**Introduction:**

The goal of this particular project was to give the numerous groups a chance to further familiarize themselves with both the IAR workbench and the STM32F207ZG microcontroller. The project given to us did this in having us make use of the onboard timers, user button, and LEDs. In doing so said groups were exposed to how to utilize the I/O functions of the microcontroller.

**Project Description:**

Project one tasked the groups with getting the onboard LEDs to illuminate for a specified amount of time. The timing of said LEDs would be handled by the onboard timers and the initialization of the lighting of the individual LEDs would be controlled by the pressing of the user button. Once the user button was pressed a timer was to activate LED1 would activate immediately with the other three following at a five hundred millisecond interval. If the button at this point had been released by the user the process would restart, however, if the button was still being held all four LEDs were to cycle off for a period of two hundred and fifty milliseconds and on again for seven hundred and fifty milliseconds. This cycle would continue until the user button was released which would again cause the process to restart.

**Design/Development:**

The approach our group took was a simple yet efficient one. We first enabled the onboard user button so we could set up the general structure our wait and check loops would take. Using a hex calculator it was found that pin 6 (0x40h) would be active if the user button was in fact being pressed. This allowed for our group to code a simple compare with the branching either going to the restart state or continuing depending on whether or not the button was being held down. Our group next enabled the LEDs which went fairly quickly once they were enabled we used the aforementioned user button loops and made certain that if pressed the LEDs would activate as they did what was expected we then moved on to the timers. The on board timers were by far the most difficult piece of this lab they allowed for this project to be done in numerous different ways but the documentation regarding them was a bit lacking even within the reference manual. Our group ended up making the decision to forgo the more intricate aspects of the timers and instead made use of a single timer. Using this timer we could compare it the already known intervals we needed our LEDs to activate at. When the clock needed to be reset we used the default behavior of its update functionality to reset the timer to zero. This approach worked very well and allowed our group to bypass having to make use of functionality such as interrupts.

**Conclusion:**

Our groups project did in fact work as intended all LEDs illuminated at the correct interval and the user button controlled them as it was meant to. Overall the project was a fun one we learned a great deal about the I/O of the board and how certain elements of it function. If we had one critique to make it would most certainly be the timers. Most resources online make use of the C equivalent where the timers have an initialization method predefined. If more descriptive and meaningful documentation could be found on the timers and how each of their functions affected them I think it would be a great help to classes in the future.

**Contributions:**