



```
/* This program is written for lcd interface in 4-bit mode in pic16
series */

#include <xc.h>
#define _XTAL_FREQ 20000000

/////////////////////////////////////////////////////////////////

/*These are the deffinitions need to be defined for different hardwares
connections*/

#define LCD_pin_init
TRISD &=~((1<<2)|(1<<3)|(1<<4)|(1<<5)|(1<<6)|(1<<7) //making all lcd
                                                    pins as output pins

#define rs RD2

#define e RD3

#define DB7 RD7
#define DB6 RD6
#define DB5 RD5
#define DB4 RD4
#define display_charect 16

/////////////////////////////////////////////////////////////////

#define command rs=0
#define data rs=1
#define clearnibble DB7=DB6=DB5=DB4=0
#define high 1
#define low 0

/////////////////////////////////////////////////////////////////

/* LCD function definitions*/

#define clear_display_ 0x01
#define display&curser_home 0x02
#define bit4_2line_10_7 0x28
#define bit8_2line_10_7 0x38
#define set_zero_address 0x80
#define disp_on_curs_underl_curs_blink 0x0f

////////////////////////////////////////////////////////////////private function////////////////////////////////////////////////////////////////

void sub_data_command(char value);

////////////////////////////////////////////////////////////////public functions////////////////////////////////////////////////////////////////

void lcd_init(void);
void clear_display(void);
void lcd_display( char display[]);
void send_data(char data_);
void send_command(char command_);
```



```
void lcd_display( char display[])
{
    int i;
    for(i=0;display[i]!='\0';i++)
    {
        if(i==0)
        {
            send_command(0x80);
        }
        else if(i==display_charect)
        {
            send_command(0xc0);
        }

        send_data(display[i]);
    }
}
```

```
void sub_data_command(char value)
{
    e=1;
    DB7=value>>3;
    DB6=value>>2;
    DB5=value>>1;
    DB4=value>>0;
    __delay_us(2000);
    e=0;
    __delay_us(2000);
}
```

```
void clear_display(void)
{
    send_command(clear_display_);
}
```

```
void send_data(char data_)
{
    data;
    sub_data_command(data_>>4);
    sub_data_command(data_);
}
```

```
void send_command(char command_)
{
    command;
    sub_data_command(command_>>4);
    sub_data_command(command_);
    data;
}
```