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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		
6.	VIDEO LINKS OF EACH DEMO		
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=\" ThEE WIFI \", \"7024746818\" \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);
```

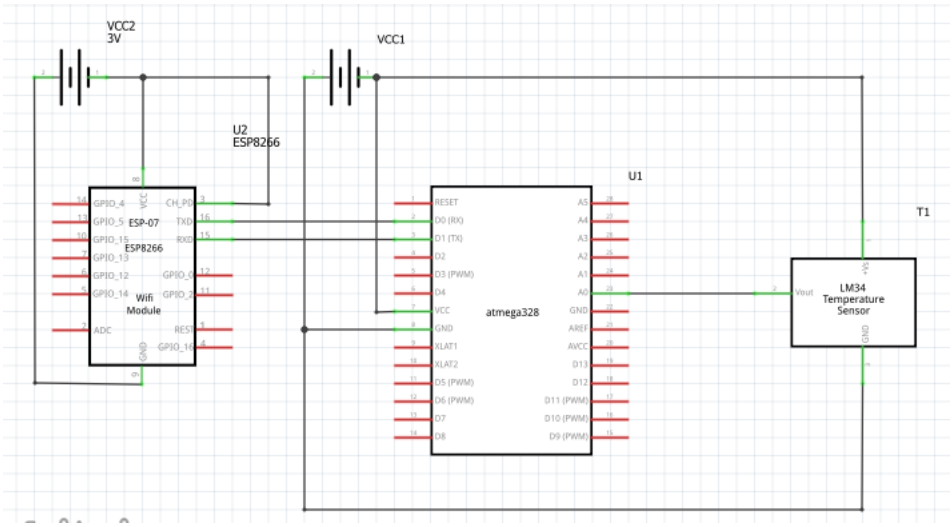
```
        TIMSK1 |= (1 << OCIE1A);
        TCCR1B |= (1 << CS12);

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

        }

        return 0;
    }
```

3. SCHEMATICS



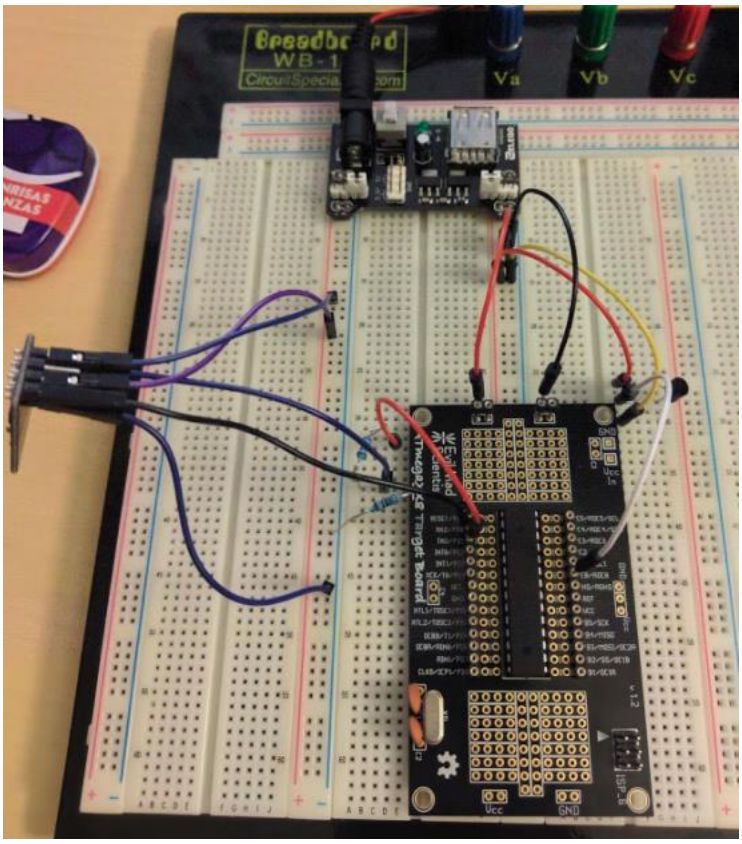
Using two different power supplies:

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