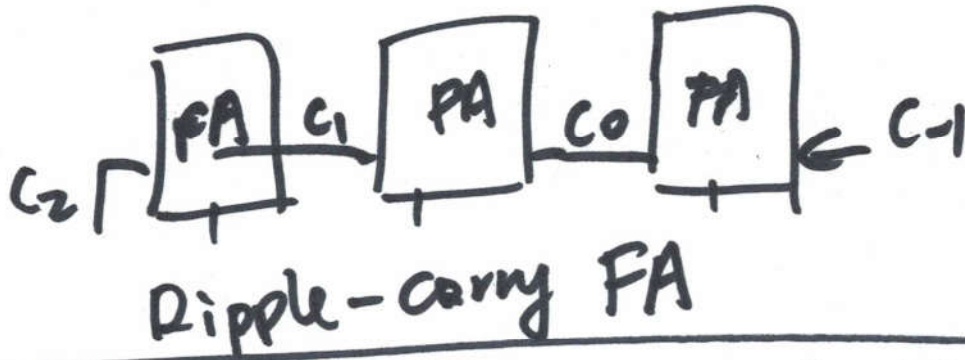


Carry Lookahead Adder



LTSPICE

$$\begin{cases} S = A \oplus B \oplus C_i \\ C_o = A \cdot B + (A + B) \cdot C_i \end{cases}$$

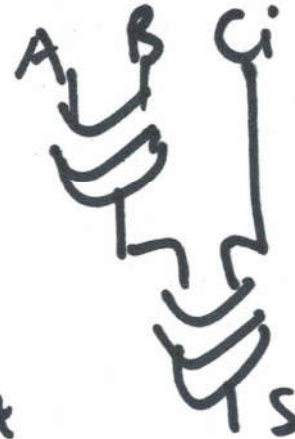
Generate Bit

Propagate Bit

G

P

$$C_o = G + P \cdot C_i$$



$$\begin{aligned} G_0 &= A_0 B_0 \\ G_1 &= A_1 B_1 \\ G_2 &= A_2 B_2 \end{aligned}$$

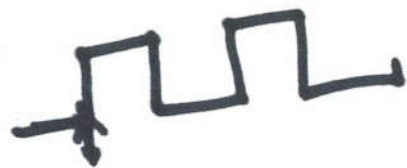
$$\begin{aligned} C_0 &= G_0 + P_0 C_{-1} \\ C_1 &= G_1 + P_1 C_0 \\ C_2 &= G_2 + P_2 C_1 \end{aligned}$$

$$\underline{C_1} = \underline{G_1 + P_1(G_0 + P_0 C_{-1})}$$

$$C_2 = G_2 + P_2(G_1 + P_1(G_0 + P_0 C_{-1}))$$

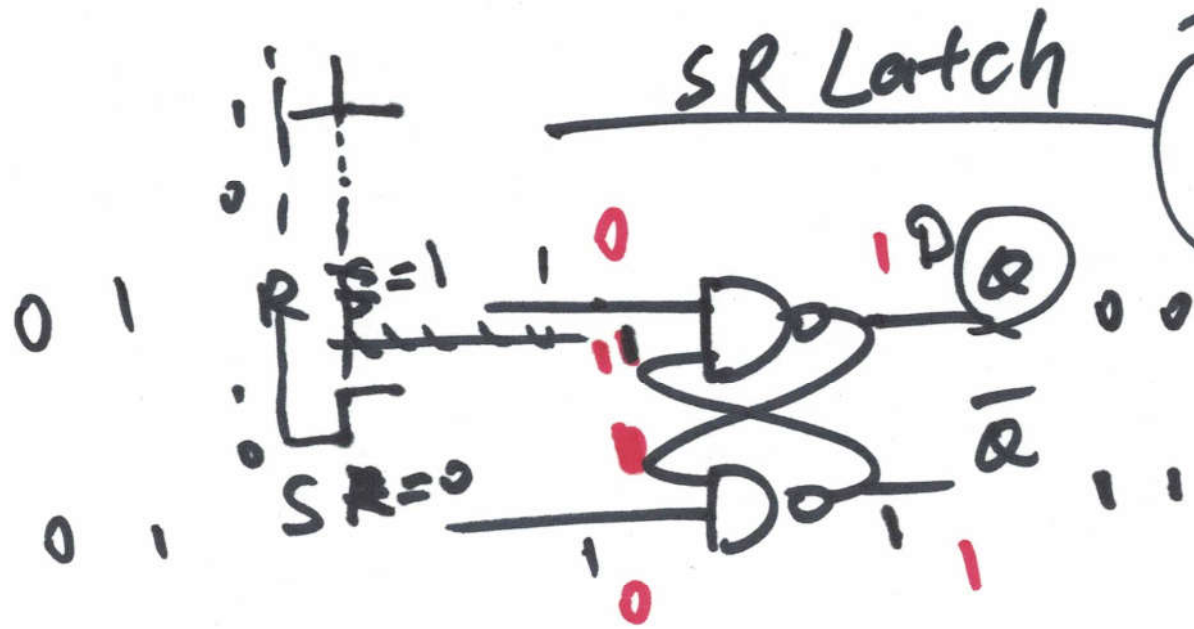
$$= G_2 + P_2 G_1 + P_2 P_1 G_0 + P_2 P_1 P_0 C_{-1}$$

$$\begin{array}{r} + \overset{!}{0} \overset{!}{0} \overset{!}{0} \overset{!}{1} \\ \hline \underline{1000} \end{array} \quad \begin{array}{r} \overset{!}{0} \overset{!}{0} \overset{!}{0} \\ \hline \underline{0111} \end{array}$$

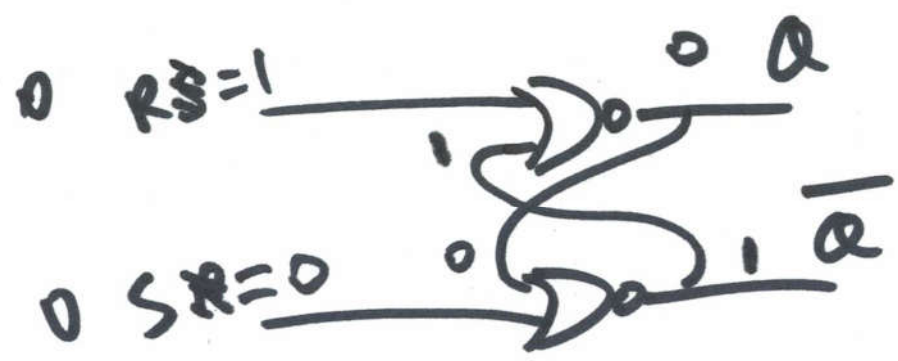


SR Latch

$\left\{ \begin{array}{l} \text{set } Q=1 \\ \text{reset } Q=0 \end{array} \right.$



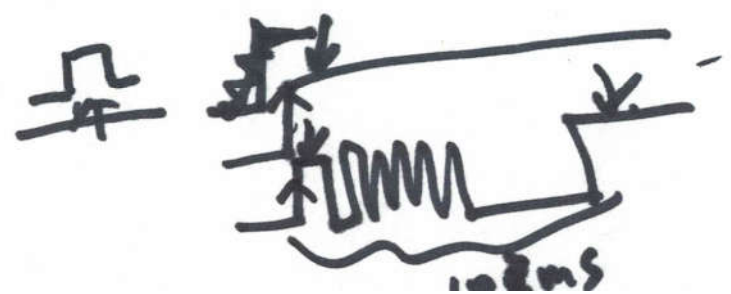
	S	R	M	unused
S	1	0	1	0
R	0	1	1	0



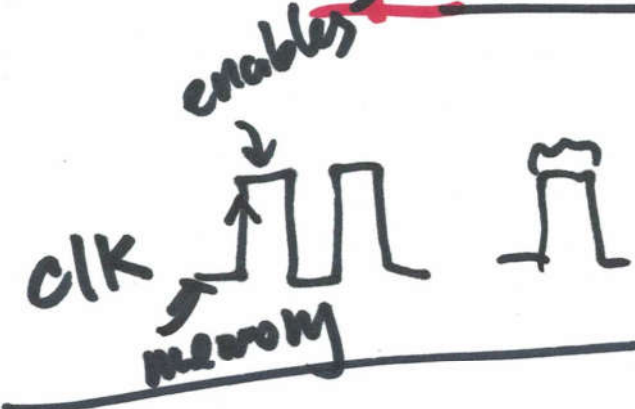
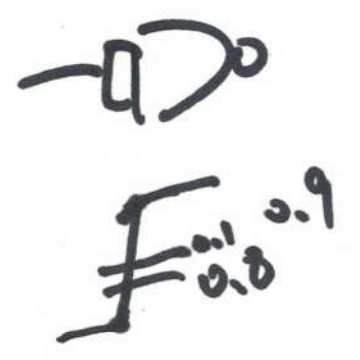
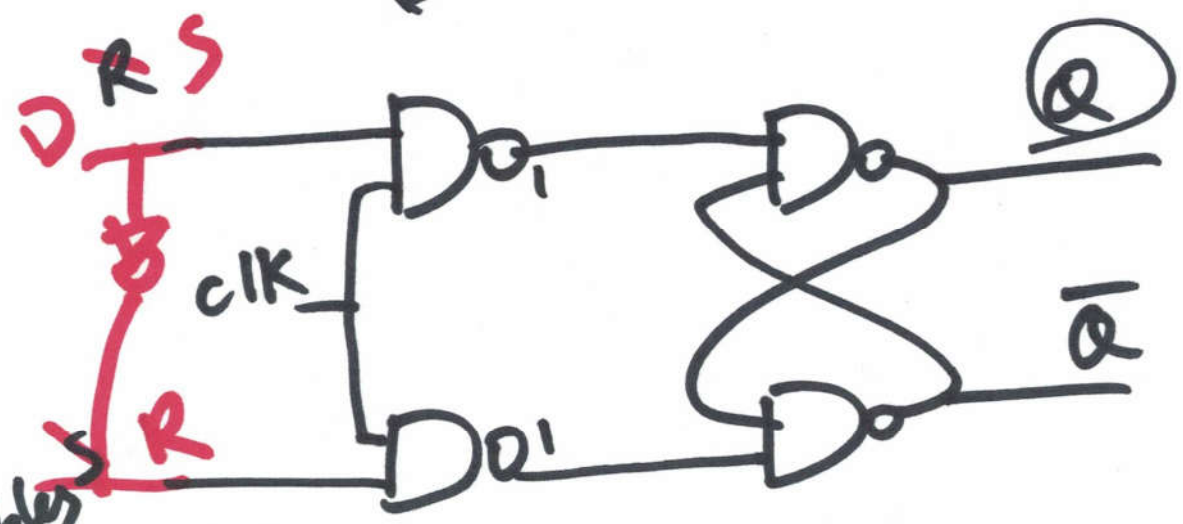
$$\overline{AB} = \overline{B}$$

	S	R	M	unused
S	1	0	0	1
R	0	1	0	1

$$0 + A = A$$



SR Flip-Flops



level-triggered FF

DFF

