Assignment #5 – Science Fiction Movie Prop

In this assignment you will use the PwmOut interface on the mbed microcontroller board to implement a science fiction movie ("The Mbeds Rise Again!") prop that has blinking LEDs and sound effects.

Connect the piezo transducer (it looks like a small black cylinder with a hole at the top to emit sound) between the mbed's p22 and GND.

The mbed should continuously turn on and off the four on-board LEDs in the cycle: LED1, LED2, LED3, LED4, LED3, and LED2. However, rather than switching an LED between full brightness to completely dark, the mbed should be using pulse-width modulation (PWM) to visibly fade the LED on or off (the apparent brightness of the LEDs is proportional to the duty-cycle selected). Use at least 4 different brightness levels with sufficient delays so that the fading effect is clearly visible (the overall cycle from LED1 to LED4 and back again should should be a few seconds).

PWM can also be used as a convenient way to generate simple sound effects. When LED4 is fully on, the mbed should send a 784 Hz signal at 50% duty-cycle to the piezo transducer. When LED1 is fully on, the mbed should send a 659 Hz signal at 50% duty-cycle to the piezo transducer. At all other times, the piezo transducer should be silent (set the duty cycle to 0%).

Submit your "main.cpp" to the appropriate dropbox on http://learn.ou.edu by the end of November 21st. (In the Program Workspace view of the mbed compiler, right-click on the file to save and select Export; this will save the file to your computer. You can then upload this file from your computer to the dropbox.)