CPE301 – SPRING 2019

Design Assignment 4B

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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

Atmel Studio 7 w/ AVR assembly and simulator, Atmega328p board, Stepper/Servo motor, and potentiometer used.

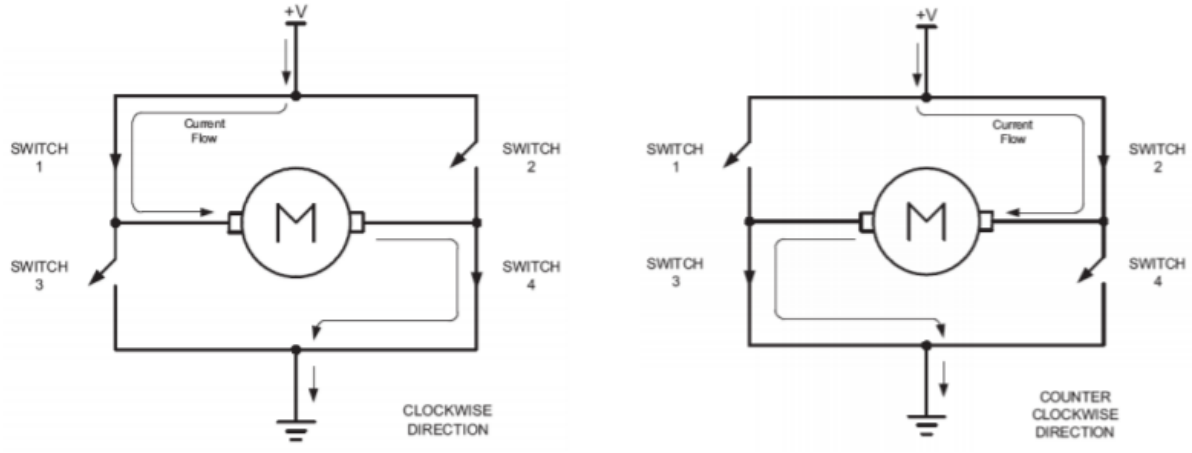
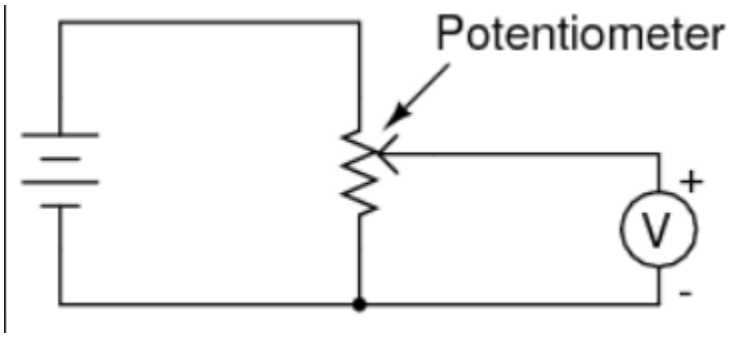


Fig. 1. DC Motor



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

Task 1 C code:

```
#define F_CPU 8000000UL
#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>

int main(void)
{
	//initialization
	DDRC = 0x00;
	DDRD = 0xff;
	DDRB = 0xff;
	int f1 = 0;
	int f2 = 0;
	int delay = 100;
```

```
        while (1)
         {
           for (f1 = 0; f1 <=4; f1++)
           {
                      PORTB |= (1<<PB0);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB0);
                      _delay_ms(delay);
                      PORTB |= (1<<PB1);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB1);
                      _delay_ms(delay);
                      PORTB |= (1<<PB2);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB2);
                      _delay_ms(delay);
                      PORTB |= (1<<PB3);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB3);
                      _delay_ms(delay);
               }
               f1 = 0;

               for (f2 = 0; f2 <=6; f2++)
               {
                      PORTB |= (1<<PB3);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB3);
                      _delay_ms(delay);
                      PORTB |= (1<<PB2);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB2);
                      _delay_ms(delay);
                      PORTB |= (1<<PB1);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB1);
                      _delay_ms(delay);
                      PORTB |= (1<<PB0);
                      _delay_ms(delay);
                      PORTB &= ~(1<<PB0);
                      _delay_ms(delay);
               }
               f2 = 0;
        }
}
```

Task 2 C Code:

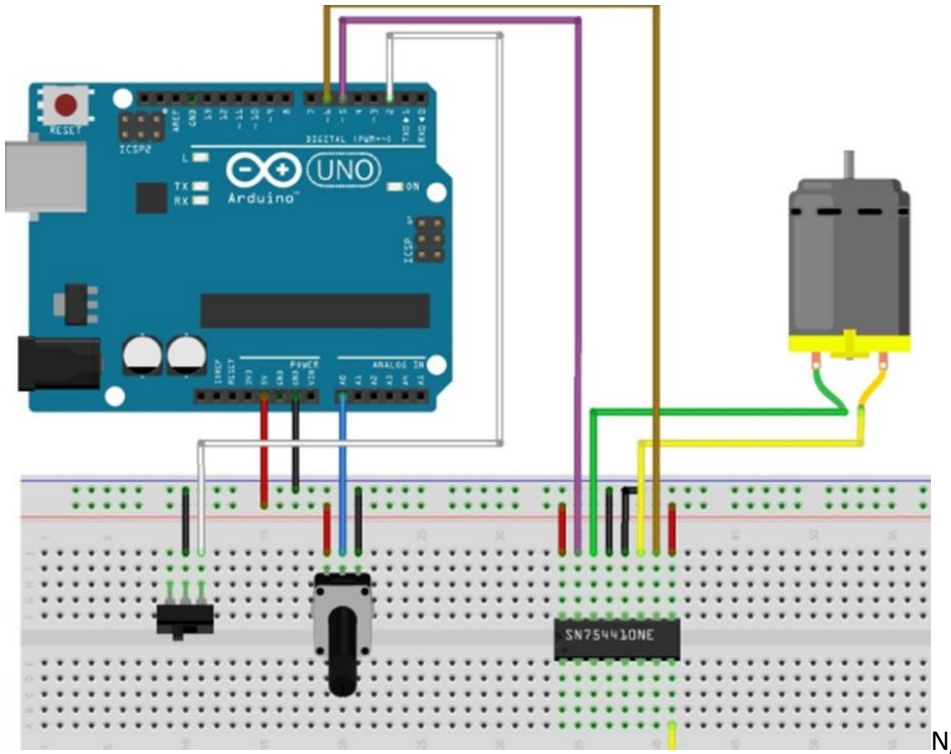
```
#define F_CPU 8000000UL
#include <avr/io.h>
#include <util/delay.h>
#include <avr/interrupt.h>

int main(void)
{
        //initializations
```

```
        DDRC = 0x00;
        DDRD = 0xff;
        DDRB = 0xff;


        //timer initialization
        TCCR1A |= (1<<COM1A1)|(1<<COM1B1)|(1<<WGM11);  //Toggle on compare match
        TCCR1B |= (1<<WGM12)|(1<<WGM13)|(1<<CS10);          //set prescaler to 1
        ICR1 = 0xFFFF;

        while (1)
        {
                _delay_ms(250);
                OCR1A = 16000;
                _delay_ms(500);
                OCR1A = 8000;
                _delay_ms(250);
        }
}
```

3. DEVELOPED MODIFIED CODE OF TASK 2/A from TASK 1/A

N/A

4. SCHEMATICS

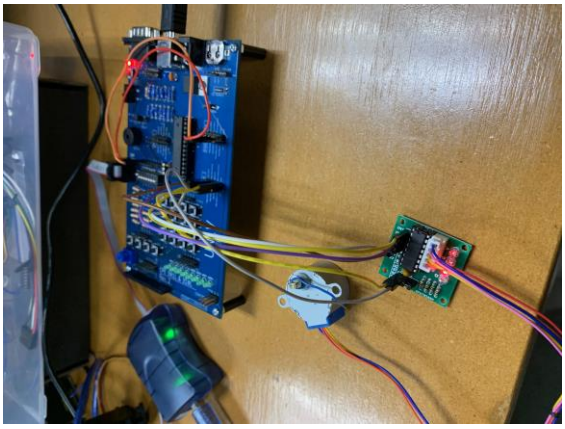
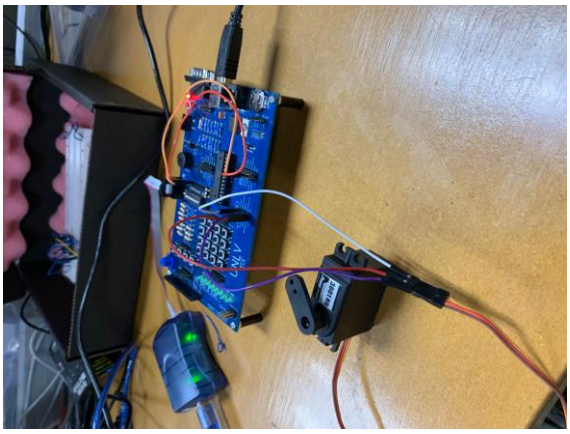


N/A

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

N/A

6. SCREENSHOT OF EACH DEMO (BOARD SETUP)

7. VIDEO LINKS OF EACH DEMO

https://youtu.be/NUgAmNCYkkQ

8. GITHUB LINK OF THIS DA

https://github.com/tylergardenhire/submission_projects.git

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

"*This assignment submission is my own, original work*".
TYLER GARDENHIRE