

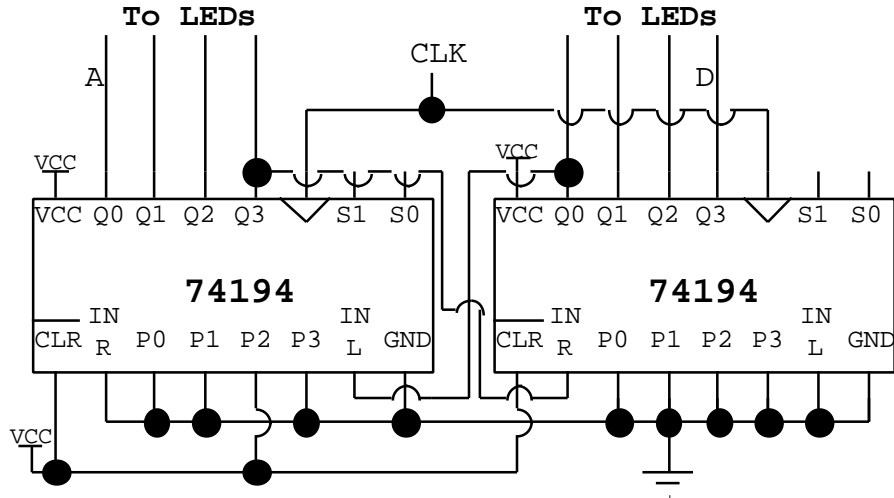
Back from your daring adventures on Mars, you are already assigned Mandatory Bonus Duty. For your next assignment, you must interrogate a group of right-wing revolutionary communistic fascist religious fundamentalists whose base of operation lies hidden among the sunbeaten dunes of the Atacama Desert. In order to complete this mission, you must construct a pocket LED hypnotizer to conduct your inquiries under the cloak of night.

The pocket hypnotizer will be built as a small finite state machine controlling two 74194 shift registers wired together to form an 8 bit shift register. The hypnotizer will control the eight LEDs, making them blink back and forth in a mesmerizing fashion. The state machine needs three inputs: Start, HitLeft, and HitRight. There will also be two outputs used to control the shift registers: ShiftLeft and ShiftRight. You may use any number of bits of state that you feel appropriate.

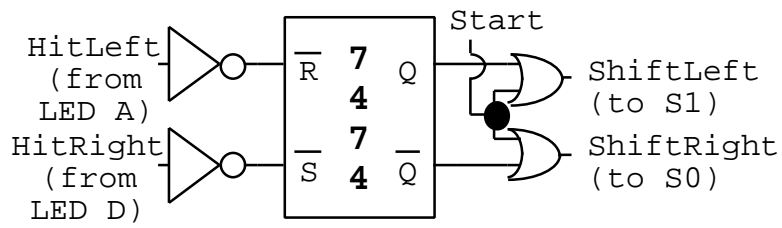
The Start input comes from a pushbutton. This will set your FSM to the desired initial state, which should set a single bit on one of the shift registers. The HitLeft input comes from the shift registers, indicating that the left end has been reached and that the light should now be shifted to the right; the HitRight signal is analogous.

The ShiftLeft output to S1 instructs the 74194s to shift to the left, while the ShiftRight output to S0 instructs the 74194s to shift to the right. When both signals are simultaneously high, the shift register is initialized by loading a single bit 1.

You may design your own circuit or use the one discussed in class. On the next page is a sample design. Build your circuit and verify that it works properly. Caution: be sure to tie the clear inputs on the '194 to VCC. Otherwise, as has been painfully discovered, the circuit tends to mysteriously lose bits! The lights should appear to bounce back and forth. Ask a TA for help if they don't. Stare at the lights for 30 seconds without blinking. Relax all the muscles in your body, each one individually, slowly handing your wallet to Romanos as you think pleasant thoughts of your favorite place...



Shift Register Hookup



Simple State Machine Controller