

Digital Logic

Homework #13

DUE: Monday, November 11

Objective

Learn how to design a more complicated state machine.

To Do

- Using rising-edge-triggered (RET) D flip-flops, design a circuit that implements the internal workings of a pop machine. Your circuit accepts as inputs the insertion of nickels, dimes, or quarters. The outputs are a nickel coin return, dime coin return, and dispense drink. A drink costs 30 cents. A drink and the correct change, if any, will be automatically dispensed when the correct total or greater is reached. Do a complete design following the nine-step method posted in the Chapter 8 lecture notes.
- Minimize the number of IC's needed to implement your design. How many IC's will you need?

Notes

- The sum of all branching conditions leaving each state must equal one;
- Only one input can be active at a given time;
- An output can be active, at most, once per state;
- For the purposes of this design, unused states are considered Don't Cares.

To Turn In

- **Staple this assignment sheet** to your solutions, which are to be done in accordance with the school of engineering homework guidelines posted on the course web page.
- A state diagram and schematic of your circuit. This should be drawn neatly and carefully and show the logic gates, not the IC outline itself. It is OK to designate pin numbers on each gate along with an IC number.
- A brief description of your design, procedures, results and conclusions.
- You do not need to wire this circuit up.