ECE 3724 Quiz #9 – Fall 05 - Reese

NAME: _______________________

Answer each of the following questions. For any required I2C functionality, use subroutine calls \texttt{i2c\_start()}, \texttt{i2c\_rstart()}, \texttt{i2c\_stop}, \texttt{i2c\_put(char byte)}, char \texttt{i2c\_get(char ackbit)}. If you use \texttt{i2c\_put}, you must pass in as an argument the byte that is to be written to the I2C bus.

a. Assume I have a periodic interrupt with \texttt{PRE}=4, \texttt{POST} = 10, and \texttt{PR2} = 50. If I change these to \texttt{PRE}= 16, \texttt{POST} =5, and \texttt{PR2} = 50, what is the relationship of the new interrupt period to the old interrupt period?

\[
\frac{\text{New Period}}{\text{Old period}} = \frac{\text{new (PRE * POST * (PR2+1))}}{\text{old (PRE * POST * (PR2 +1 ))}} = \frac{16 * 5 * (50+1)}{4 * 10 * (50+1)} = \frac{2}{1}.
\]

New period is twice as long as old period.

b. Write a series of I2C calls that will write the value \texttt{0xF3} to location \texttt{0x9025} in the LC515 serial EEPROM.

\begin{verbatim}
i2c_start();         //                                   bsel A1 A0  R/W
i2c_put(0xA8);   //i2c addr byte  1 0 1 0 1 0 0 0      assume A1,A0 tied low, select upper block
i2c_put(0x90);   // this byte could also be 0x10 since the upper bit is a don’t care
i2c_put(0x25);
i2c_put(0xF3);   // value to be written to 0x9025
i2c_stop();
\end{verbatim}

c. Write a series of I2C calls that will cause a voltage of 2 V to appear on the output of the 517 DAC assuming a Vref of 5 V.

Translate 2V into 8-bit code: \(2V/5V * 256 = 102\)

\begin{verbatim}
i2c_start();         //                                   A1 A0
i2c_put(0x58);   //i2c addr byte  0100 1 0 0 0      assume A1,A0 tied low
i2c_put(0x00);   // command byte that says do the conversion
i2c_put(102);   // 8-bit value to be converted
i2c_stop();
\end{verbatim}

d. Assuming a VREF of 5V, if upper 8 bits of the PIC18 DAC returns as \texttt{0xC0}, what is the input voltage?

\[
\text{Vin} = \frac{\text{ADC Code}}{2^N} * \text{Vref} = \text{0xC0}/2^8 * 5V = \frac{192}{256} * 5V = 3.75 V
\]