

Indian Institute of Technology, Delhi
EEP 201: Digital Electronic Circuits Laboratory
Experiment 10, July-Dec 2008
Left-right shift register

A left-right shift register has three inputs: First, a control input called LR, second a serial input X, and third, another serial input Y.

- If the control input LR is 1, then the shift register should left-shift at the rising clock edge. The rightmost flip-flop should have its input connected to the input X in this case.
- If the control input LR is 0, then the shift register should right-shift at the rising clock edge. The leftmost flip-flop should have its input connected to the input Y in this case.
- The register should be four bits wide. The outputs of the circuit are the contents of this register.
- Use 74LS74 D-flip-flops, and only 74LS00 NAND gates to wire up your circuitry. Use a debouncer circuit to generate the clock.

Post-lab question:

Consider a 1-bit wide, 4 units deep stack. If a PUSH signal is applied, the input is pushed into the stack, if a POP signal is applied, the value at the top-most address is popped out of the stack. Can you conceive of constructing this stack, with the left-right shift register as a part of it? What else would you need? How would you generate a signal to indicate that the stack is full and no more PUSHing is allowed, or that the stack is empty and no more POPping is allowed?