EE212-Microprocessors On-Lab Assignment 3 Section 1

Spring 2022

In this lab, you will add features to the music box you developed in off-lab assignment. You will be using two software programs: (i) **MCU 8051 IDE**, for simulations of your code and (ii) **Proteus**, for generating sound waves.

1 Important Notes

- Please prepare your off-lab demonstration before starting the on-lab assignment. TAs will check them during the on-lab.
- After you have completed your lab, you need to get a check from one of the lab assistants (not tutors). The check consists of explanation of the code and a small demonstration.
- This is an individual lab. You can cooperate but you have to write your **OWN** code. Any kind of plagiarism will not be tolerated. Codes will be compared manually by assistants and by Turnitin software after the lab.
- The deadline is strict. Submit your code before the deadline. There will be no extension to the deadline.
- You can get a check after the deadline if the queue for the check is long, so do not worry. If such a case occurs, you will get your check based on your latest submission to Moodle. Therefore, do not try to change your code after you have submitted your code.

2 On-Lab Assignment

As the on-lab assignment, you are required to add a button that can increase the rhythm of the tune you are playing. For this purpose, you need to use the interrupt mechanism of the microprocessor, and when an interrupt is received, set a new timer value to change how long each note is played. Note that you are not changing the pitch of the tune but the duration of it. For example, if every note is played 1 second and we want to double the speed, every note will be played 0.5 seconds with the same frequencies. If the button is pressed again, the speed will be four times the original speed. In other words, if the button is pressed n-times, the speed will be 2^n-times of the speed of the original one.
Note: The current melody should continue playing when the speedup is applied, i.e., it should not reset back to C5 after the button is pressed.

3 Requirements

You should:

- Use the interrupts and timers of 8051.
- Generate sound waves with correct frequencies and timings.
- Demonstrate the work on **Proteus** with speaker module.