**Department of Computer Engineering**

BLG 351E  
Microcomputer Laboratory Experiment Report

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Group Members :

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| --- | --- | --- |
| **ID** | **Name** | **Surname** |
| 150160531 | Okan | YILDIRIM |
| 150160546 | Hasan Emre | ARI |

Laboratory Assistant : Yusuf Hüseyin Şahin

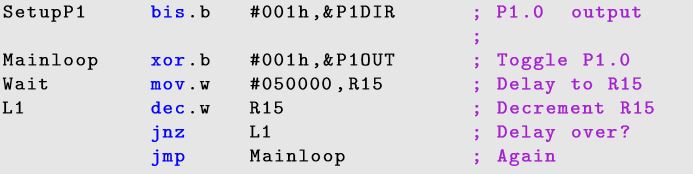
# Introduction

This experiment consists of 3 parts. In the first part, we used the code snippet from the test booklet and tried the code snippet that taught us how to turn on and turn of the 1st LED in the experiment set. In the second part, we changed the code part that we used in the first part and created a program which sequentially goes from the 1st LED to the 8th LED and turn off all LEDs and starts the 1st LED again. In the last section, a loop was created that increased to turn on all LEDs up to the 8th LED, then decrease from the 8th LED such as knight rider.

# Experiment

## Experiment 1

This part of the experiment provided us to identify the MSP430 training set, the MSP430G2253 microcontroller and the MSP430 assembly language. We used Code Composer Studio to write assembly code. In this program, we have learned how the code should be compiled and how it is run on the microcontroller.  
We run the code in compiler given below in the test book and we learn that the 1st LED on the circuit started to blink at certain intervals.



## Experiment 2

In the second part of the experiment, we changed the code given to us. As a result, starting with the first LED, we have created a loop that goes sequentially to the 8th LED and turn off all of it when it comes to the end and returns to the 1st LED. The code looks like the one below.

SetupP1 bis.b #0ffh ,& P1DIR

Mainloop mov.b #001h ,& P1OUT

Shift rlc &P1OUT

cmp #080h,&P1OUT

jeq Mainloop

Timer mov.w #050000 , R15

L1 dec.w R15

jnz L1

jmp Shift

The program consists of three parts, the main loop, the shift part and the timer part. In the program, we first set the first port to use all LEDs. Later we assigned # 001h to the first port. This enabled us to turn on the first LED in 8 LEDs. This value was then compared to # 080h which is the last LED’s address. We tried to check whether P1OUT come to 8th LED. If it is not equal, it is passed to the timer section. As a timer, a large value was assigned to register R15 and this value was reduced one time each time. If the register value is not equal to 0, the loop repeats. When the register is equal to 0, the loop is exited. During this time the light remains on. If the value in the first port is equal to # 080, the main loop will return to the beginning and continue to light from the first LED.

## Experıment 3

In the last part of the experiment, in addition to the code in the second part, when we arrived at the 8th LED, the program go back decreasingly to the 1st LED instead of going directly.

SetupP1 bis.b #0FFh, & P1DIR

Mainloop mov.b #001h, & P1OUT

jmp Timer

ShiftLeft rlc.w & P1OUT

cmp #080h,& P1OUT

jeq ShiftRight

jmp Timer

ShiftRight jmp Timer2

L1 rrc.w &P1OUT

cmp #001h,& P1OUT

jeq Mainloop

jmp Timer2

Timer mov.w #050000, R15

L2 dec.w R15

jnz L2

clrc

jmp ShiftLeft

Timer2 mov.w #050000, R15

L3 dec.w R15

jnz L3

clrc

jmp L1

The program consists of four parts, the main loop, the shift left part, the shift right part and the timers’ part. In the program, we first set the first port to use all LEDs. Later we assigned # 001h to the first port. This enabled us to turn on the first LED in 8 LEDs. The program jump to the first timer section and let the first LED remain on for a while. The return of the first timer is to the Shift Left label. The Shift Left section shifts the value in P1OUT to the left, allowing the 2nd LED to light. This process continues up to the 8th LED. When the program reaches the 8th LED, it jumps to the Shift Right. The Shift Right section also shift the P1OUT value to the right, allowing the 7th LED to light. This process continues up to the 1st LED. The program continues to loop from the beginning when it reaches the 1st LED.

# Conclusion

We had a problem with Code Composer Studio because we have not used it before. We also had a problem with the computer connection to the microcomputer due to the cable. In general we learned assembly language for microcomputer. We have learned about debug and compilation processes for Code Composer Studio and get familiar with usage of some commands.