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ENGR 270

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Computer and Organization

&

Microprocessors

Lab #1

Introduction

In this lab, we used the MPLAB program for the first time. When we started to use that, we needed to take a lot of time to figure out how to utilize it. Although we learned about C-language before, it was partially different; so that we needed time to get used it.

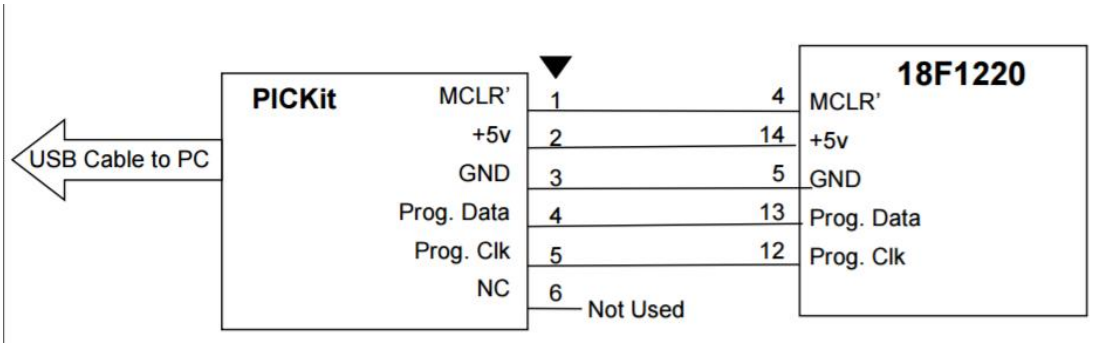
Experiment 1

In this experiment, we practiced creating a new project, compile it, simulate it, and program a PICmicro chip and test it in a circuit.

We followed the steps for the beginning; make new project, choose project, set advanced 8-bit MCU and PIC18F1220, select Simulator, choose “mpasm” for compiler and put the project name. Also, after making new project, we selected AssemblyFile.asm and then we wrote the codes like the below codes.

```
   list        p=18F1220           ; Set processor type
   radix       hex                 ; Sets the default radix for data exp.
   config      WDT=OFF, LVP=OFF, OSC = INTIO2      ; Disable Watchdog timer,  Low V. Prog, and RA6 as a clock

#define        PORTA               0xF80
#define        PORTB               0xF81
#define        TRISA               0xF92
#define        TRISB               0xF93
#define        ADCON1              0xFC1

COUNT          equ                 0x080
LASTIN         equ                 0x081
INPUT          equ                 0x082
TEMP           equ                 0x083

   org         0x000               ; Set the program origin (start) to absolute 0x000

; Initialize all I/O ports
   CLRF        PORTA               ; Initialize PORTA
   CLRF        PORTB               ; Initialize PORTB
   MOVLW       0x7F                ; Set all A/D Converter Pins as
   MOVWF       ADCON1              ; digital I/O pins
   MOVLW       0x00                ; Value used to initialize data direction
   MOVWF       TRISB               ; Set Port B RB<7:0> as outputs
   MOVLW       0x01                ; Value used to initialize data direction
   MOVWF       TRISA               ; Set Port A Pin 0 RA<0> as input

   MOVLW       0x00                ; W = 0
   MOVWF       COUNT               ; COUNT = WREG
   MOVWF       LASTIN              ; LASTIN = WREG

Loop:
   MOVFF       PORTA, INPUT        ; INPUT = PORTA
   MOVF        INPUT, 0            ; W = PORTA
   XORWF       LASTIN, 0           ; W = W XOR LASTIN
   ANDLW       0x1                 ; W = W AND 0x1
   MOVFF       INPUT, LASTIN       ; LASTIN = PORTA
   MOVWF       TEMP                ; TEMP = W
   BTFSC       TEMP, 0             ; If TEMP<0> = 0 Then Skip Next Command
   CALL        IncL
   GOTO        Loop

IncL:
   MOVF        COUNT, 0            ; W = COUNT
   ADDLW       1                   ; W = W + 1
   MOVWF       COUNT               ; COUNT = W
   MOVWF       PORTB               ; PORTB = W
   RETURN

   end         ; Indicates the end of the program.
```

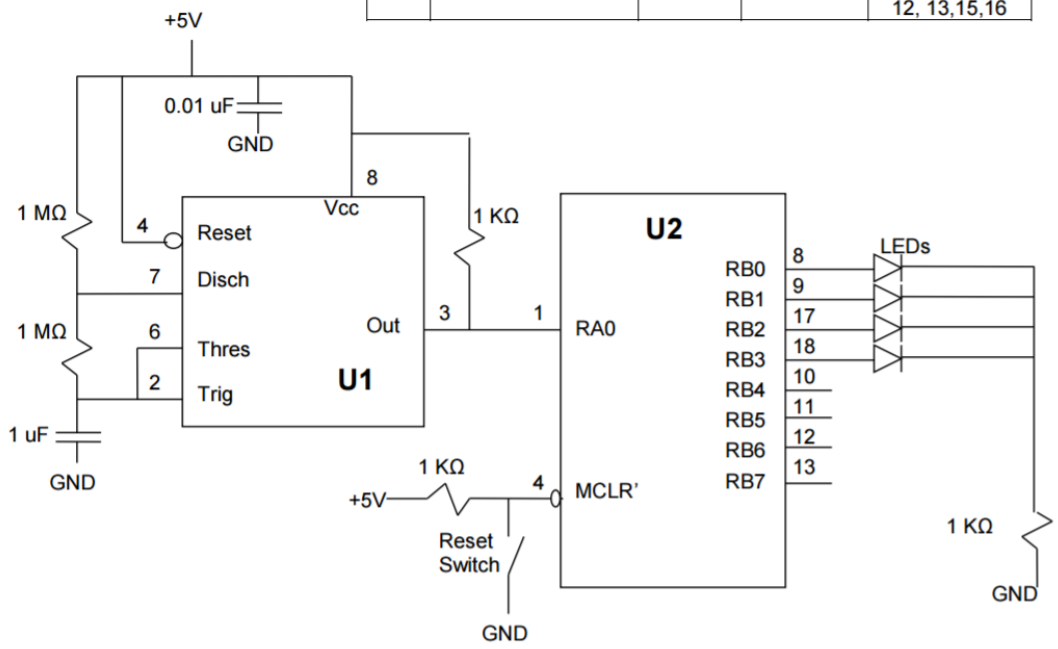
After that, by following remain steps; such as debugging, simulating, and inserting 0x80~0x83; we inserted the codes into the chip(PIC18F1220) by using 6 pins. We connected this pins with PICKit by the below way.



Experiment 2

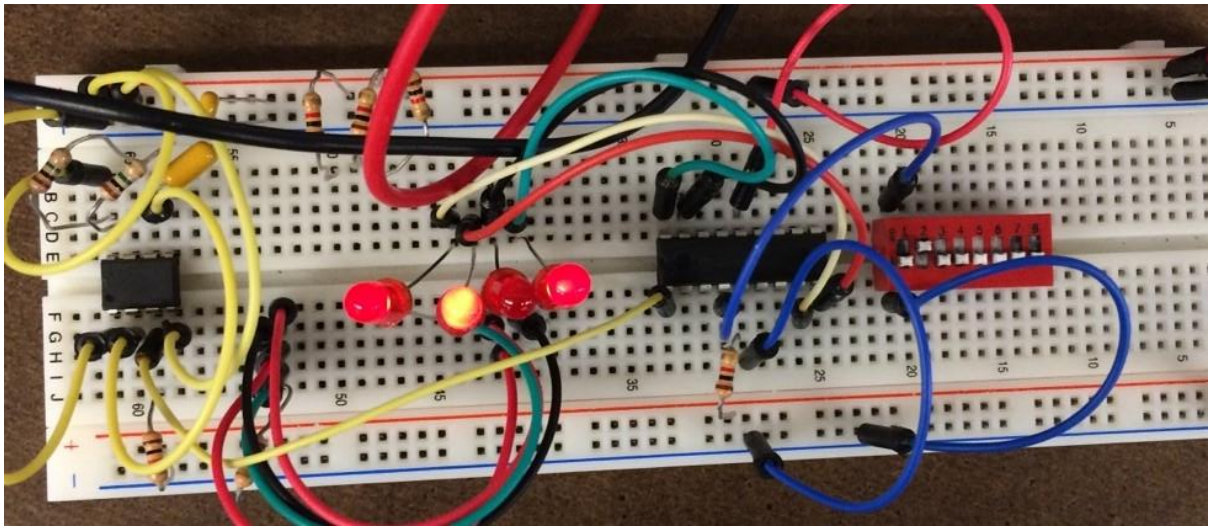
In this experiment, we built a circuit to test the functionality of the PICmicro programmed in the previous experiment. At first, we built the clock circuit and examined this circuit by using a diode. After confirming the clock circuit was working, we connected this circuit with the PIC18F1220 chip. Also, we put four diodes for output and put switch for reset the output.

U#.	Description	+5V	Ground	No Connect
U1	555 timer	8	1	5
U2	PIC 18F1220	14	5	2,3,6,7,10,11, 12, 13,15,16



After this experiment, we could know the result by four diodes. Each diode was turned off and on like the below table. Also, the diodes were turned off and on order was same with the table order.

The order	Diode 1	Diode 2	Diode 3	Diode 4	Turn on LED
1					-
2					1
3					2
4					1/2
5					3
6					3/1
7					3/2
8					3/2/1
9					4
10					4/1
11					4/2
12					4/2/1
13					4/3
14					4/3/1/
15					4/3/2
16					4/3/2/1



Above picture is our circuit

Learn from these experiments.

1. From this experiment, we could know what MPLAB-X is and how to use it.
2. After building our code, we could know how to insert the code into the chip.

Conclusion (New experiment)

In this lab, we learned about MPLAB-X; also, by using that, we learn how to insert the codes into the chip. At first, we had a big trouble about this program so that we spent a lot of time to figure it out. I think, because of this trial, it was a chance to understand it deeply. It was a new experiment to learn about the new program and I am expecting the other labs.