Programming Embedded Systems 2018 – Exercise 1

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Task

The task for this exercise was to implement a super-loop task that can do the following:

1. Switch the red led on and off every one second
2. Create the delay using a delay loop
3. Make the leds alternate between green and red
4. Find out on which hardware address the input of Port 1 can be read and which include file is used by the micro controller.

Equipment used

- Texas Instruments LaunchPad MSP430g2553 microcontroller
- Laptop

Preformed work

Before trying to implement any of the tasks, the development environment had to be set up. First I tried to install GCC for MSP430 from the supplied installer. The installer did not run so instead I installed he gcc-msp430 and mspdebug packages with apt. After that I used the Makefile to compile the example code and ran it using mspdebug.

With the development environment set up the next step was to try to modify the blink.c code. The first task was already implemented in the example so the next task was to change the starting value of i so that the delay is roughly one second which was 60 000.

The next task was to alternate between red and green. Looking at the microcontroller the port for the green led is P1.6. The address for port 1 pin 6 is 0x40. The output direction P1DIR was set to output on pins 0x01 and 0x40. In the superloop P1.0 and P1,6 are toggled on and off using an XOR with the value 0x41. If P1.0 is on, it is toggled off, P1.6 is toggled on and vice versa.

The include file used was found by browsing the include folder in the installation directory. In blink.c the msp430.h is included. Inside msp430.h there is a condition to include msp430g2553.h if the device used is MSP430g2553. Inside this header file the hardware address for the input of P1 can be found, which is at the address 0x0020

Results

The development environment which is going to be used in the future was set up. I got familiarized with the basics of microcontoller development, how to compile code and program them into the microcontroller. Most importantly both leds blink now.