Embedded Real-Time Systems (AME 3623)
Homework 4

April 21, 2007

This homework assignment is due on Friday, April 27th at 5:00pm. Your work may be handed in electronically (use the Homework 4 digital dropbox on D2L) or in hardcopy form (in person or to my office).

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

Question 1

1. (10pts) Briefly explain the need for buffers in communication.

2. (10pts) Define the “shared data problem.”
Question 2

1. (15pts) Suppose we want a small segment of code – called *donow()* – to be executed precisely once every 1.664 ms. What is the timer0 prescalar configuration and the (psuedo)code for the interrupt routine (the code does not need to be syntactically correct)?
2. (15pts) Suppose we want a `donow()` to be called once every 29.3601 sec. Which timer should we use? What is the prescalar? What is the software divisor? (there are multiple solutions; select the one that minimizes the interrupt frequency)
Question 3

(20pts) Below is the FSM for the vending machine that we discussed in class.

![Vending Machine FSM Diagram]

Alter this vending machine such that Buzz Water requires only $.15 in order to buy it. State any additional assumptions that you make.
Question 4

How much time did you spend on this assignment?