CPE301 – SPRING 2019

Design Assignment 3A

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Directory: https://github.com/armonlatifi/sub_da/tree/master/DA3A

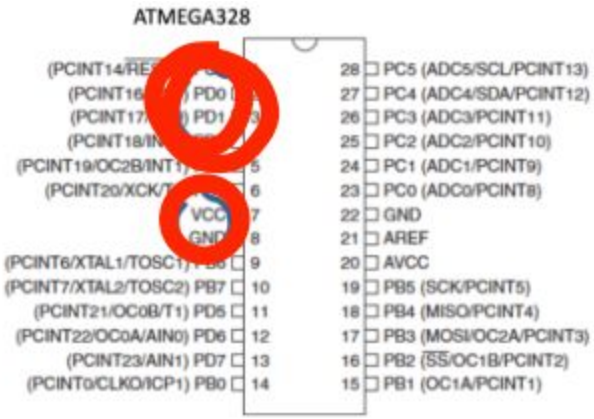
Submit the following for all Labs:

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

List of Components used:

- Assembler
- Simulator
- Debugger
- Breadboard
- Atmega328P
- Wires
- Microusb cord
- Atmel studio 7
- Arudino Multi-function shield



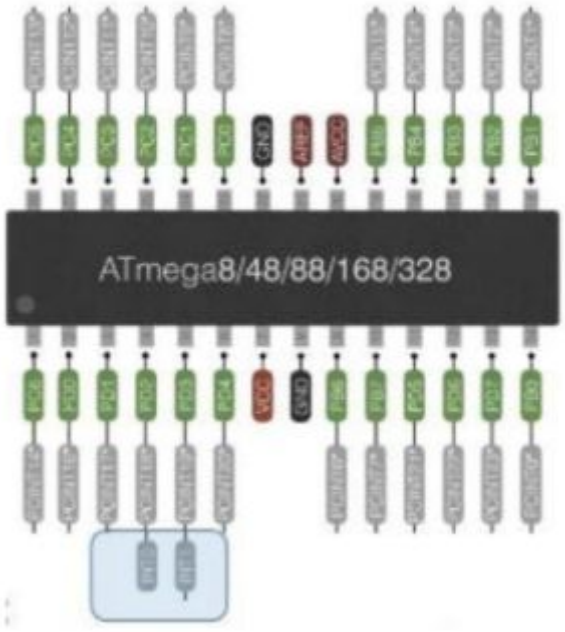
2. INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A

```
#define F_CPU 16000000UL //set clock frequency
#define BAUD 9600 //set baud rate

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

void USART_tx_string( char* data); //prints string
void USART_init( void ); //USART_init function
void USART_send(char val); //send function
char outs[20];  //character array
char str[] = "Hello World!";
volatile float tmp = 27.23;


int main(void)
{
	TCCR1B = 5; //prescaler --> 1024
	TIMSK1 = (1<<TOIE1);
	TCNT1 = 49911;
```

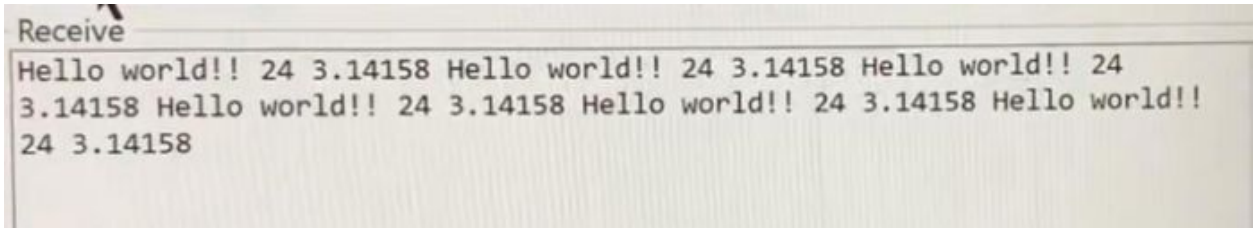
```
	USART_init();
	sei();//interrupt enable


	while(1)
	{
	}
}

ISR(TIMER1_OVF_vect)
{
	USART_tx_string(str);
	USART_tx_string("\n"); //takes care of line feed
	USART_send('7');
	USART_tx_string("\n"); //takes care of line feed

	//printing time
	snprintf(outs,sizeof(outs),"%f\r\n", tmp);
	USART_tx_string(outs);
	USART_tx_string("\n"); //takes care of line feed
	TCNT1 = 49911; //reset
}

void USART_init( void )
{
	UBRR0H = 0; //take care of lower bits
	UBRR0L = F_CPU/16/BAUD - 1; //
	UCSR0B = _BV(RXEN0) | _BV(TXEN0);
	UCSR0C = _BV(UCSZ01) | _BV(UCSZ00);
}

//sending data to serial port
void USART_tx_string(char *data)
{
	while((*data != '\0'))
	{
		while(!(UCSR0A & (1<<UDRE0)));
			UDR0 = *data;
				data++;
	}
}

void USART_send(char val)
{
//wait
	while(!(UCSR0A & (1<<UDRE0)));
	 UDR0 = val;
}
```

3. SCHEMATICS

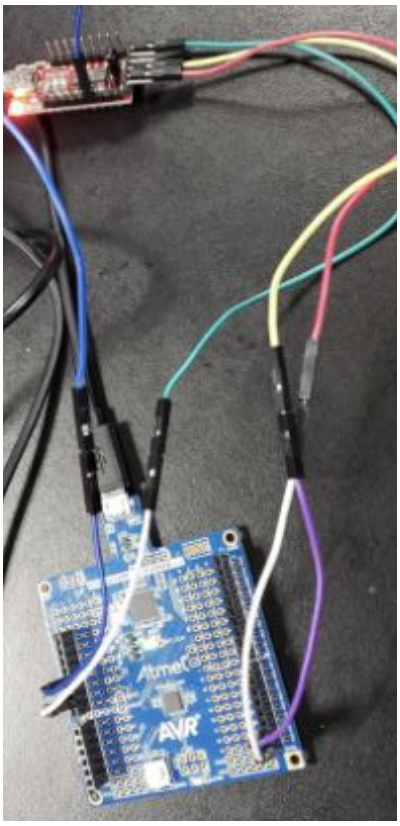
Use fritzing.org



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



5. SCREENSHOT OF EACH DEMO (BOARD SETUP)



6. GITHUB LINK OF THIS DA

https://github.com/armonlatifi/sub_da/tree/master/DA3A

Student Academic Misconduct Policy

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

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

Armon Latifi