CSE3442 (Spring 2020)
Lab #8

In this lab, you will add the ability to run the pump and play melodies or alerts on the speaker using the circuits given in class.

1. Configure the hardware as follows:
    a. Initialize the hardware to support digital outputs on the pump and speaker GPO pins.
    b. Configure timer 2 as shown in class.
2. Write functions enablePump() and disablePump() that turn the pump on and off.
3. Support the pump ON|OFF command from the UART interface.
4. Write functions playBatteryLowAlert() and playWaterLowAlert() that play melodies of your choosing that let the user know the problem. These routines should work by using a main loop that controls the notes to be played and a background timer 2 ISR function that toggles the speaker GPO pin. The algorithm works as follows:
    a. Program the period as half of the duration of a single cycle of the tone frequency (there are low→high and high→low in every cycle).
    b. Start the timer.
    c. Wait the appropriate number of microseconds for the note duration.
    d. Stop the timer.
    e. Repeat a-d for each note in the song.
5. Support the alert LIGHT_LEVEL command on the UART by recording the light level.
6. Implement the alert logic as follows:
    a. If the light is greater or equal to the light level threshold and the water reservoir is low, play the water low alert occasionally.
    b. If the light is greater or equal to the light level threshold and the battery is low, play the battery low alert occasionally.
7. Demonstrate your code and e-mail the file to the grader.