EEE204 - Introduction to Embedded Systems

Experiment 5

Objectives:

• The main objective of this experiment is to blink the leds connetcted to P1.0 and P4.7 using GPIO. This experiment will help you to learn and understand the procedure for programming the MSP-EXP430F5529 LaunchPad digital I/O pins.

Materials

- Code Composer Studio IDE
- MSP430F5529 USB LaunchPad development kit

Experimental Work

E1 The MSP430F5529 has two LED's connected to P1.0 (LED1) and P4.7(LED2) on the MSP430F5529 Launch-Pad for visual feedback. Write assembly language programs to do the following operations. Expand the P1 register in the Register Viewer. Step your program through the main loop and observe the change in P1 registers.

a) Turn on the led connected to the P1.0.

```
main:
            bis.b   #1, &P1DIR
            bis.b   #1, &P1OUT
            bic.b   #1, &P1OUT
            jmp main
```

b) Toggle the led connected to the P1.0 at fixed time intervals determined within the code.

```
main:
            bis.b   #1, &P1DIR
            xor.b   #1, &P1OUT
            mov.w   #50000, R5
L1          dec     R5
            jnz     L1
            jmp main
```

E2

a) Write an assembly language program to turn on the leds connected to P1.0 and P4.7.

```
main:
            bis.b   #1, &P1DIR
            bis.b   #10000000b, &P4DIR
            bis.b   #1, &P1OUT
            bis.b   #10000000b, &P4OUT

            jmp main
```

b) Write an assembly language program to toggle the led1 and led2 together at fixed time intervals.

```
SetupP1     bis.b   #1, &P1DIR
            mov.b   #1, &P1OUT
SetupP4     bis.b   #10000000b, &P4DIR
            mov.b   #80h, &P4OUT
main:
            xor.b   #1, &P1OUT
            xor.b   #10000000b, &P4OUT
            mov.w   #65000, R5

L1          dec.w   R5
            jnz     L1
            jmp main
```

c) Write an assembly language program to turn on and off each led in turn.

```
SetupP1     bis.b   #1, &P1DIR
            mov #1, &P1OUT
SetupP4     bis.b   #10000000b, &P4DIR
            mov     #0, &P4OUT
main:
            xor.b   #1, &P1OUT
            xor.b   #10000000b, &P4OUT
            mov.w   #65000, R5

L1          dec.w   R5
            dec.w   R5
            dec.w   R5
            add.w   #2,R5
            jnz     L1
```

```
jmp main
```