

Group_5

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10:06 PM

Team :

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```
/*
 * LCD.c
 *
 * Created: 3/2/2024 9:17:58 PM
 * Author : Ayat
 */
#define F_CPU 8000000UL
#include "BIT_MATH.h"
#include "STD_TYPES.h"
#include "LCD_Interface.h"
#include "DIO_INTERFACE.h"
#include <util/delay.h>
int main(void)
{
    LCD_Init();
    LCD_Clear();
    _delay_ms(50);
    while (1)
    {
        int i=0;
        for(i = 0 ; i < 10 ; i++)
        {
            if(i <= 5)
            {
                LCD_Move_Cursor(0,i);
                LCD_Print_String("Hello");
                _delay_ms(1000);
                LCD_Clear();
                _delay_ms(5);
            }
            else if(i > 5)
            {
                LCD_Move_Cursor(0,10-i);
                LCD_Print_String("Hello");
                _delay_ms(1000);
                LCD_Move_Cursor(0,i);
                LCD_Clear();
                _delay_ms(5);
            }
        }
    }
}
```

```
/*
 * LCD_Prog.h
 *
 * Created: 3/2/2024 9:21:35 PM
 * Author: Ayat Mohamed
 */

#include "BIT_MATH.h"
#include "STD_TYPES.h"
#include "LCD_Interface.h"
#include "DIO_INTERFACE.h"
#include <util/delay.h>
#ifndef LCD_PROG_H_
#define LCD_PROG_H_
static uint8 cursor = 1;
void LCD_Init(void)
{
    DIO_VidSetPinDirection(CONTROL_PORT , RS ,Output);
    DIO_VidSetPinDirection(CONTROL_PORT , EN ,Output);
    _delay_ms(20);
    DIO_VidSetPinDirection(CONTROL_PORT , D4 ,Output);
    DIO_VidSetPinDirection(CONTROL_PORT , D5 ,Output);
    DIO_VidSetPinDirection(CONTROL_PORT , D6 ,Output);
    DIO_VidSetPinDirection(CONTROL_PORT , D7 ,Output);

    DIO_VidSetPinValue(CONTROL_PORT , RS , PinLow );
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinLow );
    LCD_Void_Send_Command(0x02);
    /*Function set: 2 lines 5*8*/
    LCD_Void_Send_Command(0x28);//10100000
    _delay_ms(1);
    /*Display on off :display enable ,display cursor,no blink cursor */
    LCD_Void_Send_Command(0x0C);
    LCD_Void_Send_Command(0x06);
    LCD_Void_Send_Command(0x80);
    LCD_Void_Send_Command(0x01);
}
void LCD_Void_Send_Data(uint8 Data)
{
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinHigh);
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , D4 ,GET_BIT(Data,Pin4));
    DIO_VidSetPinValue(CONTROL_PORT , D5 ,GET_BIT(Data,Pin5));
    DIO_VidSetPinValue(CONTROL_PORT , D6 ,GET_BIT(Data,Pin6));
    DIO_VidSetPinValue(CONTROL_PORT , D7 ,GET_BIT(Data,Pin7));
    DIO_VidSetPinValue(CONTROL_PORT , RS , PinHigh);
    _delay_ms(1);
}
```

```
DIO_VidSetPinValue(CONTROL_PORT , EN ,PinLow );
_delay_ms(1);
DIO_VidSetPinValue(CONTROL_PORT , EN ,PinHigh);
_delay_ms(1);
DIO_VidSetPinValue(CONTROL_PORT , D4 ,GET_BIT(Data,Pin0));
DIO_VidSetPinValue(CONTROL_PORT , D5 ,GET_BIT(Data,Pin1));
DIO_VidSetPinValue(CONTROL_PORT , D6 ,GET_BIT(Data,Pin2));
DIO_VidSetPinValue(CONTROL_PORT , D7 ,GET_BIT(Data,Pin3));
DIO_VidSetPinValue(CONTROL_PORT , RS , PinHigh);
_delay_ms(1);
DIO_VidSetPinValue(CONTROL_PORT , EN ,PinLow );
_delay_ms(1);
}

void LCD_Void_Send_Command(uint8 Com)
{
    //uint8_t Local_Com ;
    DIO_VidSetPinValue(CONTROL_PORT , RS , PinLow );
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinHigh);
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , D4 ,GET_BIT(Com,Pin4));
    DIO_VidSetPinValue(CONTROL_PORT , D5 ,GET_BIT(Com,Pin5));
    DIO_VidSetPinValue(CONTROL_PORT , D6 ,GET_BIT(Com,Pin6));
    DIO_VidSetPinValue(CONTROL_PORT , D7 ,GET_BIT(Com,Pin7));
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinLow );
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinHigh);
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , D4 ,GET_BIT(Com,Pin0));
    DIO_VidSetPinValue(CONTROL_PORT , D5 ,GET_BIT(Com,Pin1));
    DIO_VidSetPinValue(CONTROL_PORT , D6 ,GET_BIT(Com,Pin2));
    DIO_VidSetPinValue(CONTROL_PORT , D7 ,GET_BIT(Com,Pin3));
    _delay_ms(1);
    DIO_VidSetPinValue(CONTROL_PORT , EN ,PinLow );
    _delay_ms(1);
}

void LCD_Print_String(uint8 *Copy_Str)
{
    uint8 iterator = 0;
    // check if the string is ending or not
    while(Copy_Str[iterator] != '\0')
    {
```

```
// print the data
LCD_Void_Send_Data(Copy_Str[iterator]);

//increase the address by one to send the next element.
iterator++;
}
}

void LCD_Move_Cursor(uint8 row , uint8 column)
{
    switch(row)
    {
        case 0 :
            if(column < 16)
            {
                LCD_Void_Send_Command((0x80) + (column));
                cursor = column;
            }
            break;
        case 1:
            if(column < 16)
            {
                LCD_Void_Send_Command((0x80) + 0x40 + (column));
                cursor = 17 + column;
            }
            break;
    }
}

void LCD_Clear(void)
{
    LCD_Void_Send_Command(0x01);
    _delay_ms(1);
}

#endif /* LCD_PROG_H_ */
```

```
/*
 * LCD_Interface.h
 *
 * Created: 3/2/2024 9:21:17 PM
 * Author: Q
 */

#ifndef LCD_INTERFACE_H_
#define LCD_INTERFACE_H_

#define CONTROL_PORT Port_A
#define RS Pin1
#define EN Pin2
#define D4 Pin3
#define D5 Pin4
#define D6 Pin5
#define D7 Pin6

void LCD_Init(void);
void LCD_Void_Send_Data(uint8 Data);
void LCD_Void_Send_Command(uint8 Com);
void LCD_Print_String(uint8 *Copy_Str);
void LCD_Move_Cursor(uint8 row , uint8 column);
void LCD_Clear(void);

#endif /* LCD_INTERFACE_H_ */
```