Embedded Real-Time Systems (AME 3623)
Homework 3

February 22, 2006

This homework assignment is due on Tuesday, February 21st at 5:00pm. Your work may be handed in electronically (use the **Homework 3** digital dropbox on D2L) or in hardcopy form (in person or see the administrative assistant on the first floor of Engineering Lab; next to the West entrance).

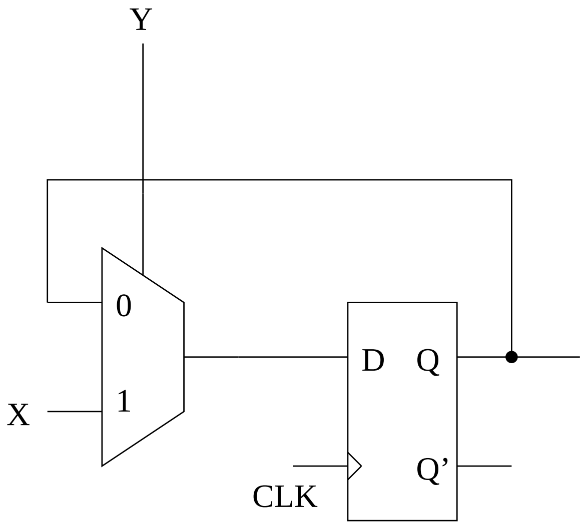
This assignment must be done individually: do not share/discuss your answers with others or look at the answers of others.

Question 1

1. (5pts) Given the binary number: 1001011. What is the decimal equivalent? Show your work.
2. (5pts) Given the binary number: 111010. What is the decimal equivalent? Show your work.
3. (5pts) Given the decimal number: 68. What is the binary equivalent? Show your work (all of the steps of the algorithm that we discussed in class).
4. (5pts) Given the decimal number: 122. What is the binary equivalent? Show your work.

Question 2

Given the following circuit:



(15pts) Explain in detail what this circuit does in terms of its inputs (X, Y, and CLK). (Multiplexer notation note: the 0 and 1 tell you which input is selected when Y is in these states)

Question 3

Following the steps below (and our design procedure from class), design a counter that counts down from 7 to 2. After 2, the counter returns to 7.

1. (10pts) Show the truth table
2. (15pts) Show the Karnaugh map for the first bit, the clusters, and the resulting algebraic expression.
3. (15pts) Show the Karnaugh map for the second bit, the clusters, and the resulting algebraic expression.
4. (15pts) Show the Karnaugh map for the third bit, the clusters, and the resulting algebraic expression.
5. (15pts) Show the full circuit

Question 4

How much time did you spend on this assignment?