North South University

Department of Electrical & Computer Engineering

LAB REPORT

Course Code : EEE211

Course Title: Digital Electronics

Section: 01

Experiment Number: 07

Experiment Name: Introuction to Multiplexers & Decoders

Experiment Date: 21.12.2020

Date of Submission: 27.12.2020

Course Instructor: Fahimul Haque

Submitted To: Fatema Zahra

Experiment Name:

Introduction to multiplexers & decoders.

Objectives:

→ Understand the concept of multiplexing in the context of digital circuit.

→ Learn about the internal logic of digital multiplexers.

→ Implement digital logic functions using MUX.

→ Observe & analyze the operations of the 3 to the 8 line decoder.

Theory:

Multiplexer is a device that selects between several input signals & forward the selected input signal to a single output line.

A binary decoder is a combinational logic circuit that converts binary information from the n coded inputs to a maximum of 2^n unique outputs.

Apparatus:

- Trainer board.
- NOT gates, 3 input AND gates, 2 OR input OR gates.
- Decoder.
- MUX.

Table:

A	B	C	F (Theoretical)	Data Inputs	F (Practical)
0	0	0	1	$I_0 = 1$	1
0	0	1	1	$I_0 = 1$	1
0	1	0	0	$I_1 = 0$	0
0	1	1	0	$I_1 = 0$	0
1	0	0	0	$I_2 = C$	0
1	0	1	1	$I_2 = C$	1
1	1	0	0	$I_3 = C$	0
1	1	1	1	$I_3 = C$	1

figure: implementing Boolean function using 4:1 MUX.
for $F(A, B, C) = \Sigma(0, 1, 5, 7)$.

A	B	C	D	F (Theoretical)	Data Inputs	F (Practical)
0	0	0	0	0	$I_0 = D$	0
0	0	0	1	1	$I_0 = D$	1
0	0	1	0	1	$I_1 = D'$	1
0	0	1	1	0	$I_1 = D'$	0
0	1	0	0	1	$I_2 = 1$	1
0	1	0	1	1	$I_2 = 1$	1
0	1	1	0	0	$I_3 = 0$	0
0	1	1	1	0		0
1	0	0	0	0	$I_4 = 0$	0
1	0	0	1	0		0
1	0	1	0	1	$I_4 = D'$	1
1	0	1	1	0		0
1	1	0	0	1	$I_5 = 1$	1
1	1	0	1	1		1
1	1	1	0	0	$I_6 = 0$	0
1	1	1	1	0		0

figure: Implementing $F(A, B, C, D) = \Sigma(1, 2, 4, 5, 10, 12, 13)$ using 8x1 MUX.

Circuit Diagrams:

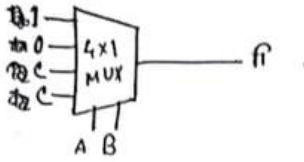

Figure: $F(A,B,C) = \Sigma(0,1,5,7)$ implementation using 4x1 MUX.

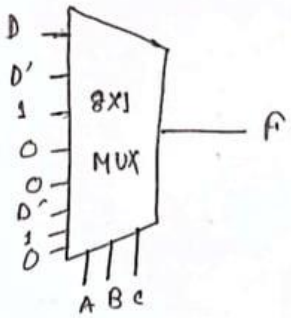

Figure: Implementing $F(A,B,C,D) = \Sigma(1,2,4,5,10,12,13)$ using 8x1 MUX.

Question · Answer :

Active high device are those device which sends high signal to the output for a particular selected inputs.

On the other hand, active low devices sends the low signal to output for a selected inputs.

For example, In a ~~decoder~~ 3 to 8 line decoder, for 001 input only g_1 becomes high for active high device while other output pins are low. And, in a active low device for the same inputs g_1 becomes low and all other pins becomes high.

Discussion:

Due to pandemic we are can't attend practical lab session. But, we are using software simulation. From Through this lab we understand the use of MUX & decoder more better. It helped us to relate our theoretical knowledge with the practical ones.

Mohammed Mahmudur Rahman
Mux Internal Circuit
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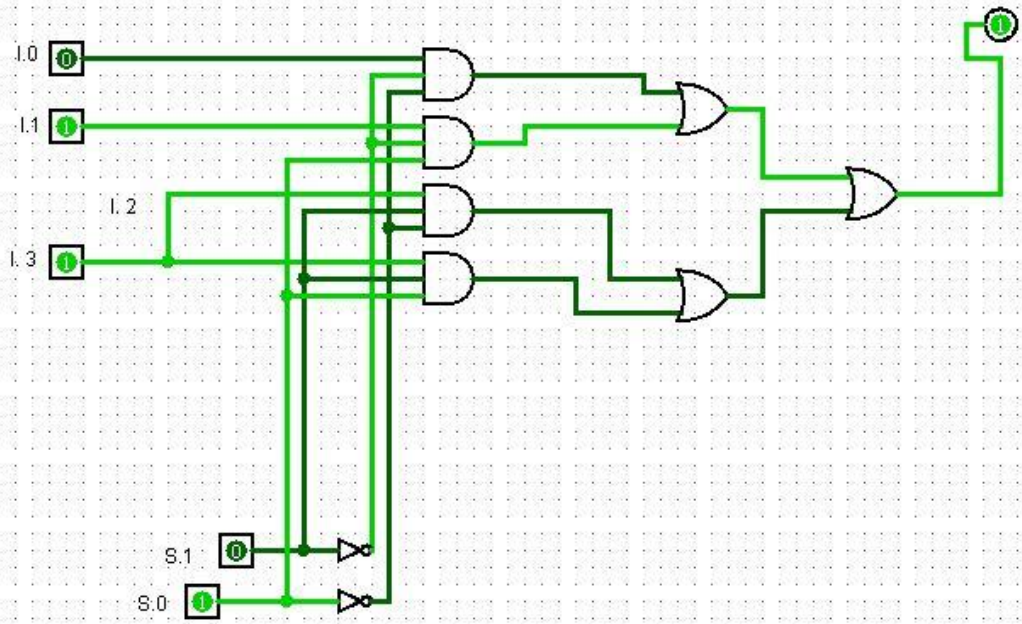

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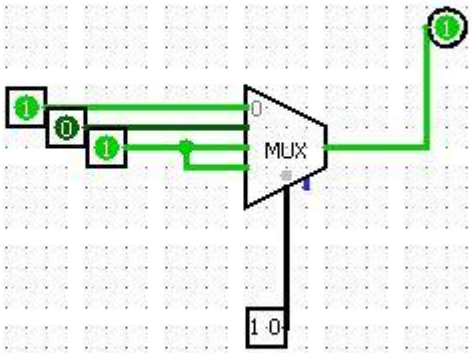
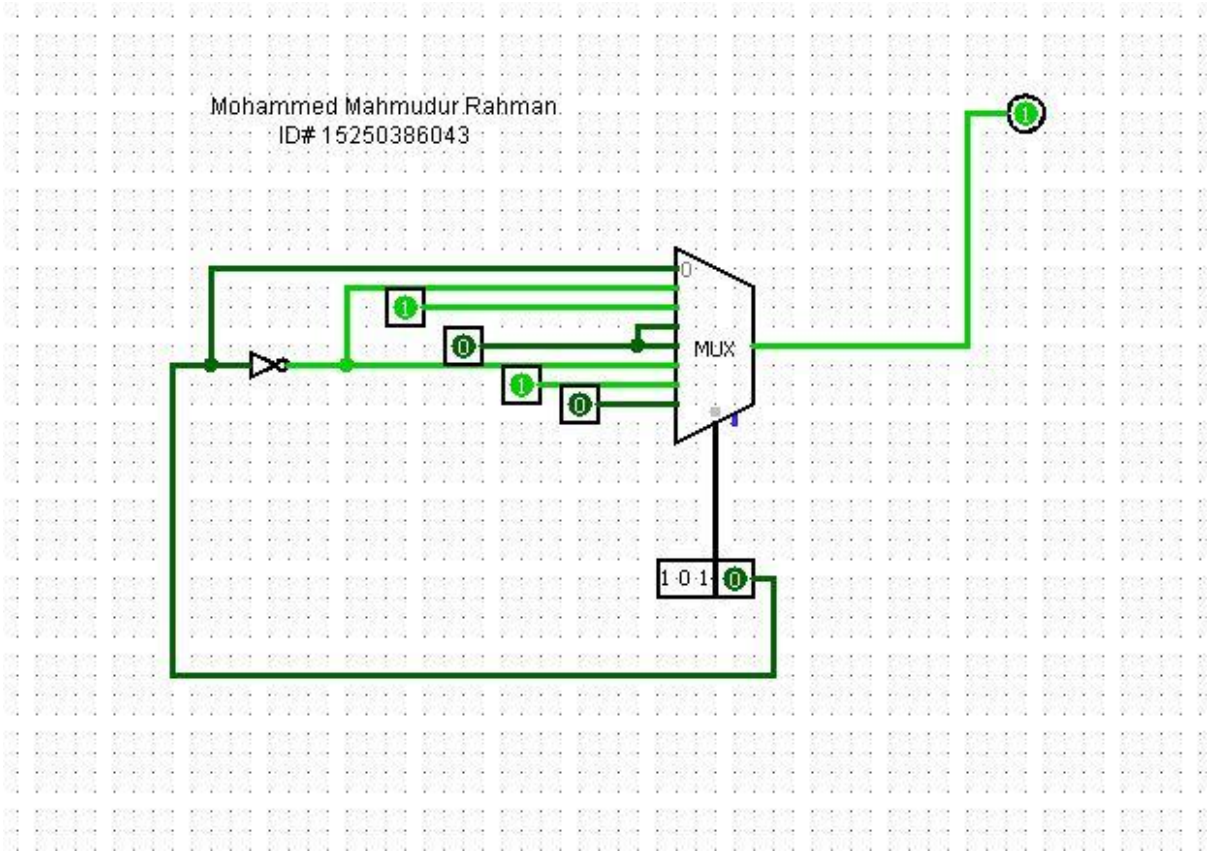
Logisim 2

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MUX
1 0 1 1