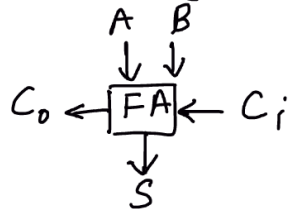


4-bit CMOS Adder

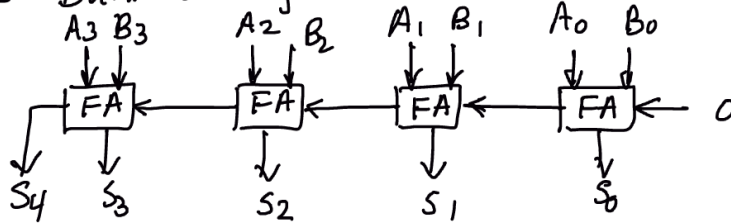
- Full Adder



$$S = A \oplus B \oplus C_i$$

$$C_o = A \cdot B + A \cdot C_i + B \cdot C_i$$

- Adder built using FA



- Gate Library

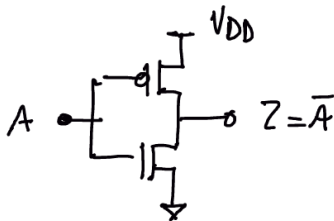
- Need XOR, AND, OR

$$\text{AND} = \text{NAND} + \text{Inverter}$$

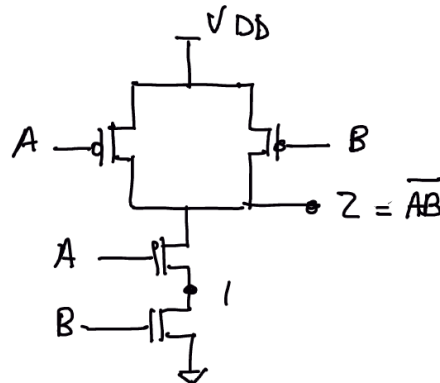
$$\text{OR} = \text{NOR} + \text{Inverter}$$

⇒ Need XOR, NAND, NOR, Inverter

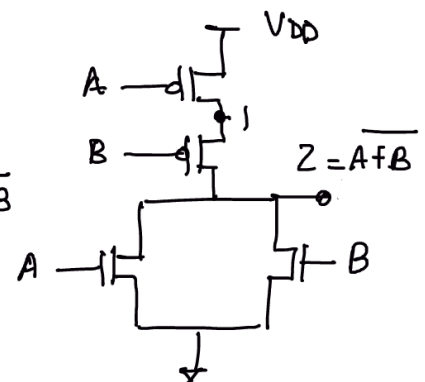
- CMOS Inverter



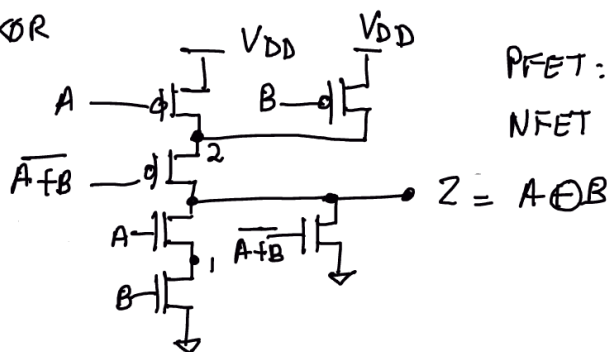
- CMOS NAND



- CMOS NOR



- CMOS XOR



$$\text{PFET: } SW=4, SL=1$$

$$\text{NFET: } SW=2, SL=1$$

