**EECE 343 Computer Interface Circuits**

**Lab 7**

**Vending Machine**

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**Objectives**

The purpose of this exercise is to learn how to design a Vending Machineusing finite state machine. We will use the dip switches or de-bounced switches on the DE2 board as inputs to the circuit, and outputs to LEDs, Seven Segment Display, and LCD Display.

**Project**

# A sequential circuit is to be used to control the operation of a vending machine which dispenses a can of Coca and a bag of Chips, priced at $0.25 and $0.30, respectively. The vending machine has four inputs, Nickel, Dime, Quarter, and Dollar, and three outputs, Coca, Chips and Nickels for Changes (extra credit will be given if the machine returns dime and quarter for changes, too.) The coin detector mechanism in the vending machine is synchronized with the same clock as the sequential circuit you are to design. The coin detector outputs a single 1 to the N, D, Q, or DB input for every nickel, dime, quarter, and dollar bill, respectively, that the customer inserts. Only one input will be 1 at a time.

# Please design this vending machine with VHDL programming and implement the design with the DE2 board. The seven-segments will be used to display money deposited and changes returned, and the LCD will display the products the vending machine sells, prices, and other info you wish customers know.

**Procedure**

Perform the following steps to implement a circuit for the project on the DE2 board.

1. Create a new Quartus II project for your circuit. If using the Altera DE2 board, select Cyclone II EP2C35F672C6 as the target chip, which is its FPGA chip.
2. Create a VHDL entity for the code of the lab project.
3. Include in your project the required pin assignments for the DE2-series board, as discussed above. Compile the project.
4. Download the compiled circuit into the FPGA chip. Test the functionality of the circuit.
5. Turn in your lab report on the day you demonstrate your project in class.

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