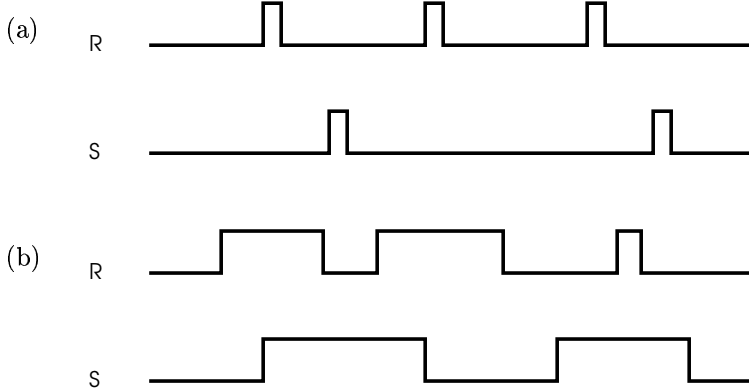
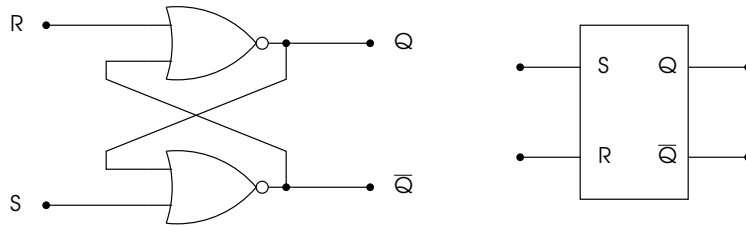


Work the following digital problems from Fortney:

9-9

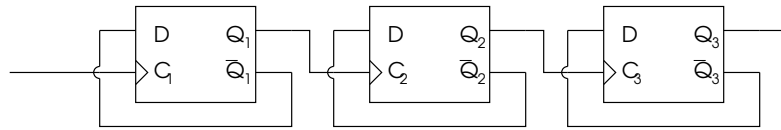
9-12 Except, make the circuit with simple gates any way you can. (There is a three-gate solution, though).

3. Consider the RS flip-flop below (from Figure 9-25a of *Fortney*). Draw a timing diagram of Q and \bar{Q} in reaction to the following inputs R and S :



(Assume that Q starts low and \bar{Q} starts high.)

4. Analyze the outputs, Q_1 , Q_2 , Q_3 , and their complements, of the circuit below in a timing diagram assuming a square wave clock input into C_1 .



- (a) Explain, with reference to your timing diagram, why this is called a “ $\div n$ ” with $n = 2^N$.
- (b) Explain why this is also a binary counter.
- (c) Add some gates (or a single gate) to the circuit above to make it a “ $\div 3$ ”.
- (d) Add some gates to make the desired output for problem 9–24 in *Fortney*.
5. Construct a circuit using three JK flip-flops and as many gates as you need to solve problem 9–25a in *Fortney*.