Leading University

Lab Report 2

Course code: CSE-4113

Course Title: VLSI

Submitted To

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Experiment No.2:

Title: Design of 2*1 MUX and 4*1 MUX using LTSPICE software

Abstract: Multiplexer is a circuit that has maximum of 2n data inputs, 'n' selection lines and single output line. One of these data inputs will be connected to the output based on the values of selection lines. In 2:1 multiplexer we have two inputs and one select inputs on other hand 4:1 multiplexer have four inputs and two select inputs and consisting one output.

Since there are 'n' selection lines, there will be 2n possible combinations of zeros and ones. So, each combination will select only one data input. In MUX We implement this circuit using Inverters, AND gates & OR gate.

Introduction: The main objectives of the experiment is to study the gate logic behaviour of different multiplexer circuits as follows:

i. 2*1 MUX
ii. 4*1 MUX

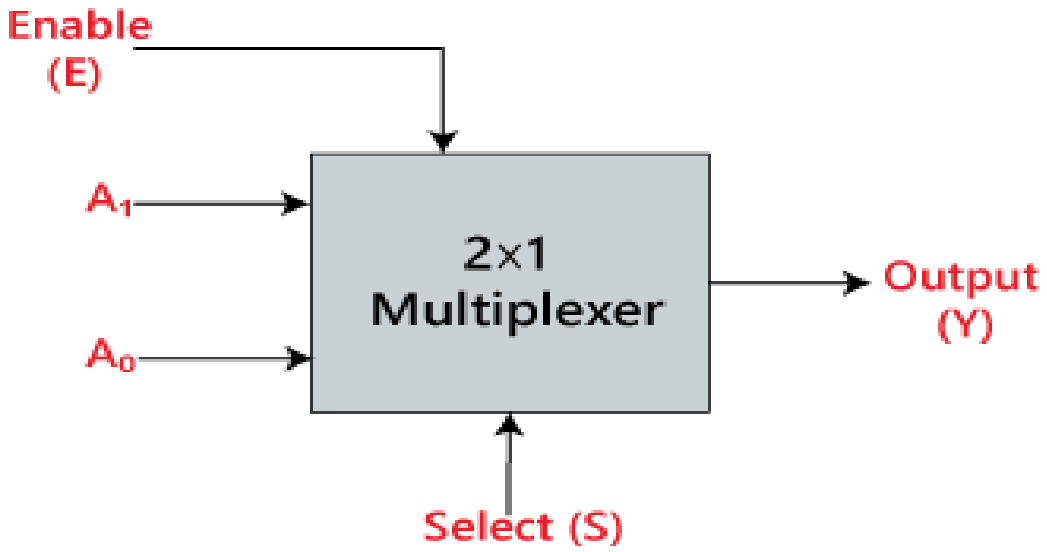
Theory and Methodology:

i. **2*1 MUX:** In 2×1 multiplexer, there are only **two inputs**, i.e., A_0 and A_1, 1 selection line, i.e., S_0 and single outputs, i.e., Y. On the basis of the combination of inputs which are present at the selection line S^0, one of these 2 inputs will be connected to the output.

Truth table:

S	D_1	D_0	Z
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	1
1	0	0	0
1	0	1	0
1	1	0	1
1	1	1	1

Block Diagram:

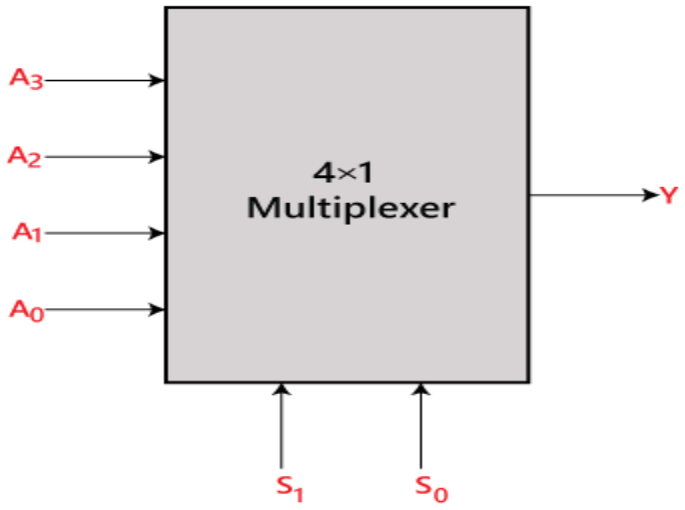


ii. <u>4*1 MUX:</u> A 4-to-1 multiplexer consists **four data input lines as D0 to D3, two select lines as S0 and S1 and a single output line** Y. The select lines S0 and S1 select one of the four input lines to connect the output line.

<u>Truth Table:</u>

S0	S1	A	B	C	D	Y
0	0	A	0	0	0	A
0	1	0	B	0	0	B
1	0	0	0	C	0	C
1	1	0	0	0	D	D

Block diagram:



Software: LTSPICE XVII

Circuit diagram: Providing the schematic circuit diagram from LTSPICE software in this section.

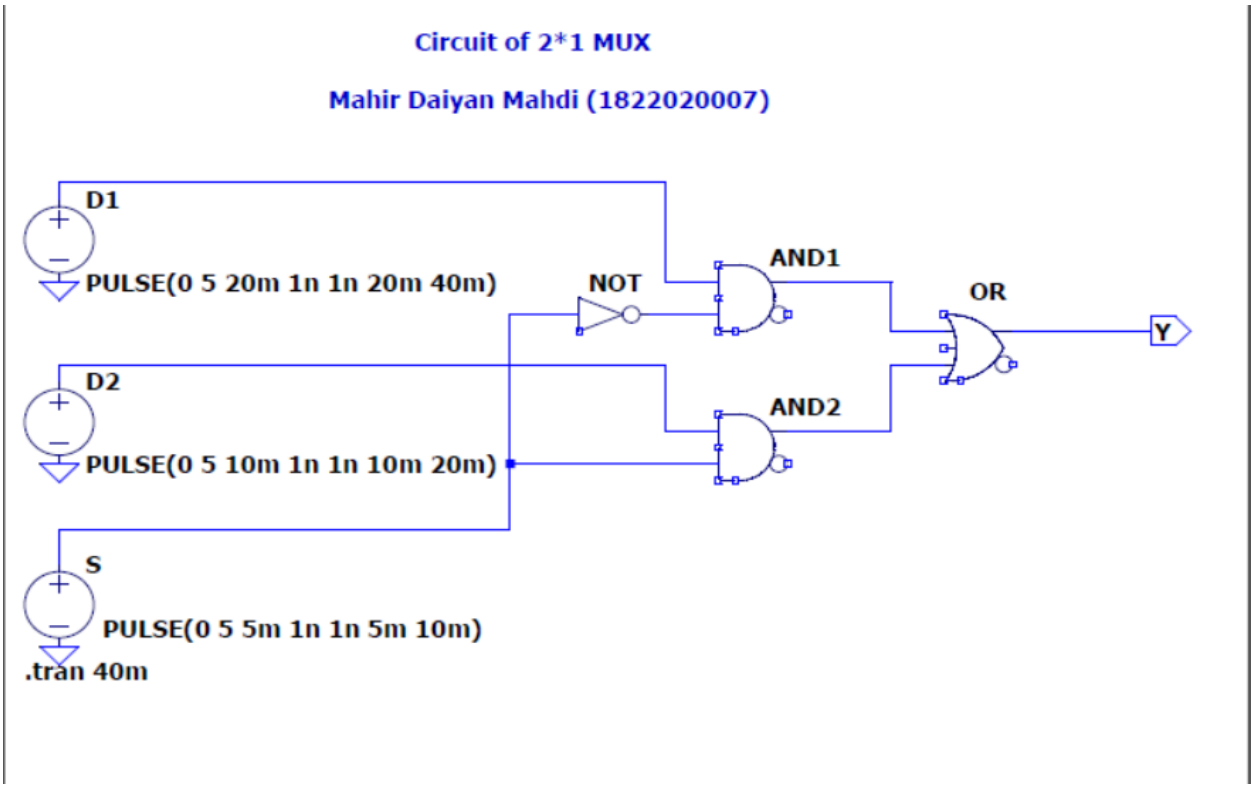


FIG-01- Schematic diagram of 2*1 MUX circuit

Simulation Result:

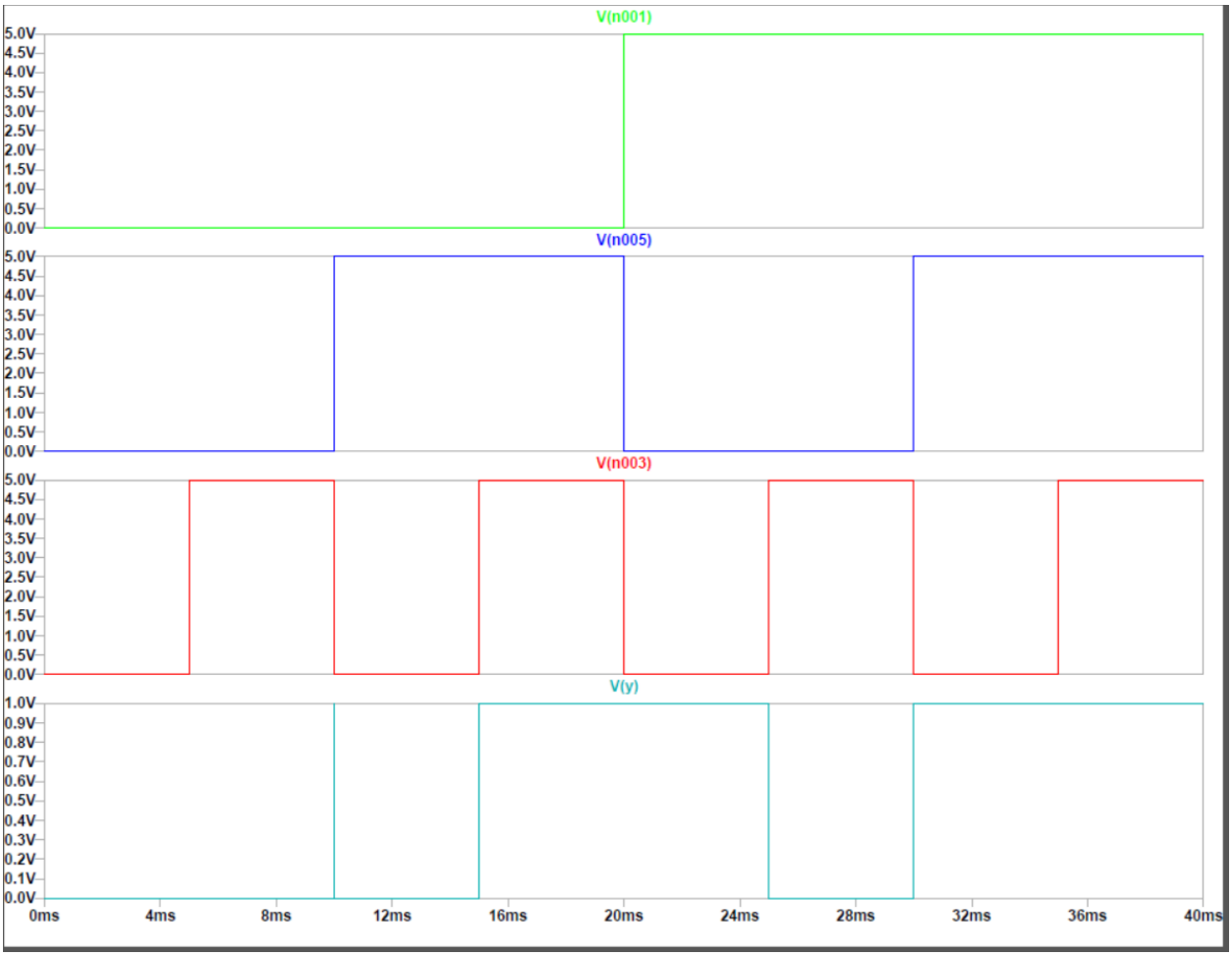


FIG-02- Simulation result of 2*1 MUX

Circuit diagram of 4*1 MUX:

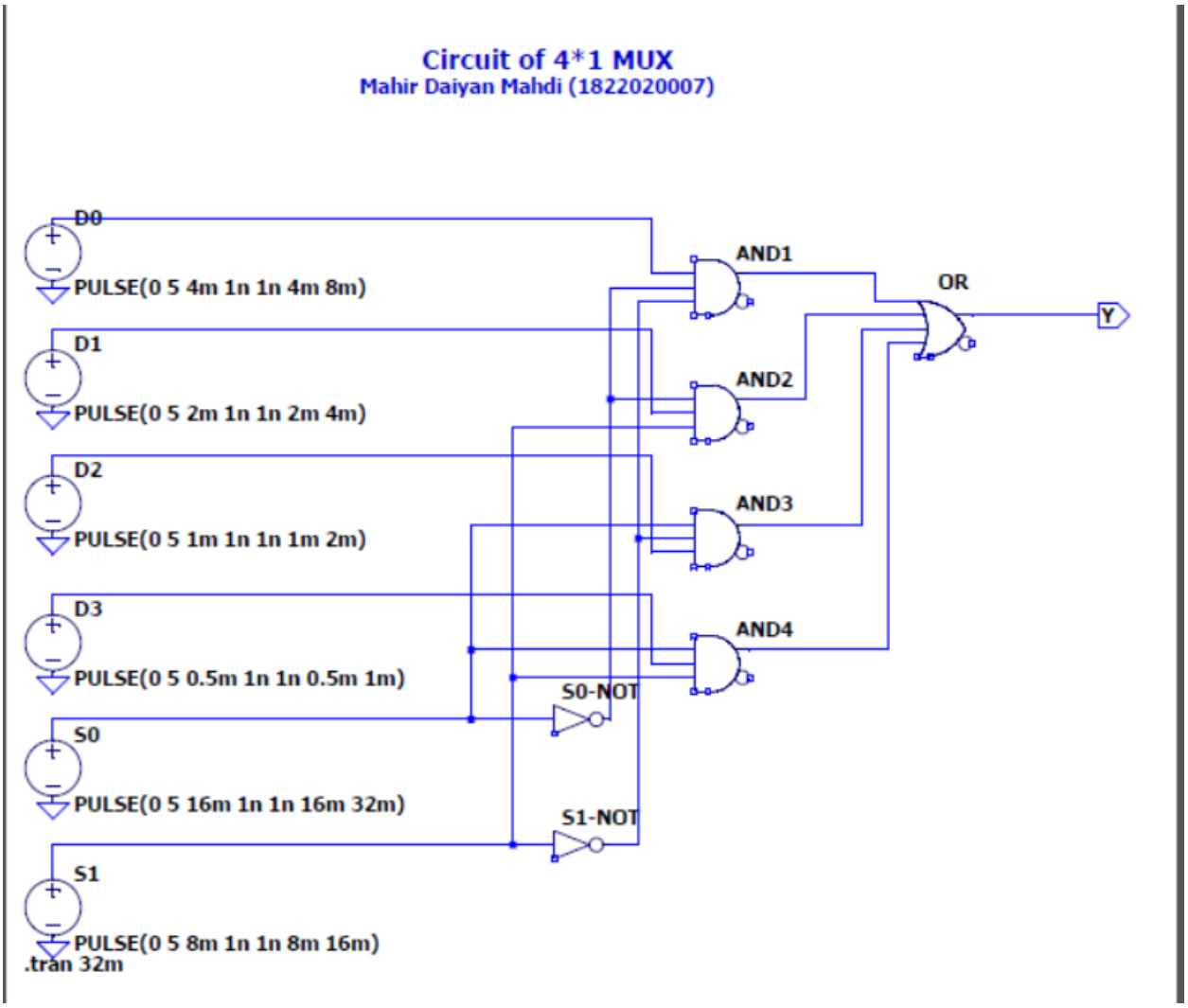


FIG-03- Schematic diagram of 4*1 MUX circuit

Simulation Result:

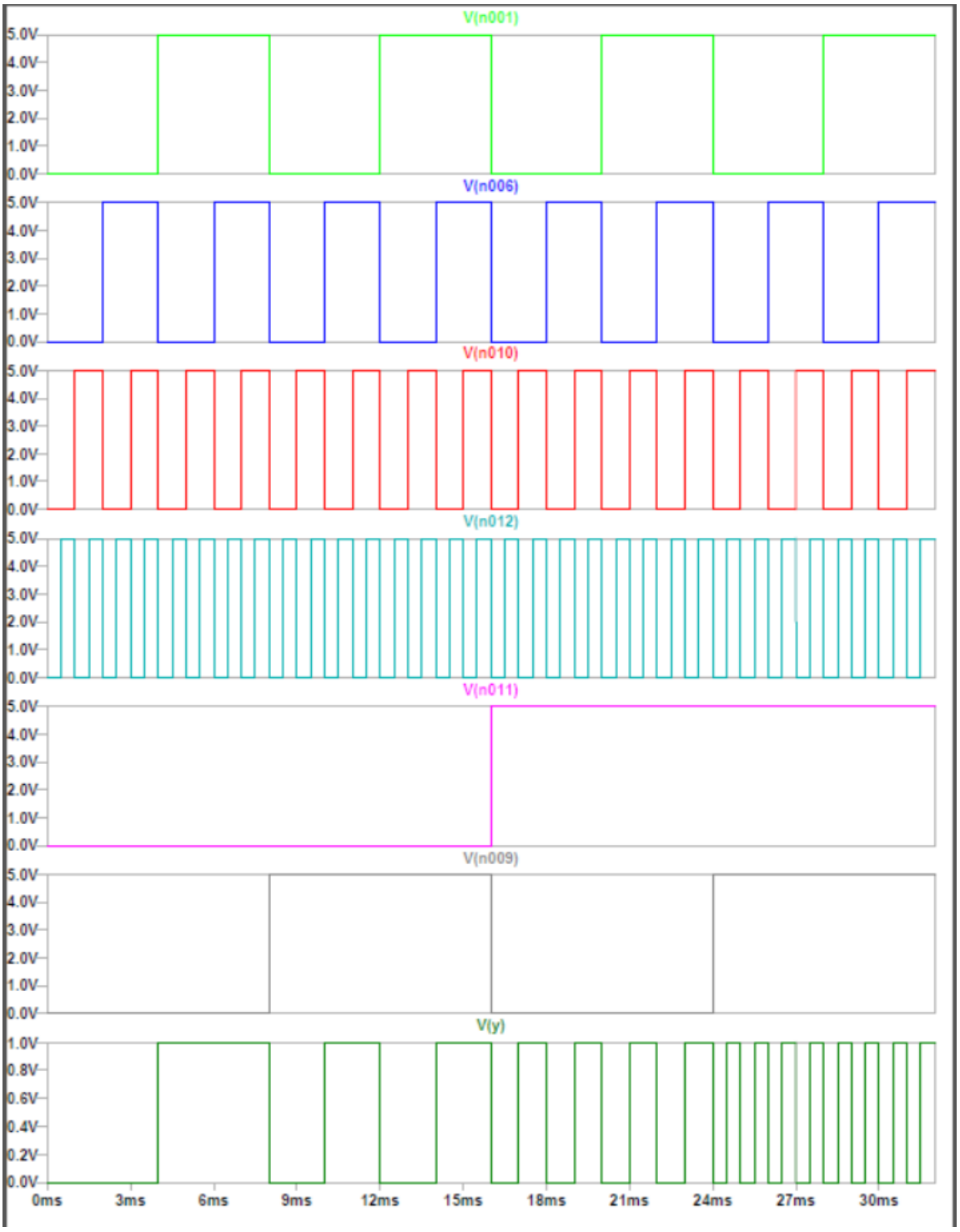


FIG-04-Simulation result of 4*1 MUX

Discussion and Conclusion :

In this entire experiment I had faced so much troubles specially in 4*1 MUX just because of the circuit, it was too big and too much complex to draw for me. And also I got some confusion when I saw its simulation graph first time. Its takes most of the time. After all this troubles finally I solved the experiment.