INDIAN INSTITUTE OF TECHNOLOGY PATNA

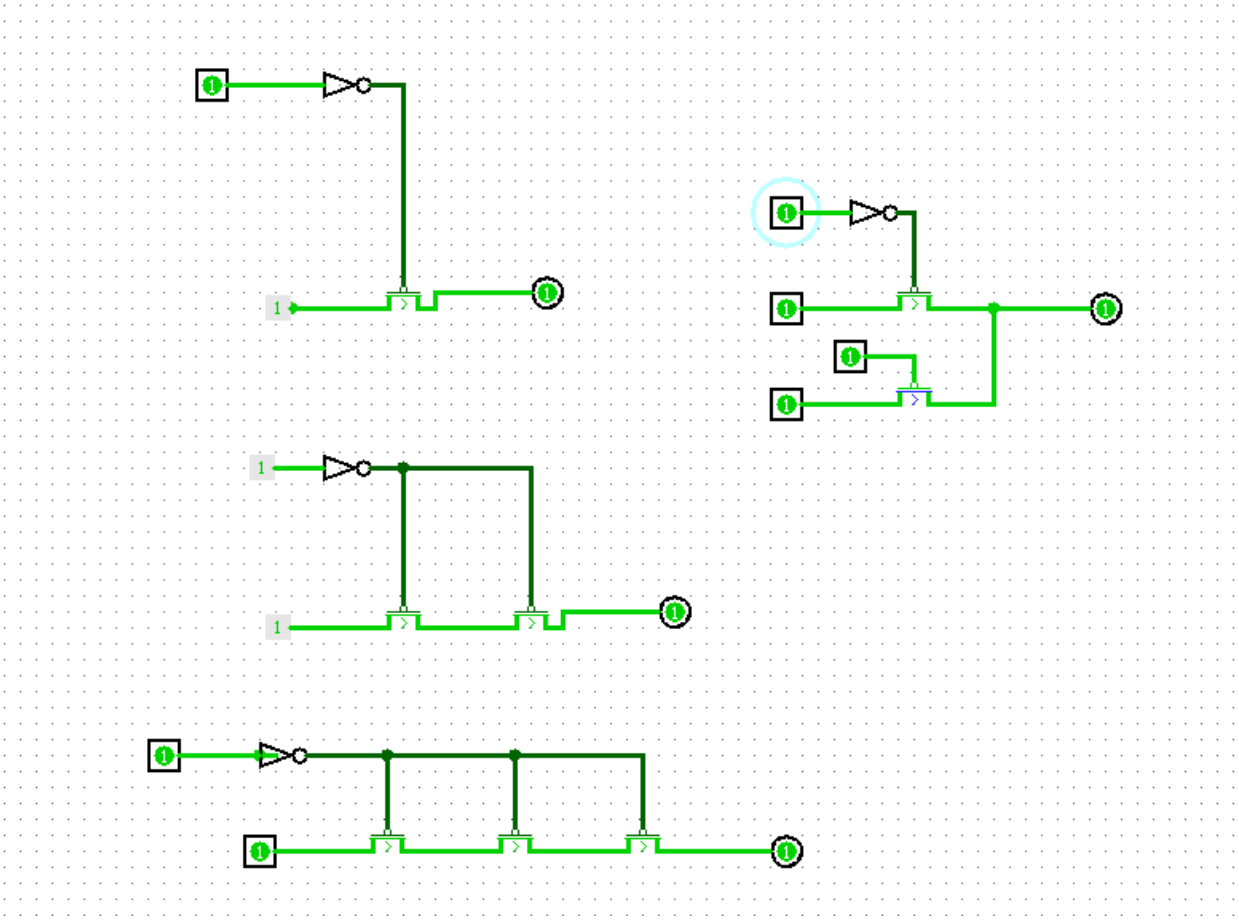
CS226- Switching Theory Lab

Lab 2: Logic simulation Sub-blocks

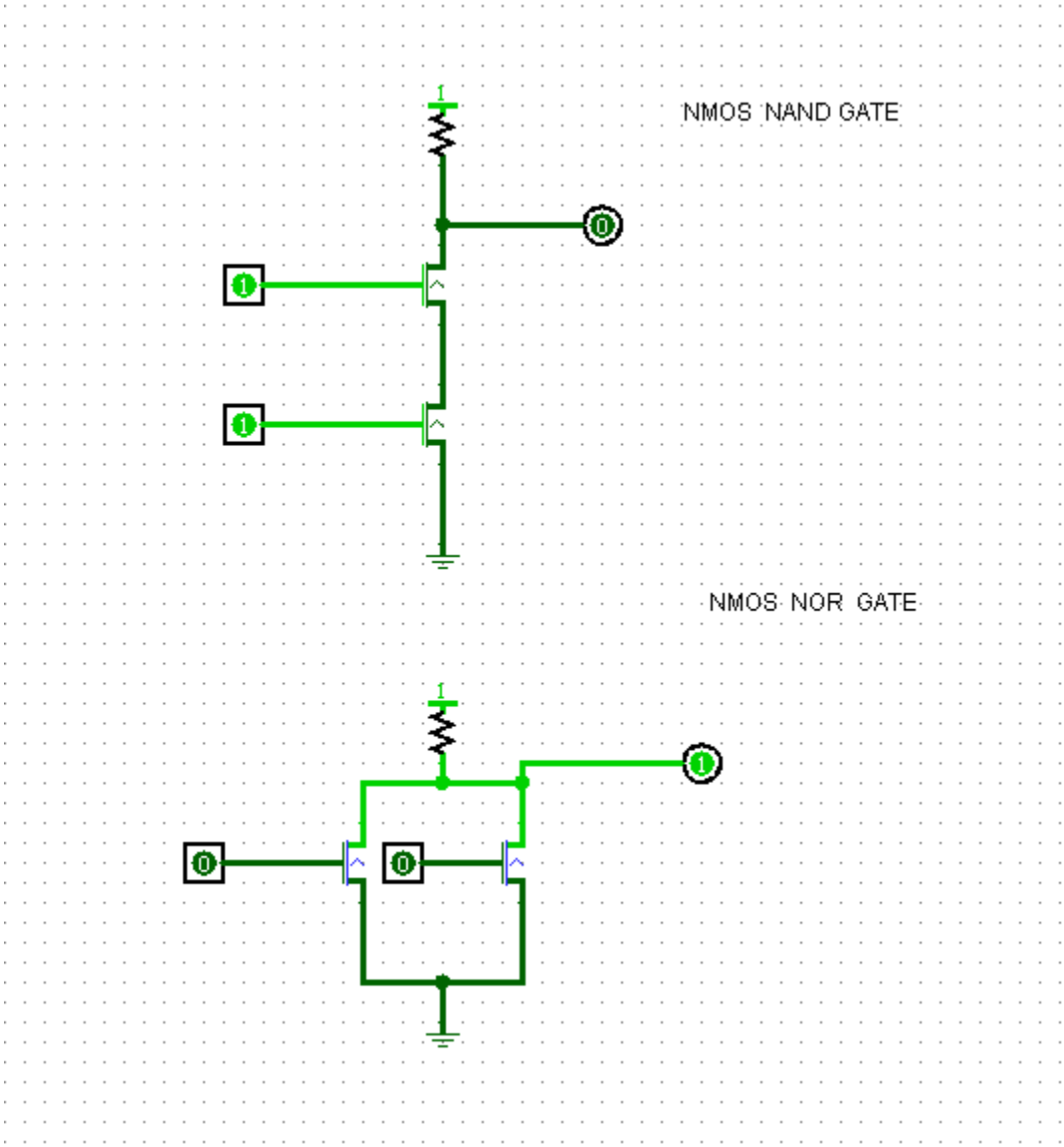
Exercise 1 (series parallel structures):

Simulate the following structures:

(Follow Lab1 steps to simulate)



Exercise 2 (NMOS gates):



Assignment:

(Design and simulate)

1. Create series structure with 4 PMOS/NMOS transistors and verify the functionality (Assume A, B,C, and D are the inputs).
   (5 points)

2. Using NMOS logic, create 5 input NAND, NOR, AND and OR gates. **(10 points)**

3. Implement the following using CMOS Logic.
   Y= $\overline{AB + CD + E}$ **(10 points)**

4. Implement the following using CMOS Logic.
   Y= AB + CD + E **(5 points)**

5. Create a library of gates (NAN,NOR, AND, OR, XOR) from the Lab 1 and implement the following using your library(See tutorial sub-circuits). **Y= AB + C** **(15points)**

6. Implement and verify the functionality using existing library of Gates in logic-sim
   Y= $A + BC + D$ **(5points)**
7. Using CMOS logic, create 6 input NAND, NOR, and gates. **(10 points)**

Submission:

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Submit Report with hand drawn schematic is required for the problems (by end of the class). Show the simulations to TAs. Submit your .circ file containing your various transistor-level/logic level implementations

- The simulation files p1.circ, p2.circ, p3.circ, p4.circ, p5.circ and p6.circ
- Zip the above five files. Zip file name is your role number.

Course work submission through Email: cs225.iitp@gmail.com
(use email subject Lab2_Logicsim_your roll number).
This work is due on: : 21st January