# CS 2420 Lab 8

Topics: Finite State Machine Design – Mealy Machine

Pre Lab: Attempt to complete T2 and T3 to find the state diagram, truth table, and k-maps for the machine.

T1. Overview of Mealy machine

A mealy machine is a finite state machine (FSM) whose output depends on the current state and current input and whose next transition depends on both current state and current input. A Mealy design fits the model shown below.
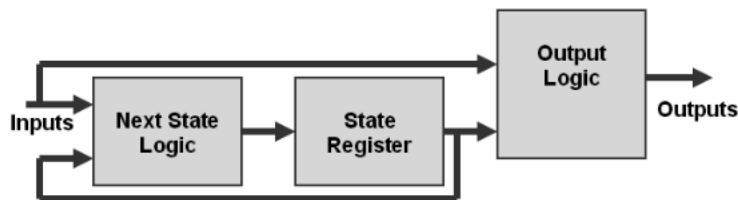
T2. State Diagram

Complete the Mealy FSM diagram, with 3 states, that defines the following machine: A serial device that takes in a binary number and outputs (serially) the same number with every third '1' converted to a '0'. For example, if the number is 10011000101010 than the output is 00011000001010. The data input is low order bits first (read right to left).

T3. Build a Circuit

Now implement this machine using positive edge triggered D flipflops. Set up a transition table, identify each state with an encoding and use excitation tables and Karnaugh maps to computer the input and output circuits of the two flipflops. Now build the device in DSCH, test it, have instructor verify it works, and take screen shots for report.

T4. Build another Mealy Machine

Build a Mealy machine that counts 3,4,8,9,3,4,8,9,… if the input x is a 0. The sequence will be reversed if the input x is a 1. Follow the previous task steps by creating a diagram, truth table, and using K-maps to find the combinational logic needed. After building and thorough testing, have instructor ensure it works and capture screen shots for report.