

Electronics Homework Set #7

1. The basic flip-flop is the RSFF.
 - a. Sketch the RSFF as constructed from the 2-input NAND gates, and work through its truth table.
 - b. Starting from the truth table for the RSFF, and devise a circuit for it using only 2-input NOR gates.
2.
 - a. Sketch the modification to an RSFF to turn it into a gated or (clocked) DFF.
 - b. Explain the basis for using DFF's as 1-bit memory elements.
3. Explain the meaning of "toggle" operation, as in a TFF.
4. Sketch an array of flip-flops to be used as a 4-bit counter, and explain its operation by use of waveforms.
 - a. Assume the use negative edge-triggered TFF's;
 - b. Assume the use of positive edge-triggered TFF's.
5. Devise the logic circuit for converting a 4-bit binary counter (with a "direct clear" connection) into a decade counter, (only the counts 0-9 will occur). Assume the outputs to change on the positive edge of the input pulses.
6. Sketch the array of D flip-flops to make a 4-bit serial-in, parallel-out, shift register. *Carefully* label the connections.