

VLSI Lab

LABORATORY MANUAL

Spring 2019



LAB 11

Title of Lab Experiment: Implementation of PLA
structure using Pseudo NMOS Logic

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STUDENT NAME

ROLL NO

SEC

LAB ENGINEER SIGNATURE & DATE

MARKS AWARDED: /10

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Verified by: Engr. Rashid Karim.

Version: 1.00
Date: 16th April, 2019

1. Learning Objectives:

- a. Layout design and verification of Pseudo NMOS based digital designs

2. Equipment Required:

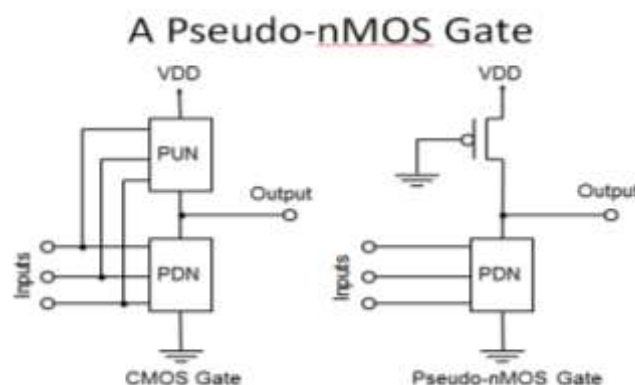
Software : L-Edit, T-Spice, W-Edit

3. Introduction:

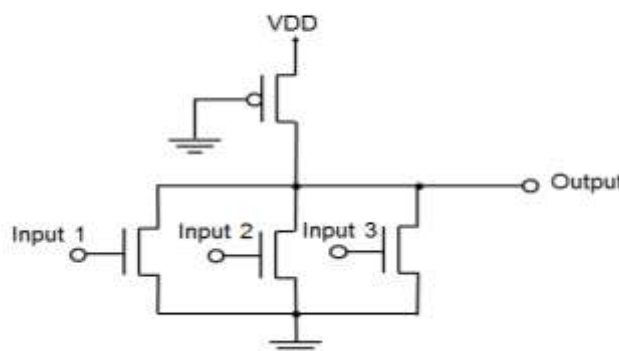
Static CMOS: Pros and Cons

- Advantages: Static (robust) operation, low power.
- Disadvantages:
 - Large size: An N input gate requires 2N transistors.
- Alternatives: Pass-transistor logic (PTL), pseudo-nMOS, dynamic CMOS.

A Pseudo-nMOS Gate



Pseudo-nMOS NOR



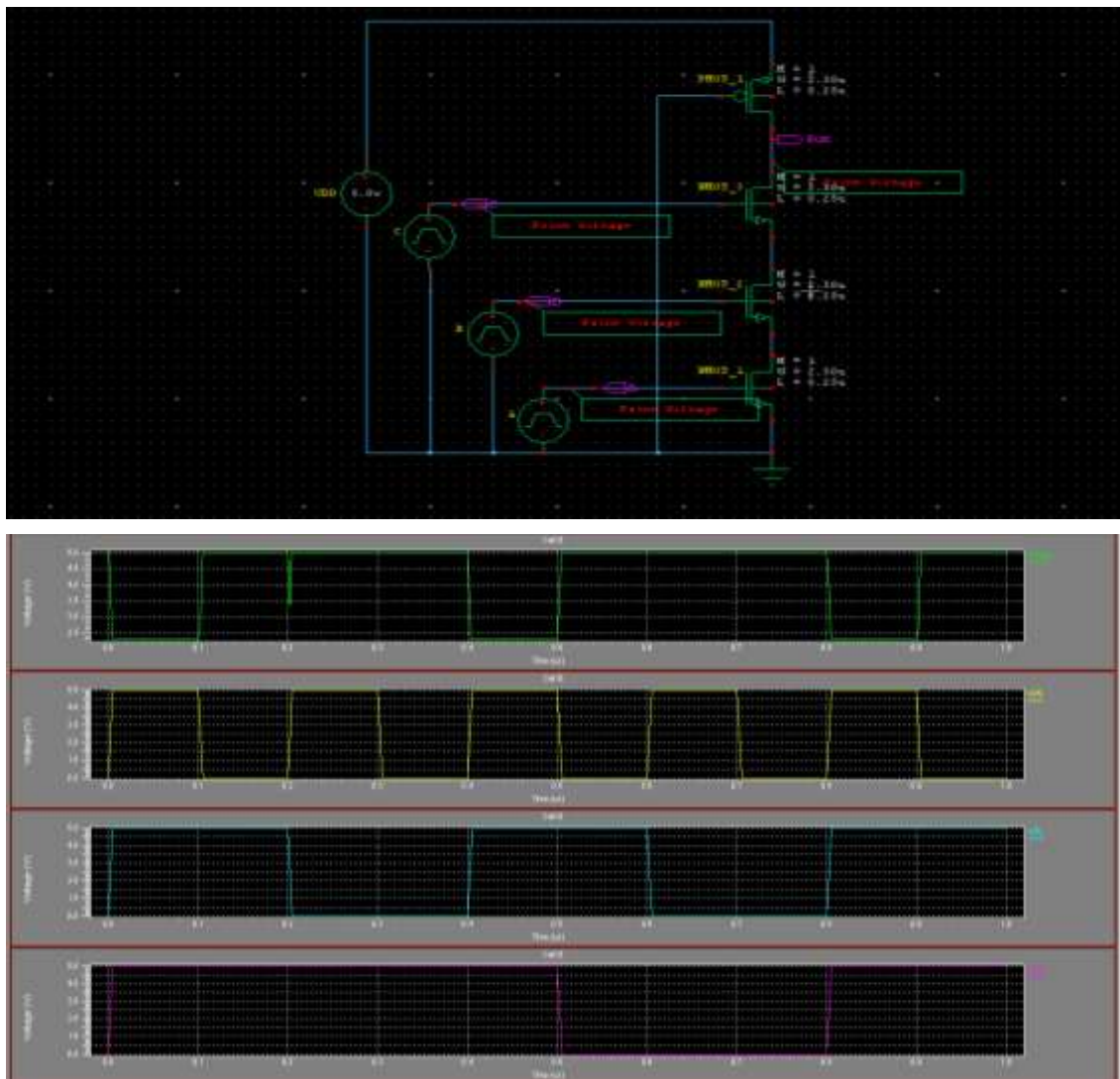
Negative Aspects of Pseudo-nMOS

- Faster gates mean higher static power.
- Low static power means slow gates.

4. Procedure:

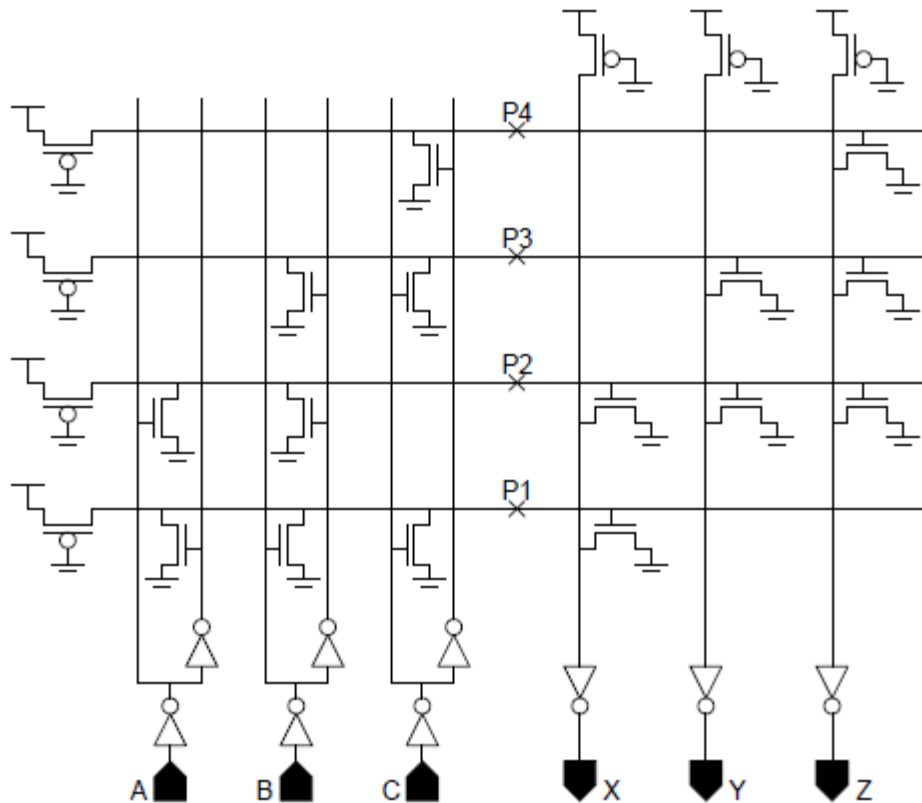
2-Input NAND Gate

Schematic verification of Pseudo NMOS using S-Edit.



5. Task:

Design an optimized layout for the transistor level diagram of the following PLA structure which has been implemented using Pseudo NMOS technology. Also, test its functionality.



Submission Declaration by the Student:

In submitting this lab write-up to the Lab Engineer/Instructor, I hereby declare that:

- ☐ I have performed all the practical work myself
- ☐ I have noted down actual measurements in this writeup from my own working
- ☐ I have written un-plagarised answers to various questions
- ☐ I have/have not obtained the desired objectives of the lab.

Reasons of not obtaining objectoves (if applicable):

Student's signature and Date

Student Evaluation by the Lab Engineer:

The Lab Engineer can separate this page from the writeup and keep it for his/her own record. It must be signed by the student with date on it.

- ☐ **Lab Work:** objectives achieved (correctness of measurements, calculations, answers to questions posed, conclusion)
_____/30
- ☐ **Lab Writeup:** Neatness, appropriateness, intime submission
_____/10
- ☐ **Troubleshooting:** Were the student able to troubleshoot his/her work when it was purposely changed?
_____/10
- ☐ **TOTAL:**
_____/50

Feedback on student behaviour:

Encircle your choice. -2 means poorest/worst/extremely inadequate/irrevlevant, 0 gives an average score, and +2 means best/most relevant/most adequate.

- ☐ Did the student join the lab at the start/remained in lab? -2 -1
0 1 2
- ☐ Did the student remain focused on his/her work during lab? -2 -1
0 1 2
- ☐ Rate student's behaviour with fellows/staff/Lab Engineer? -2 -1
0 1 2

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- ☐ Did the student cause any distraction during the Lab? -2 -1
0 1 2
- ☐ Was the student found in any sort of plagiarism? -2 -1
0 1 2

Additional comments (if any) by the Lab Engineer:

Lab Engineer's signature and Date

Student's feedback: [Separate this page; fill it; drop in the Drop Box.]

- ☐ Providing feedback for every lab session is optional. No feedback means you are satisfied
- ☐ The Lab Committee will consider only duly filled forms submitted within one week after the lab
- ☐ This feedback is for LAB session:
- ☐ LAB Number: _____,
- ☐ Date: _____
- ☐ General (to provide feedback on a persistent practice/occurrence in LABs).
- ☐ Your current CGPA is in the range 4.00 to 3.00/2.99 to 2.00/1.99 to 1.00/0.99 to 0.00

This feedback is:

- ☐ For a Particular
- ☐ Who conducted the LAB?

- ☐ Actual Start time: _____
- ☐ Total Duration of Lab: _____
- ☐ Instruction Duration: _____
- ☐ Practical Duration: _____

- ☐ LAB writeup available before LAB? Yes/No with the Photocopier/in LAB/in SLATE
☐ Had the theory related to lab been covered in theory class? Yes/No

Encircle your choice. -2 means poorest/worst/extremely inadequate/irrelevant, 0 gives an average score, and +2 means best/most relevant/most adequate.

Instruction Session	Was duration of instruction session adequate?	-2	-1	0	+1	+2
	How much did you understand about the practical?	-2	-1	0	+1	+2
	How much content was irrelevant to the practical?	-2	-1	0	+1	+2
	Did the instructor allowed Q/A and discussion?	-2	-1	0	+1	+2
Practical	Did you get sufficient time for practical?	-2	-1	0	+1	+2
Lab Engineer	Presence in lab at all time?	-2	-1	0	+1	+2
	Ability to convey?	-2	-1	0	+1	+2
	Readiness to help during practical?	-2	-1	0	+1	+2
	Readiness to discuss theoretical aspects?	-2	-1	0	+1	+2
	Helps in troubleshooting?	-2	-1	0	+1	+2
Staff	Guides hows & whys of troubleshooting?	-2	-1	0	+1	+2
	How friendly was the lab staff?	-2	-1	0	+1	+2
	Presence of staff throughout the lab session?	-2	-1	0	+1	+2
	Impact of availability of staff on your practical?	-2	-1	0	+1	+2
Equipment	Performance of Electronic Instruments?	-2	-1	0	+1	+2
	Performance of Breadboard/experiment kit?	-2	-1	0	+1	+2
	Performance of circuit components esp. ICs?	-2	-1	0	+1	+2
Overall	Your overall rating for the whole lab session?	-2	-1	0	+1	+2

Other comments:
