ISTANBUL TECHNICAL UNIVERSITY

COMPUTER ENGINEERING DEPARTMENT

BLG 222E

COMPUTER ORGANIZATION
PROJECT REPORT

Project : 2

DATE : 03.04.2019

GROUP NO : 34

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SPRING 2019

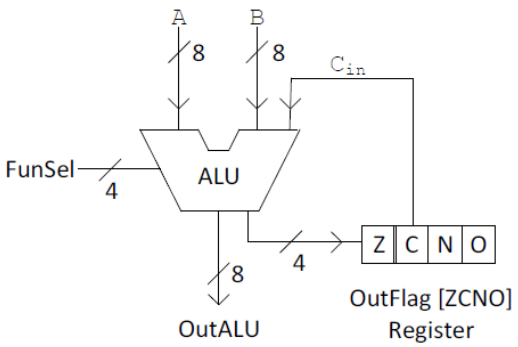
Contents

1 INTRODUCTION

In this project, we designed and implemented Arithmetic Logic Unit and we implemented the organization which give us in the project.

2 Part 1

In this part we designed an Arithmetic Logic Unit (ALU) that has two 8-bit inputs and an 8-bit output. We used 4 bit FunSel input to choose the function. For the functions we used the tools already in the logisim (full adder, or gate, shifter etc.). As in previous project, we used multiplexers in order to determine which operation result will be shown as the output.



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

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

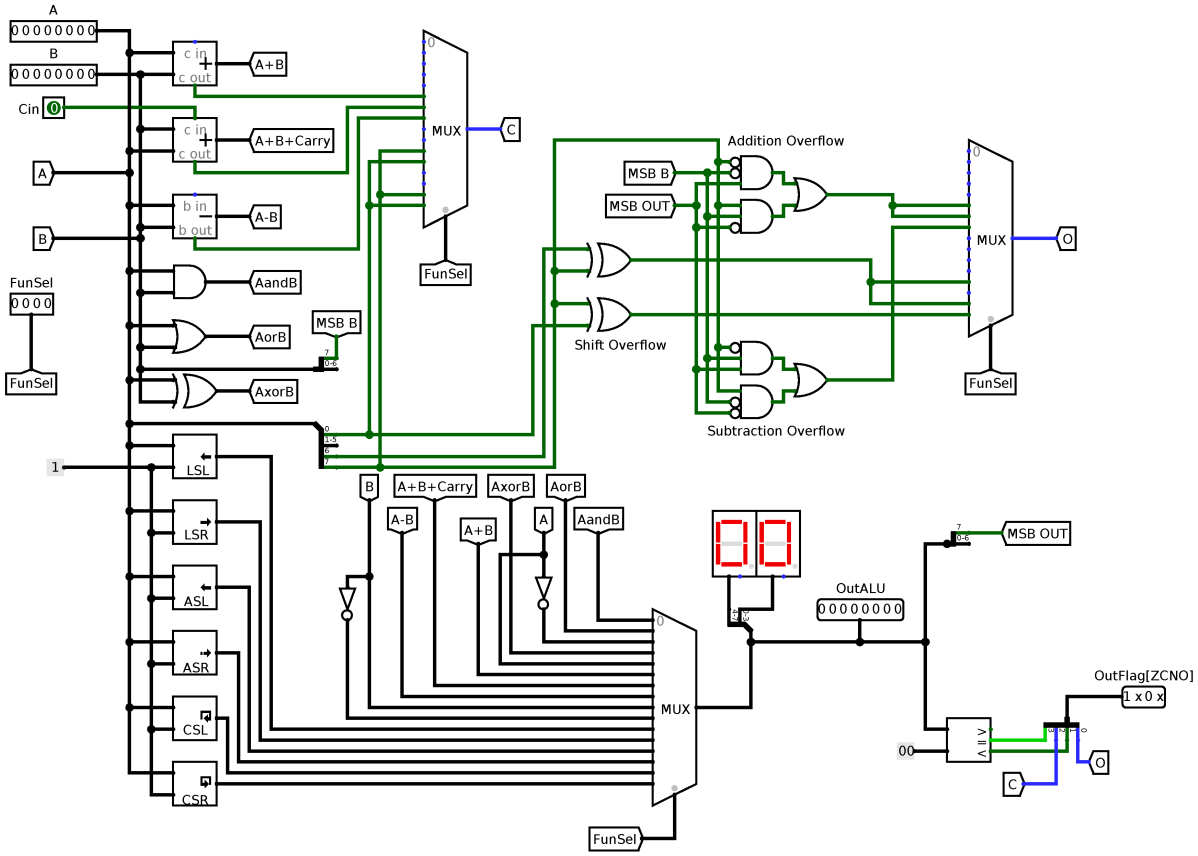
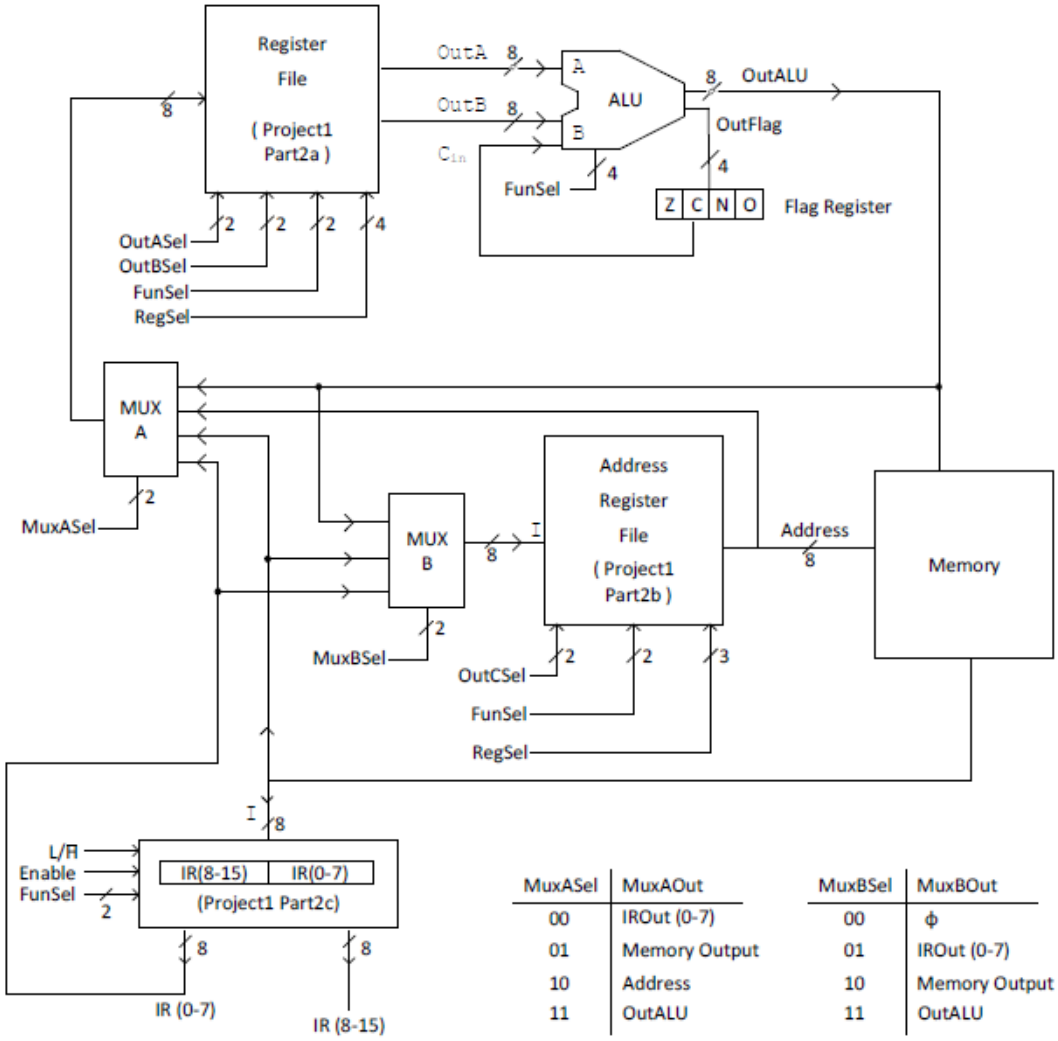


Figure 2: ALU that has two 8-bit inputs and an 8-bit output

3 Part 2

In this part we implemented the organization given below.



MuxASel	MuxAOut
00	IROut (0-7)
01	Memory Output
10	Address
11	OutALU

MuxBSel	MuxBOut
00	ϕ
01	IROut (0-7)
10	Memory Output
11	OutALU

Figure 3: ALU System

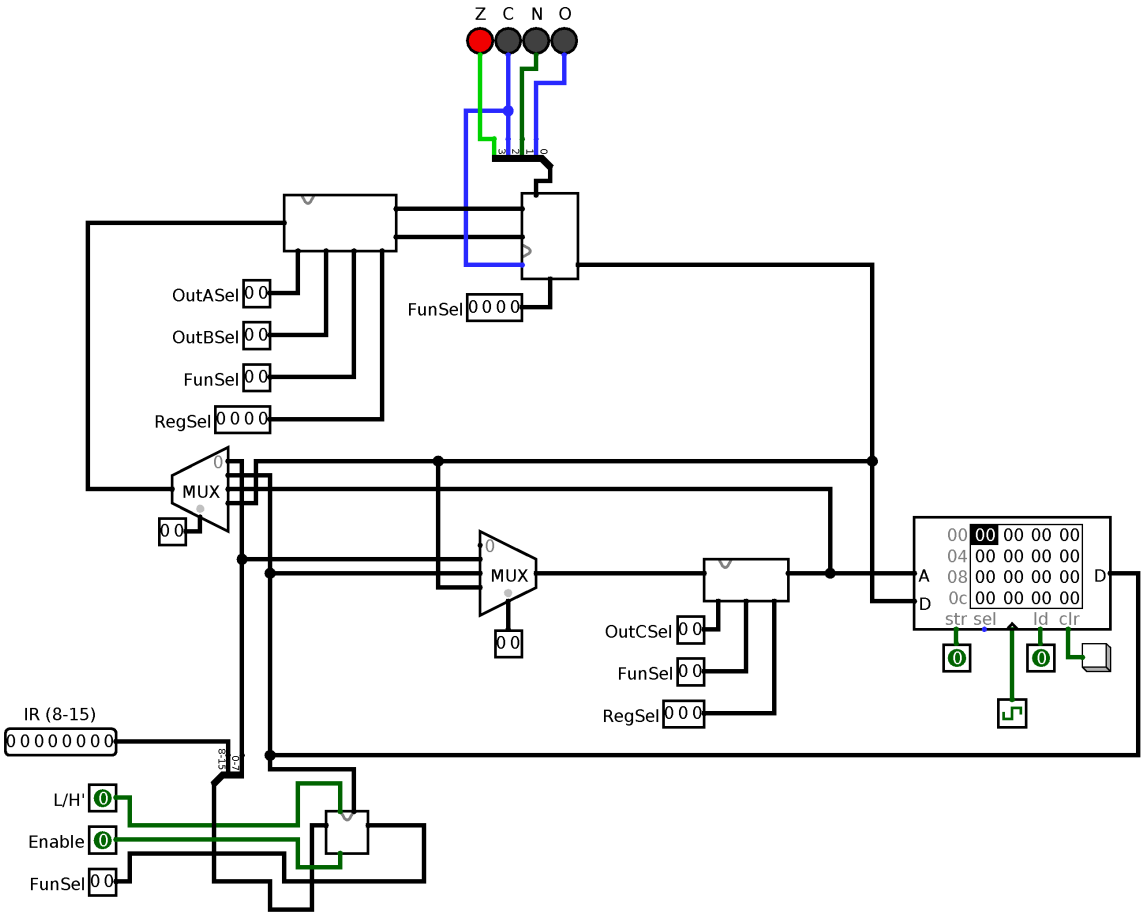


Figure 4: Implementation of the ALU System

4 CONCLUSION

In this project we designed an Arithmetic Logic Unit(ALU) and we used this ALU in our ALU system. We also used 16-bit IR register, 8-bit address register and the general purpose register file which we have designed in the project 1. When we were doing this project, we learned how the ALU works and we started to compose basic parts to create a basic computer.