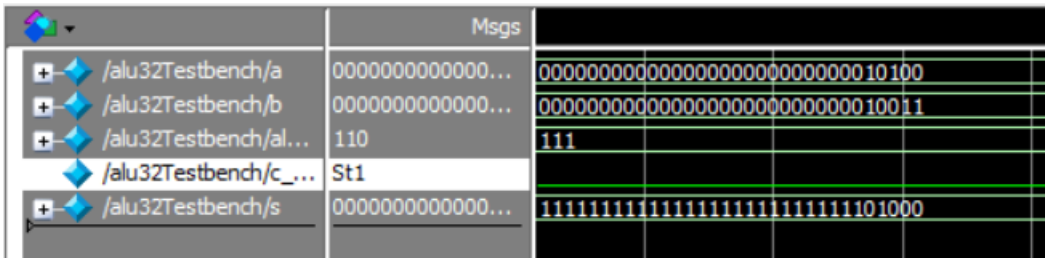


- ALL 32 BIT ALU OPERATIONS









NOTE: ALL THE OPERATIONS USES ONLY ONE ADDER.

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