North South University

Department of Electrical & Computer Engineering

LAB REPORT

Course Name: **CSE332L- Computer Organization and Architecture Lab**

Experiment Number:

Experiment Name: Design a 4-bitBinaryMultiplier

Experiment Date: 31.10.21

Report Submission Date: 31.10.21

Section: 7

Group Number:

Student Name: Riaz Mehadi	Score
Student ID: **1931746042**	
Remarks:	

Exp: Design a 4-bit Multiplier

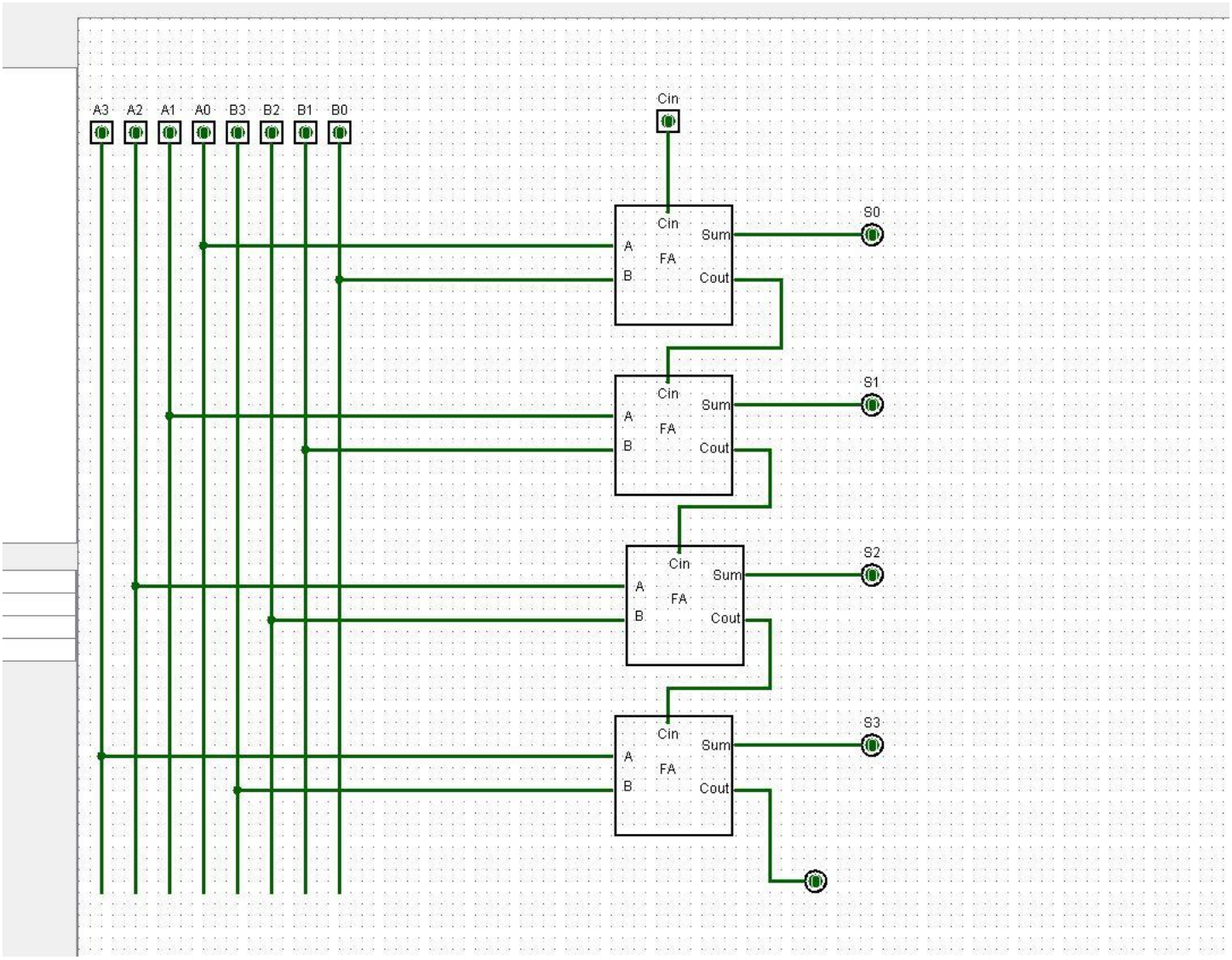
Objectives:

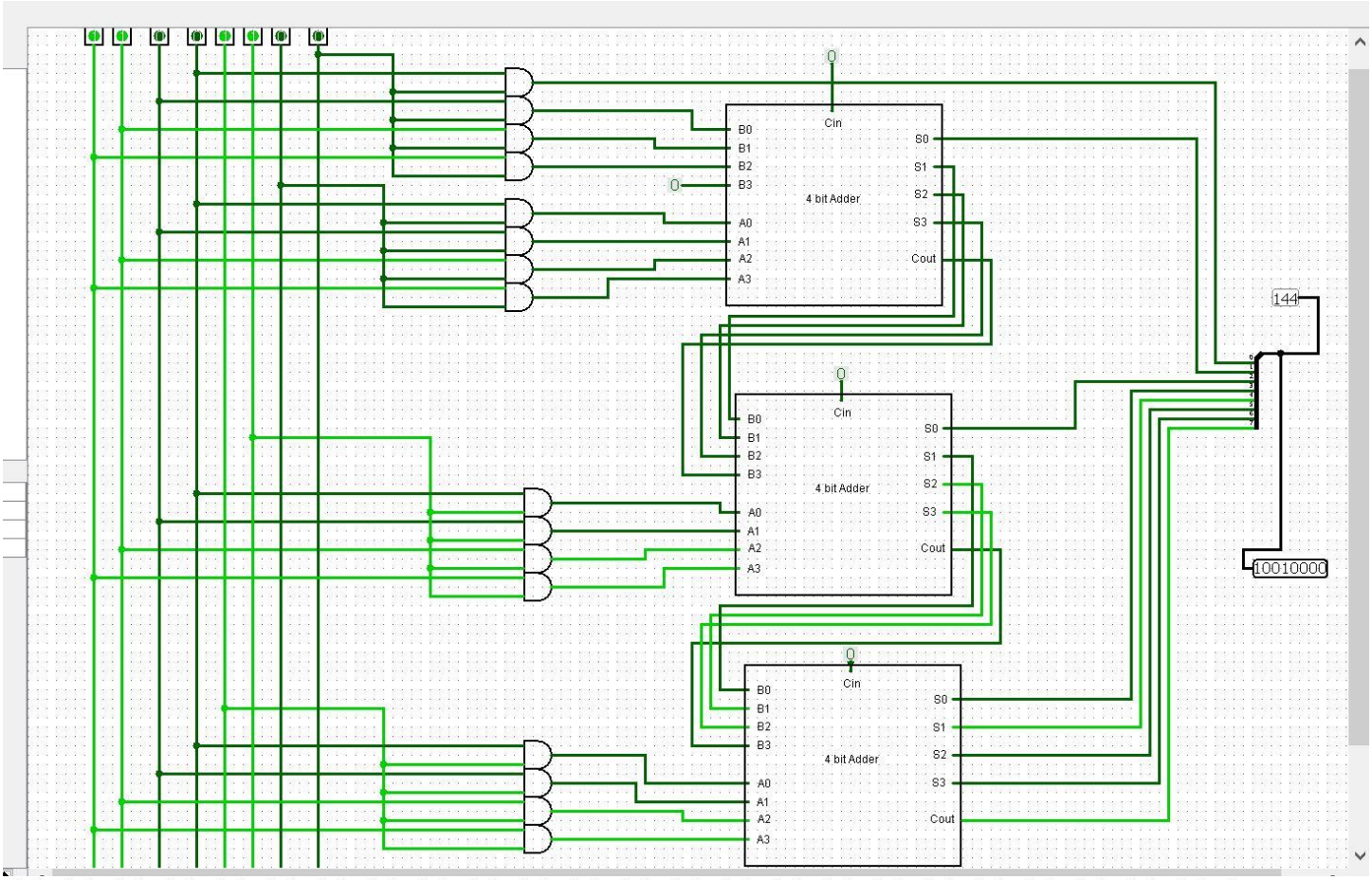
1.Understanding behavior of combinational multiplier from module designed by the student as part of the experiment.
2.Understanding the theoryand implement the multiplication unit which is as follows (along with the logic diagram bellow.
3.Check Multiplying bits and Show the sum outputs.

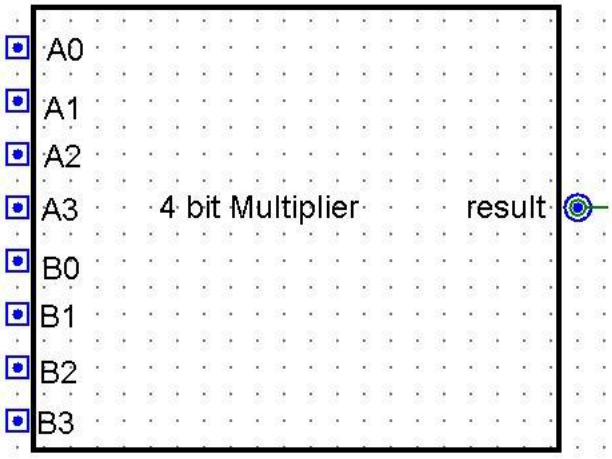
Apparatus:

1. 4 X 7408 AND IC .
2. 3X 7483or 74283 4-bit Adder IC .
3. Trainer Board Wires.

LOGIC CIRCUIT DIAGRAM


A3
A2
A1
A0
B3
B2
B1
B0
Cin
Cin
A
B
FA
Sum
Cout
S0
Cin
A
B
FA
Sum
Cout
S1
Cin
A
B
FA
Sum
Cout
S2
Cin
A
B
FA
Sum
Cout
S3


0
Cin
B0
B1
B2
B3
0
A0
A1
A2
A3
4 bit Adder
S0
S1
S2
S3
Cout
144
10010000


A0
A1
A2
A3
4 bit Multiplier
result
B0
B1
B2
B3

Data Table:1 Theoretical

Multiplicand A4 A3 A2 A1	**Multiplier** B4 B3 B2 B1	**Product** **S8 S7 S6 S5 S4 S3 S2 S1**	**Result in Decimal**

1 0 0 0	1 0 0 1	0 1 0 0 1 0 0 0	**8 × 9 = 72**
0 1 0 1	0 0 1 0	0 0 0 0 1 0 1 0	5 x 2 = 10
0 1 1 1	0 0 1 1	0 0 0 1 0 1 0 1	7 x 3 = 21
0 1 0 0	1 0 0 0	0 0 1 0 0 0 0 0	4 x 8 = 32
0 1 0 1	0 1 1 0	0 0 0 1 1 1 1 0	5 x 6 = 30
1 0 0 1	0 1 0 0	0 0 1 0 0 1 0 0	9 x 4 = 36
1 1 1 1	1 0 1 1	1 0 1 0 0 1 0 1	15 x 11 = 165

Data Table:2 Experimental

Multiplicand A4 A3 A2 A1	**Multiplier** B4 B3 B2 B1	**Product S8 S7 S6 S5 S4 S3 S2 S1**	**Result in Decimal**
1 0 0 0	1 0 0 1	0 1 0 0 1 0 0 0	**8 × 9 = 72**
0 1 0 1	0 0 1 0	0 0 0 0 1 0 1 0	5 x 2 = 10
0 1 1 1	0 0 1 1	0 0 0 1 0 1 0 1	7 x 3 = 21
0 1 0 0	1 0 0 0	0 0 1 0 0 0 0 0	4 x 8 = 32
0 1 0 1	0 1 1 0	0 0 0 1 1 1 1 0	5 x 6 = 30
1 0 0 1	0 1 0 0	0 0 1 0 0 1 0 0	9 x 4 = 36
1 1 1 1	1 0 1 1	1 0 1 0 0 1 0 1	15 x 11 = 165

Discussion:

In this expriment,i gather knowledge about 4 bit BinaryMultiplier.For implementing 4 bit BinaryMultiplier ,I had to use 4 bit adder ,some AND gate for taking input which is output of AND gate.Firstly,i make 1 bit adder.By using 1 bit adder’s ic,I make 4 bit adder.I also use

And,OR,X-OR gate for makingAdder.I learn how to make a ic by our own circit .It is very helpful but I do not have to make same circuit again and again.I also learn how to make 4 or more bit logic unit by using 1 or more bit ic.

For making 4 bit BinaryMultiplier,I use three 4 bit adder's ic.Firstly,I take one copy of 4 bit ic from adder's ic .Then I take rest of the two ic in the same process.I use splitter for showing the output of BinaryMultiplier.One splitter use for showing binary output and I use same splitter for showing output in decimal form by the help of probe.This part was very interesting for me.

During the experiment,I face a problem,like my circuit output is showing wrong output .By the help of my lab instructor ,I solve the problem.Then I do the all thing successfully.