North South University

Department of Electrical & Computer Engineering

LAB REPORT

Course Name: CSE332L

Experiment Number: 02

Experiment Name: Design of a 2-bit Arithmetic unit

Experiment Date: 10/03/2021

Report Submission Date: 17/03/2021

Faculty: SFM

Submitted to: Md Saidur RRahman

Section: 06

Student Name: **Koushik Banerjee**

Student ID: **1812171642**

Score

Remarks:

Objectives:

In this experiment, we will construct a 2-bit arithmetic unit which is a part of an arithmetic logic unit (ALU). arithmetic logic unit (ALU). The arithmetic unit will be used to add and subtract two 2 bit inputs, A and B, as well as increment, decrement, or transfer any of the inputs. reinforce our experience in designing and implementing combinational logic circuits, gain experience in abstraction at the hardware level and assemble larger wholes from smaller parts, and develop expertise with Logisim, an educational software package for designing and simulating digital circuits.

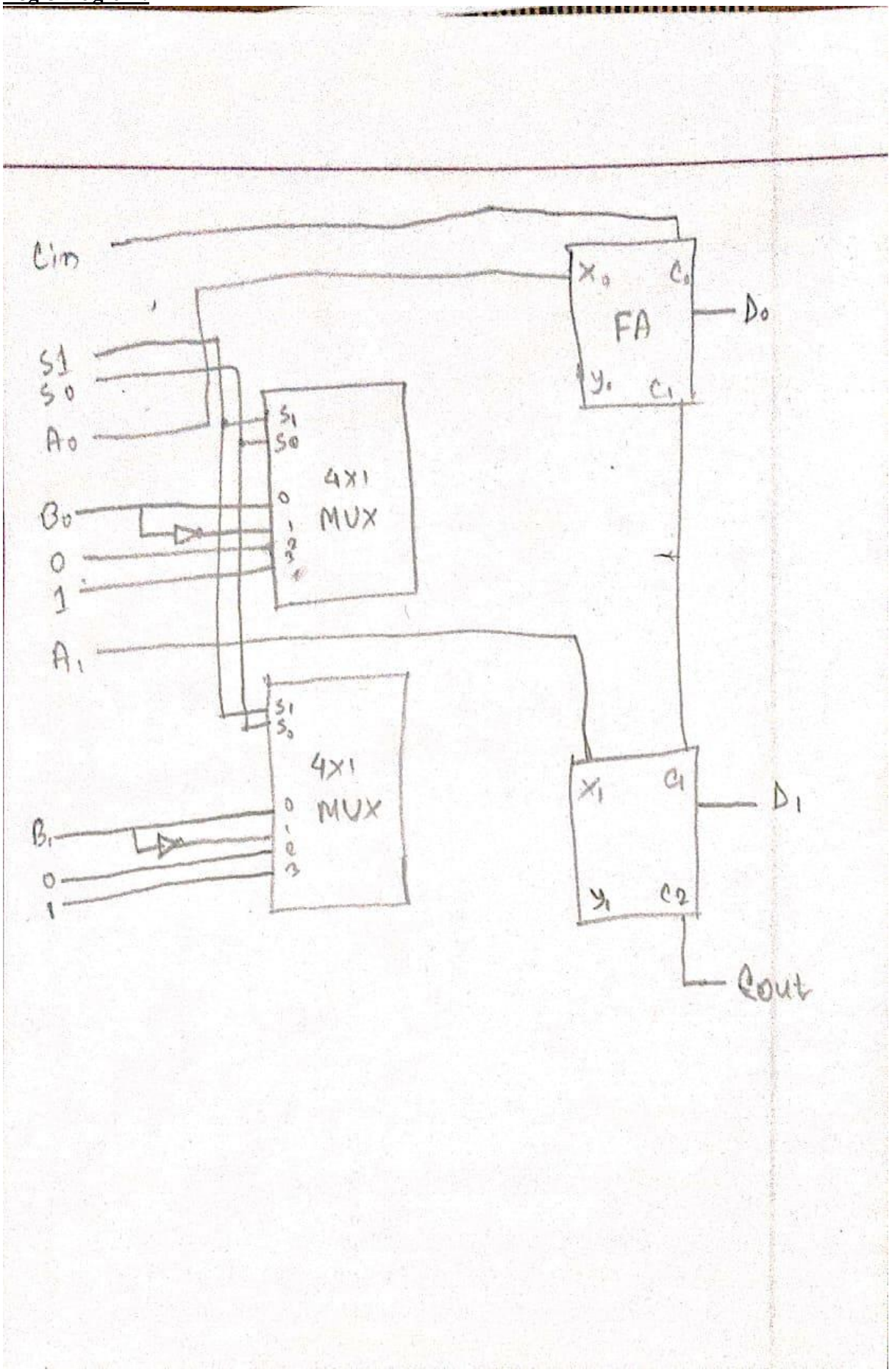
Types of equipment:

* Trainer board
* IC 7404,7483, 74F153
* Wires for connection.

Function Table:

S1	S0	Cin	A0	A1	B1	B0	D1	D0	Cout	Microoperation
0	0	0	0	0	0	1	0	1	0	Add
0	0	1	0	1	0	1	0	0	1	Add with Carry
0	1	0	1	0	0	0	0	1	1	Subtract with Borrow
0	1	1	1	0	1	1	1	0	0	Subtract
1	0	0	1	1	0	1	1	1	0	Transfer A
1	0	1	0	1	1	0	1	1	0	Increment A
1	1	0	1	1	0	0	1	0	1	Decrement A
1	1	1	0	1	0	0	1	0	1	Transfer A

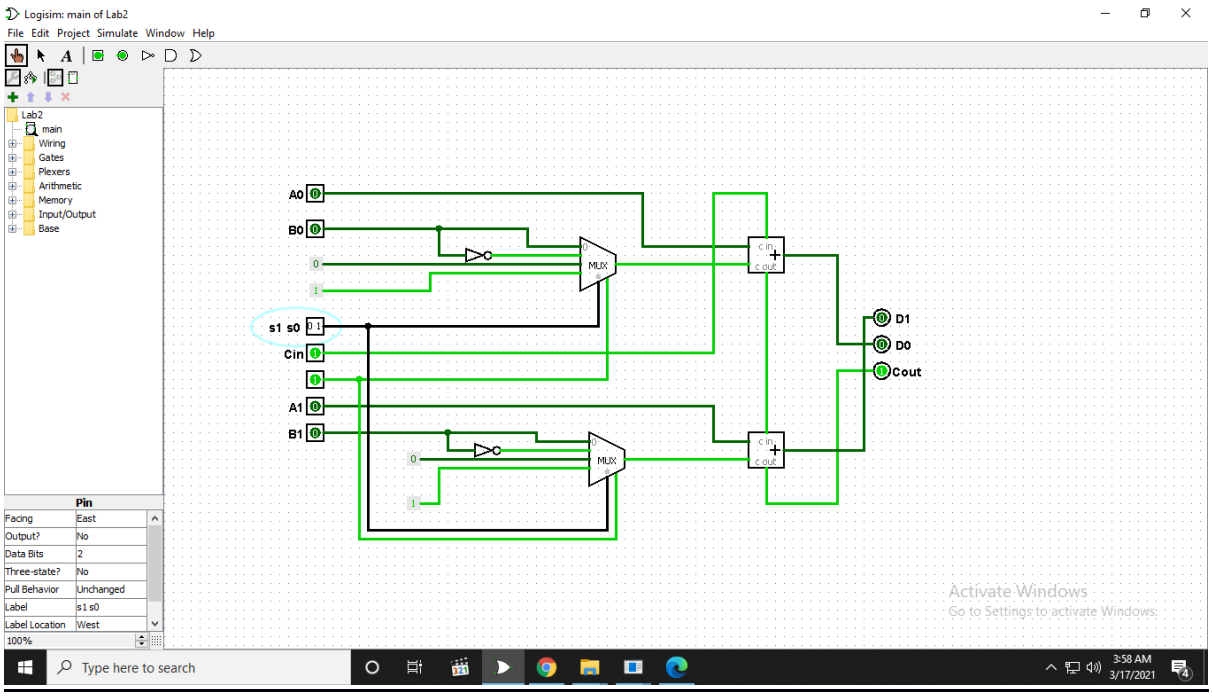
Logic Diagram:



Procedure:

1) Place the ICs on the trainer board.
2) Connect V_{cc} and ground to the respective pins of IC.
3) Connect the inputs with the switches and the outputs with LEDs.
4) Apply various combinations of inputs and observe the outputs.
5) Verify the experimental outputs with the Function Table.

Logisim works screenshot(s):



Discussion:

In lab 2, I construct a 2-bit arithmetic unit which is a part of an ALU. We had to run 8 different Arithmetic Operations in this experiment, Add, Add with carry, Subtract, Subtract with borrow, Increment, Decrement, Transfer. I had done mistake on Add with Carry but I solve that by following the equation. Every component in the circuit is 2 bit. But this lab was pretty simple. It took some time but finally I found out where the problem was and fix IC circuit and then solved it properly. By the help of our class lab instructor I fix that problem also.