//start up confoguration

#pragma config FOSC = HSMP

#pragma config PWRTEN = ON

#pragma config BOREN = OFF

#pragma config WDTEN = OFF

#pragma config LVP = OFF

#pragma config PBADEN = OFF

//#define frequencies

#define \_XTAL\_FREQ 4000000

#define I2C\_freq 100000

//file adding

//#include header file

#include <xc.h>

//display config location

#define unlit 0x3e

#define lit 0x38

#define zero 0x3f

#define one 0x6

#define two 0x5b

#define three 0x4f

#define four 0x66

#define five 0x6d

#define six 0x7d

#define seven 0x7

#define eight 0x7f

#define nine 0x67

unsigned char digits[]={unlit,lit,zero,one,two,three,four,five,six,seven,eight,nine};

//MCP data sheet info location

//needs write address

//read address

//IODIR

//GPIO

#define mcp23008\_address\_write 0x40 //important changed based on a1,a0,a2

#define mcp23008\_address\_read 0x41 //important changed based on a1,a0,a2

#define MCP\_IODIR 0x00//important

#define MCP\_GPIO 0x09//important

#define MCP\_IPOL 0x01

#define MCP\_GPINTEN 0x02

#define MCP\_DEFVAL 0x03

#define MCP\_INTCON 0x04

#define MCP\_IOCON 0x05

#define MCP\_GPPU 0x06

#define MCP\_INTF 0x07

#define MCP\_INTCAP 0x08

#define MCP\_OLAT 0x0A

//setting up functions which are gonna be used

//void initilise (void)

//pic

//i2c

//mcp

//idlei2c

//starti2c

//i2c send data requires 3 unsigned char

//writei2c requires unsigned char

//stopi2c

//led flash for config confirmation

void PIC\_Initialise (void);

void I2C\_Initialise (void);

void MCP23008\_Initialise (void);

void IdleI2C (void);

void StartI2C (void);

void I2C\_send\_data (unsigned char device\_address,unsigned char register\_address,unsigned char register\_data) ;

void WriteI2C (unsigned char data );

void StopI2C (void);

void LED\_flash (void);

void main(void)

//call pic,i2c and mcp functions

//loop forever

{

PIC\_Initialise();

I2C\_Initialise();

MCP23008\_Initialise();

while (1)

{

int i = 0;

for (i=0;i<12;i++) //he wrote 16 i wrote 11

{

I2C\_send\_data (mcp23008\_address\_write,MCP\_GPIO, digits[i]);

\_\_delay\_ms(500);

}

}

}

//sub routines - the functions being created

void I2C\_Initialise ()

{

SSP1STAT = 0x00;

SSP1CON1 = 0x28;

SSP1CON2 = 0x00;

SSP1CON3 = 0x08;

SSP1ADD = 0x09;

}

void PIC\_Initialise (void)

{

PORTA=PORTB=PORTC=0;

LATA=LATB=LATC = 0x00;

TRISA=TRISB=TRISC=0x00;

TRISC=0b00011000;

ANSELC=0;

}

void MCP23008\_Initialise (void)

{

LED\_flash();

I2C\_send\_data(mcp23008\_address\_write,MCP\_IODIR,0x00);

LED\_flash();

I2C\_send\_data(mcp23008\_address\_write,MCP\_IPOL,0x00);

LED\_flash();

I2C\_send\_data(mcp23008\_address\_write,MCP\_GPINTEN,0x00);

LED\_flash();

I2C\_send\_data(mcp23008\_address\_write,MCP\_IOCON,0x3E);

LED\_flash();

I2C\_send\_data(mcp23008\_address\_write,MCP\_GPPU,0x00);

LED\_flash();

}

void LED\_flash (void)

{

PORTBbits.RB0 =1;

\_\_delay\_ms(500);

PORTBbits.RB0 =0;

\_\_delay\_ms(500);

}

void I2C\_send\_data (unsigned char device\_address,unsigned char register\_address,unsigned char register\_data)

{

StartI2C();

WriteI2C(device\_address);

IdleI2C();

WriteI2C(register\_address);

IdleI2C();

WriteI2C(register\_data);

IdleI2C();

StopI2C();

}

void IdleI2C(void)

{

while ((SSP1CON2 & 0x1F)||(SSP1STAT & 0x02));

}

void StartI2C (void)

{

PIR1bits.SSPIF = 0;

SSP1CON2bits.SEN = 1;

while (!PIR1bits.SSPIF);

PIR1bits.SSPIF=0;

}

void WriteI2C (unsigned char data)

{

SSP1BUF = data;

while (SSP1STATbits.BF);

}

void StopI2C()

{

SSP1CON2bits.PEN = 1;

}