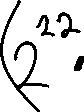
Chapter 3 – Latches, FSM, and Memory

3.42) Refer to Figure 3.32b. Why are lights 1 and 2 controlled by the output of the OR gate labeled Z? Why is the next state of storage element 2 controlled by the output of the OR gate labeled U?

Lights 1 and 2 are controlled by the output of the OR gate labeled Z since it has 3 states where it is turned on, which are 01, 10, and 11. Also, the next state of storage element 2 is controlled by gate U since it should be set to 1 if the next state is either 00 or 01. This is only true if the switch is off and the state is 00 or the switch is on and the state is 11.

3.35) Given a memory that is addressed by 22 bits and is 3-bit addressable, how many bits of storage does the memory contain?



3.41) The IEEE campus society office sells sodas for 35 cents. Suppose they install a soda controller that only takes the following three inputs: nickel, dime, and quarter. After you put in each poin, you push a pushbutton to register the coin. If at least 35 cents has been put in the controller, it will output a soda and proper change (if applicable). Draw a finite state machine that describes the behavior of the soda controller. Each state will represent how much money has been put in (Hint'. There will be seven of these states). Once enough money has been put in, the controller will go to a final state where the person will receive a soda and proper change (Hint: There are five such final states). From the final state, the next coin that is put in will start the process again.

