**CPE301 – SPRING 2019**

# Design Assignment 3B

Student Name: Shaquille Regis
Student #: 2000686590
Student Email: regis@unlv.nevada.edu
Primary Github address: https://github.com/regis-shaquille/submissions-SR
Directory: https://github.com/regis-shaquille/submissions-SR/tree/master/Design%20Assignments

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 LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

Atmega328P Xplained Mini Microcontroller
LM35 Temperature sensor

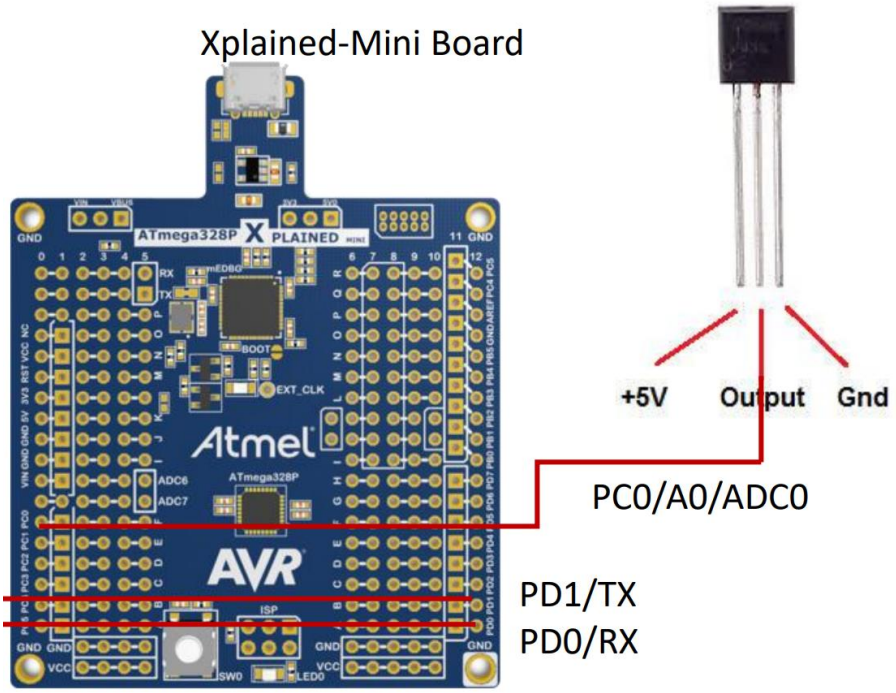
## 2. INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A

Insert initial code here

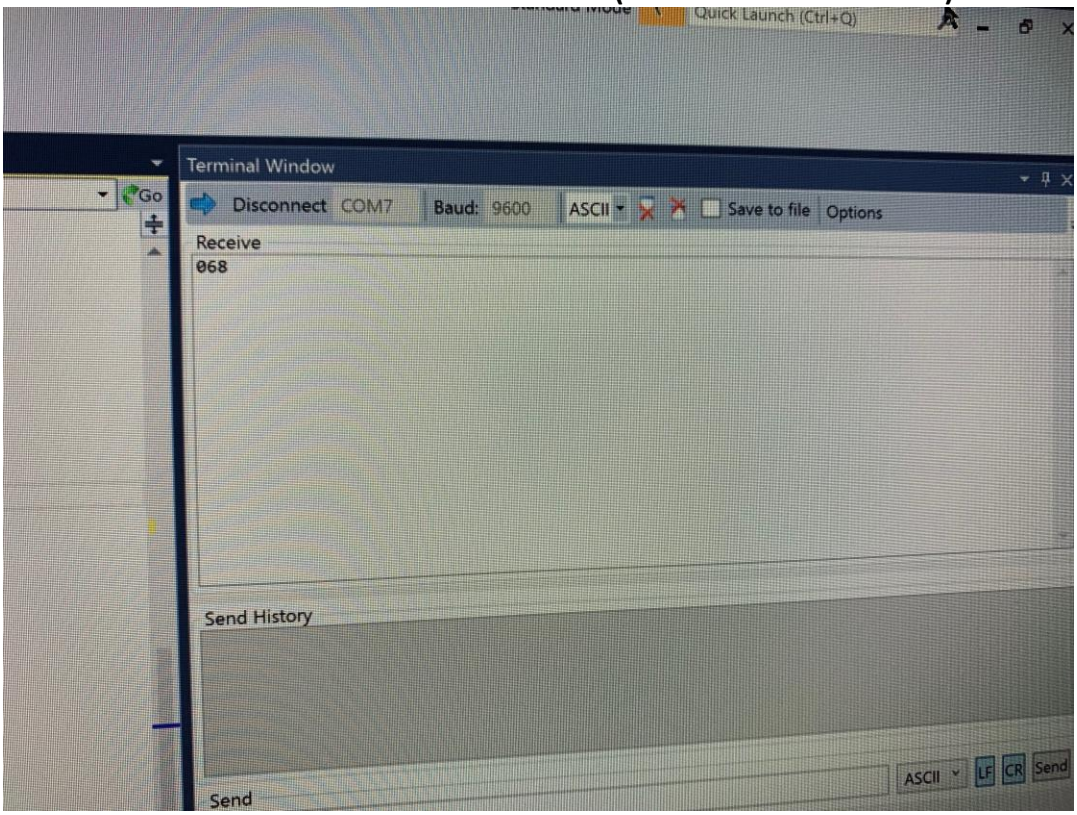
```
#define F_CPU 16000000UL
#define BAUD_RATE 9600

#include <avr/io.h>
#include <util/delay.h>

void usart_init ();
void usart_send (unsigned char ch);

int main (void)
{
    usart_init ();

    ADCSRA= 0x87;           //make ADC enable and select ck/128
    ADMUX= 0xC8;            //1.1V Vref, temp, right-justified, internal temp. sensor

    while (1)
    {
        ADCSRA|=(1<<ADSC);  //start conversion
        while((ADCSRA&(1<<ADIF))==0);//wait for conversion to finish

        ADCSRA |= (1<<ADIF);

        int a = ADCL;
        a = a | (ADCH<<8);


        a -= 266;

        //sprintf(str,"%d",a);
```

```
        if(a < 0)
        {
            usart_send('-');
            a *= -1;
        }

        usart_send((a/100)+'0');
        a = a % 100;
        usart_send((a/10)+'0');
        a = a % 10;
        usart_send((a)+'0');
        usart_send('\r');

        _delay_ms(100);
    }
    return 0;
}

void usart_init (void)
{
    UCSR0B = (1<<TXEN0);
    UCSR0C = (1<< UCSZ01)|(1<<UCSZ00);
    UBRR0L = F_CPU/16/BAUD_RATE-1;
}

void usart_send (unsigned char ch)
{
    while (! (UCSR0A & (1<<UDRE0)));    //wait until UDR0 is empty
    UDR0 = ch;                          //transmit ch
}

void usart_print(char* str)
{
    int i = 0;
    while(str[i] != 0)
    usart_send(str[i]);
}
```

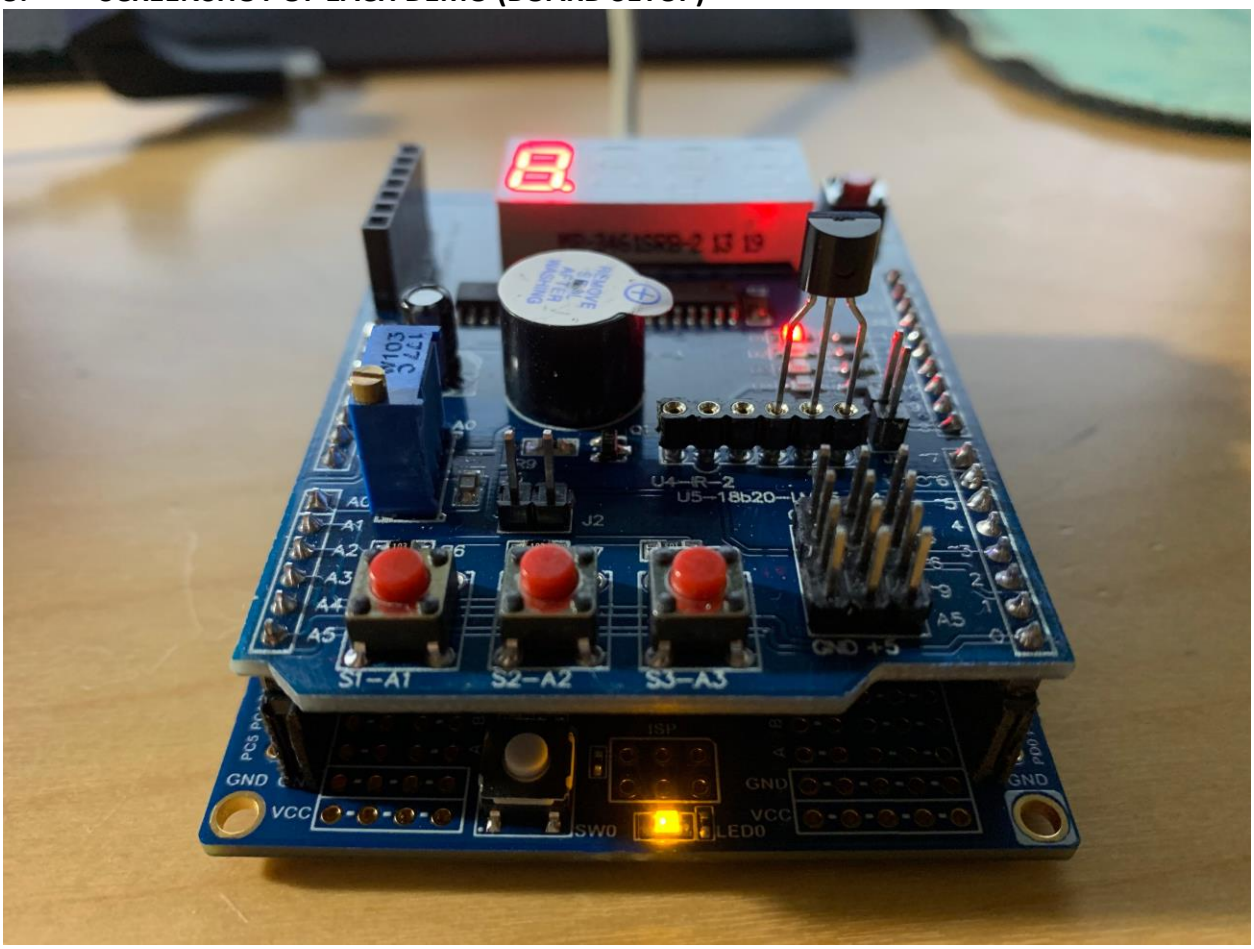
## 3. SCHEMATICS




## 4. SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)



## 5. SCREENSHOT OF EACH DEMO (BOARD SETUP)




## 6. VIDEO LINKS OF EACH DEMO

https://www.youtube.com/watch?v=iBYF-t6qgm8

## 7. GITHUB LINK OF THIS DA

https://github.com/regis-shaquille/submissions-SR/tree/master/Design%20Assignments/DA3b

**Student Academic Misconduct Policy**
http://studentconduct.unlv.edu/misconduct/policy.html

"*This assignment submission is my own, original work*".
Shaquille Regis