North South University

Department of Electrical & Computer Engineering

Lab Report

Experiment No:	06
Experiment Title:	Design of an ALU.
Course Code:	**CSE332L**
Section:	**10**
Course Name:	**Computer Organization & Architecture Lab**
Lab Group #:	03
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Objective:

- Build 1 bit ALU with specific set of instructions.
- Incorporate equality check, overflow detection and other necessary flags.
- Build 16 bit ALU by connecting 16 one bit ALU.

Equipment:

- Logisim software

Block Diagram:

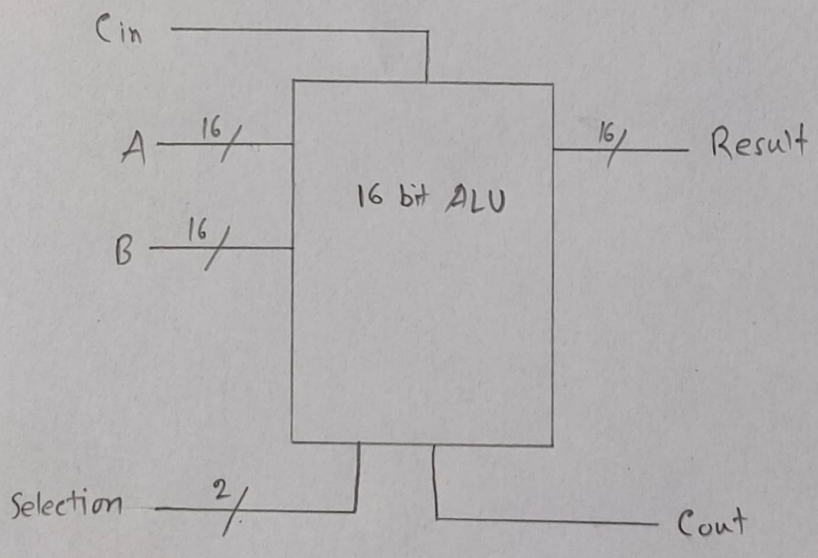


Fig 6.1: Block Diagram of 16 bit ALU.

Circuit Diagram:

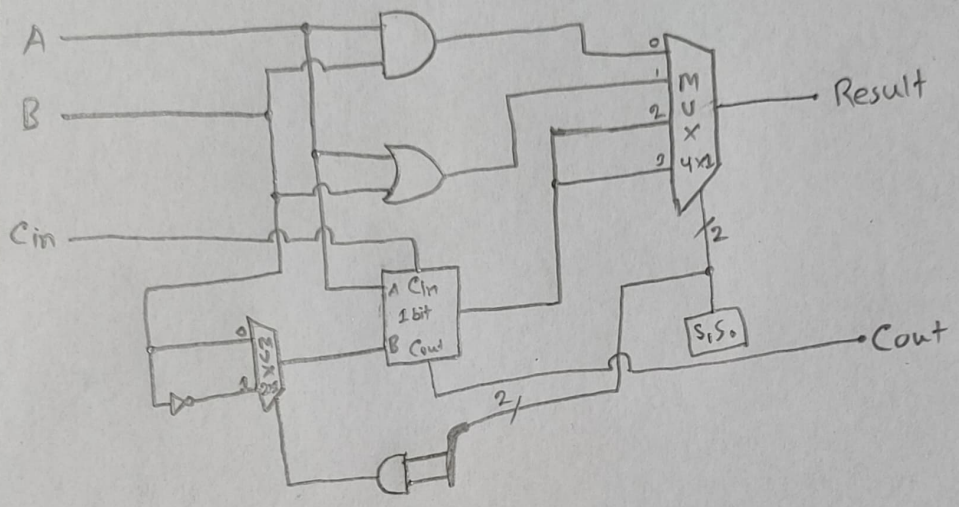
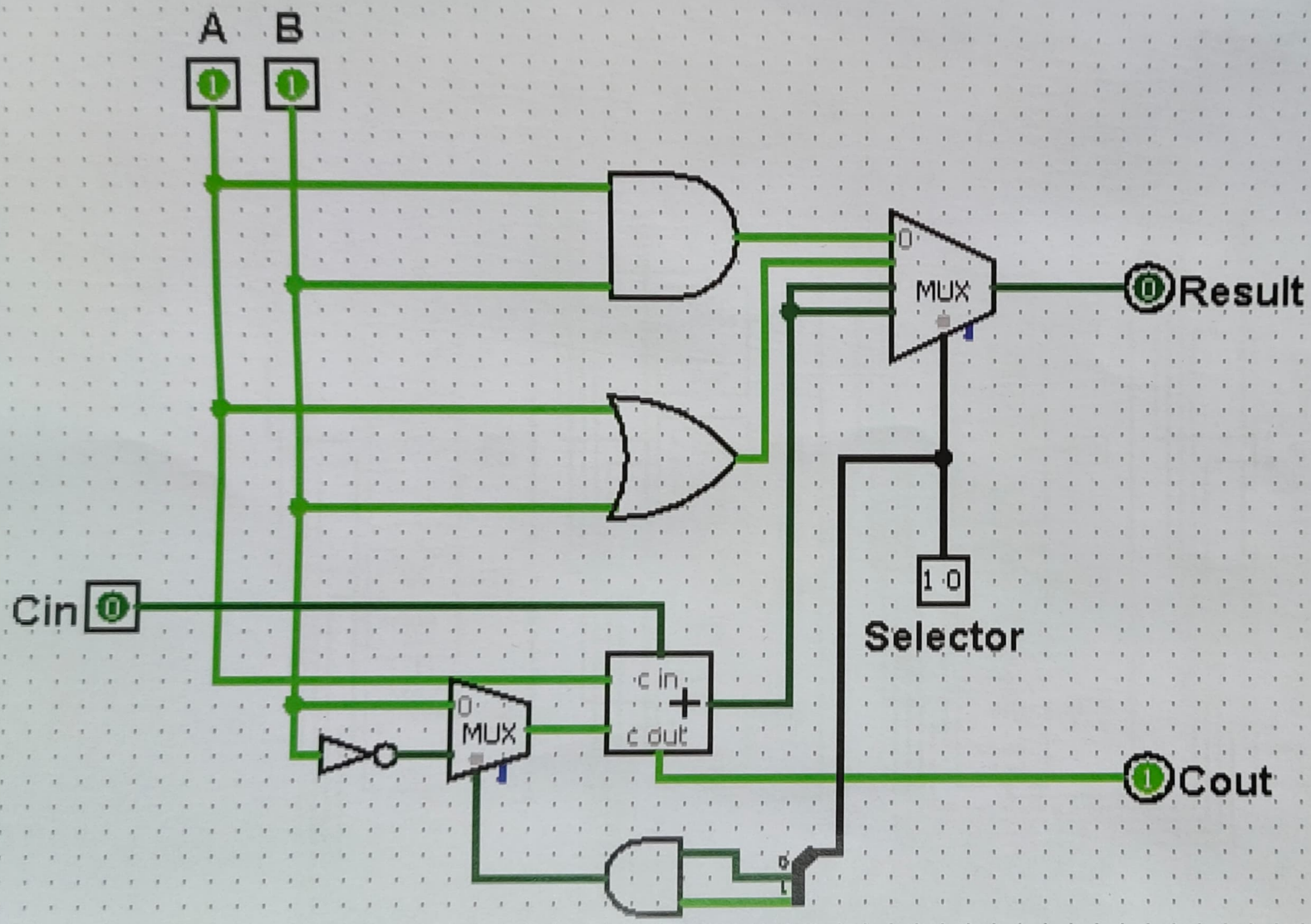
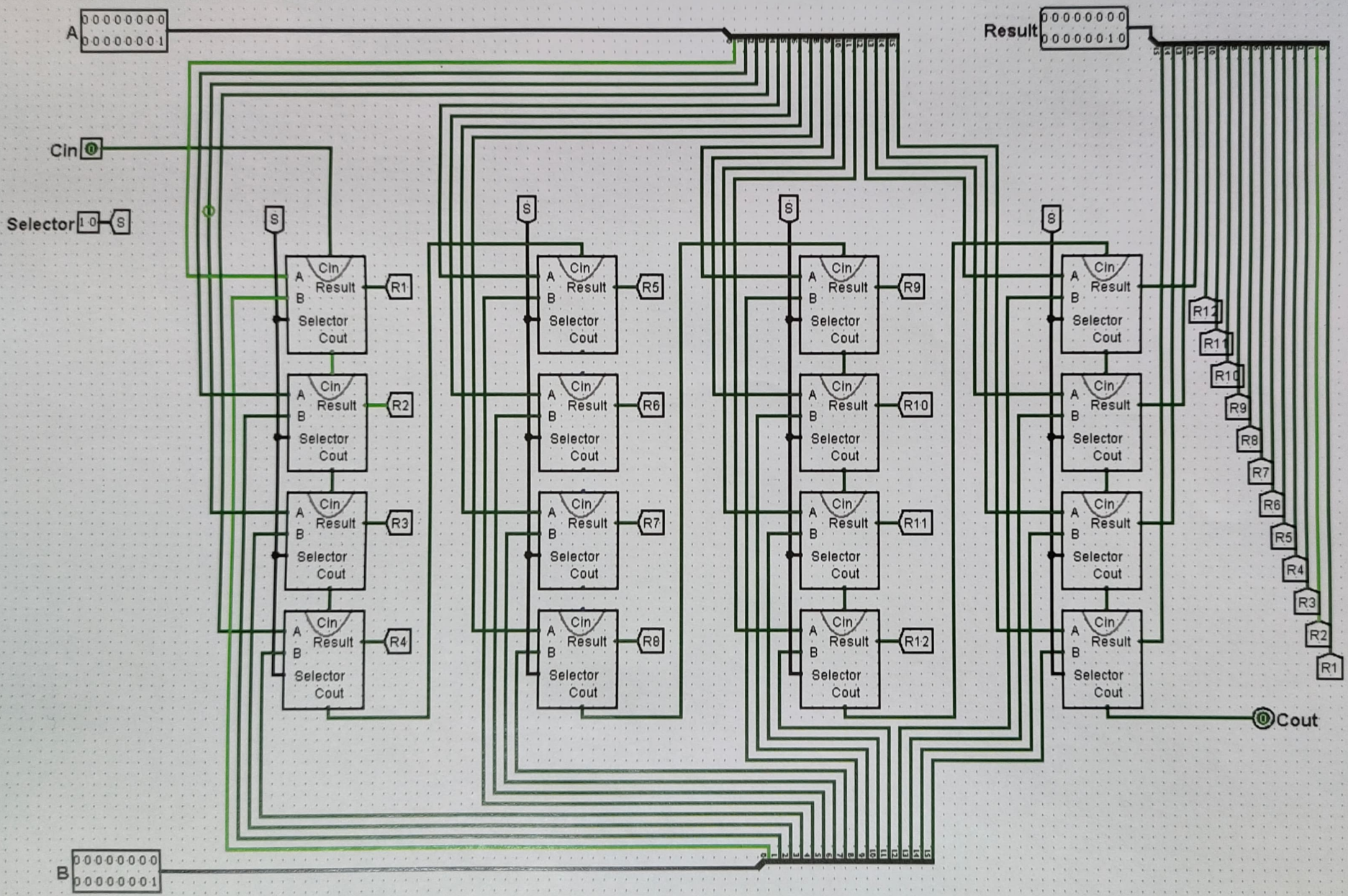


Fig 6.2: Circuit Diagram of one bit ALU.

Discussion:

In this experiment, we needed to build a 16-bit ALU. First, we construct a 1-bit ALU in the Logisim software. We used 1x AND and 1x OR for the logical operation, 1x Adder for the arithmetic operation, 1x MUX for selecting the operation and another MUX and AND gate used to make a complement output of the input B. Then, we copied that 1-bit ALU and connected 16 times to build our 16-bit ALU. Connecting lots of wires together was critical, but the tunnel probe system made this easy. Hence, we learned to build a 16-bit ALU and its operation procedure.


A
B
Cin
MUX
MUX
c in
c out
1 0
Selector
Result
Cout


A
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00000001
Result
00000000
00000010
Cin
Selector
1 0
S
B
00000000
00000001
Cout
A
B
Cin
Result
Selector
Cout
R1
R2
R3
R4
R5
R6
R7
R8
R9
R10
R11
R12