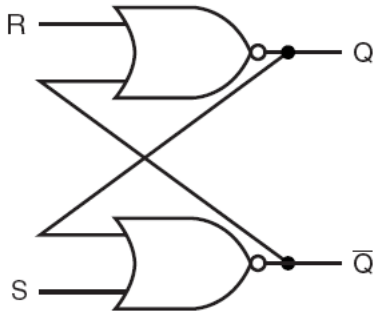
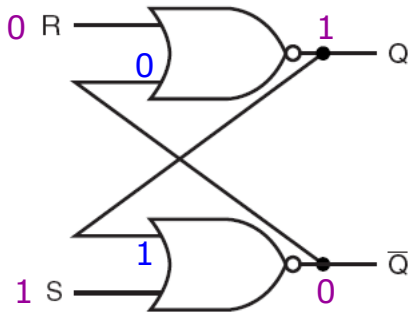
RS latch



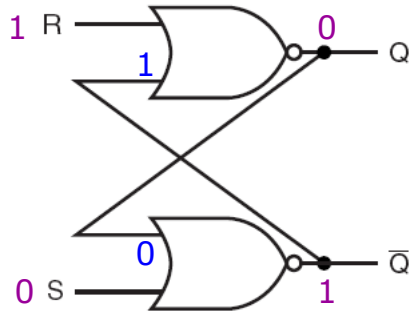
- Beware of the feedback!

RS latch



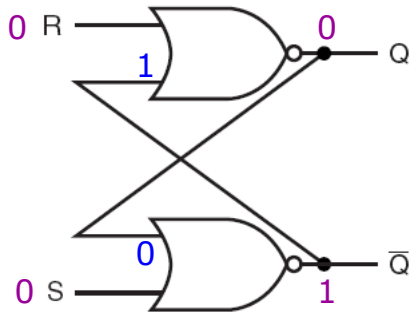
- When R=0, S=1

RS latch



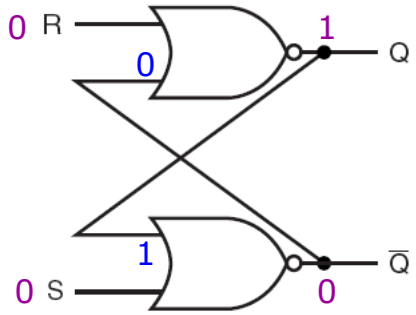
- When R=1, S=0

RS latch



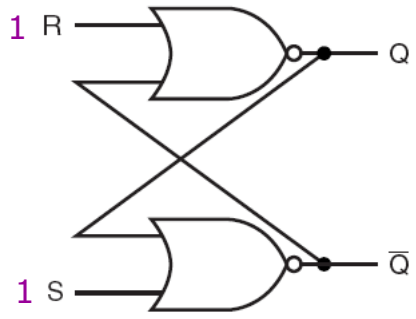
- When R=0, S=0, and Q was 0

RS latch



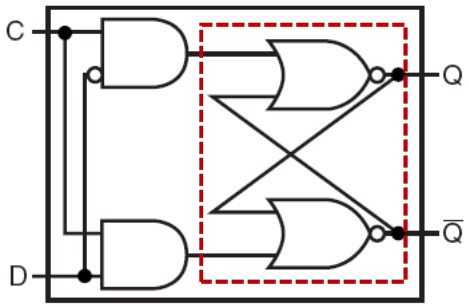
- When R=0, S=0, and Q was 1

RS latch



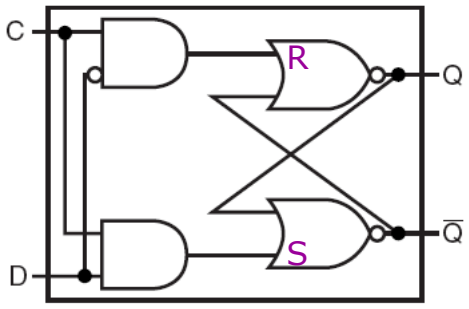
- What happens if R=S=1

D latch



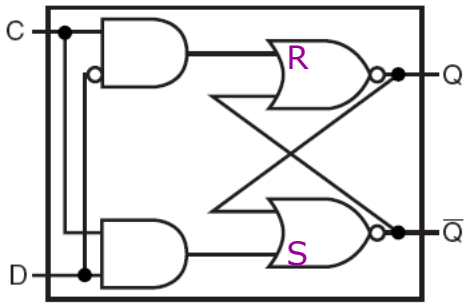
- Note that we have an RS latch in the back-end of this design

D latch



- Note that R, S inputs always get opposite values when C=1
- When C=0, S=R=0 $\Rightarrow$ RS latch remembers the previous value

D latch

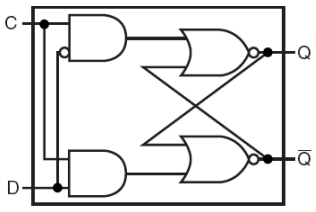


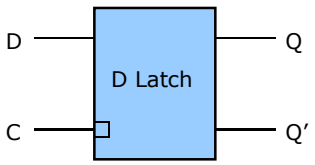
"latched mode"

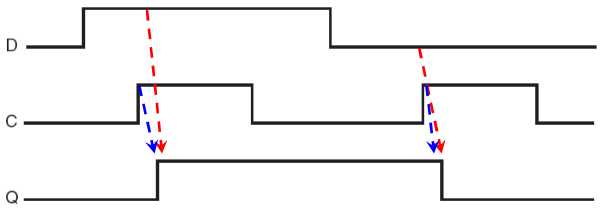
C	D	Q(t)
0	0	Q(t-1)
0	1	Q(t-1)
1	0	0
1	1	1

"transparent mode"

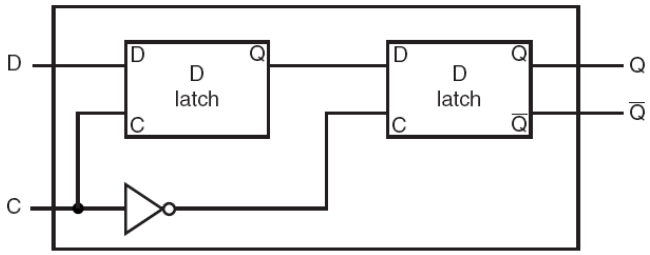
D latch







D flip-flop (D-FF)



- Two cascaded D latches; C input of the second is inverted
- This is a negative edge triggered D-FF

D flip-flop