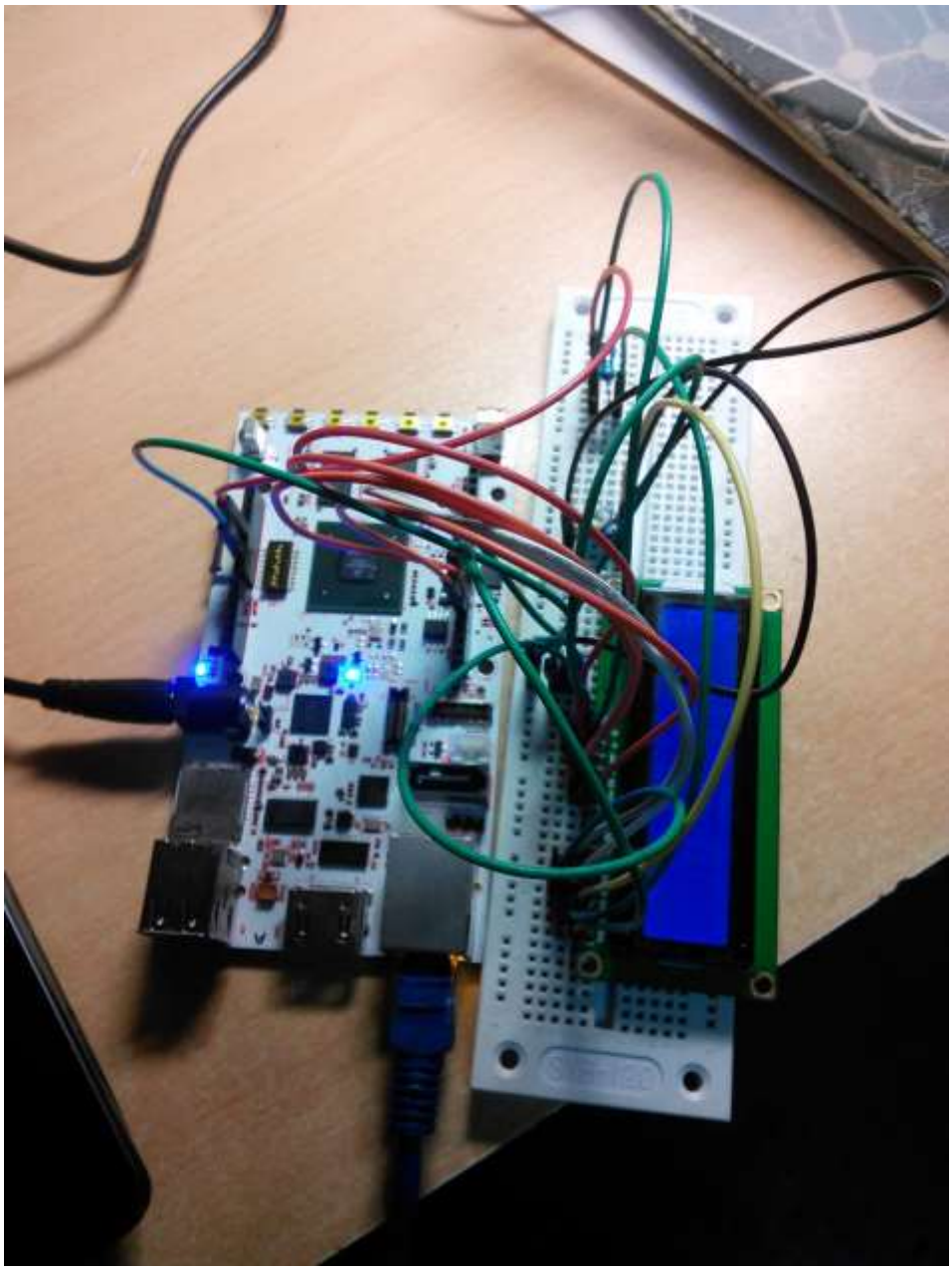
Lab#228 做一个网络时钟

姓名：徐子诚

学号：3120000073

邮箱：zing@zju.edu.cn

一．　连接示意图



二．　器材列表

Acadia	×1
5V 电源	×1
microUSB 线	×1
路由器	×1
PC	×1
以太网线	×1
SYB-120 面包板	×1
LCD	×1
可变电阻	×1
电阻	×2
按钮	×2
面包线	若干

三．　操作方法和实验步骤

ntp 客户端在之前的实验中已经完成安装，不再赘述。

编写程序通过 ntp 客户端获取时间并在七段 LCD 上显示：

```
#include <core.h>
#define RS 8
#define EN 9
#define backlight 10
#define RS_L digitalWrite(RS,LOW)
#define RS_H digitalWrite(RS,HIGH)
#define EN_L digitalWrite(EN,LOW)
#define EN_H digitalWrite(EN,HIGH)
int DB[] = {7,6,5,4};
char * date;
```

```
byte jia[8] = {0x1F,0x15,0x1F,0x15,0x1F,0x04,0x04,0x04};
byte yi[8] = {0x1F,0x01,0x02,0x04,0x08,0x10,0x11,0x0E};
byte bing[8] = {0x1F,0x04,0x1F,0x15,0x15,0x1B,0x11,0x11};
byte ding[8] = {0x1F,0x04,0x04,0x04,0x04,0x14,0x0C,0x04};
byte heart[8] = {0x00,0x0E,0x1F,0x1F,0x0E,0x04,0x00,0x00};
byte year[8] = {0x04,0x0F,0x12,0x0F,0x0A,0x1F,0x02,0x00};
byte month[8] = {0x0F,0x09,0x0F,0x09,0x0F,0x09,0x13,0x00};
byte day[8] = {0x0F,0x09,0x09,0x0F,0x09,0x09,0x0F,0x00};

void write_command(int command)
{
int i,temp;
RS_L;
EN_L;
temp=command & 0xf0;
for (i=0; i < 4; i++)
{
if(temp&0x80)digitalWrite(DB[i],HIGH);
else digitalWrite(DB[i],LOW);
delay(1);
temp <<= 1;
}
EN_H;
delay(10);
EN_L;
temp=(command & 0x0f)<<4;
for (i=0; i < 4; i++)
{
if(temp&0x80)
digitalWrite(DB[i],HIGH);
else digitalWrite(DB[i],LOW);
temp <<= 1;
delay(1);
}
EN_H;
delay(10);
EN_L;
}

void write_data(int dat)
{
int i=0,temp;
RS_H;
EN_L;
```

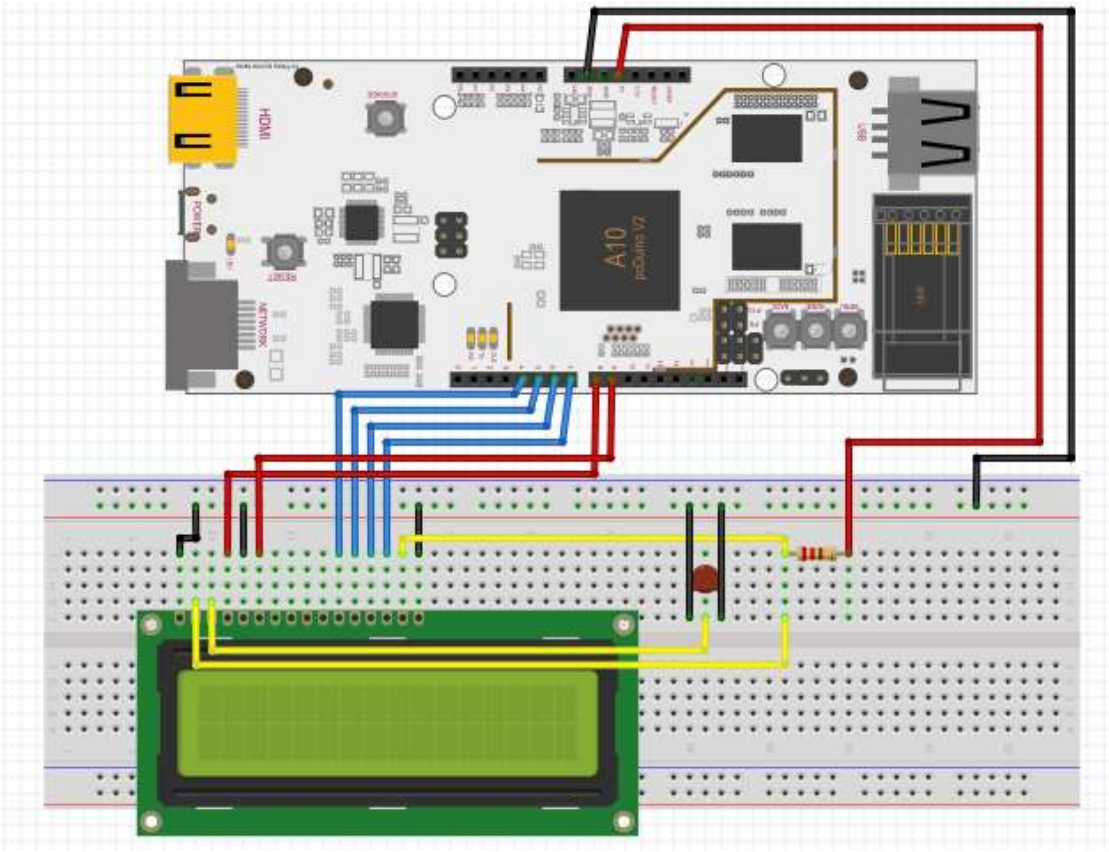
```
temp=dat & 0xf0;
for (i=0; i < 4; i++)
{
if(temp&0x80) digitalWrite(DB[i],HIGH);
else digitalWrite(DB[i],LOW);
temp <<= 1;
delay(1);
}
EN_H;
delay(10);
EN_L;
temp=(dat & 0x0f)<<4;
for (i=0; i < 4; i++)
{
if(temp&0x80) digitalWrite(DB[i],HIGH);
else digitalWrite(DB[i],LOW);
temp <<= 1;
delay(1);
}
EN_H;
delay(10);
EN_L;
}

void LCD_write_char( int x,int y,int dat)
{
int address;
if (x ==0) address = 0x80 + y;
else address = 0xC0 + y;
write_command(address);
write_data(dat);
delay(5);
}
/*********************************************************************/
void lcd1602_init()
{
int i = 0;
pinMode(RS,OUTPUT);
pinMode(EN,OUTPUT);
pinMode(backlight,OUTPUT);
digitalWrite(backlight,HIGH);
for (i=0; i < 4; i++)
{
pinMode(DB[i],OUTPUT);
```

```
}
delay(50);
write_command(0x28);
delay(50);
write_command(0x06);
delay(50);
write_command(0x0c);
delay(50);
write_command(0x80);
delay(50);
write_command(0x01);
delay(100);
}

void setup (void)
{
lcd1602_init();
write_command(0x40);
for(int i=0;i<8;i++)
{
write_data(heart[i]);
}
write_command(0x48);
for(int i=0;i<8;i++)
{
write_data(jia[i]);
}
write_command(0x50);
for(int i=0;i<8;i++)
{
write_data(yi[i]);
}
write_command(0x58);
for(int i=0;i<8;i++)
{
write_data(bing[i]);
}
write_command(0x60);
for(int i=0;i<8;i++)
{
write_data(ding[i]);
}
write_command(0x68);
for(int i=0;i<8;i++)
```

```
{
write_data(year[i]);
}
write_command(0x70);
for(int i=0;i<8;i++)
{
write_data(month[i]);
}
write_command(0x78);
for(int i=0;i<8;i++)
{
write_data(day[i]);
}
}

char* getdate(void)
{
FILE *stream;
char buf[1024];
memset(buf, 0, sizeof(buf));
stream = popen("date", "r");
fread(buf, sizeof(char), sizeof(buf), stream);
pclose(stream);
return buf;
}
void loop (void)
{
write_command(0x02);
write_command(0x80);
date = getdate();
LCD_write_char(0,0,*date);
LCD_write_char(0,1,*(date+1));
LCD_write_char(0,2,*(date+2));
LCD_write_char(0,3,*(date+3));
LCD_write_char(0,4,*(date+4));
LCD_write_char(0,5,*(date+5));
LCD_write_char(0,6,*(date+6));
LCD_write_char(0,7,*(date+7));
LCD_write_char(0,8,*(date+8));
LCD_write_char(0,9,*(date+9));
LCD_write_char(0,10,*(date+10));
LCD_write_char(1,1, *(date+11));
LCD_write_char(1,2, *(date+12));
LCD_write_char(1,3, *(date+13));
```

```
LCD_write_char(1,4, *(date+14));
LCD_write_char(1,5, *(date+15));
LCD_write_char(1,6, *(date+16));
LCD_write_char(1,7, *(date+17));
LCD_write_char(1,8, *(date+18));
LCD_write_char(1,9, *(date+19));
}
```

设计硬件连线方式如下：



最终连接图如实验报告第一段所示。

代码下板验证，视频地址如下：

http://v.youku.com/v_show/id_XMTI2MTkxNTA5Mg==.html

四．　实验要求完成情况

做一个网络时钟，通过 ntp 从一个互联网服务器得到时间，实时在 7 段数码管或 LCD 上显示时间。

最终实现：

在 LCD 上，第一行显示“星期几/月/日/年”，第二行显示“时/分/秒”。

数字不断随时间流逝而跳转。实现了所有实验要求。