CPE301 – SPRING 2019

Midterm2

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Primary Github address: <https://github.com/biscuit0x/submission_yun.git>

Directory: submission\_yun/DesignAssignments/midterm2/

Submit the following for all Labs:

1. In the document, for each task submit the modified or included code (only) with highlights and justifications of the modifications. Also, include the comments.
2. Use the previously create a Github repository with a random name (no CPE/301, Lastname, Firstname). Place all labs under the root folder ESD301/DA, sub-folder named LABXX, with one document and one video link file for each lab, place modified asm/c files named as LabXX-TYY.asm/c.
3. If multiple asm/c files or other libraries are used, create a folder LabXX-TYY and place these files inside the folder.
4. The folder should have a) Word document (see template), b) source code file(s) and other include files, c) text file with youtube video links (see template).

1. Components :

atmega328

jumper wires

esp8366

APDS-9960

2. C code

/\*

\* midterm2.c

\*

\* Created: 12/14/2019 1:48:41 PM

\* Author : jayne

\*/

#define F\_CPU 16000000UL

#define BAUD\_PRESCALAR (((F\_CPU / (BAUDRATE \* 16UL))) - 1)

#define I2C\_WRITE 0x00

#define I2C\_READ 0x01

#define APDS9960\_WRITE\_ADR (APDS9960\_I2C\_ADDR << 1) | I2C\_WRITE

#define APDS9960\_READ\_ADR (APDS9960\_I2C\_ADDR << 1) | I2C\_READ

#include <avr/io.h>

#include <util/delay.h>

#include <stdio.h>

#include <stdlib.h>

#include <stdint.h>

#include "i2c\_master.h"

#include "uart.c"

#include "APDS9960\_def.h"

#include "adps.c"

char colors[256];

uint16\_t ambient, red, green, blue = 0;

void read\_adc(void);

int main(void)

{

i2c\_init(); // initialize i2c

USART\_Init(); // initialize uart

apds\_init(); //initialize APDS960

//connects to wifi

USART\_SendString("AT\r\n");

\_delay\_ms(1000);

USART\_SendString("AT+CWMODE=1\r\n");

\_delay\_ms(1000);

USART\_SendString("AT+CWLAP\r\n");

\_delay\_ms(4000);

USART\_SendString("AT+CWJAP=\"LAST\",\"OVER\"\r\n");

\_delay\_ms(3000);

while (1) //loop

{

read\_adc(); //read colors

USART\_SendString("AT+CIPSTART=\"TCP\",\"api.thingspeak.com\",80\r\n"); //thingspeak connection

\_delay\_ms(3000);

USART\_SendString("AT+CIPSEND=200\r\n"); //send 200 characters

\_delay\_ms(1000);

snprintf(colors, sizeof(colors),"GET https://api.thingspeak.com/update?api\_key=NX0KTDW6RHKFUTFC&field1=%d&field2=%d&field3=%d&field4=%d\r\n", ambient, red, green, blue);

USART\_SendString(colors); //send temperature

\_delay\_ms(1000);

USART\_SendString("AT+CIPCLOSE\r\n"); //end

\_delay\_ms(1000);

}

}

void read\_adc(void) { //read sensor values

i2c\_start(APDS9960\_WRITE\_ADR);

i2c\_write(APDS9960\_CDATAL);

i2c\_stop();

i2c\_start(APDS9960\_READ\_ADR);

ambient =((int)i2c\_read\_ack()|((int)i2c\_read\_ack()<<8));

red = ((int)i2c\_read\_ack()|((int)i2c\_read\_ack()<<8));

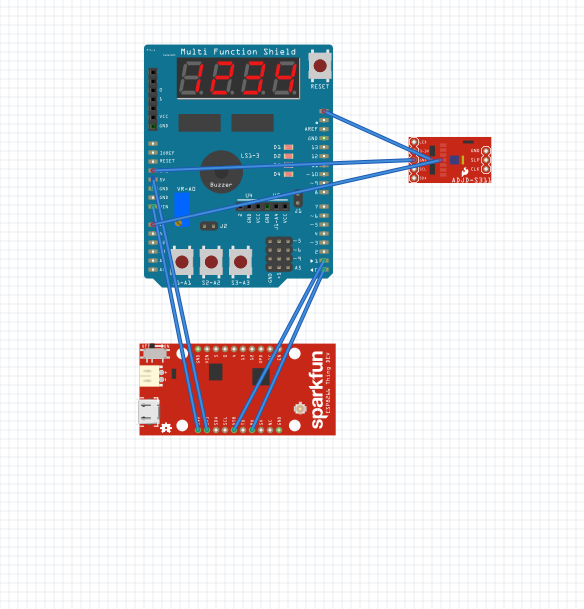
green = ((int)i2c\_read\_ack()|((int)i2c\_read\_ack()<<8));

blue = ((int)i2c\_read\_ack()|((int)i2c\_read\_ack()<<8));

i2c\_stop();

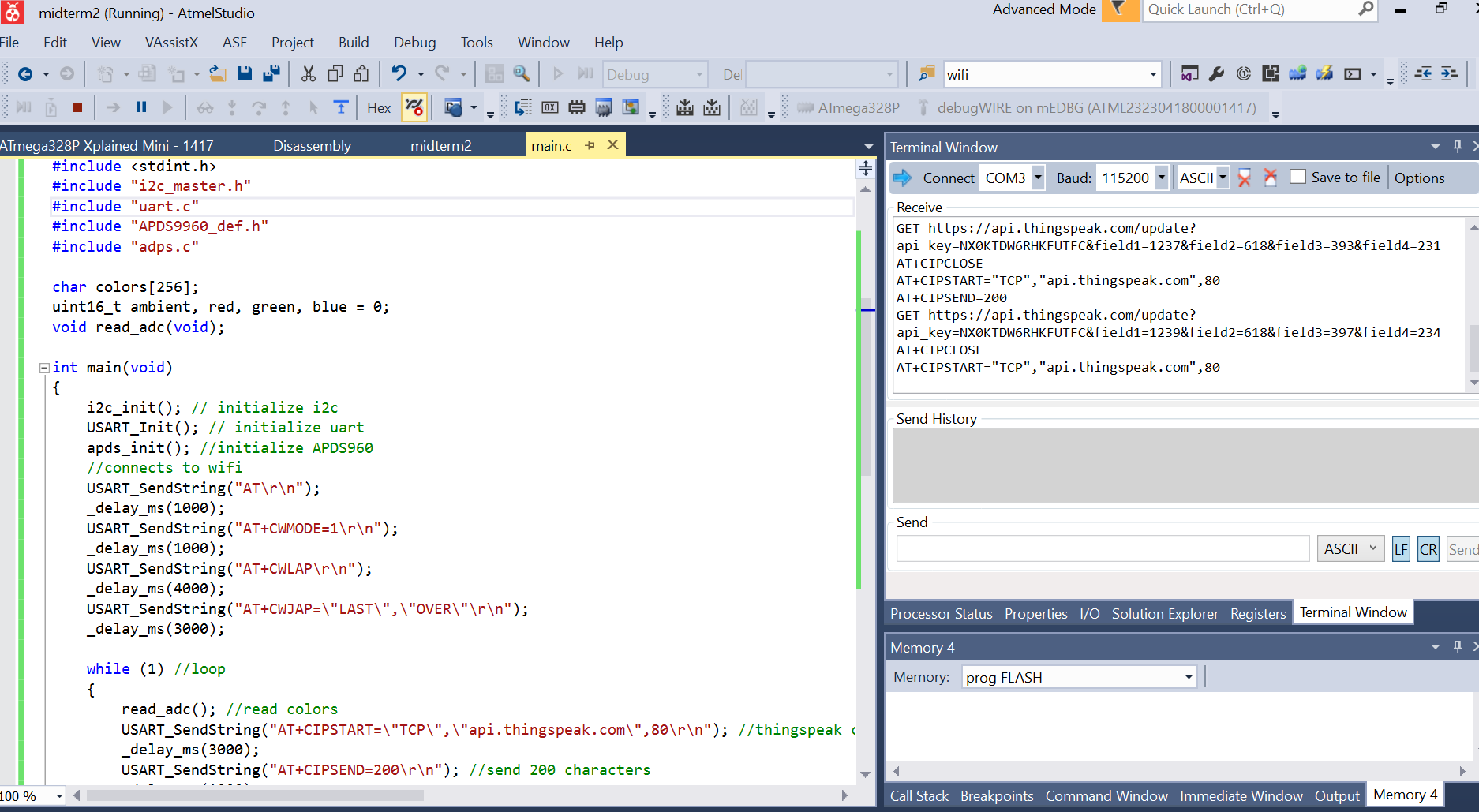
}

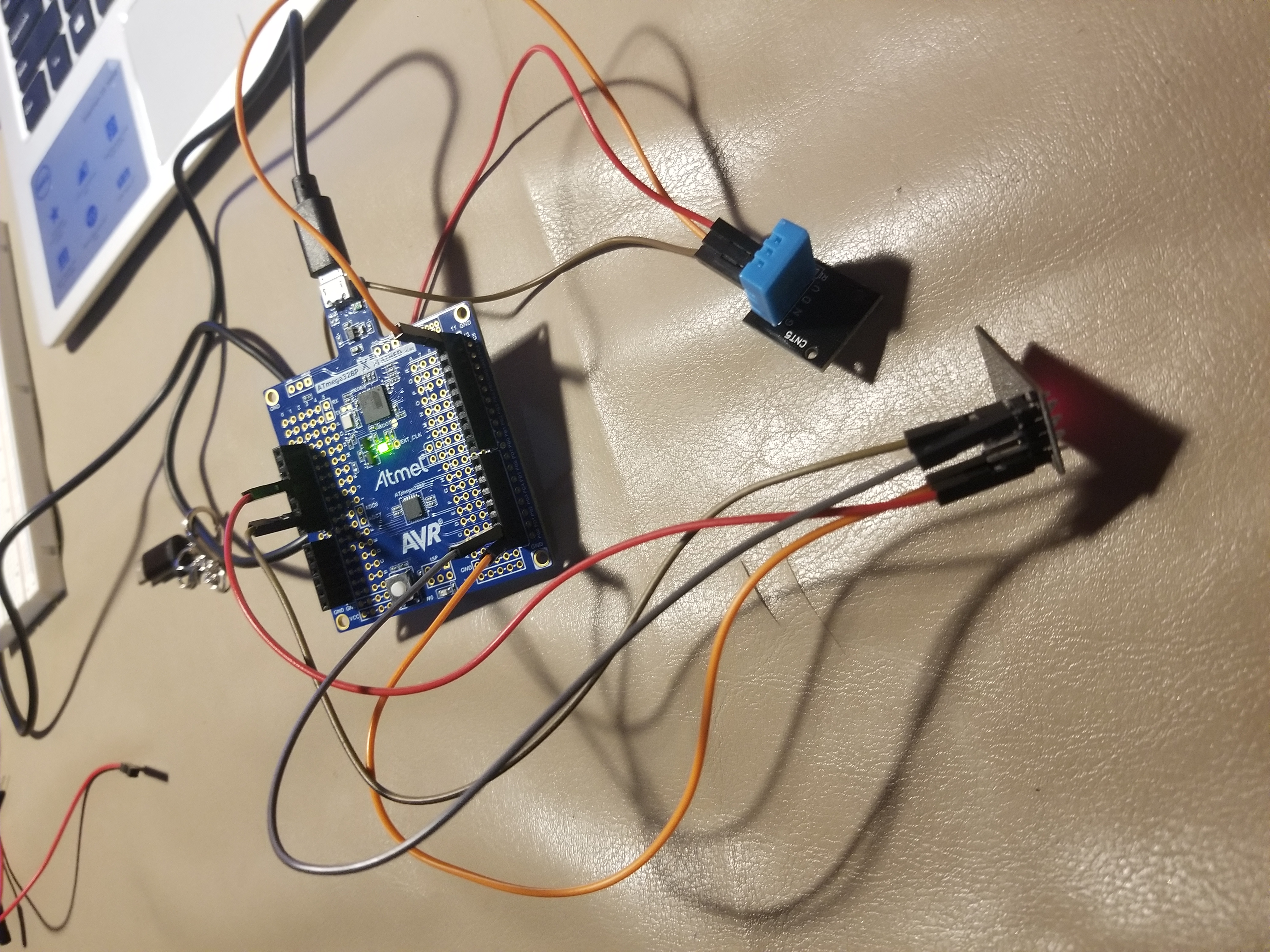
3. Schematic



4. Screenshot

Atmel studio :



5. Photo / video

https://youtu.be/az4UatoSAaE