1. 代码实现

```
//PE5
#define DHT11_PORT  GPIOE
#define DHT11_IO    GPIO_Pin_5
#define DHT11_RCC   RCC_AHB1Periph_GPIOE

void dht11_io_out()
{
    //配置dth11连接的gpio引脚为推挽输出模式
    GPIO_InitTypeDef g;
    g.GPIO_Pin = DHT11_IO;
    g.GPIO_MODE = ...;
    //...

    GPIO_Init(DHT11_PORT, &g);
}

void dht11_io_in()
{
    //配置dht11连接的gpio引脚为浮空输入模式

}

void dht11_init()
{
    RCC_AHB1PeriphClockCmd(RCC_AHB1Periph_GPIOE, ENABLE);
    dht11_start();
    return dht11_check();
}

void dht11_start()
{
    dht11_io_out();

    //将总线拉低

    //延时至少18ms
    Mdelay_Lib(20);

    //将总线拉高

    //拉高20 ~ 40 us
    Udelay_Lib(30);

}

unsigned char dht11_check()
{
    unsigned char n = 0;

    dht11_io_in();
    while((GPIO_ReadInputDataBit(DHT11_PORT, DHT11_IO) == 1) && n < 100)
    {
```

```
        n++;
        Udelay_Lib(1);
    }
    if(n >= 100)
        return 1;

    else
        n = 0;

    while((GPIO_ReadInputDataBit(DHT11_PORT, DHT11_IO) == 0) && n < 100)
    {
        n++;
        Udelay_Lib(1);
    }
    if(n >= 100)
        return 1;

    else
        return 0;
}

unsigned char dht11_read_bit()
{
    unsigned char n;

    while((GPIO_ReadInputDataBit(DHT11_PORT, DHT11_IO) == 1) && n < 100)
    {
        n++;
        Udelay_Lib(1);
    }

    n = 0;
    while((GPIO_ReadInputDataBit(DHT11_PORT, DHT11_IO) == 0) && n < 100)
    {
        n++;
        Udelay_Lib(1);
    }
    Udelay_Lib(40);

    if(GPIO_ReadInputDataBit(DHT11_PORT, DHT11_IO) == 1)
        return 1;
    else
        return 0;
}

unsigned char dht11_read_byte()
{
    unsigned i, dat;
    dat = 0;
    for(i = 0; i < 8; i++)
    {
        dat = dat << 1;
        dat = dat | dht11_read_bit();
    }
    return dat;
}

unsigned char temp = 0;
```

```c
unsigned char humi = 0;

unsigned char dht11_read_dat()
{
    unsigned char buf[5];

    dht11_start();
    if(dht11_check() == 0)
    {
        for(int i = 0; i < 5; i++)
        {
            buf[i] = dht11_read_byte();
        }
        if((buf[0]+buf[1]+buf[2]+buf[3]) == buf[4])
        {
            temp = buf[0];
            humi = buf[2];
        }
    }
    else
        return 1;

    return 0;
}

int main()
{
    dht11_init();
    lcd_init();
    char str[32] = {0}

    while(1)
    {
        dht11_read_dat();
        lcd_gotoxy(0, 0);
        sprintf(str, "temp = %d", temp);
        lcd_print_str(str);

        lcd_gotoxy(1, 0);
        sprintf(str, "humi = %d", humi);
        lcd_print_str(str);

        Mdelay_Lib(2);
    }

}


int printf(const char *format, ...);
    printf("str = %d\n", 10);


int sprintf(char *str, const char *format, ...);
    @str        指向一块空间，格式化字符串输出到这个空间中
    @format     指定字符串格式格式，可以包含格式化字符
    @...        匹配前一个参数的格式化字符

char str[32] = {0}
```

```
sprintf(str, "temp = %d", temp);
lcd_print_str(str);
```