

Lecture (06)

16F84A programming III

Dr. Ahmed M. ElShafee

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- Build a operable, press controlled flasher with C
- MC drives AC load
- Build a operable, press controlled flasher with ASM
- Photo resistor interfacing to MC
- Assignment, press controlled single 7segment display counter without decoder, Simulator

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Build a real press controlled flasher with C

- Build millisecond delay

```
void delay_ms(int x)
{
    for(int n=0;n<x;n++)
    {
        _delay(1000);
    }
}
```

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- Build the program

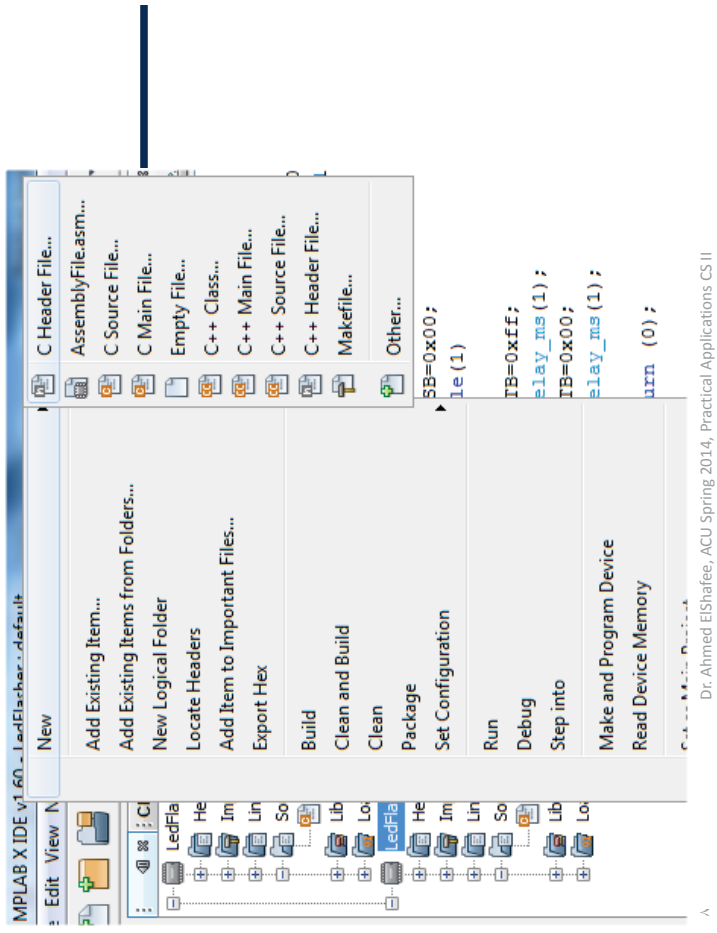
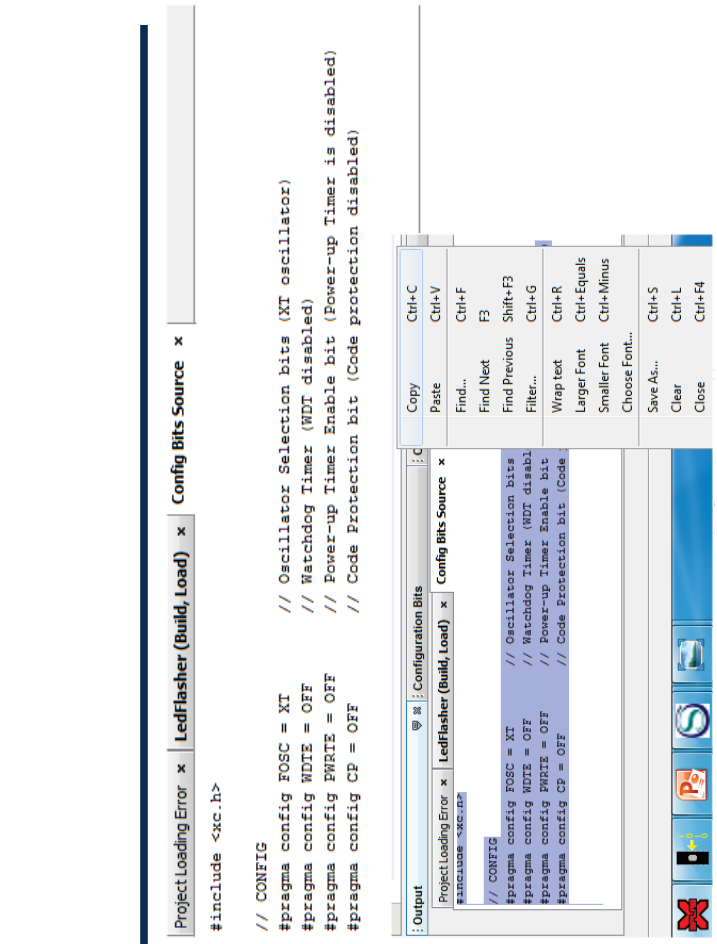
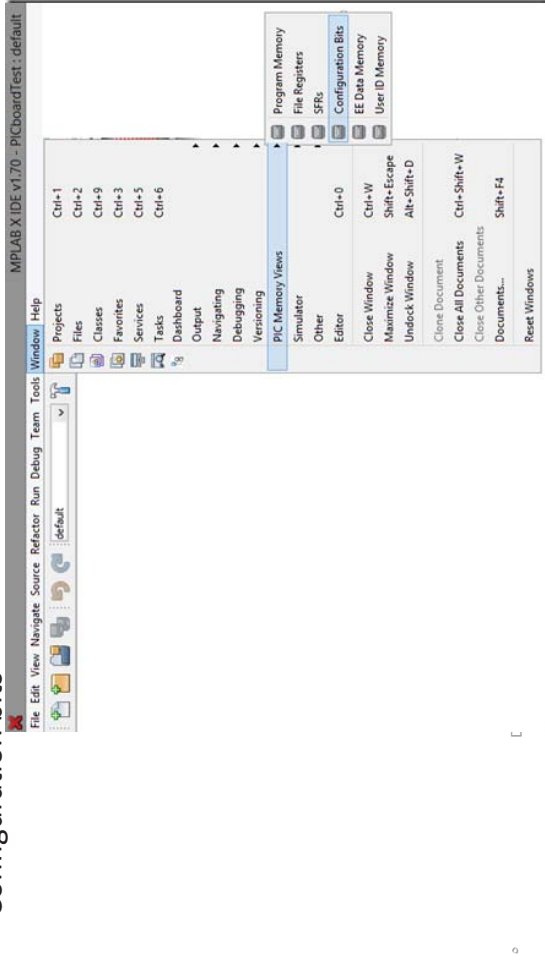
```
#include <xc.h>
#include <pic16f84a.h>
#include "config.h"
void delay_ms(int x);

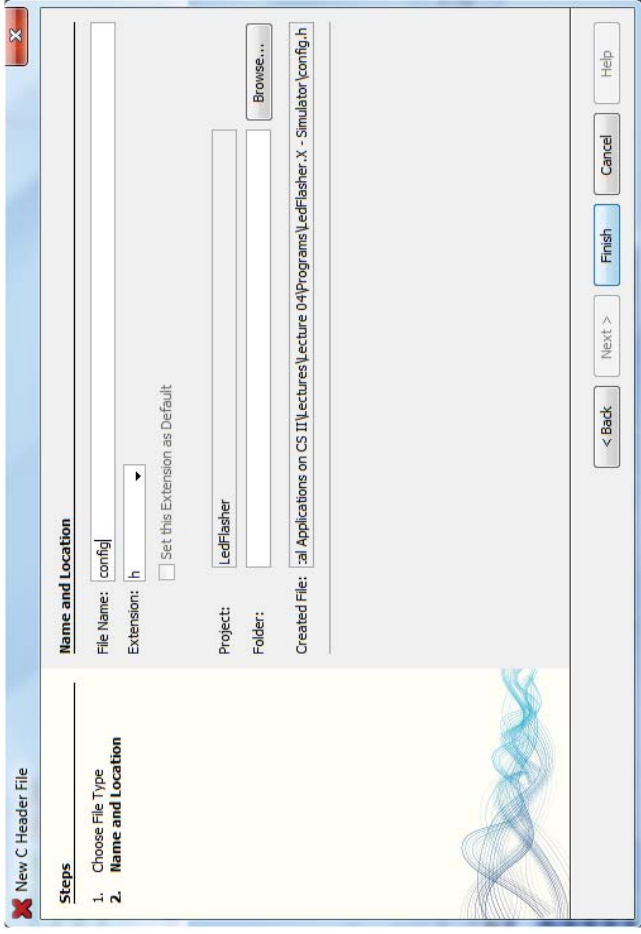
int main(void) {
    TRISB=0x00;
    TRISA=0xff;
    while(1)
    {
        if(RA0==0)
        {
            PORTB=0xff;
            delay_ms(100);
            PORTB=0x00;
            delay_ms(100);
        }
    }
}
```

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```
else
{
    PORTB=0x00;
}
return (0);
}
```

- Configuration bits





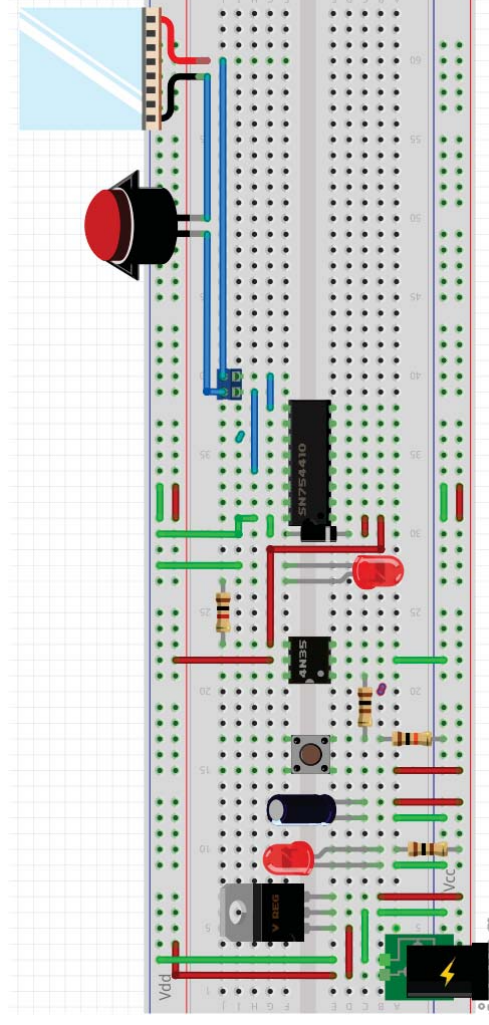
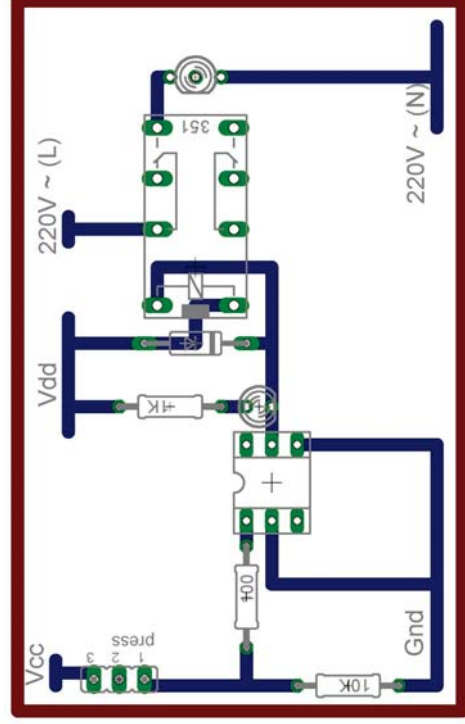
```

Start Page | newfile.c | newfile.c | config.h | config.h
1 #pragma config FOSC = XT // Oscillator Selection bits (XT oscillator)
2 #pragma config WDTE = OFF // Watchdog Timer (WDT disabled)
3 #pragma config PWRTE = OFF // Power-up Timer Enable bit (Power-up Timer is disabled)
4 #pragma config CP = OFF // Code Protection bit (Code protection disabled)

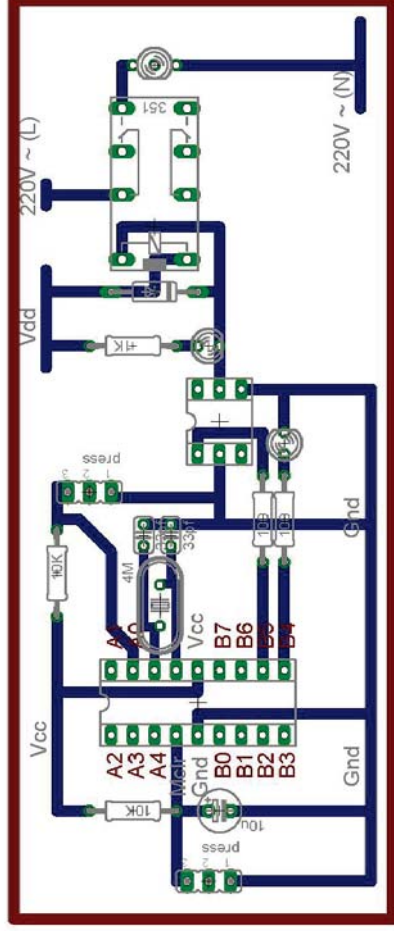
```

MC drives AC load

Interfacing AC loads using Opto-Coupler Isolator and relays



- Interfacing MC to an AC loads using Opto-Coupler Isolator and relays



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Build a operable, press controlled flasher with ASM

- Build millisecond delay

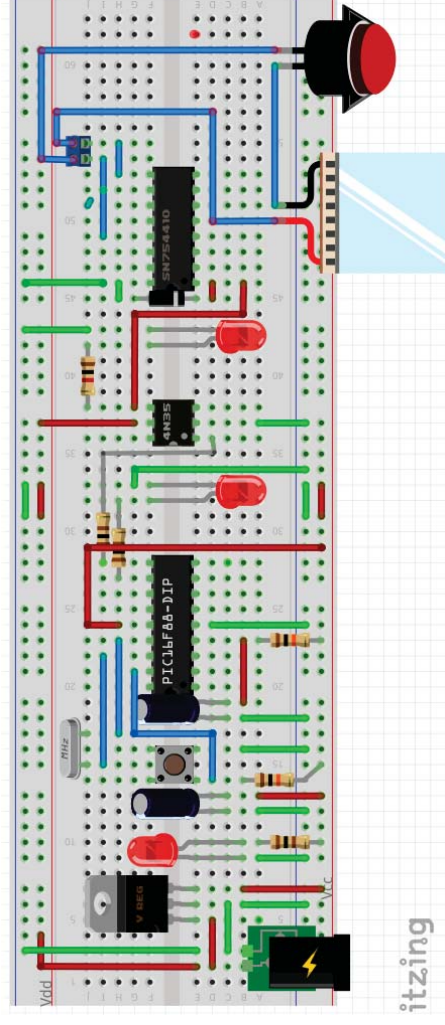
```

DELAYMS
MOVLW D'02'
MOVWF 0x4f
MOVLW D'250'
MOVWF 0x4e
DELAYMS_loop
DECFSZ 0x4e
goto DELAYMS_loop
DECFSZ 0x4f
goto DELAYMS_loop
RETURN

```

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- Build 10 millisecond delay

```

DELAY10MS
MOVLW D'9'
MOVWF 0x4d
DELAY10MS_loop
CALL DELAYMS
DECFSZ 0x4d
goto DELAY10MS_loop
RETURN

```

- Build 100 millisecond delay

```

DELAY100MS
MOVLW D'99'
MOVWF 0x4d
DELAY100MS_loop
CALL DELAYMS
DECFSZ 0x4d
goto DELAY100MS_loop
RETURN
end

```

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- Build 1 second delay

```

DELAY1S
MOVLW D'2'
MOVWF 0x4d
MOVLW D'250'
MOVWF 0x4c
DELAY1S_loop
call DELAYMS
DECFSZ 0x4c
goto DELAY1S_loop
DECFSZ 0x4d
goto DELAY1S_loop
RETURN

```

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- Build the program

```

LIST P=16f84
include "p16F84.inc"
__config_FOSC_XT &
_PWRTE_ON & _WDT_OFF &
_CP_OFF
ORG 0
GOTO start
ORG 4
GOTO start
start
BSF STATUS,RP0
MOVLW H'00'
MOVWF TRISB
MOVLW H'01'
MOVWF TRISA
BCF STATUS,RP0

```

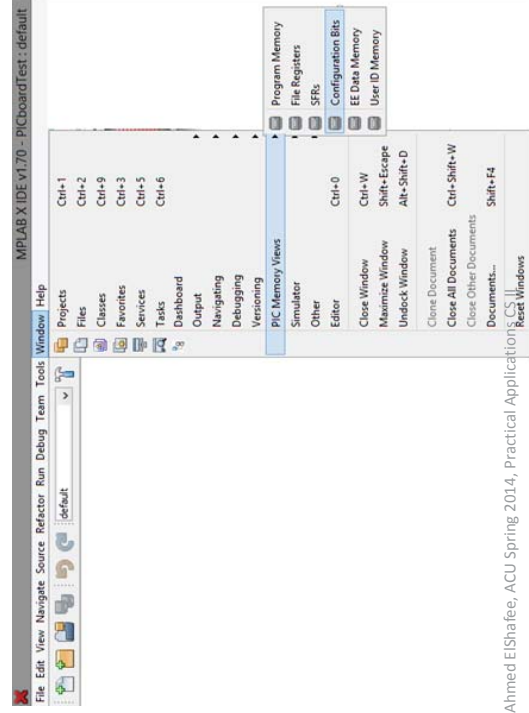
```

LOOP
MOVLW B'00000000'
MOVWF PORTB
CALL DELAY100MS
BTFSC PORTA,RA0
GOTO LOOP
MOVLW B'11111111'
MOVWF PORTB
CALL DELAY100MS
GOTO LOOP

```

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- Configuration bits



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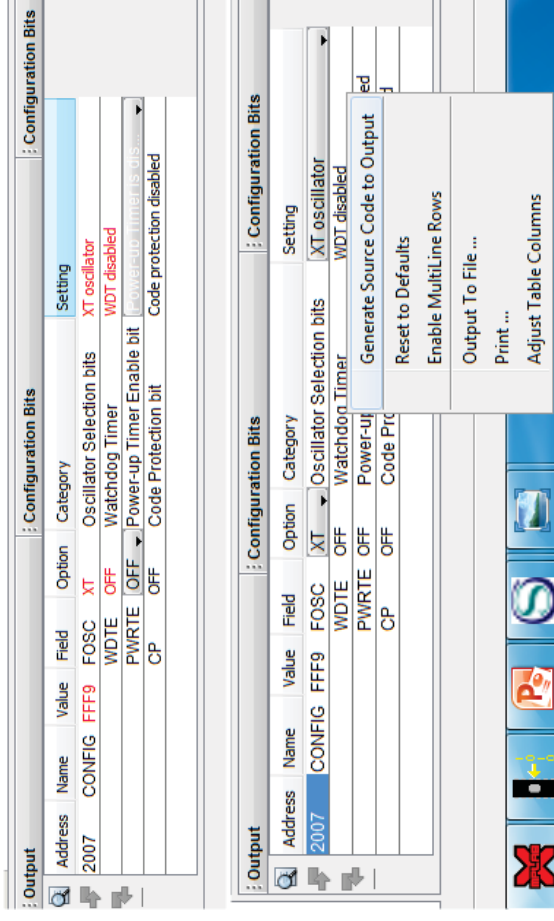
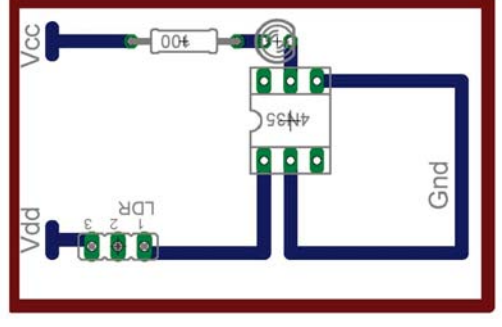


Photo resistor interfacing to MC

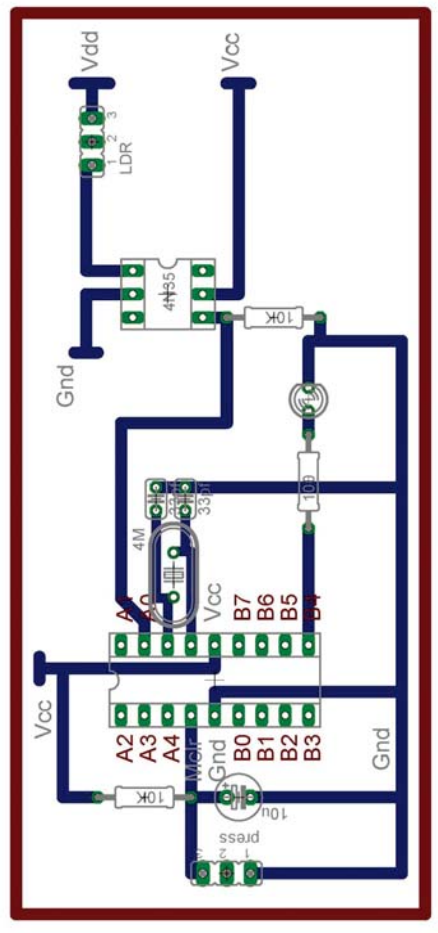
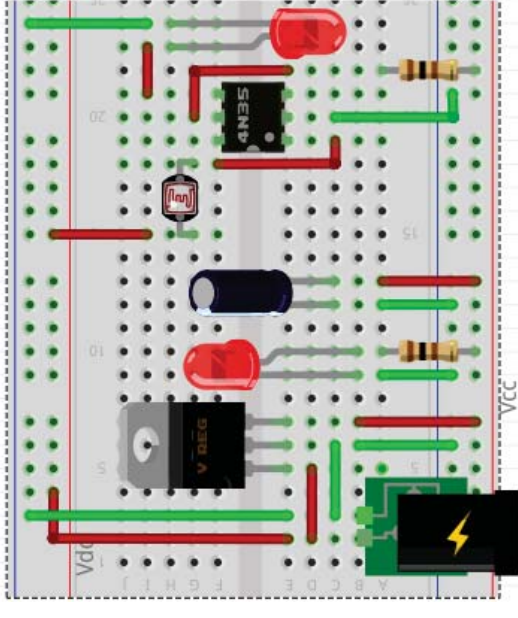
Interfacing generic sensors using opto-coupler isolators

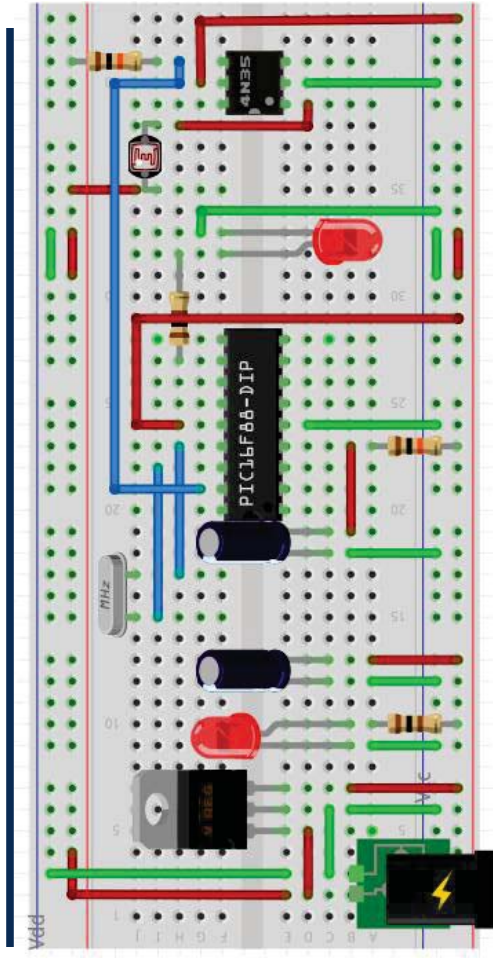
Light status	Resistance
dark	1 mega ohm
light	36 k ohm



```

: Output
ier.asm.Simulator (Clean, Build, ...) x PressControlledLedStatusToggle.asm.simulator (Clean, Build, ...) x F
; PIC16F84A Configuration Bit Settings
#include "p16F84A.inc"
; CONFIG
; __config 0x3FF1
; __CONFIG_CONFIG1, _FOSC_XT & _WDTE_OFF & _PWRTE_ON & _CP_OFF
    
```

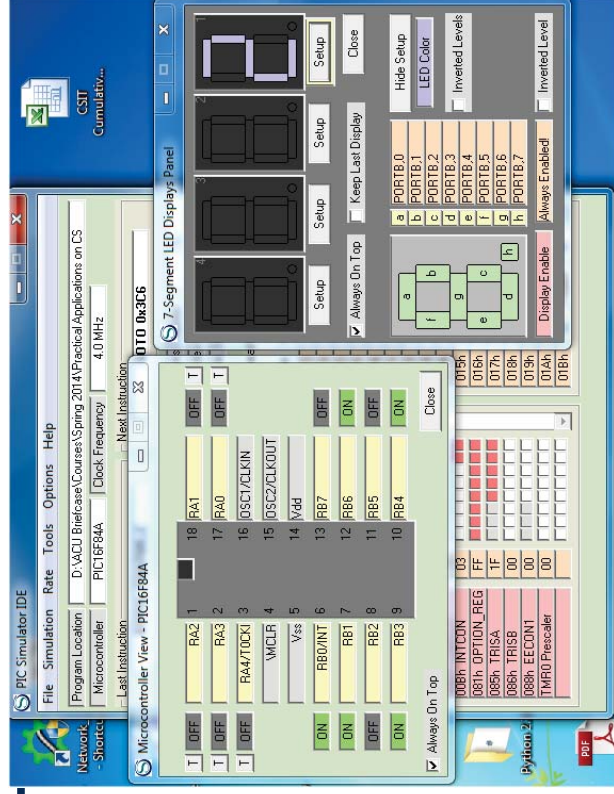




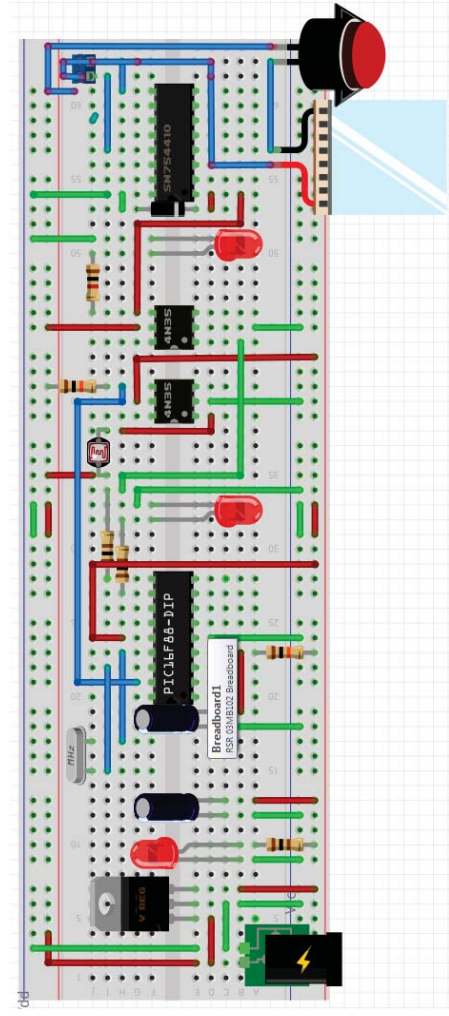
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Assignment, press controlled single 7segment display counter without decoder, Simulator



Y1

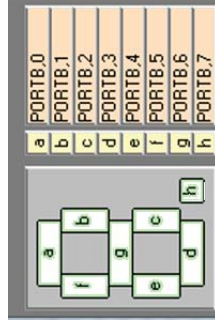
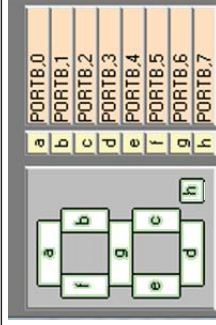


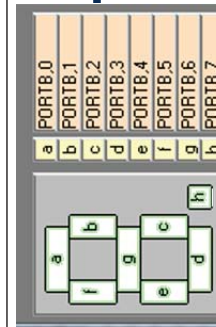
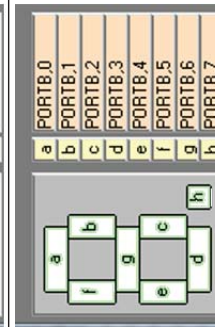
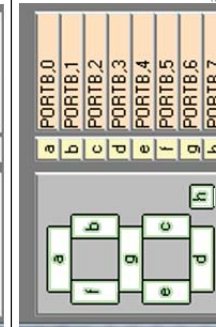
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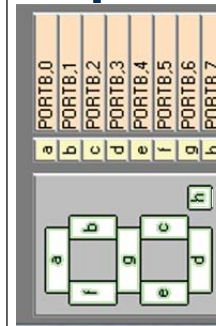
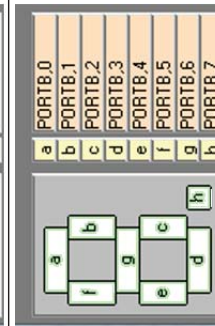
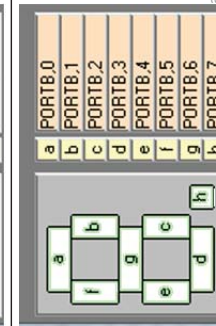
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7Segments configuration

- 7 segments count each one second
- RA0 controls 7 segments display counting direction
- If RA0 is low 7segments count up, till reaching 9 then start over from 0
- If RA0 is high, 7 segments count down, till reaching 0 then start over from 9

Number (Decimal)	7 segment	PORT B (Binary)
0		b00111111
1		b0000011

Number (Decimal)	7 segment	PORT B (Binary)
2		
3		
4		

Number (Decimal)	7 segment	PORT B (Binary)
5		
6		
7		

Number (Decimal)	7 segment	PORT B (Binary)
8		
9		

Thanks,..
See you next week (ISA),...