Software Considerations

Design a program that changes the PWM in increments of 25% duty cycle per every button press. For example:

Button Press #1	PWM goes from 25% to 50%
Button Press #2	PWM goes from 50% to 75%
Button Press #3	PWM goes from 75% to 100%
Button Press #4.	PWM goes from 100% to 25%

Etc…

Complete the following table and show your instructor

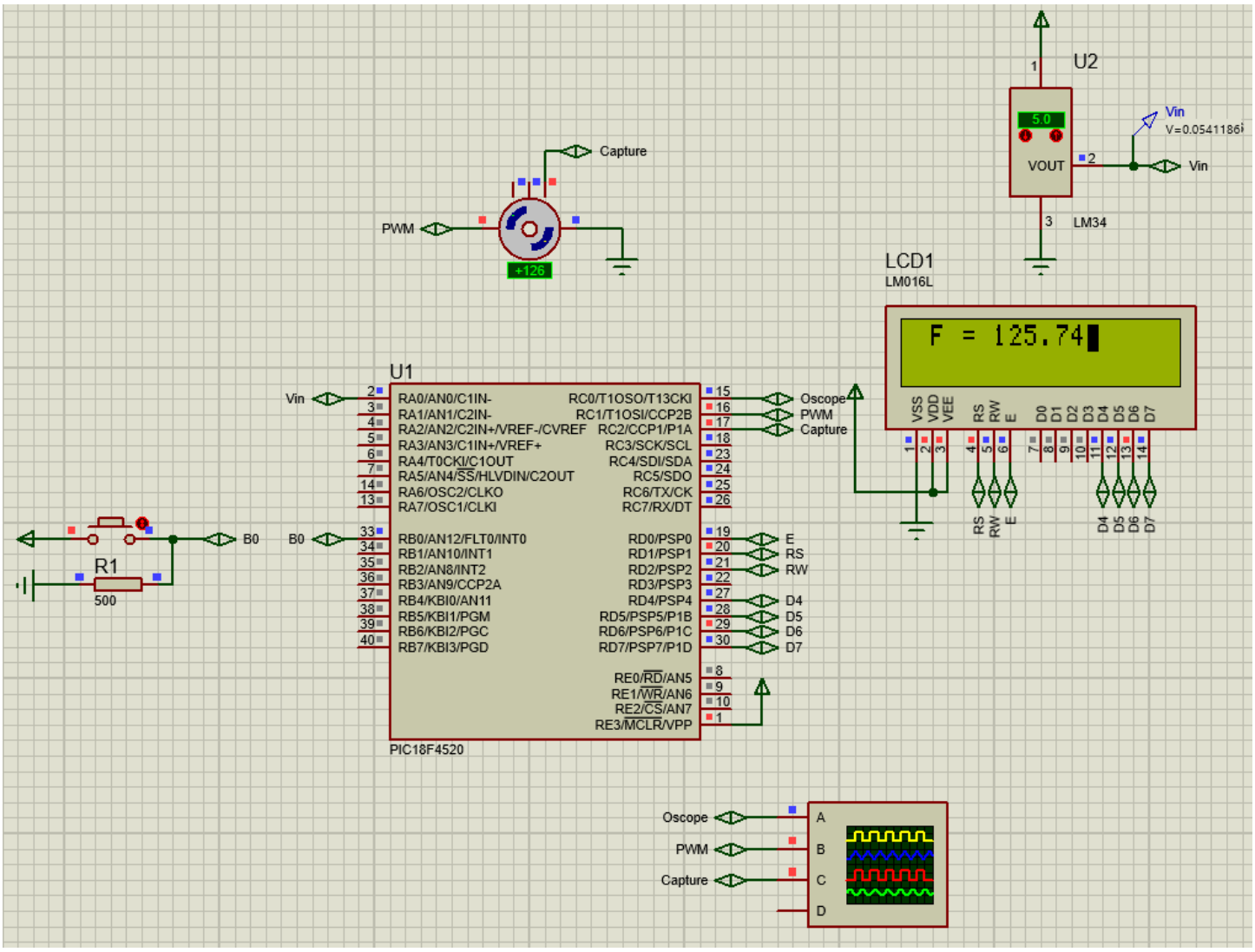
PWM	Measured RPM
25%	
50%	
75%	
100%	

25% = 31.43

50% = 62.86

75% = 94.29

100% = 125.73


U2
1
5.0
VOUT
2
3
LM34
Vin
V=0.0541186
Vin
Capture
PWM
+126
LCD1
LM016L
F = 125.74
VSS
VDD
VEE
RS
RW
E
D0
D1
D2
D3
D4
D5
D6
D7
U1
Vin
RA0/AN0/C1IN-
RA1/AN1/C2IN-
RA2/AN2/C2IN+/VREF-/CVREF
RA3/AN3/C1IN+/VREF+
RA4/T0CKI/C1OUT
RA5/AN4/SS/HLVDIN/C2OUT
RA6/OSC2/CLKO
RA7/OSC1/CLKI
RC0/T1OSO/T13CKI
RC1/T1OSI/CCP2B
RC2/CCP1/P1A
RC3/SCK/SCL
RC4/SDI/SDA
RC5/SDO
RC6/TX/CK
RC7/RX/DT
Oscope
PWM
Capture
B0
RB0/AN12/FLT0/INT0
RB1/AN10/INT1
RB2/AN8/INT2
RB3/AN9/CCP2A
RB4/KBI0/AN11
RB5/KBI1/PGM
RB6/KBI2/PGC
RB7/KBI3/PGD
RD0/PSP0
RD1/PSP1
RD2/PSP2
RD3/PSP3
RD4/PSP4
RD5/PSP5/P1B
RD6/PSP6/P1C
RD7/PSP7/P1D
E
RS
RW
D4
D5
D6
D7
RE0/RD/AN5
RE1/WR/AN6
RE2/CS/AN7
RE3/MCLR/VPP
PIC18F4520
R1
500
Oscope
PWM
Capture
A
B
C
D

```c
#include <18f4520.h>
#use delay (clock = 20000000)
#fuses HS, NOWDT, NOLVP
#include "../../Library/myLibrary.h"
#include "../../Library/modifiedlcd.h"

unsigned int x = 0, button = 1;
unsigned int16 tstop, tstart, telapsed;

#INT_TIMER1
void int_timer1_isr(){
   x++;                        // Count the overflows
   output_toggle( PIN_C0 );
}

#INT_CCP1
void int_ccp1_isr(){
    tstop = *CCPR1;
    telapsed = x * 0x10000 -tstart + tstop;
    x = 0;   // Rest Overflow
    tstart = tstop;
    output_toggle( PIN_C1 );
}

#INT_EXT
void int_ext_isr(){
    button++;

    if( button > 4 ) {
      button = 1;
    }
}

main(){
   float T1c = 4 * 1 / 20000000.0;
   lcd_init();             // Initializing the LCD Panel
   *TRISC = 0x4;           // 0000 0100   C2 is input

   // Capture System Setup
   CCP1CON -> CCPxMx = 0x4; //Capture every falling

   // Timer Setup
   T1CON -> TMR1ON = 1;      // Timer is ON
   T1CON -> TMR1CS = 0;      // Fosc / 4
   T1CON -> T1CKPSx = 0;     // PS = 1;

   // Interrupt System Setup
   PIE1 -> TMR1IE = 1;       // Timer 1 overflow interrupt system 0n
   PIE1 -> CCP1IE = 1;       // CCP1 Interrupt Systen ON
   INTCON -> PEIE = 1;
   INTCON -> GIE = 1;        // Interrupt System Enabled

   // PWM Setup
   CCP2CON -> CCPxMx = 0xC;
   *PR2 = 100;
   *CCPR2L = 10;
```

```
57      T2CON -> TMR2ON = 1;
58
59      // Button
60      INTCON -> INT0IE=1;
61
62      while(1){
63            // Just show me the data
64            printf(lcd_putc,"\f F = %f", 60 / ( 161 * (T1c * telapsed ) ) );
65            delay_ms(100);
66
67            if( button == 1 ) {
68               *CCPR2L = 25;
69            }
70            else if( button == 2 ) {
71               *CCPR2L = 50;
72            }
73            else if( button == 3 ) {
74               *CCPR2L = 75;
75            }
76            else if( button == 4 ) {
77               *CCPR2L = 100;
78            }
79      }
80  }
81
```