Cpr E 281 HW 12

ELECTRICAL AND COMPUTER ENGINEERING
IOWA STATE UNIVERSITY

Synchronous Sequential Circuits
Assigned Date: Fifteenth Week
Due Date: Dec. 8, 2014

P1. (15 points) Problem 6.35 in textbook.

P2. (15 points) Problem 6.36 in textbook.

P3. (20 points) Problem 6.40 in textbook.

P4. (10 points) We found earlier that trying all possible state assignments in order to find the best implementation is impractical. Determine the number of possible state assignments for an FSM that has n states for which $k = log_2 n$ state variables are used. Assume for simplicity that n is a power of 2.

P5. (20 points) We would like to design a synchronous sequential circuit with two inputs A_1 and A_0, and one output Z. The two inputs are interpreted as a two-bit unsigned integer A_1A_0. Assume the input combination $A_1A_0 = 11$ will never happen. In other words, the inputs represent an integer from 0 to 2. The circuit will produce an output of 1 if the sum of the last two inputs in the input sequence is 2. Draw the state diagram of a Moore-type FSM for the circuit. Draw your diagram as clearly as possible.

P6. (20 points) Repeat P5 above but design a Mealy-type FSM instead.