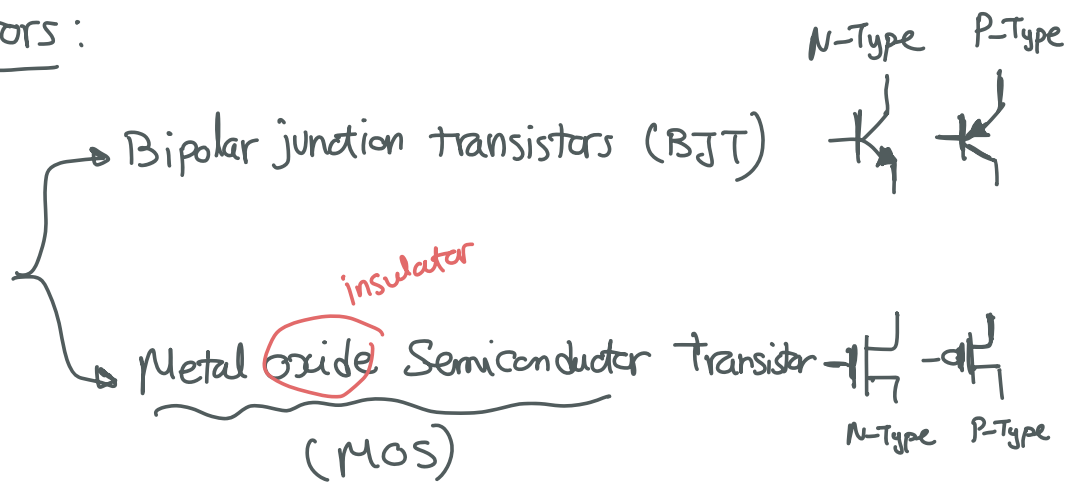
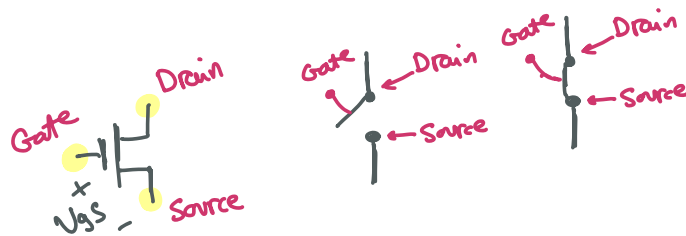


## Transistors:



## TTLs: (Transistor-transistor logic)



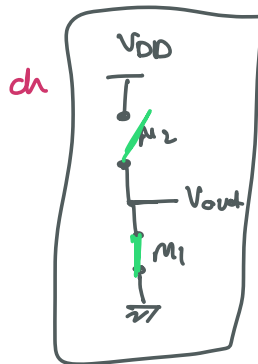
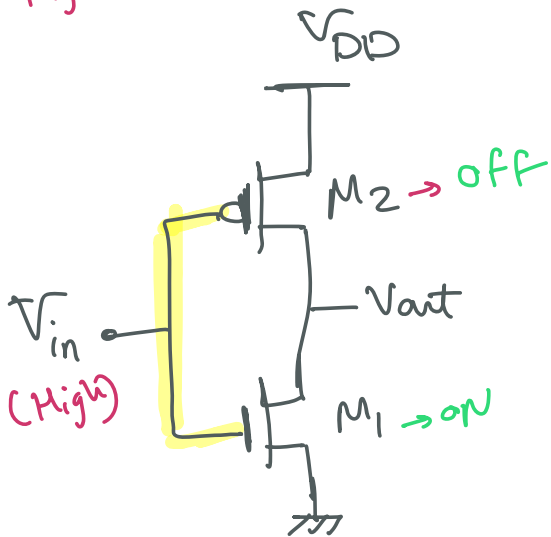
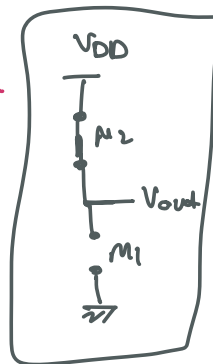
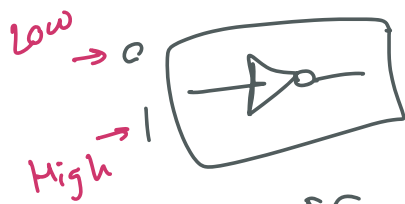
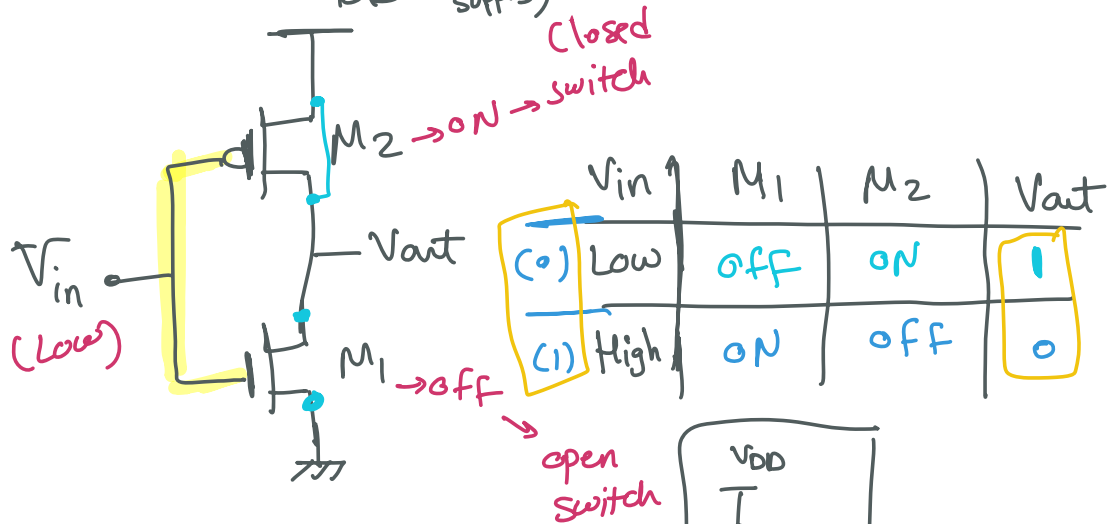
For NMOS, if  $V_{gs}$  is Low  $\rightarrow$  Transistor is off  
 $\rightarrow$  Switch is open

if  $V_{gs}$  is High  $\rightarrow$  Transistor is ON  
 $\rightarrow$  switch is closed

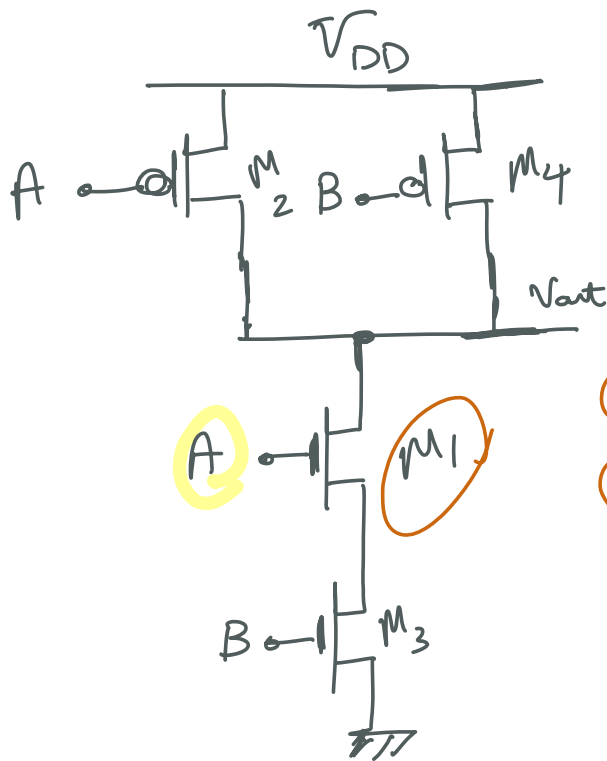


Complementary  
 $\uparrow$   
 $\rightarrow$  NMOS

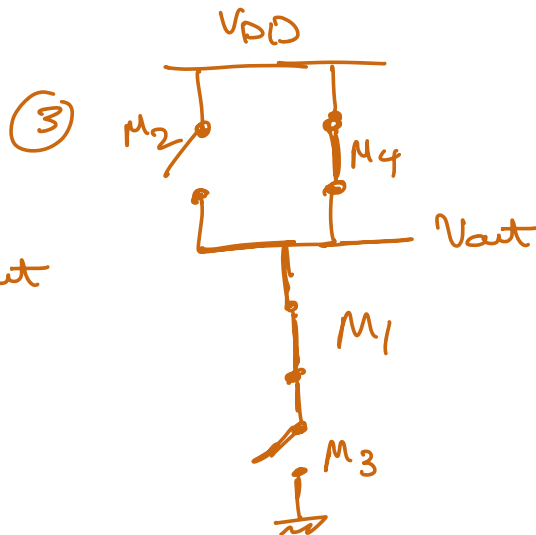
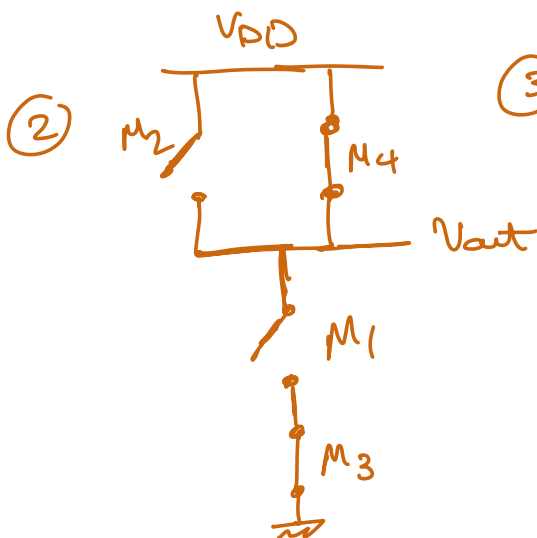
# CMOS → PMOS



Example:



	A	B	M <sub>1</sub>	M <sub>2</sub>	M <sub>3</sub>	M <sub>4</sub>	V <sub>out</sub>
①	Low	Low	off	ON	off	ON	High
②	Low	High	off	ON	ON	off	High
③	High	Low	ON	off	off	ON	High
④	High	High	ON	off	ON	off	Low



This is a NAND gate.