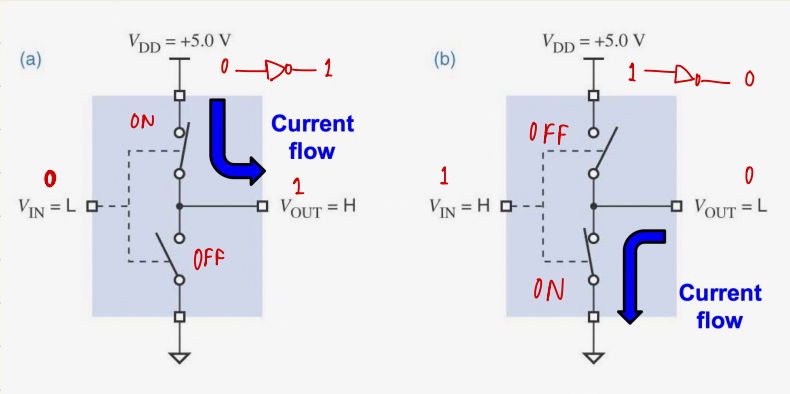
a good logic circuit diagram

all indicated:

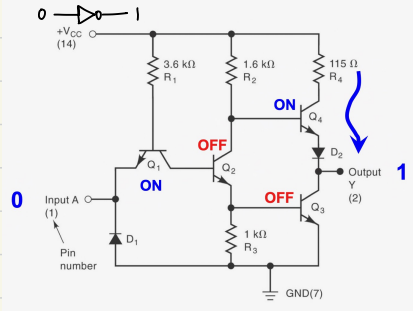
- pin numbers, IC numbers, component values, signal names and power supply voltages clearly indicated
- bubble to bubble design
- active levels

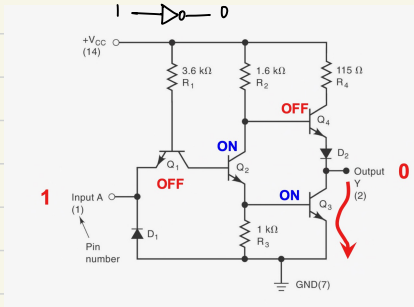
back to transistors as a switch

BJT INVERTER

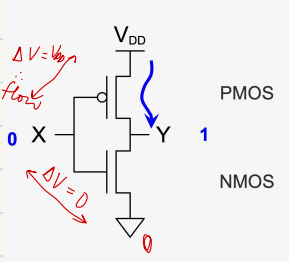


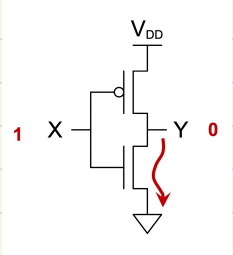
TTL INVERTER





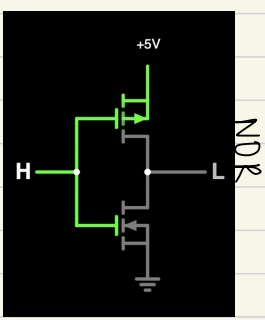
CMOS INVERTER

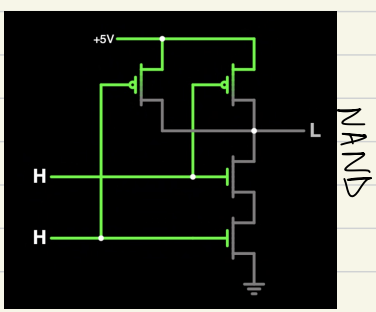


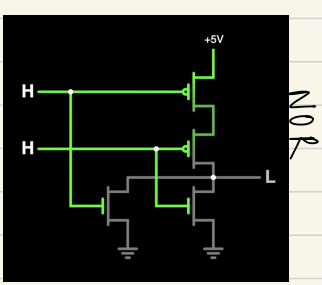


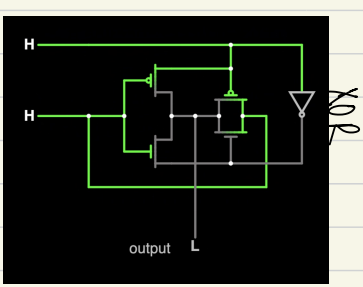
CMOS LOGIC CIRCUITS

- series : all must work
- parallel : at least one must work









L10 practice problems

CMOS Logic

Determine the truth tables for the following CMOS logic circuits.

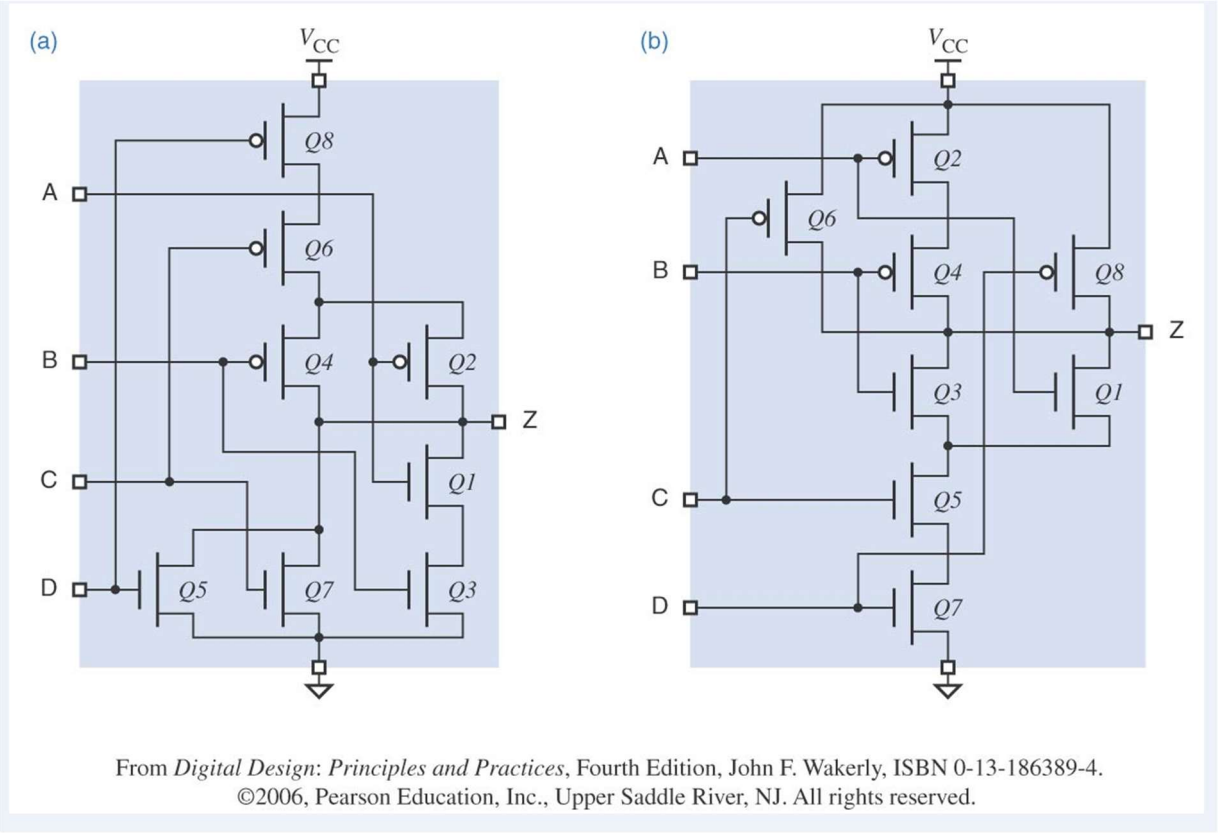


Fig. X3.11

Hint:
From the circuit diagram
Step 1: identify the inputs (e.g. A, B, C, D)
Step 2: identify the pair of transistors directly controlled by each input (e.g. input A controls Q1 and Q2)
Step 3: identify all the possible current paths (series as well as parallel) from Vcc to output so as to make output = 1.
For each possible path, identify the correct input values, and fill up the corresponding rows in the truth table with output=1
Step 4: identify all the possible current paths (series as well as parallel) from output to GND so as to make output = 0.
For each possible path, identify the correct input values, and fill up the corresponding rows in the truth table with output=0

A	B	C	D		Z	
						(0) A : $Q8, Q2, \overline{Q1}$ (0) B : $Q4, \overline{Q3}$ (0) C : $Q6, \overline{Q7}$ (0) D : $\overline{Q5}, Q8$

10