



NORTH SOUTH UNIVERSITY

Department of Electrical & Computer Engineering

LAB REPORT

Course Name: Computer Organization & Architecture

Course Code: CSE332

Experiment Number: 02

Experiment Name:

Design of a 2-bit Arithmetic Unit.

Submitted By

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Submitted To

Instructor: Md. Saidur Rahman

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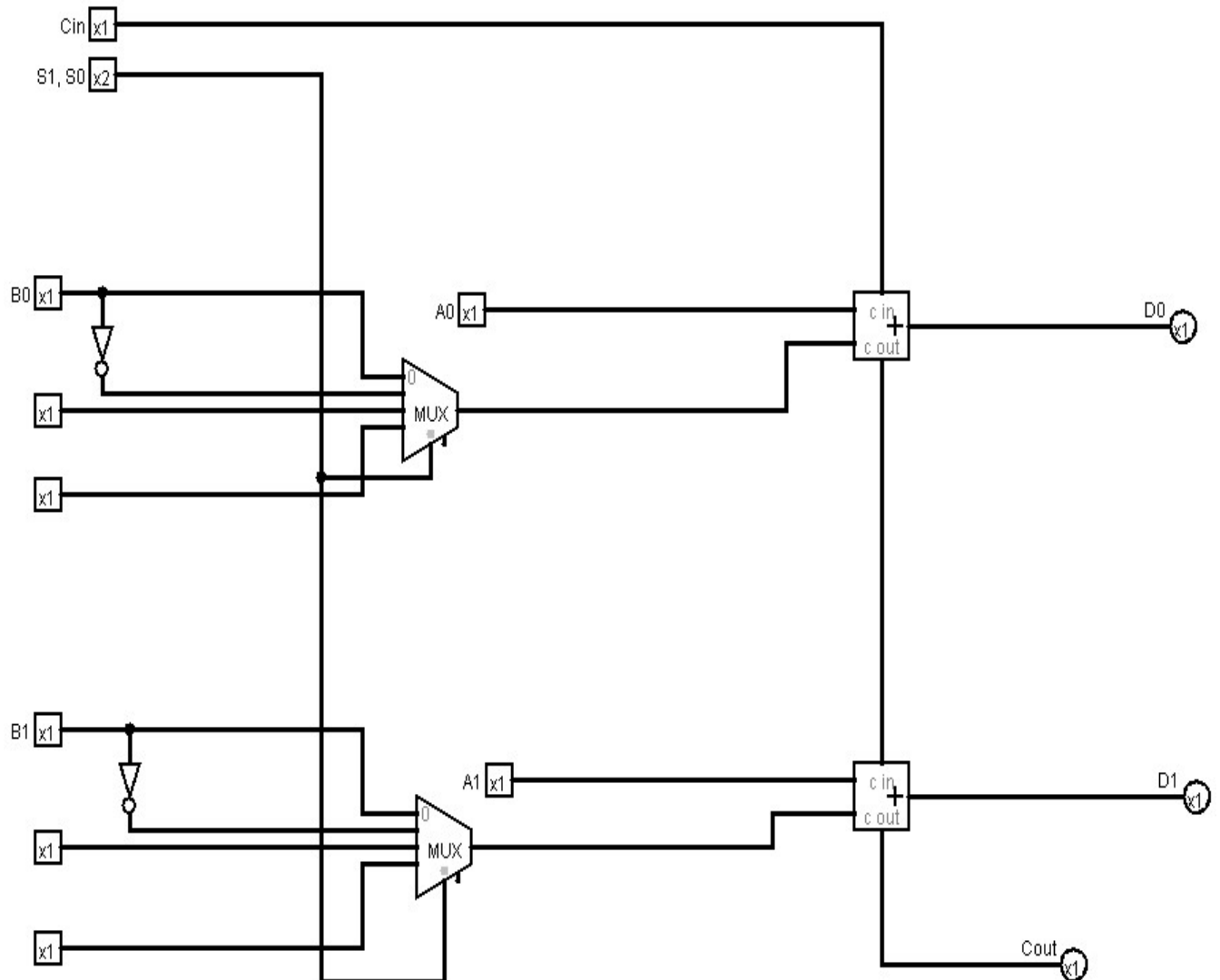
Experiment Name:

Design of a 2-bit Arithmetic Unit.

Objectives:

- Learn how to design a 2-bit Arithmetic Unit.
- Learn the implementation of various operations of 2-bit arithmetic unit by simply using multiplexers and full adders.

Circuit Diagram:



Function Table:

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

Discussion:

After completing the experiment, we got the clear idea to build the arithmetic unit of an Arithmetic Logic Unit or in-short ALU. In the previous lab we learnt how to build a 2-bit logic unit and in this lab, we have learnt how to build an arithmetic unit. As we know an Arithmetic Logic Unit or an ALU is a combination of logic unit and arithmetic unit thus after completing these two experiments we have accomplished to build an ALU for a CPU. In this lab we have implement several operations such as add with or without carry, subtract with or without borrow, increment, decrement, transfer the first input and so on with only using full adder and MUX. To build various operations with only FA and MUX, we needed to build a certain logic for every operation. We design those operations with the help of selection pins and Cin (S1, S0, Cin). With different values of (S1, S0, Cin) those operation being selected as for (0,0,0) the add operation being selected, (0, 1,1) the subtract operation being selected, (1, 1, 1) the transfer operation being selected and so on according to the functional table mentioned above.

As the global pandemic goes on, we are conducting online classes so all the experiments are doing in online using the desired software so there is no scope of getting error or any obstacle to do the experiment which we used to get in the physical lab classes. So, we get all the output accurately and finished the experiment without any problem.