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CPE301 – SPRING 2018

Midterm 1

DO NOT REMOVE THIS PAGE DURING SUBMISSION:

The student understands that all required components should be submitted in complete for grading of this assignment.

NO	SUBMISSION ITEM	COMPLETED (Y/N)	MARKS (/MAX)
1	COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS		
2.	INITIAL CODE OF TASK 1/A		
3.	INCREMENTAL / DIFFERENTIAL CODE OF TASK 2/B		
3.	INCREMENTAL / DIFFERENTIAL CODE OF TASK 3/C		
3.	INCREMENTAL / DIFFERENTIAL CODE OF TASK 4/D		
3.	INCREMENTAL / DIFFERENTIAL CODE OF TASK 5/E		
4.	SCHEMATICS		
5.	SCREENSHOTS OF EACH TASK OUTPUT		
5.	SCREENSHOT OF EACH DEMO		
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7.	GOOGLECODE LINK OF THE DA		

1. COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS

NOTE I was not able to flash the ESP8266 after hours of trying. I kept getting random characters. There were a few times where it did the boot message, but instead of 'ready', it said 'invalid'. It let me type in commands, but there was no response when I entered it. Therefore I just did all I could.

- Atmega328P
- ESP8266 module
- Elego Voltage Regulator
- 9V battery
- LM34
- A few resistors and some jumper wires

2. INITIAL/DEVELOPED CODE OF TASK 1/A

```
#define BAUD 115200
#define F_CPU 8000000UL
#define BAUDRATE ((F_CPU)/(BAUD*8UL)-1)
#include <avr/io.h>
#include <util/delay.h>
#include <stdio.h>
#include <avr/interrupt.h>

void init_uart(){
    // setting the baud rate  based on FCPU and baudrate
    UBRR0L = BAUDRATE;
    // enabling TX & RX
    UCSR0B = (1<<RXEN0)|(1<<TXEN0);              // enable receive and transmit
    UCSR0A = (1<<UDRE0)|(1<<U2X0);
    UCSR0C =  (1 << UCSZ01) | (1 << UCSZ00);    // Set frame: 8data, 1 stop

}

void ADC_init() {
    ADMUX = 0;                 // read from port ADC0
    ADMUX |= (1<<REFS0);       // use AVcc for reference
    ADCSRA |= (1<<ADPS2) | (1<<ADPS1); // prescalar of 64
    ADCSRA |= (1<<ADEN);       // enable ADC
    ADCSRB = 0;                // free running mode
}

unsigned int readADC()
{
    ADMUX &= ~(1<<ADLAR);              // clear the adc value
    unsigned int val = 0;
    ADCSRA |= (1 << ADSC);             // start adc
    while(ADCSRA & (1<<ADSC));         // wait until adc is done

    val = ADC;
    val = val * 0.488;               // doing (5 * 100 * adc) / 1024, just simplified

    return val;
```

```
}

void usart_send(unsigned char ascii)
{
    while(!(UCSR0A & (1<<UDRE0)));     // wait for transmit buffer to empty
    UDR0 = ascii;            // send the char
}

void AT_send( unsigned char message[])
{
    unsigned char i=0;
    while(message[i] != '\0')     // loop until NULL is reached
    {
           usart_send(message[i]);       // send the char
           i++;
    }
}

ISR (TIMER1_COMPA_vect)
{
    int temp = 0;
    temp = readADC();                // read from lm34
    char out[30];
    snprintf(out, 30, "GET /update?api_key=DN72F6LKT2GVW8RD&field1=%d", temp);  // get
command set up to output temp
    AT_send(out);          // send out the command
    TIFR1 |= (1 << OCF1A);     // reset interrupt flag

}

int main(void)
{
    unsigned char AT[] = "AT\r\n";
    unsigned char CIPMUX[] = "AT+CPIMUX=1\r\n";
    unsigned char WIFI[] = "AT+CWJAP=\" SSID \", \"PASS\" \r\n";
    unsigned char CIPSTART[] = "AT+CPISTART=0,\"TCP\",\"api.thingspeak.com\", 80\r\n";

    _delay_ms(200);
    init_uart();      // initialize uart
    _delay_ms(200);

    ADC_init();        // unitialize ADC
    _delay_ms(200);

    AT_send(AT);       // set up some commands
    _delay_ms(2000);

    AT_send(CIPMUX);
    _delay_ms(2000);

    AT_send(WIFI);
    _delay_ms(2000);

    AT_send(CIPSTART);
    _delay_ms(2000);

    OCR1A = 3125;          // set up the timer for 1 second CTC mode
    TCCR1B |= (1 << WGM12);
```

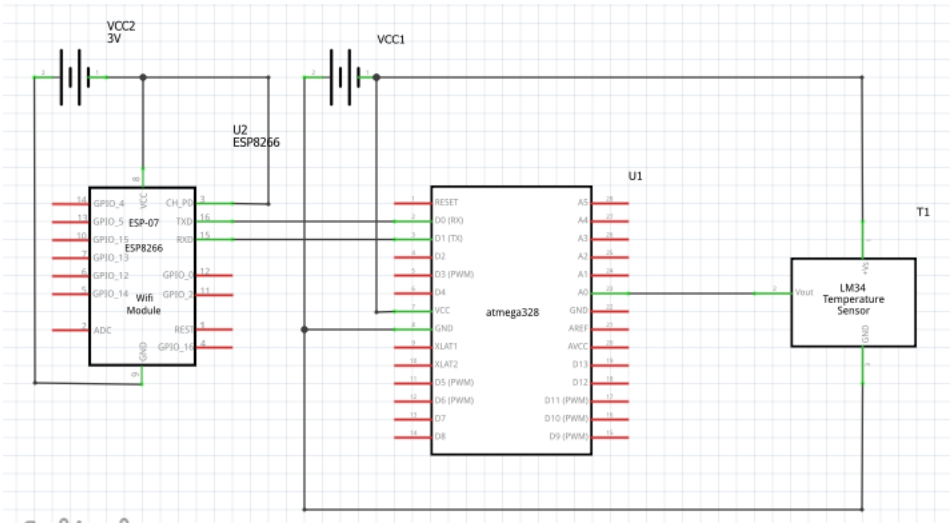
```
        TIMSK1 |= (1 << OCIE1A);
        TCCR1B |= (1 << CS12);

        sei();              // turn on interrupts
        while(1)
        {

        }

        return 0;
    }
```

3. SCHEMATICS



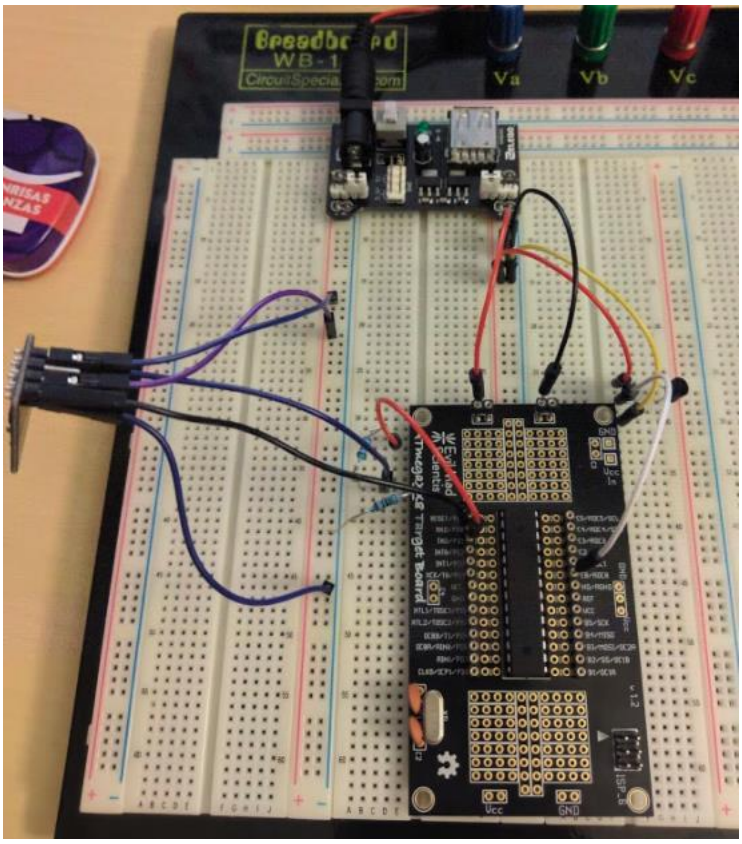
Using two different power supplies:

A 5V supply for the atmega and LM34 and a 3.3V for the ESP8266.

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

N/A, was not able to flash the ESP8266 properly ☹

5. SCREENSHOT OF EACH DEMO (BOARD SETUP)



Left power rails are 3.3V while the right power rails (right on top of the Atmega) are 5V

6. VIDEO LINKS OF EACH DEMO

N/A ☹

7. GITHUB LINK OF THIS DA

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http://studentconduct.unlv.edu/misconduct/policy.html

"*This assignment submission is my own, original work*".
Brian Lopez