## EEE204 - Introduction to Embedded Systems Experiment 4

## **Objectives:**

• Become familiar with the MSP430 instruction set data transfer instructions, arithmetic instructions, logic instructions, and the program control instructions.

## **Materials**

- Code Composer Studio IDE
- MSP430F5529 USB LaunchPad development kit

## **Experimental Work**

**Ex. 1:** Type in the given code into main.asm file and fill the table below according to C-flag and R5 register.

mov.b	#11011111b,R5
clrc	
rla.b	R5

	С	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0
1 <sup>st</sup> Rotate									
2 <sup>nd</sup> Rotate									
3 <sup>rd</sup> Rotate									
4 <sup>th</sup> Rotate									
5 <sup>th</sup> Rotate									
6 <sup>th</sup> Rotate									
7 <sup>th</sup> Rotate									
8 <sup>th</sup> Rotate									
9 <sup>th</sup> Rotate									

**Ex. 2:** Type in the given code into main.asm file and fill the table below according to C-flag and R5 register.

mov.b	#10101011b,R5
clrc	
rra.b	R5

	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0	С
1 <sup>st</sup> Rotate									
2 <sup>nd</sup> Rotate									
3 <sup>rd</sup> Rotate									
4 <sup>th</sup> Rotate									
5 <sup>th</sup> Rotate									
6 <sup>th</sup> Rotate									
7 <sup>th</sup> Rotate									
8 <sup>th</sup> Rotate									
9 <sup>th</sup> Rotate									

**Ex. 3:** Type in the given code into main.asm file and fill the table below according to C-flag and R5 register.

mov.b	#10101000b,R5
clrc	
rlc.b	R5

	С	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0
1 <sup>st</sup> Rotate									
2 <sup>nd</sup> Rotate									
3 <sup>rd</sup> Rotate									
4 <sup>th</sup> Rotate									
5 <sup>th</sup> Rotate									
6 <sup>th</sup> Rotate									
7 <sup>th</sup> Rotate									
8 <sup>th</sup> Rotate									
9 <sup>th</sup> Rotate									

**Ex. 4:** Type in the given code into main.asm file and fill the table below according to C-flag and R5 register.

mov.b	#10101000b,R5
clrc	
rrc.b	R5

	R5.7	R5.6	R5.5	R5.4	R5.3	R5.2	R5.1	R5.0	С
1 <sup>st</sup> Rotate									
2 <sup>nd</sup> Rotate									
3 <sup>rd</sup> Rotate									
4 <sup>th</sup> Rotate									
5 <sup>th</sup> Rotate									
6 <sup>th</sup> Rotate									
7 <sup>th</sup> Rotate									
8 <sup>th</sup> Rotate									
9 <sup>th</sup> Rotate									