

**Lab 1 – Prelab assignment****1. Describe the overall purpose of this week's project**

The entire pre-lab reading was an introduction to C programming for the TI microcontroller. It described how abstraction is used to make hardware programming simpler for the user, through the inclusion of headers for specific memory allocation, GPIO, communication and other important applications. The purpose of this week's project is to get acquainted with the IDE used to program the TI Microcontroller, and to also learn how to debug our programs using the tools provided in the IDE. The tutorial for the watchdog timer and examples for HAL is intended to strengthen our fundamentals around embedded systems programming in C, so that we can focus on more conceptual controls-based projects in the future labs.

**2. Describe why some registers are protected, and describe the purpose of the watchdog timer**

Certain registers are protected in order to prevent malfunctioning code from editing the data stored in these registers, which could eventually damage the functioning of several sub-modules within the firmware for the device. The watchdog timer helps to reset the microcontroller to its initial functioning stage in case of a malfunctioning program. By default it is designed to reset the microcontroller based on a counter, however, this timer can be refreshed by repeatedly setting it the counter to 0, within our program.

**3. Describe how the appropriate registers will be used to complete the tasks assigned in 5.2. Be specific, state what numerical values need to be assigned to the relevant HAL variables identified in this week's lab documentation.**

- a. WdRegs.WDCR.all helps us control the watchdog timer
- b. WdRegs.WDKEY.all helps us reset the watchdog timer

**To control the watchdog timer, we would use**

```
Wd.Reg.WDCR.all = 01101000 //OFF
```

```
Wd.Reg.WDCR.all = 00101000 //ON
```

**To reset the timer, we would do**

```
Wd.Reg.WDKEY.all = 0x55; // run as usual
```

```
Wd.Reg.WDKEY.all = 0xAA; //reset at 0
```