Department of Computer Engineering

BLG 222E
Computer Organization
Report of Project-2

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1. INTRODUCTION

We desinged an Arithmetic Logic Unit (ALU) that has two 8-bit inputs and an 8-bit output then implemented them to the organization that wanted at second part.

2. EQUIPMENTS

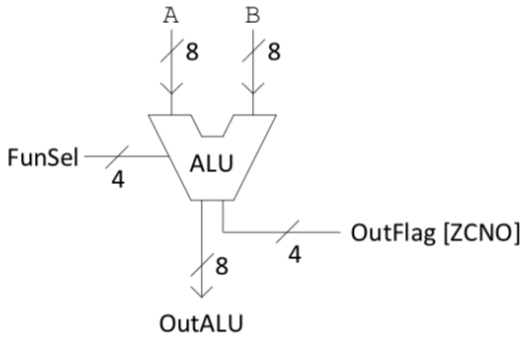
When preparing the circuits, we used these equipments in Logisim:

- 4-select 16-data bits Multiplexer
- 8 bit adders
- D flip-flops
- Registers

3. EXPERIMENT

3.1. Part-1

We implemented an ALU that has two 8-bit inputs and an 8-bit output as shown below according to desired functions.



FunSel	OutALU	Z	C	N	O
0000	A	√	–	√	–
0001	A + B	√	√	√	√
0010	A + B + Carry	√	√	√	√
0011	A - B	√	√	√	√
0100	A AND B	√	–	√	–
0101	A OR B	√	–	√	–
0110	NOT A	√	–	√	–
0111	A XOR B	√	–	√	–
1000	LSL A	√	√	√	–
1001	LSR A	√	√	√	–
1010	ASL A	√	–	√	√
1011	ASR A	√	–	–	√
1100	CSL A	√	√	√	√
1101	CSR A	√	√	√	√
1110	B	√	–	√	–
1111	NOT B	√	–	√	–

Figure 1: The ALU (Left) and its characteristic table (Right)

3.1.1. ALU

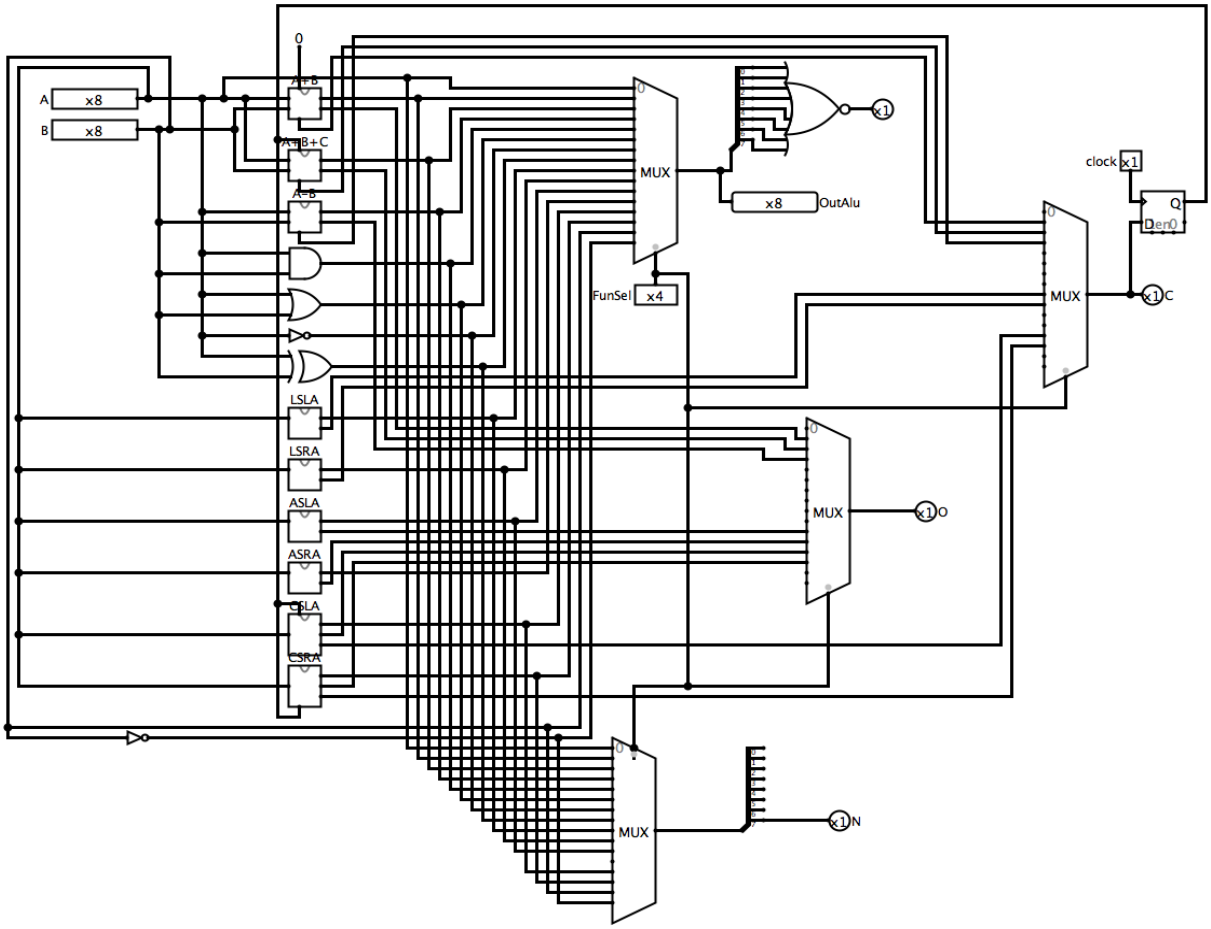


Figure 3.1.1. an ALU

We connected A directly to Multiplexer. Then we implemented A+B , A+B+C , A-B in order. A AND B, A OR B, NOT A and A XOR B operations are performed by Gates directly. Then we implemented shifting operations LSL A, LSR A, ASL A, ASR A, CSL A, CSR A.

3.1.2. A + B

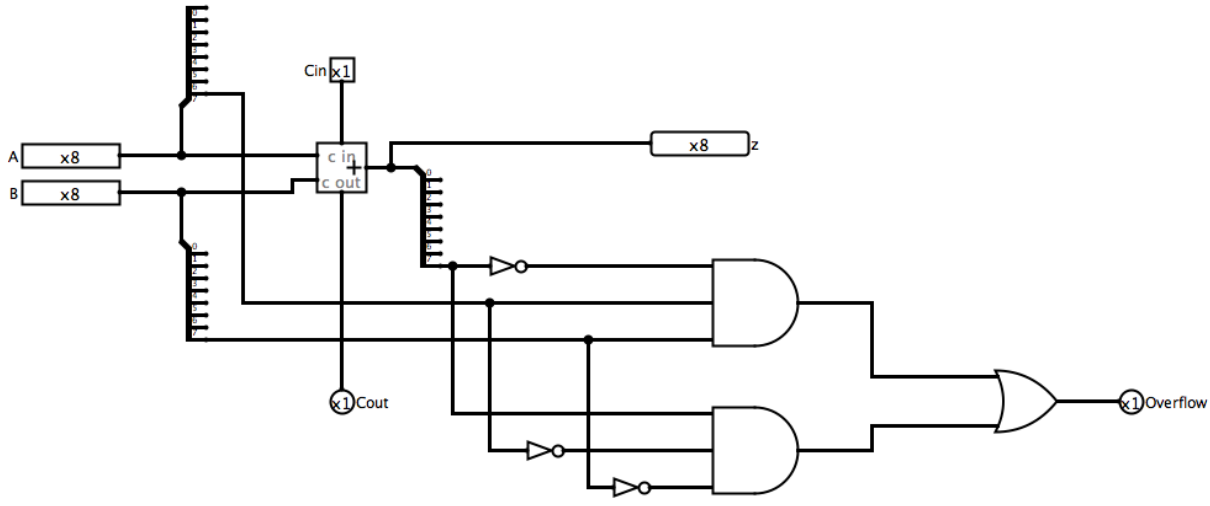


Figure 3.1.2. A+B

3.1.3. A + B + C

We added Carry input to A+B operation above.

3.1.4. A – B

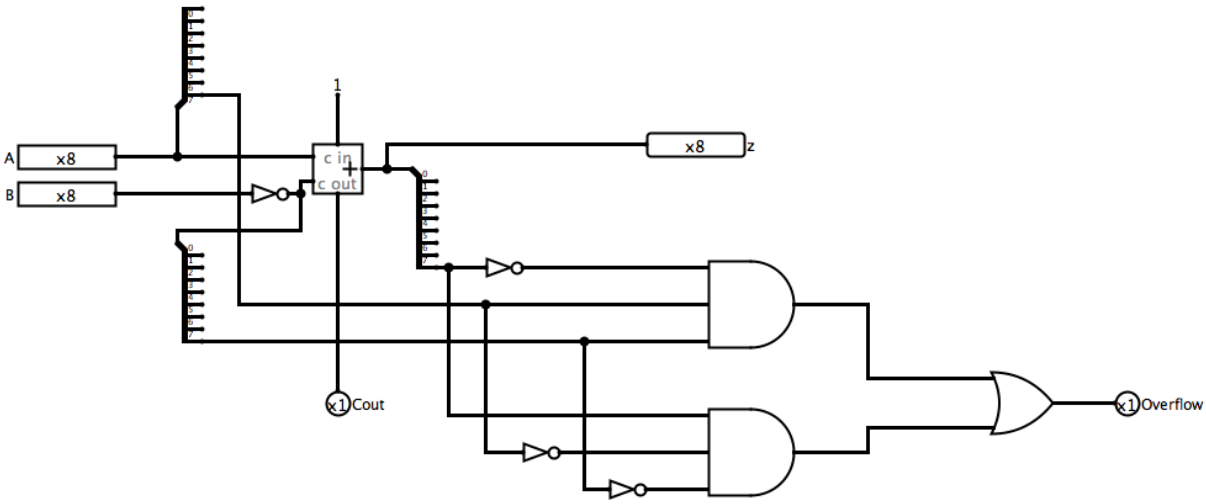


Figure 3.1.4. A-B

3.1.5. Logical Shift Operations

3.1.5.1. LSL A

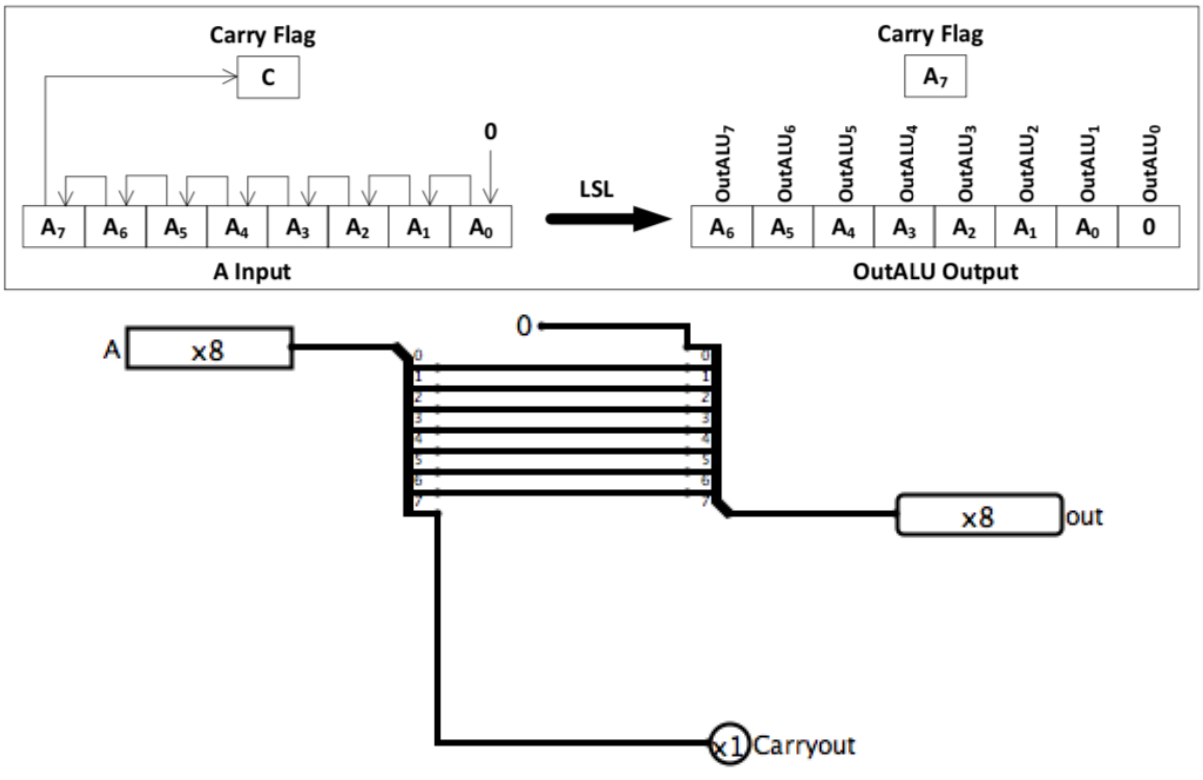


Figure 3.1.5.1. LSL A

3.1.5.2. LSR A

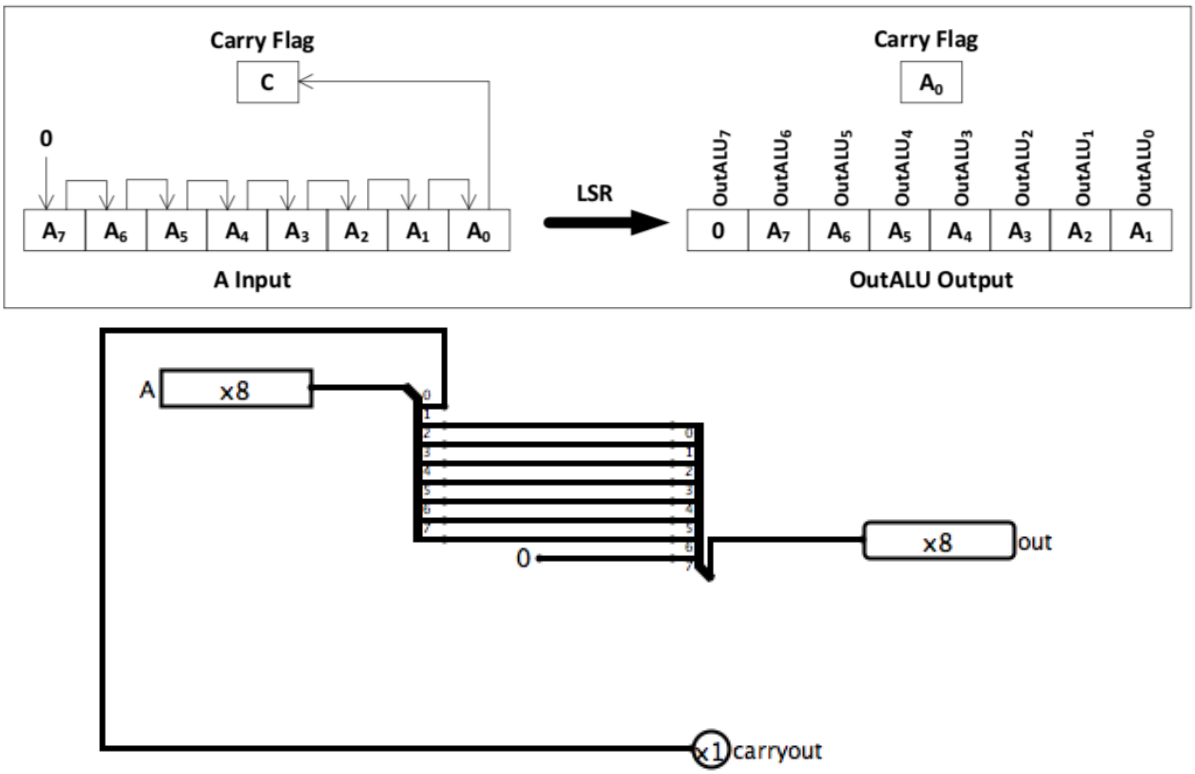


Figure 3.1.5.2. LSR A

3.1.6. Arithmetic Shift Operations

3.1.6.1. ASL A

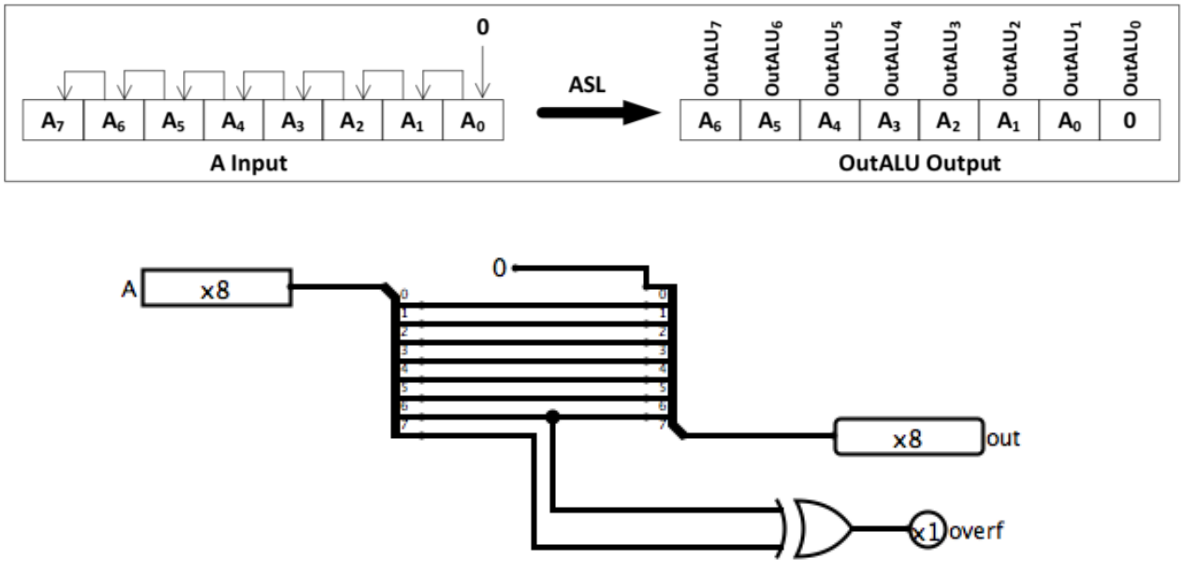


Figure 3.1.6.1. ASL A

3.1.6.2. ASR A

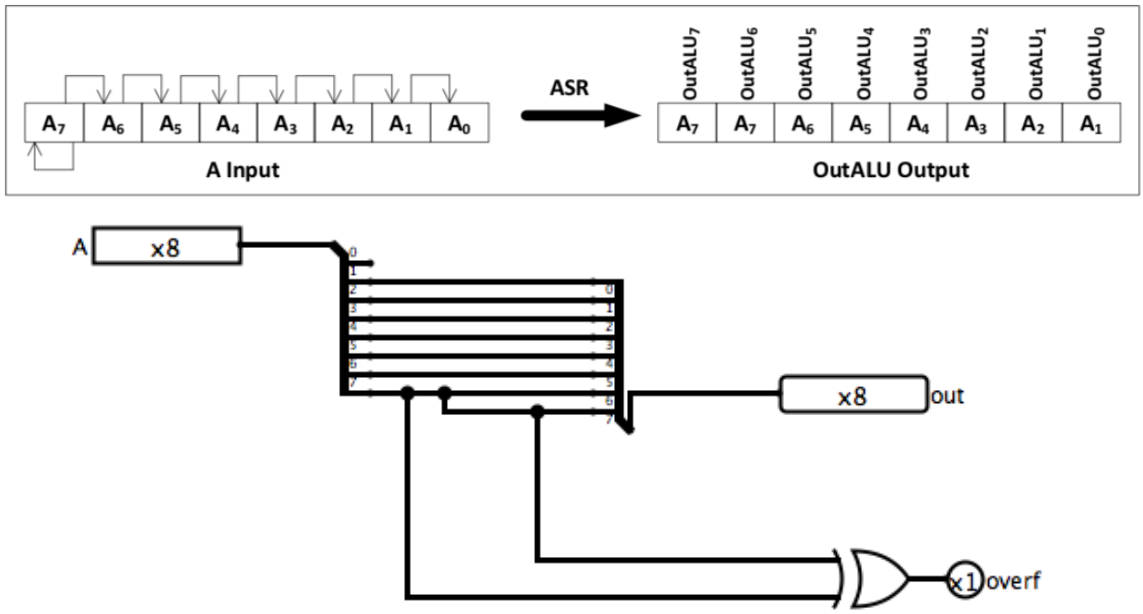


Figure 3.1.6.2. ASR A

3.1.7. Circular Shift Operations

3.1.7.1. CSL A

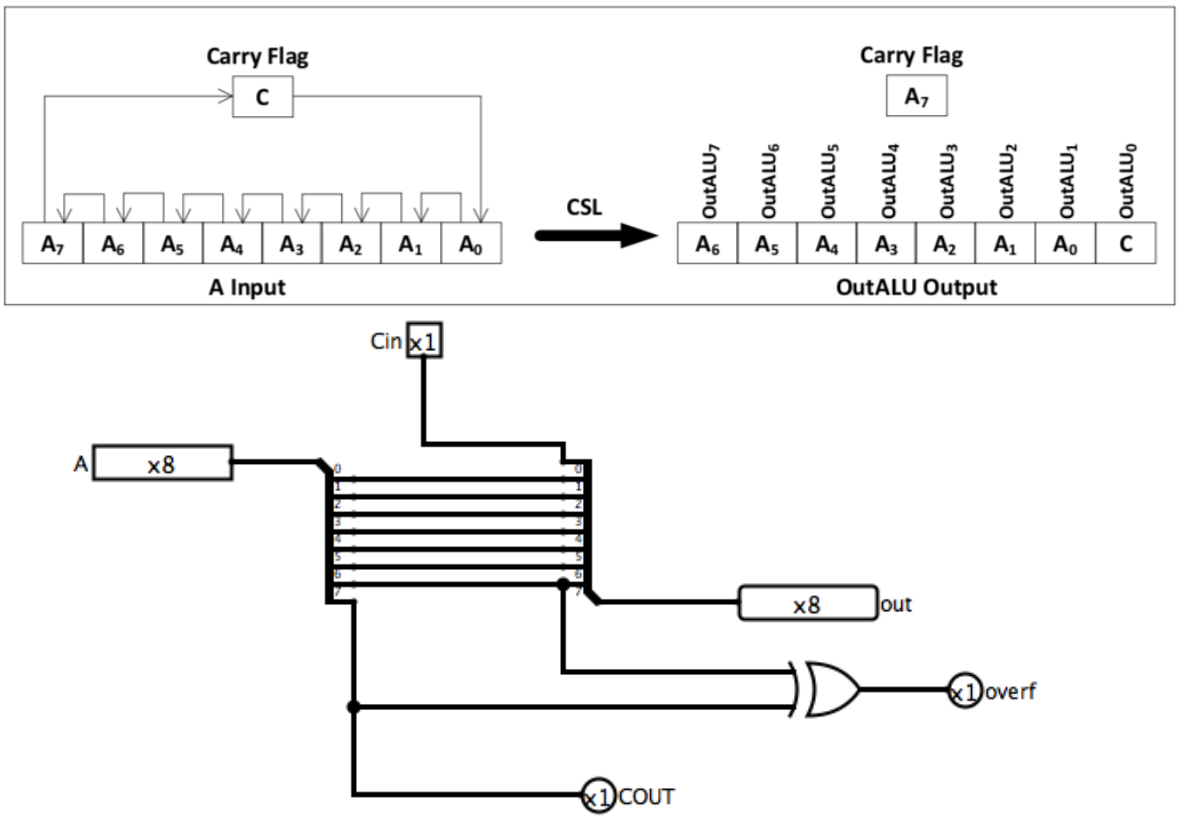
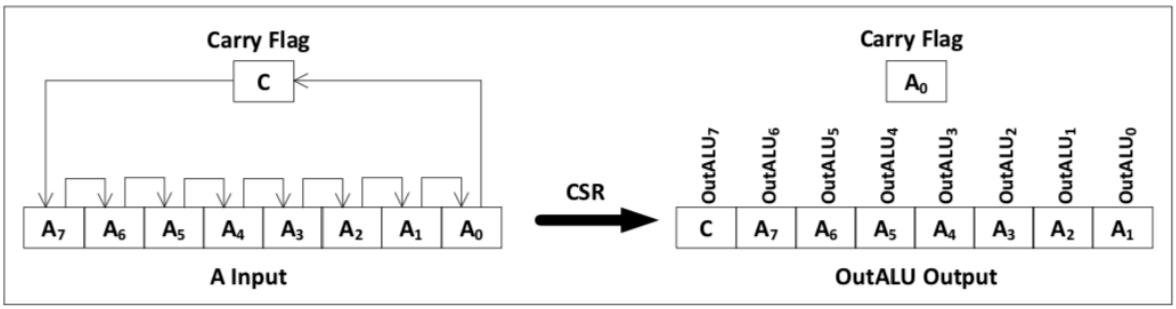


Figure 3.1.7.1. CSL A

3.1.7.2. CSR A



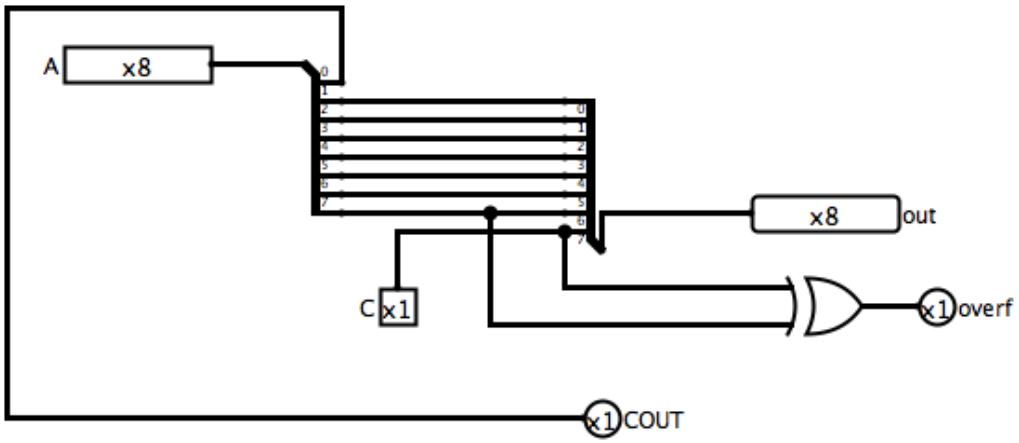


Figure 3.1.7.2. CSR A

3.2. Part-2

We implemented the organization in Figure 4.

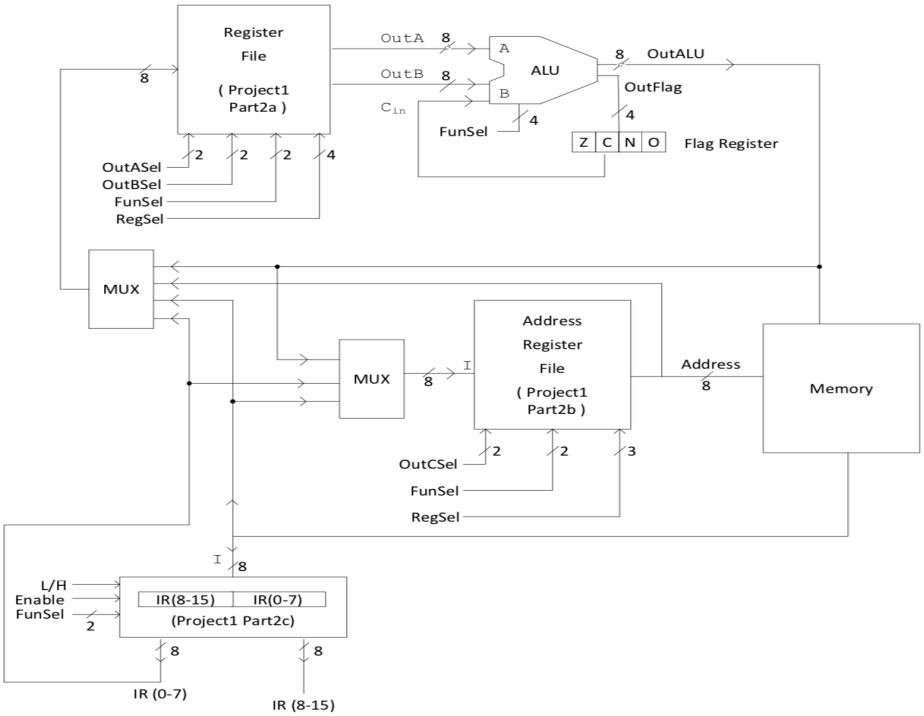


Figure 4.

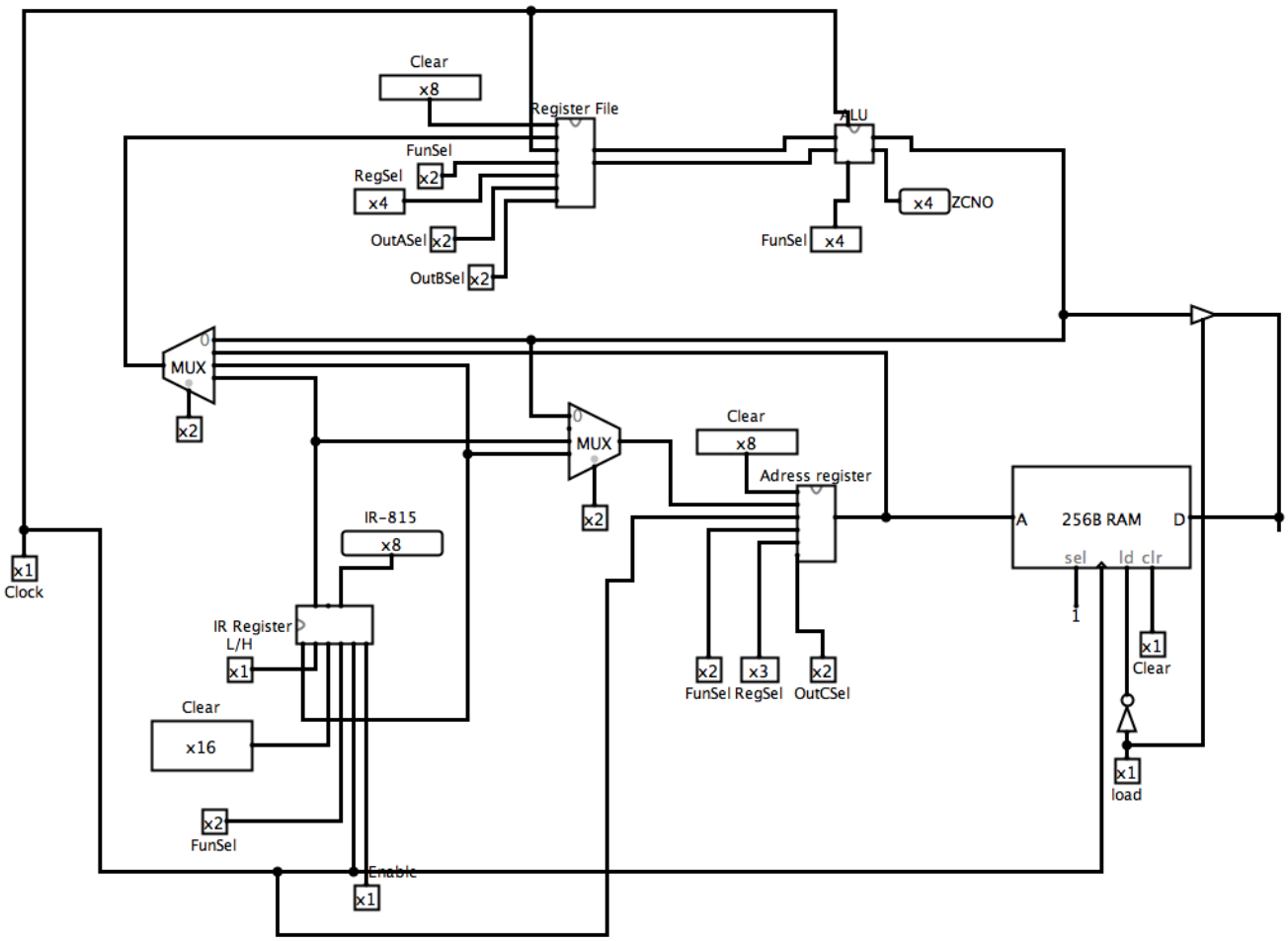


Figure 4.2. ALU SYSTEM

4. CONCLUSION

In this Project we support our knowledge on Logism environment and learned how to desing an ALU System wich contains arithmetic, circular and logical operations.