EEE204 - Introduction to Embedded Systems

Experiment 2

Objectives

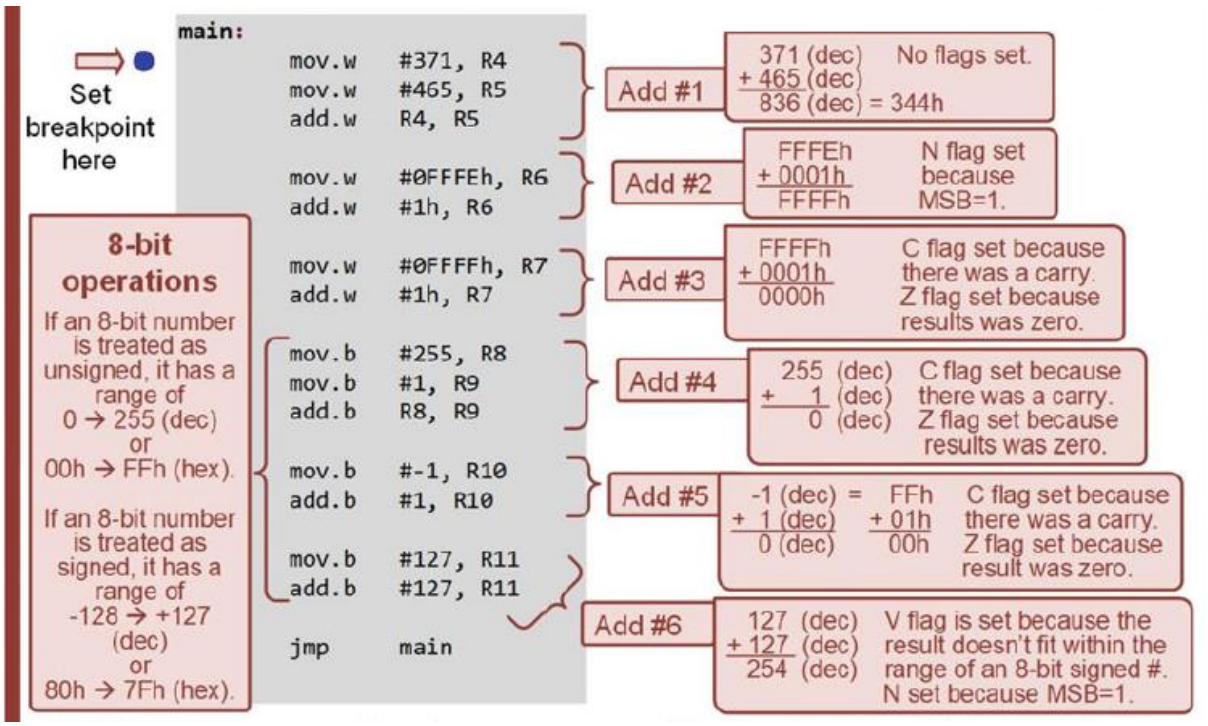
• Become familiar with the MSP430 instruction set data transfer instructions, arithmetic instructions, logic instructions, and the program control instructions.
• Learn to use bit set and bit clear instructions to set and clear individual bits within an operand.

Materials

- Code Composer Studio IDE
- MSP430F5529 USB LaunchPad development kit

Experimental Work

E1
1) *Create a new Empty Assembly-only CCS project titled*: **ASM_ADD.**
2) *Type the following code into the main.asm file where the comments say "Main loop here".*



3) *Debug your program. If you have errors correct them and continue debugging until your program is succesfully downloaded to the Launchpad board.*

4) *Open the Register Viewer and expand the Core Registers item to see the CPU registers. Expand the status register.*
5) *Step your program to observe the operation of each addition*

E2:

- Do the operition "AAAA + 7777" and fill the table below according to the result.

C	Z	N	V

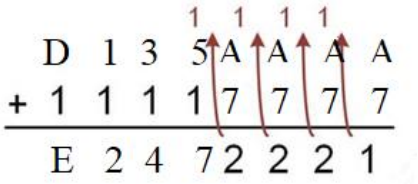
b15	b14	b13	b12	b11	b10	b9	b8	b7	b6	b5	b4	b3	b2	b1	b0

Answer:

```
main:
            mov.w    #0AAAAh, R5
            mov.w    #7777h, R6
            add.w    R5,R6

             jmp main
```

- Write an asembly language program to do following operation :
  D135AAAA + 11117777 = E247 2221



Answer:

```
main:
            mov.w    #0AAAAh,
R4
            mov.w    #0x0D135,
R5
            mov.w    #7777h, R6
            mov.w    #1111h, R7

            add.w    R4,R6
            addc.w   R5,R7

            mov.w    #3000h, R8
            mov.w    R7, 0(R8)
            mov.w    R6, 2(R8)

             jmp main
```

E3: Each case in this experiment is independent of others. Type in the following codes into the main.asm file and observe the content of the registers.

a)

1) mov.b #11110000b,R5
and.b #00111111b,R5

2) mov.b #11000001b,R5
or.b #00011111b,R5

3) mov.b #01010101b,R5
xor.b #11110000b,R5

	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0
1	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**0**
2	**1**	**1**	**0**					
3								

b)

1) mov.b #00000000b,R5
2) bis.b #10000001b,R5
3) bis.b #01000010b,R5
4) bis.b #00100100b,R5
5) bis.b #00011000b,R5
6) bic.b #00011000b,R5
7) bic.b #00100100b,R5
8) bic.b #01000010b,R5
9) bic.b #10000001b,R5

	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0
1								
2								
3								
4								
5								
6								
7								
8								
9								