CSE370: Introduction to Digital Design
Winter 1999

Homework Set 8

DUE: Friday Mar 5, 1999, 12:30 pm

Please show *all* of your work. Solutions do not have to be typeset, but may be if desired. In any case, your solutions must be legible.

1. Katz Problem 8.7. Be sure your state diagram is a Mealy and not a Moore machine. See Katz pgs. 406–410 if you are unsure how to solve this problem.

2. Katz Problem 8.17 part (a) and (b). You need only draw the Mealy or Moore machine. No minimization or implementation is required.

3. 74190 Date Sheet Problem. (There is a separate link to the data sheet pdf file.) This question is in reference to the data sheet for the Motorola 74LS190, a commercial version of the BCD counter you designed for HW7. Study the description and try to figure out how it is similar and how it is different from yours. It might help to first understand the meaning of each pin. Then consider this: how would you use this part to build a larger BCD counter, for example, a 3-byte counter? AFTER thinking about this for a while (no peeking ahead), look at figures a, b, and c, which are three different designs for a multistage counter. Figure them out (start by asking a simple question like, which byte is low-order and which is high-order?) Convince yourself that all of them work. Then convince *us* that you understand how each of them work! For example, it might help to trace some sample case. E.g., assume the counter is sitting at a BCD value of 199; show the value of each internal and output net; then show what happens on the next counter increment (and what input causes that increment?) (Use only the simplified pictures of fig. a, b, c, not the internal logic of each stage.)