Lab Assignment 2 Turn In Requirements

CSE474 rev 1.0 Spring 2022

### Learning Objectives

With successful completion of this lab, the student will be able to

* Manipulate hardware registers/bits, without the use of existing libraries, to perform low-level hardware functions.
* Coordinate multiple concurrent tasks with round-robin scheduling.

### (refer to [Overall Lab Guidance Doc.](https://docs.google.com/document/d/1OTeYcTR07uE6CdOy5KNWbYGtL0PEmOchBPG0bTykZcQ/edit?usp=sharing) Spring 2022 )

### Report Turn In:

Turn in a PDF report following the [document template](https://docs.google.com/document/d/1YUVa19-zfnLmRncJ9Dcno-DOsjOL0VUytMJEKBwSmoY/edit?usp=sharing) documents. Include a section detailing each partner’s contributions, and be specific. This PDF should be turned in as a standalone document, not in a .zip file.

### In-Lab Demo: You may combine all steps into a single code file. Compile it multiple times with commenting out code to achieve the below specifications. You might also consider running each code block in an if-statement and changing a #define symbol to select functions.

Demo must include:

1. Sequential Flashing of LEDs in Part 1.4, with each LED on for 333ms. Show where the code uses the DDR and PORT registers.
2. Speaker tone output in Part 2.4. Show where the code uses the 16-bit Timer/Counter registers.
3. Operation of Task C as outlined in Part 3.2.1.
4. Operation of 3.2.1 but with Task B playing “Mary Has a Little Lamb”
5. Working LED matrix dot controller with thumbstick
6. Simultaneous output of “Mary had a little lamb” with smooth function of the thumbstick/8x8display. (Extra Credit for “raw” LED Matrix, SPI / i2C LED matrices are substantially simpler code)

**Be prepared to answer** the following questions.

1. How could you implement the pinMode() and digitalWrite() functions?
2. How do you change the frequency of the square wave generated on OC4A?
3. How do you achieve simultaneous operation of Task A and B in Task C despite using a round-robin scheduler?
4. How do you determine which index to move the dot to in your LED matrix dot-controller?
5. Any other questions at the discretion of the instructor/TA

### Code Turn In:

Turn in ALL code in .ino and .c files (if applicable).Submit a zipped folder containing all .ino and .c files, and keep Arduino files in their sketch folder. Comment out (but do not delete) code which might be required for intermediate steps but is not required for the final code. This will help us give you partial credit!

### Backup Demo Turn-In **(Only in case of UW-Wide shutdown)** :

Turn in a link to an **unedited** video (one take) that includes both partners. Recording a Zoom meeting will likely be the easiest way to do this. Do not forget to pin the speaker's screen, and do not screen share code while trying to show the hardware. You may compile multiple times with commenting out code to achieve the below specifications. You might also consider running each code block in an if-statement and changing the conditions.

Demo must include:

1. Sequential Flashing of LEDs in Part 1.4, with each LED on for 333ms. Share screen to show code upload using DDR and PORT registers.
2. Speaker tone output in Part 2.4.. Share screen to show code upload using the 16-bit Timer/Counter registers.
3. Operation of Task C as outlined in Part 3.2.1.
4. Operation of 3.2.1 but with Task B playing “Mary Has a Little Lamb”
5. Working LED matrix dot controller with thumbstick
6. Simultaneous output of “Mary had a little lamb” with smooth function of the thumbstick/8x8display. (Extra Credit for “raw” LED Matrix)

**In the Demo, verbally answer** the following questions. Both partners must speak equally.

1. How could you implement the pinMode() and digitalWrite() functions?
2. How do you change the frequency of the square wave generated on OC4A?
3. How do you achieve simultaneous operation of Task A and B in Task C despite using a round-robin scheduler?
4. How do you determine which index to move the dot to in your LED matrix dot-controller?