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Department of Computer Engineering

BLG 351E Microcomputer Laboratory Experiment Report

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1 INTRODUCTION

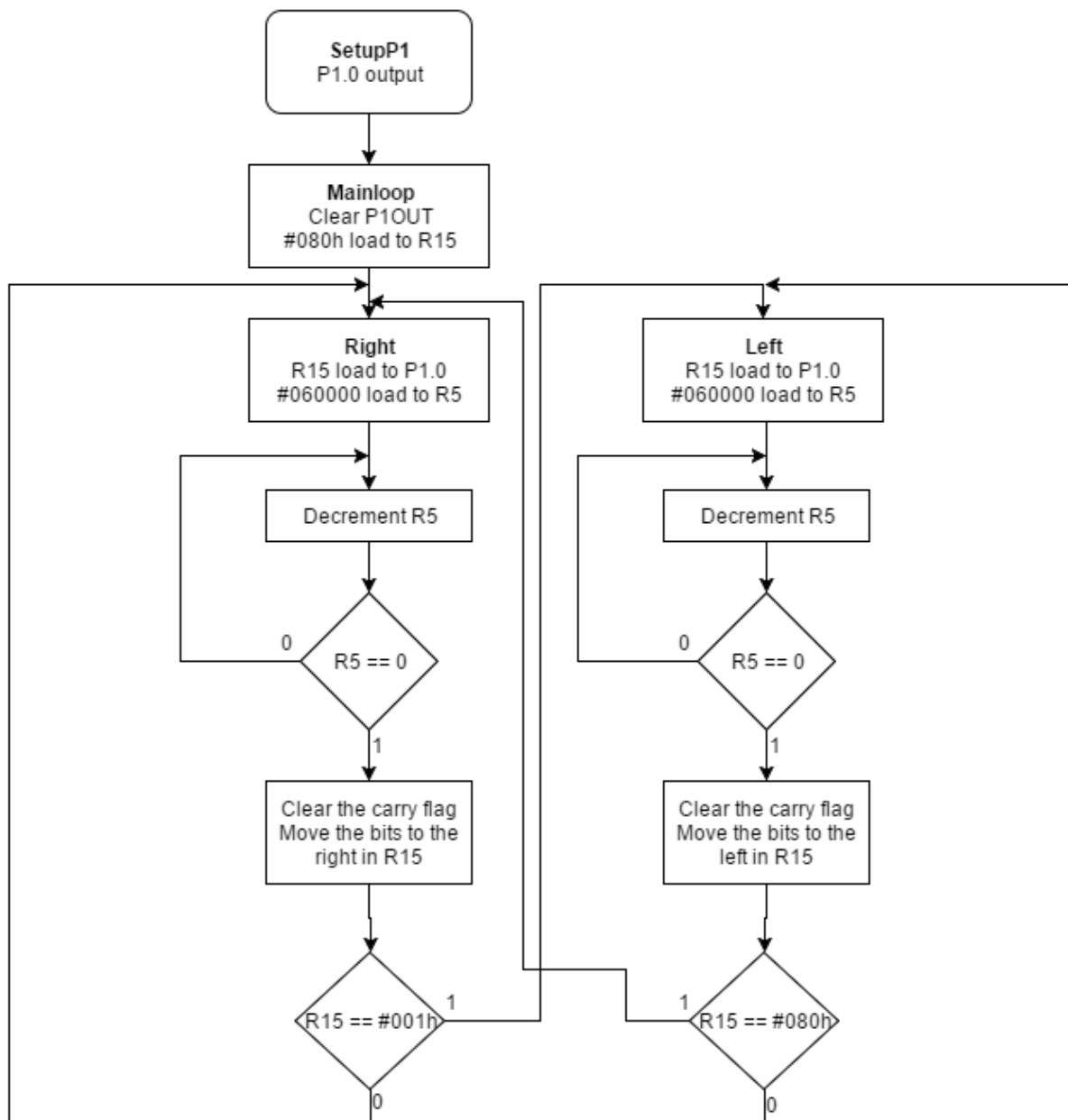
In this experiment, we have learned how to use the Code Composer Studio by writing 2 programs. In the first part, the program was given in the experiment pdf and we had to run the program in Code Composer Studio. In the second part, we wrote an assembly program which was lightning the P1 register lambs in order.

2 EXPERIMENT

The code that was written on the experiment is:

SetupP1	bis.b #0FFh,&P1DIR	; P1.0 output
Mainloop	clr.b &P1OUT	; Make P1.0 bits zero
	mov.w #10000000b,R15	; Load the first bit of R15
Right	mov.w R15,&P1OUT	; Load P1.0 output using R15
	mov.w #060000,R5	; Load R5 to observe the output change by eye
RetR	dec.w R5	; Decrement R5
	jnz RetR	; Is R5 zero?
	clrc	; Clear the carry flag/bit
	rrc.b R15	; Move the bits to the right in R15
	cmp.b #00000001b,R15	; Is the last bit of R15 1?
	jeq Left	; If it is 1 start moving left
	jmp Right	; If not move the bits right again
Left	mov.w R15, &P1OUT	; Load P1.0 output using R15
	mov.w #060000,R5	; Load R5 to observe the output change by eye
RetL	dec.w R5	; Decrement R5
	jnz RetL	; Is R5 zero?
	clrc	; Clear the carry flag/bit
	rlc.b R15	; Move the bits to the left in R15
	cmp.b #10000000b, R15	; Is the first bit of R15 1?
	jeq Right	; If it is 1 start moving right
	jmp Left	; If not move the bits left again

Flowchart of the algorithm is:



The most difficult part in this experiment was in the second part. While we were rotating the bits in R15 register, the carry bit was 1 and that made one more bit of the register 1 and we had seen lightning one more lamb in each iteration. Then, we learned how to run the codes in the Code Composer Studio debugger moving step by step and caught the reason of the error. After that, we understood that, we have used the rla and rra commands and these commands adds the carry bit to the register. Since the carry bit was 1, it was normal that we saw more lights on each iteration.

After we had changed rra and rla commands to rrc and rlc and made the carry bit 0 before that, we understood that the error had been solved.

3 CONCLUSION

The main aim of this experiment was showing us how to use Code Composer Studio and how to make an assembly program run on MSP430 board. We got used to write an assembly program, how to debug the codes and how to run the program on MSP430 board. We have learned the registers which are used in the programs and the assembly language which is for the MSP430 board. We have also learned that assembly languages change according to the boards that are used.

The difficulties made the experiment harder to us but we have also learned better by difficulties. For example, we have learned by heart that we have to think about the carry bit situation when rotating the bits in registers. Additionally, not clearing the output register bits may make all program work in wrong way. We have actually learned that we need to take those probabilities into account when writing the assembly programs.