

## State Machine Design

**Due: Friday, November 8, Start of Class**

### To Do

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 dime coin return, nickel coin return and dispense drink. A drink cost 30 cents. A drink and the correct change, if any, will be automatically dispensed when the correct total or greater is reached.

### Procedure

- Work with your lab partner;
- Draw a block diagram, listing the inputs and outputs;
- Draw a state diagram;
- Write and implement your VHDL code;
- Use the constraints file found on the course web page rather than individual *attribute* statements to assign signals to FPGA pins. Simply add the file to your project (vector or scalar version), and edit out the comments on the pins you wish to use.

### 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 a hard copy of your code;
- Demonstrate your working design to the Lab TA at the start of lab. Grade is dependent on timely completion.