

CSE3442 (Spring 2020)

Lab #9

In this lab, you will complete the project.

- 1.** Configure the hardware as follows:
 - a. Initialize the hardware to control all GPIO for the project (all initialization from labs 4-8).
 - b. Initialize timers 1 and 2 as in the previous labs.
 - c. Initialize the hibernation module RTC for operation.
- 2.** Add support for the time H M command by loading the value into the RTC.
- 3.** Add support for the water H1 M1 H2 M2 command by storing the values.
- 4.** Add support for the level LEVEL command by store the value.
- 5.** Write a function `getCurrentSeconds()` that returns the current second in the day based on the value in the HIBRTCC register.
- 6.** Write a function `bool isWateringAllowed()` that returns true iff the current seconds is between the H1:M1 starting seconds and the H2:M2 stopping seconds values.
- 7.** Modify the user interface code in labs 4 and 5 to use the `kbhitUart0()` function as shown in class, so that sensors and UART0 data are being continuously checked.
- 8.** In the endless main loop, if `kbhitUart0()` is true, process the key. By calling `kbhitUart0()` before `getcUart0()`, `getcUart0()` will be non-blocking meaning you can check the sensors continuously without waiting for a key to be pressed.
- 9.** In the endless main loop, if `kbhitUart0()` is false, then
 - a. Check the moisture level and the current time to see if watering is needed and watering is permitted. If the soil is dry and you are in the watering time window, run the pump for bursts of 5s separated by 30s to allow the water to soak into the soil.
 - b. Check the reservoir level and play the appropriate tone if the water is low.
 - c. Check the battery level and play the appropriate tone if the battery is low (you can define this limit).
- 10.** Demonstrate your code and e-mail the file to the grader.