Embedded Systems Essentials with Arm: Getting Started

Module 6

SV3 (6): Module 6 Lab Project: Part 2

We also define the function that the ticker initialization will call. This is the interrupt service routine, which will be periodically triggered after each single music note. We ensure the name is the same as the one given in the “attach” initialization in the main function.

Taking a look at this function bit by bit, the function starts with an ‘if’ statement to compare the number of notes to play with a counter. If “k” is smaller than the size of the note array, it means that the song is not complete.

Then, nested inside this is another if statement that if the current note is the silent note, the speaker has to be turned off, which is equivalent to setting the duty cycle equal to 0.

If the note is not the silent one, the period of the PWM pin connected to the speaker has to be set to the period of the corresponding note. Also, the duty cycle has to be set according to the potentiometer that controls the volume.

We then increment the “k” variable. Also, we re-configure the Ticker to call the interrupt service routine after a specific time, related to the length of the beat. The beat time depends on the value specified in the beat array corresponding to each note, and the potentiometer that controls the speed of reproduction. This is one of the potential solutions.

The next few lines update the brightness of the LEDs to reflect the melody change. The red LED intensity should represent the note being played. The blue LED intensity should represent the beat’s length. The yellow LED intensity should represent the volume. It also should blink at the same speed of the melody.

Finally, if the piece of music has finished playing, we reset the variables to zero to start from the beginning.