EAST WEST UNIVERSITY

ELECTRICAL & ELECTRONIC ENGINEERING

POST LAB-03

Sakib Hasan Mitul

Student ID : 2020-1-80-092

Course Code : EEE 416

Course Title : VLSI Circuit & Systems

Experiment no : 03

Experiment name : Introduction to Cadence, NAND Gate design and design rule checking

Course Instructor : Dr. Mohammad Mozammel Al Hakim

Date of Performance : 11/12/2024

Date of Submission : 23/12/2024

OBJECTIVE :

In this experiment we have learnt to use cadence to build a NAND gate, verify it and also build a layout of NAND gate.

Methodology :

In NAND gate, we used two inputs, connected two pmos in parallel and two nmos in series. Then we generated sinusoids and build a layout and verified it.

RESULTS

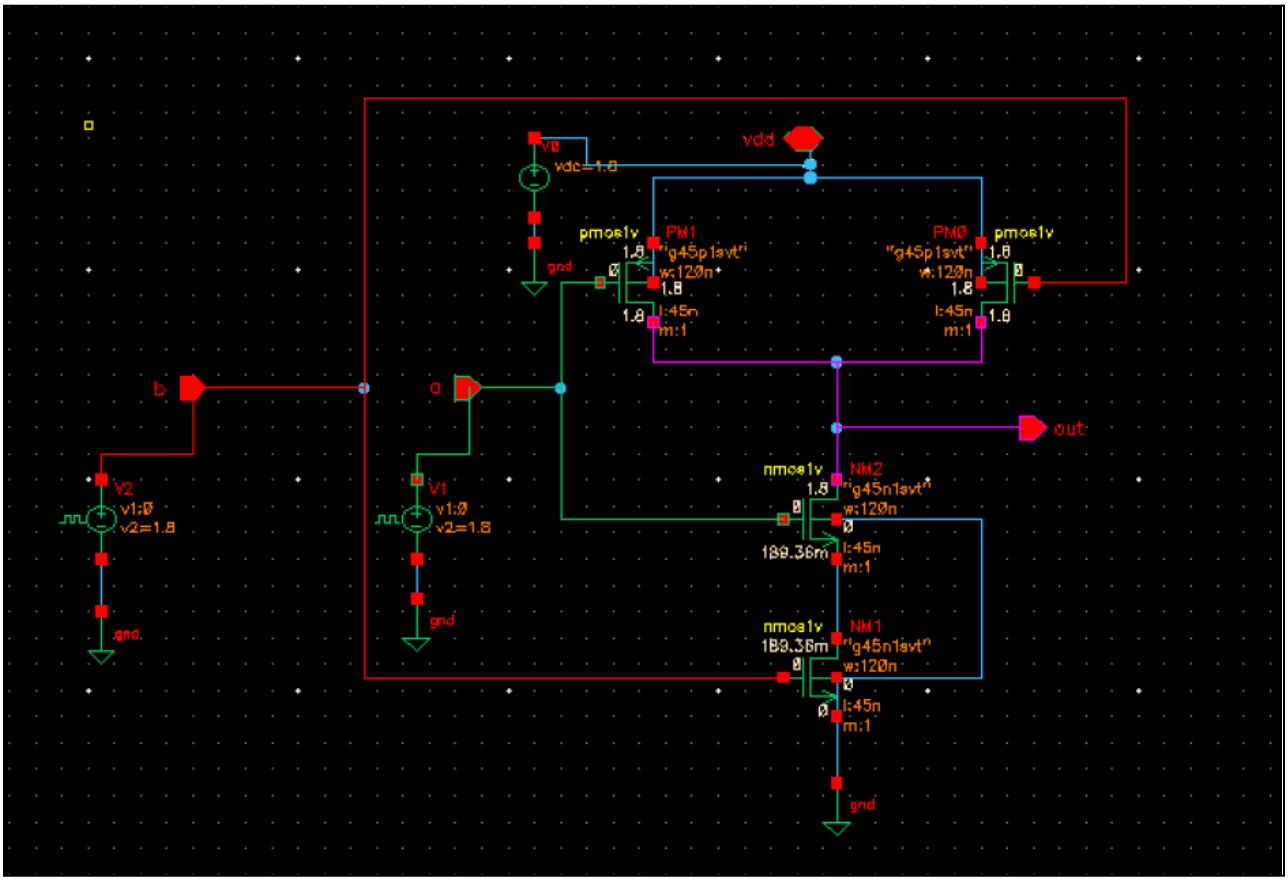

Fig 1 : NAND gate circuit diagram

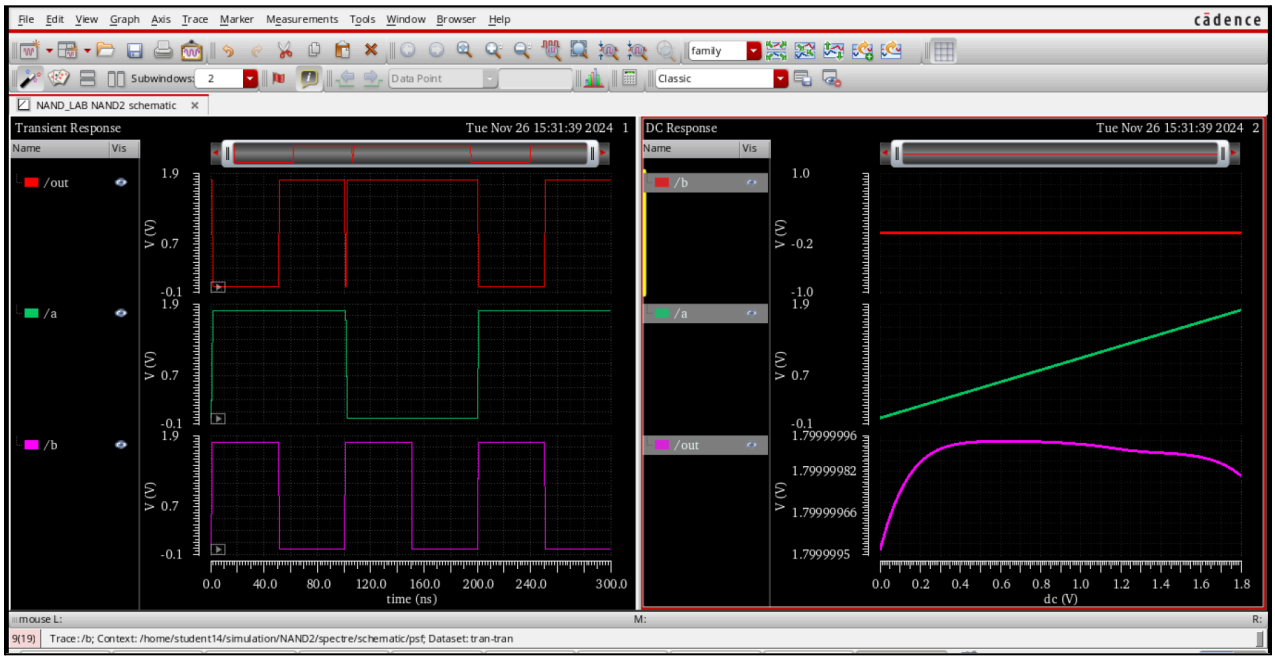

Fig 2 : NAND gate input and output result

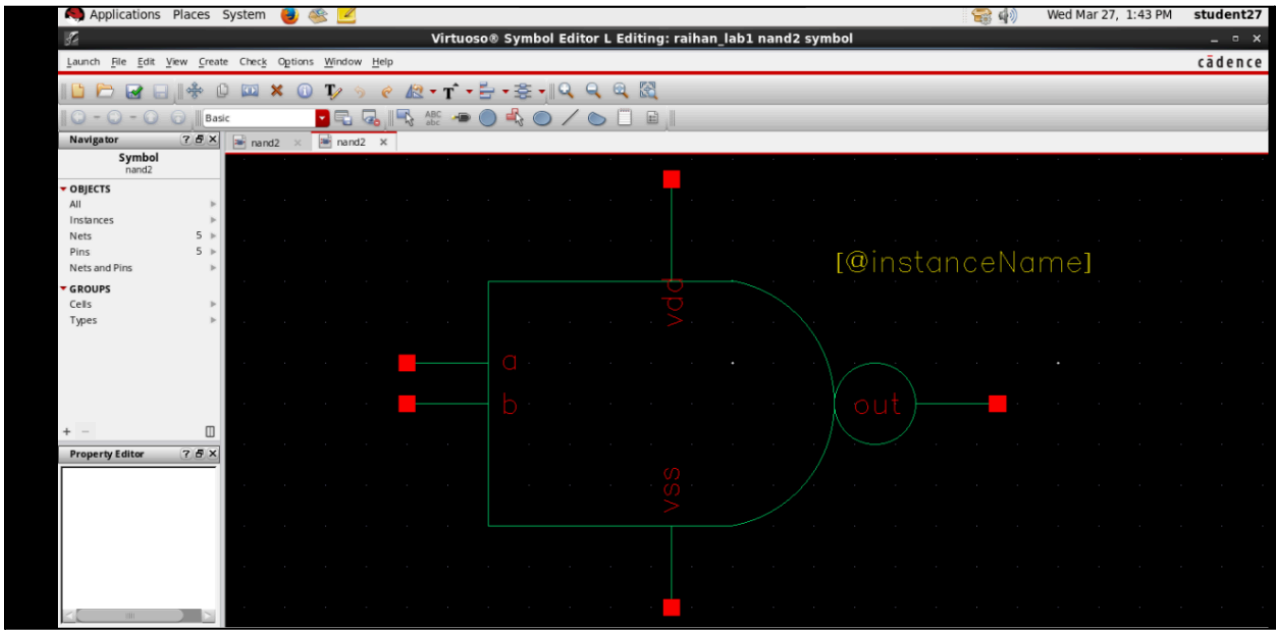

Fig 3 : NAND gate symbol

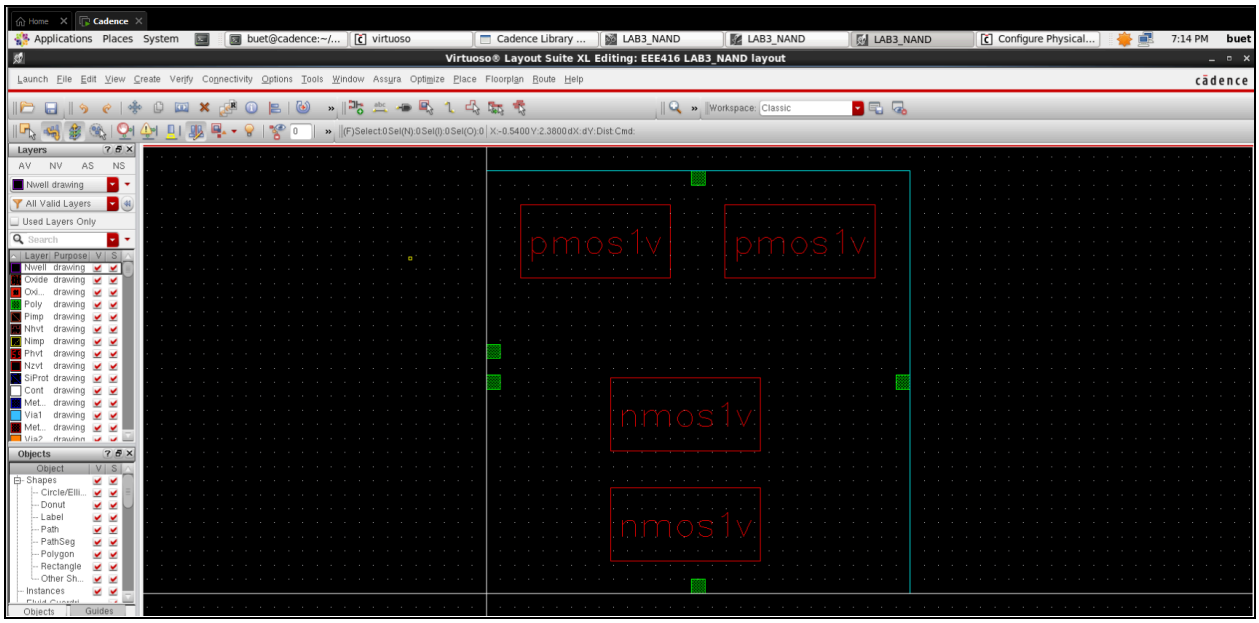

Fig 4 : Mosfet boxes in the starting of layout design

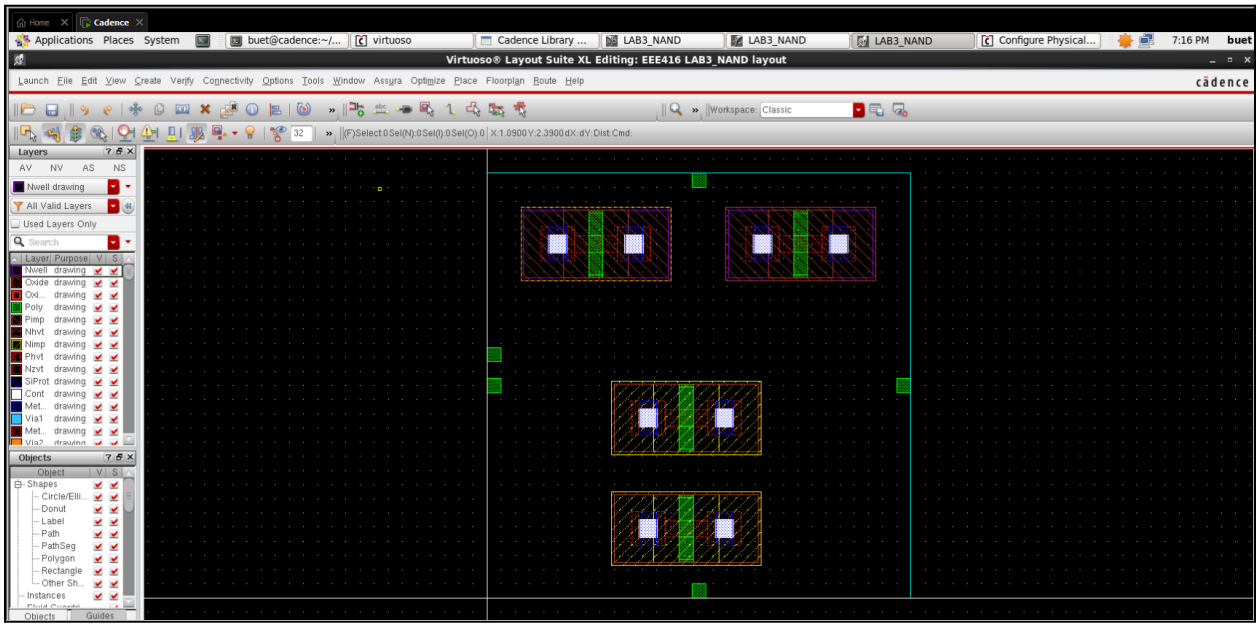

Fig 5 : After pressing shift+f

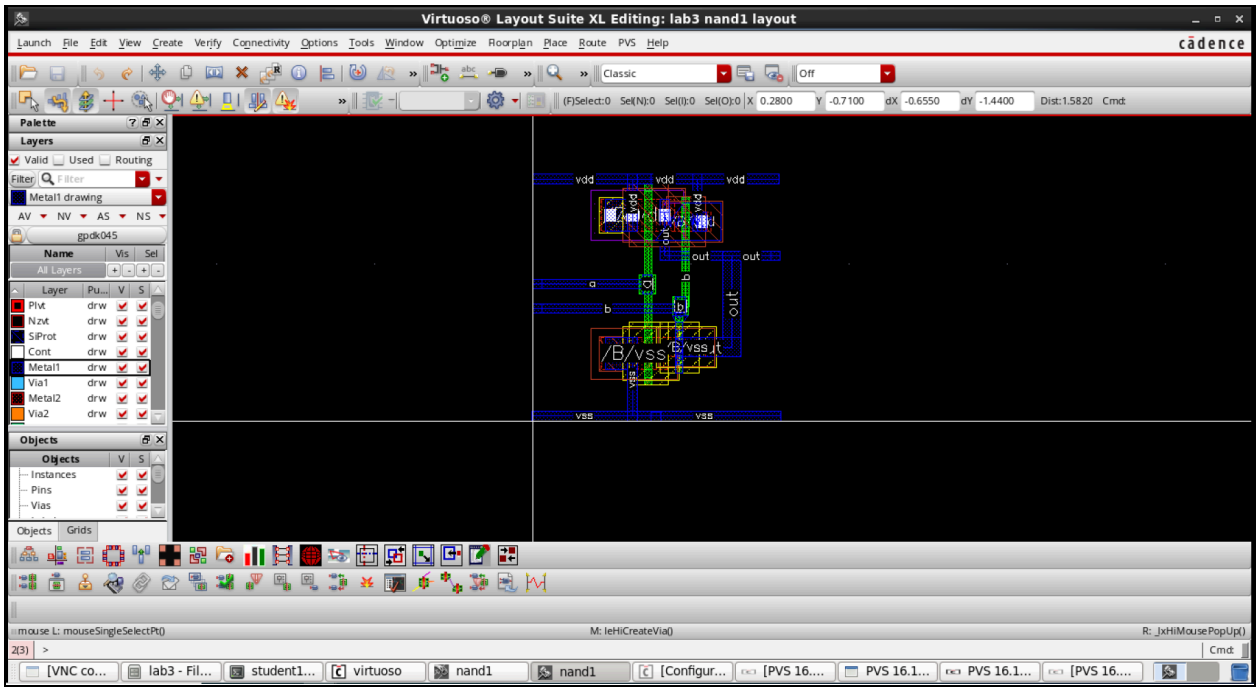

Fig 6 : NAND gate layout design

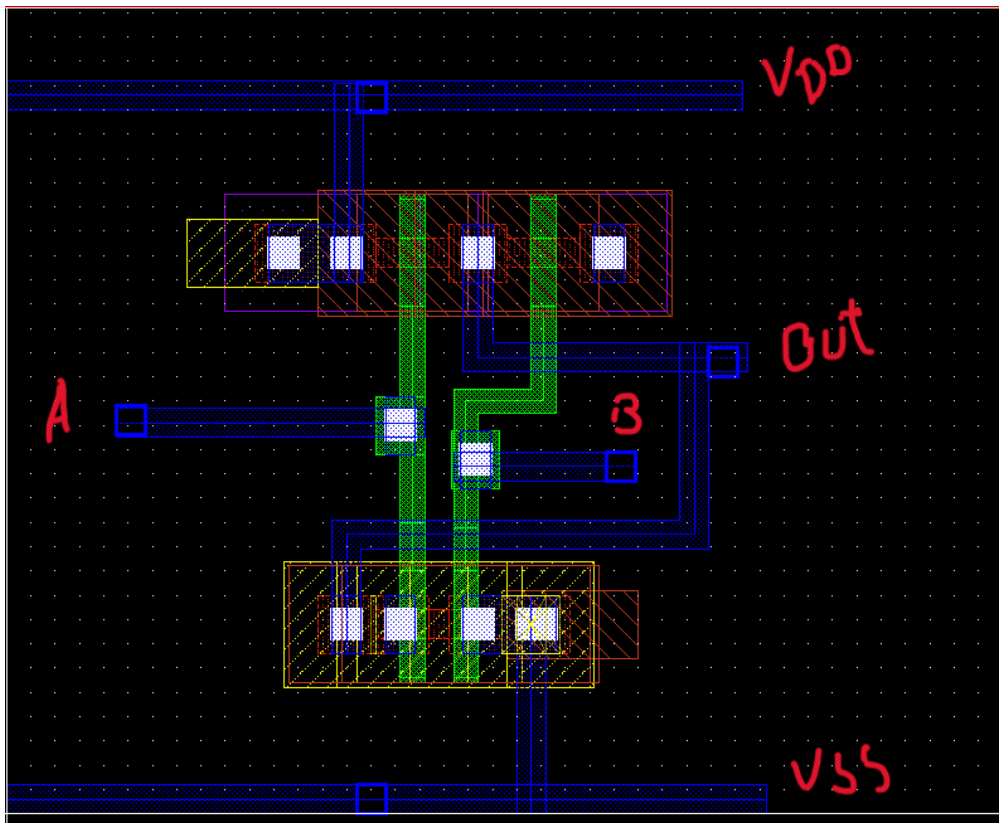

Fig 7 : Layout design

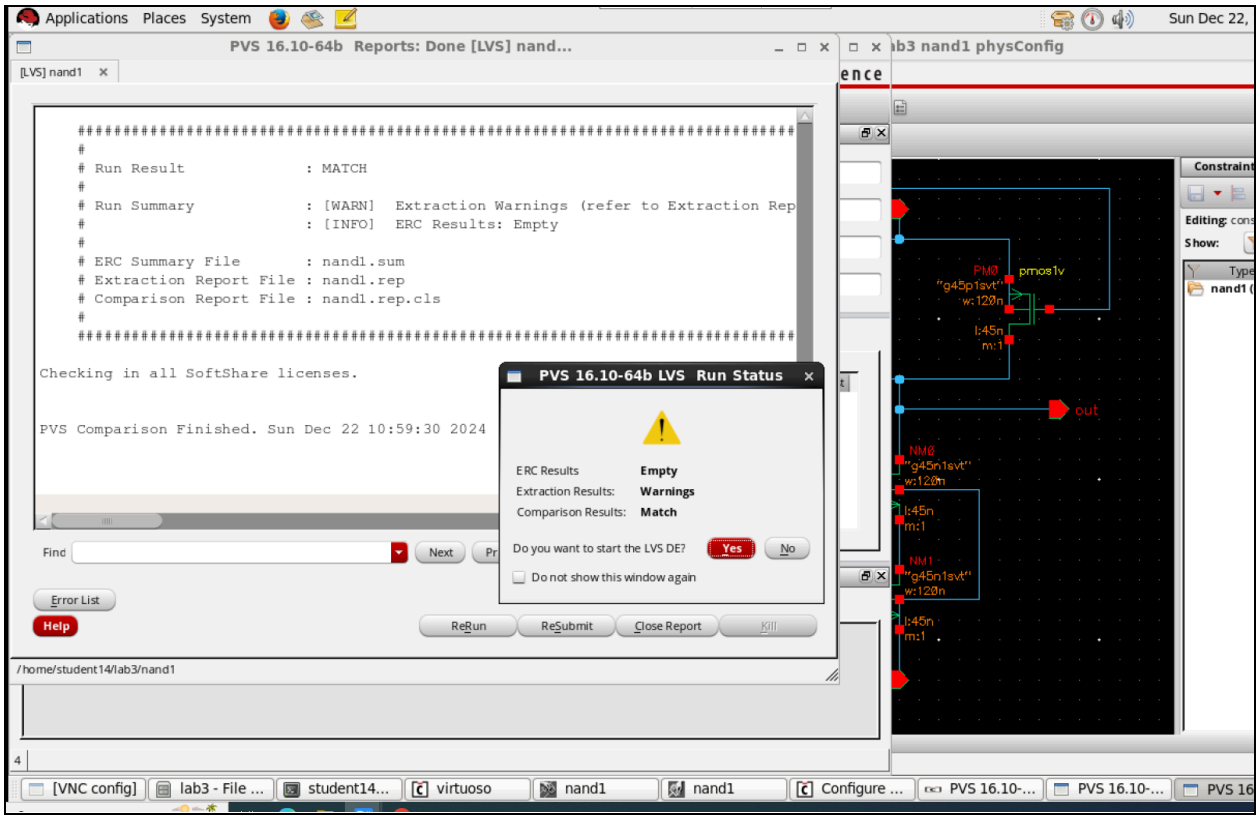

Fig 8 : LVS match result

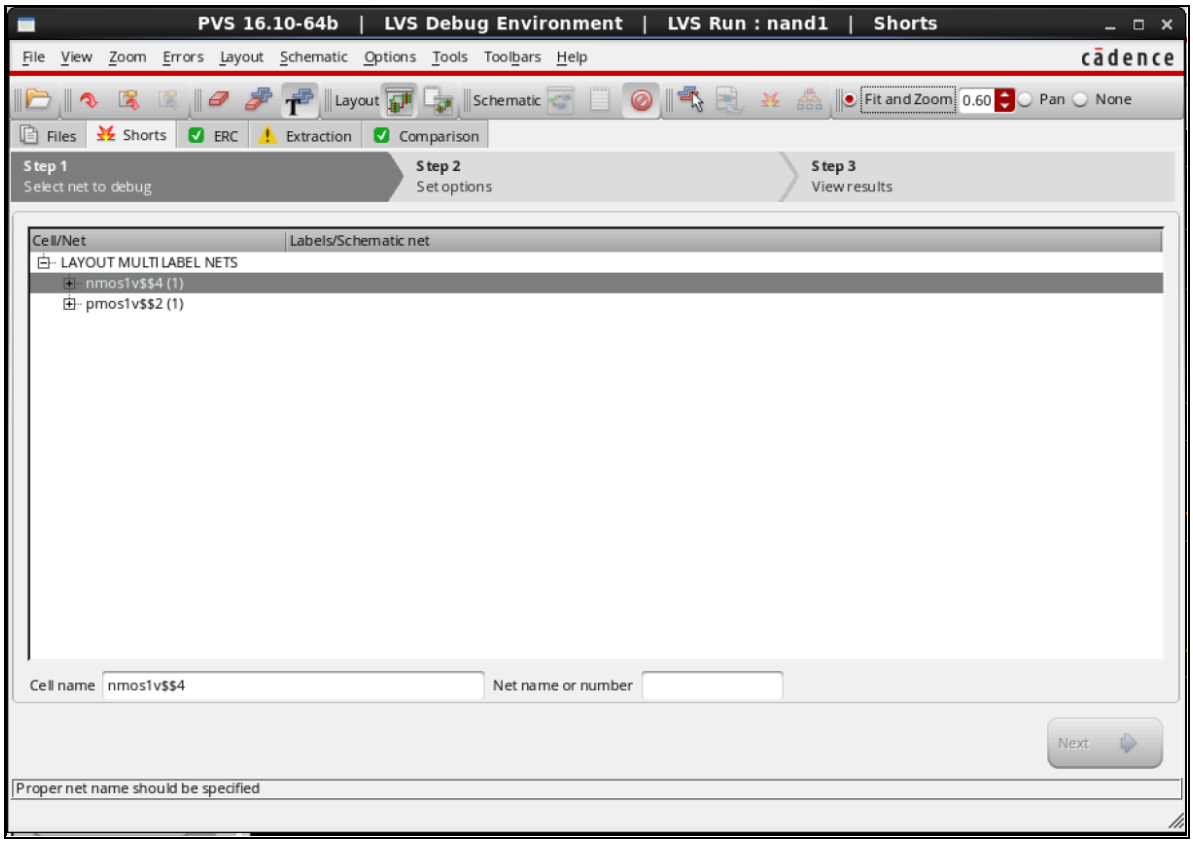

Fig 9 : LVS match result

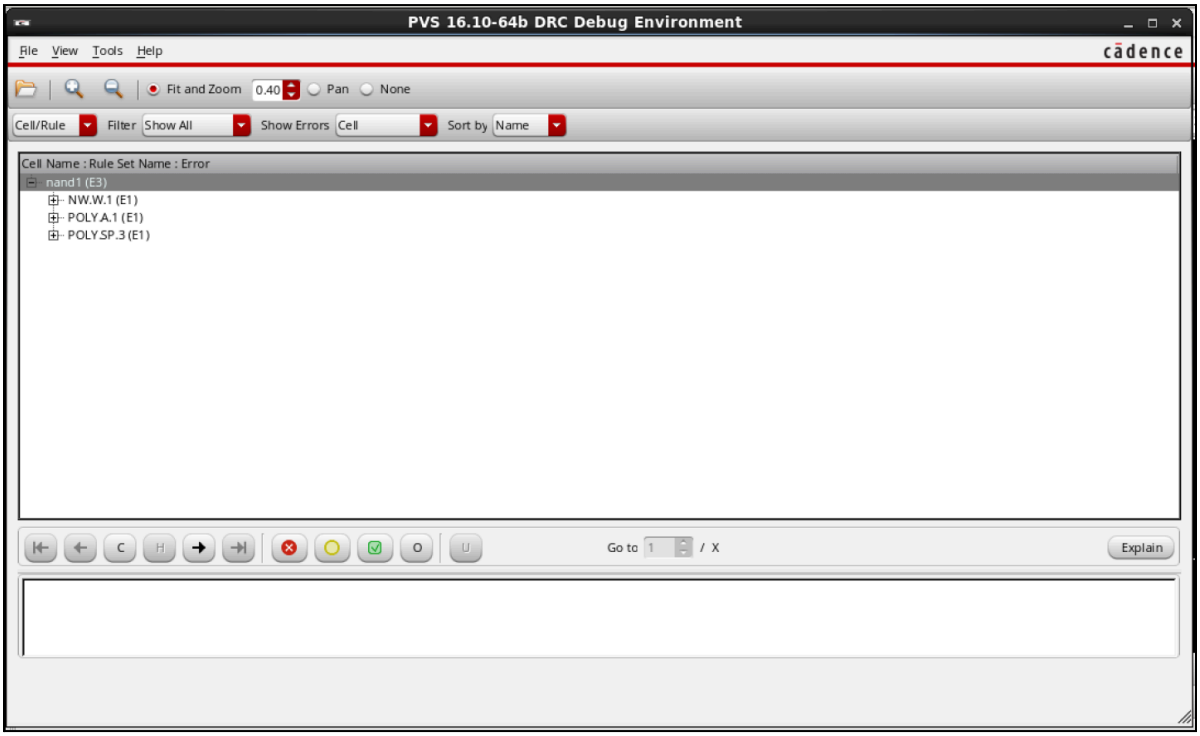

Fig 10 : DRC match result

Truth Table :

Input		Output
a	b	⎍
0	0	1
0	1	1
1	0	1
1	1	0

From the sinusoid we can see when the input a = 1 and b = 1 the output is 0.

When a = 1, b = 0 the output becomes 1. So we can see the truth table and varify the sinusoid of Nand gate.

Explanation:

During this experiment we tried to follow design rule of MOSFET. We considered the size of n-well, polysilicon spacing metal spacing latch up effect. In Mos design, design rules are to be strictly maintained to fabricate and integrate the circuit. Also it is mandatory to deduct the latch up effect. Due to ionization effect we generated body contact and polarization contact.

Conclusion:

This experiment gives opportunity to be familiarized with the 'cadence'. We understood from the circuit level implemantion to the layout design. The theory of design rules that were taught in the class. we experienced the importance of that while designing the layout.