Assignment 5

Implement a small reaction test using the PICDEM boards. The reaction test works as follows:
1. The program waits for a random amount of time.
2. The program gives a signal upon which the user must react.
3. The program measures the time between the signal and the user's reaction.
4. The program reports the reaction time to the user.

For this assignment, you have to decide what hardware to use for the signal, for the reaction input, and for reporting the time. Evaluate properties such as short vs long button-push times (polling vs. interrupts), precision vs. long reaction times (timer resolution vs. prescaling), etc.

Possible input devices are the two buttons. Possible signal devices are: LED, LCD, buzzer, serial line with output on workstation. Possible output devices are: LED, LCD, serial line with output on the workstation.

A nice setup would be: use the buzzer for the signal, use the RB button with interrupts to react, use a timer to measure the time between the signal and the reaction, and report the reaction time via the UART to the computer (use the Windows terminal software with 9600 baud, no handshake!, flow control turned off).

A cheap setup would be: use the buzzer for the signal, use the RA button with polling for the reaction, use a timer to measure the time between the signal and the reaction, and report the reaction time by using the LEDs and Morse code.

1a Write the program that implements the reaction test.
1b Write a one page description that explains how your system works, what hardware you use, and provide arguments why you did it that way.

Hint:

- This time, use the Microchip library!
- Check in advance that you don't have pin collisions, meaning that you require one pin to do two things (e.g., use RB and the LEDs).
- Check the examples given in the C18 user guide and posted on the forum (forum.microchip.com). They provide good starting points.
- Don't forget to turn off unused features (e.g., turn off the ADC if you want to use the INT0 line), because otherwise you won't get the interrupt.
- If you want to use the LCD, you have to physically reroute PORTB to PORTD, because the board uses PORTD, but the 28pin chip does not have PORTD. You also have to recompile the Microchip library that it uses PORTB. Also consider timing.