**CPE301 – SPRING 2019**

Design Assignment 4A

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Primary Github address: <https://github.com/prachi173/>

Directory: <https://github.com/prachi173/da_sp18/>

Submit the following for all Labs:

* In the document, for each task submit the modified or included code (only) with highlights and justifications of the modifications. Also, include the comments.
* 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.
* If multiple asm/c files or other libraries are used, create a folder LabXX-TYY and place these files inside the folder.
* 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)
* **COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS**

ATmega328p Xplained Mini

L293D motor driver

Trimmer Pot (1K)

Arduino multifunctional shield for switch

DC Motor

External DC power of 5V

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* **INITIAL/MODIFIED/DEVELOPED CODE OF TASK 3/A**

#define F\_CPU 16000000UL

#include <avr/io.h>

#include <avr/interrupt.h>

#include <util/delay.h>

#include <stdio.h>

int sw\_motor = 0; // motor switch

int main(void)

{

DDRD = 0x40; // set PD6 to Output

DDRC = 0x02; // set PC0 to input and PC1 to output

PORTC |= (1<<1); // enable pull-up

TCCR0A |= (1<<COM0A1)|(1<<WGM01)|(1<<WGM00); // clear OC0A on compare match, fast PWM

TCCR0B |= (1<<CS02)|(1<<CS00); // prescaler = 1024

PCICR |= (1<<PCIE1); // enable pin change interrupt 1

PCMSK1 |= (1<<PCINT9); // PinC1 for interrupt

ADMUX |= (1<<REFS0); // setup reference voltage at Aref

ADCSRA |= (1<<ADEN)|(1<<ADSC)|(1<<ADATE)|(1<<ADPS2)|(1<<ADPS1)|(1<<ADPS0); //setup ADC

sei();

while (1) {

//wait for interrupt

}

}

ISR (PCINT1\_vect) {

if (!(PINC & (1<<PINC1))) {

if (sw\_motor == 0) {

OCR0A = 0; //compare match at 0, motor is off

PORTD &= ~(1<<PORTD6); //turn off PortD6

}

if (sw\_motor == 1) {

while ((ADCSRA & (1<<ADIF)) == 0); // process ADC

OCR0A = ADC; //set OCR0A to the value of ADC (0 at 0V, 512 at 2.5V and 1023 AT 5v)

PORTD |= (1<<PORTD6); //Turn on Output1

}

\_delay\_ms(500);

sw\_motor ^= 1;

}

}

* **SCHEMATICS**

Use fritzing.org

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* **SCREENSHOTS OF THE TASK OUTPUT (ATMEL STUDIO OUTPUT)**

// no simulation for this assignment, I just debugged.

* **SCREENSHOT OF THE DEMO (BOARD SETUP)**

A circuit board

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* **VIDEO LINKS OF THE DEMO**

<https://youtu.be/lO-1gU9gw3w>

* **GITHUB LINK OF THIS DA**

[https://github.com/prachi173/da\_sp18/tree/master/Design Assignments/DA4A](https://github.com/prachi173/da_sp18/tree/master/Design%20Assignments/DA4A)

**Student Academic Misconduct Policy**

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

“*This assignment submission is my own, original work*”.

PRACHI PATEL