Design Assignment 3A

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Primary Github address: https://github.com/WorkuT1226/CPE301.git
Directory:

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**

List of Components used
Block diagram with pins used in the Atmega328P

- **INITIAL/MODIFIED/DEVELOPED CODE OF TASK 1/A**

```
#define BAUD 9600
#define F_CPU 16000000UL
#include <avr/io.h>
#include <avr/interrupt.h>
#include <stdio.h>
#include <util/setbaud.h>
void USART_tx_string(char*x);
void USART_tx_char (char i);
void USART_init(void);
float usart_temp = 2.18;
```

```c
char myArray[100];
char L[] = " ";

int main(void){
        USART_init();
        TCCR1B |= (1<<CS12) | (1<<CS10);
        TIMSK1 = (1<<TOIE1);
        TCNT1 = 49911;
        sei();
}
void USART_init (void){
        UCSR0C = _BV(UCSZ01) | _BV(UCSZ00);
        UCSR0B = _BV(RXEN0) | _BV(TXEN0);
        UBRR0L = UBRRL_VALUE;
        UBRR0H = UBRRH_VALUE;
}

ISR (TIMER1_OVF_vect){
        USART_tx_string(L);
        USART_tx_char('3');
        USART_tx_string(L);
        USART_tx_string("Hello World");
        USART_tx_string(L);
        snprintf(myArray, sizeof(myArray), "%f\r\n", usart_temp);
        USART_tx_string(myArray);
        USART_tx_string(L);
        TCNT1 = 49911;
}

void USART_tx_char (char i){
        while (!(UCSR0A & (1<<UDRE0)));
        UDR0 = i;
}

void USART_tx_string (char*x){
        while ((*x != '\0')){
                while (!(UCSR0A & (1<<UDRE0)));
                UDR0 = *x;
                x++;
        }
}
```
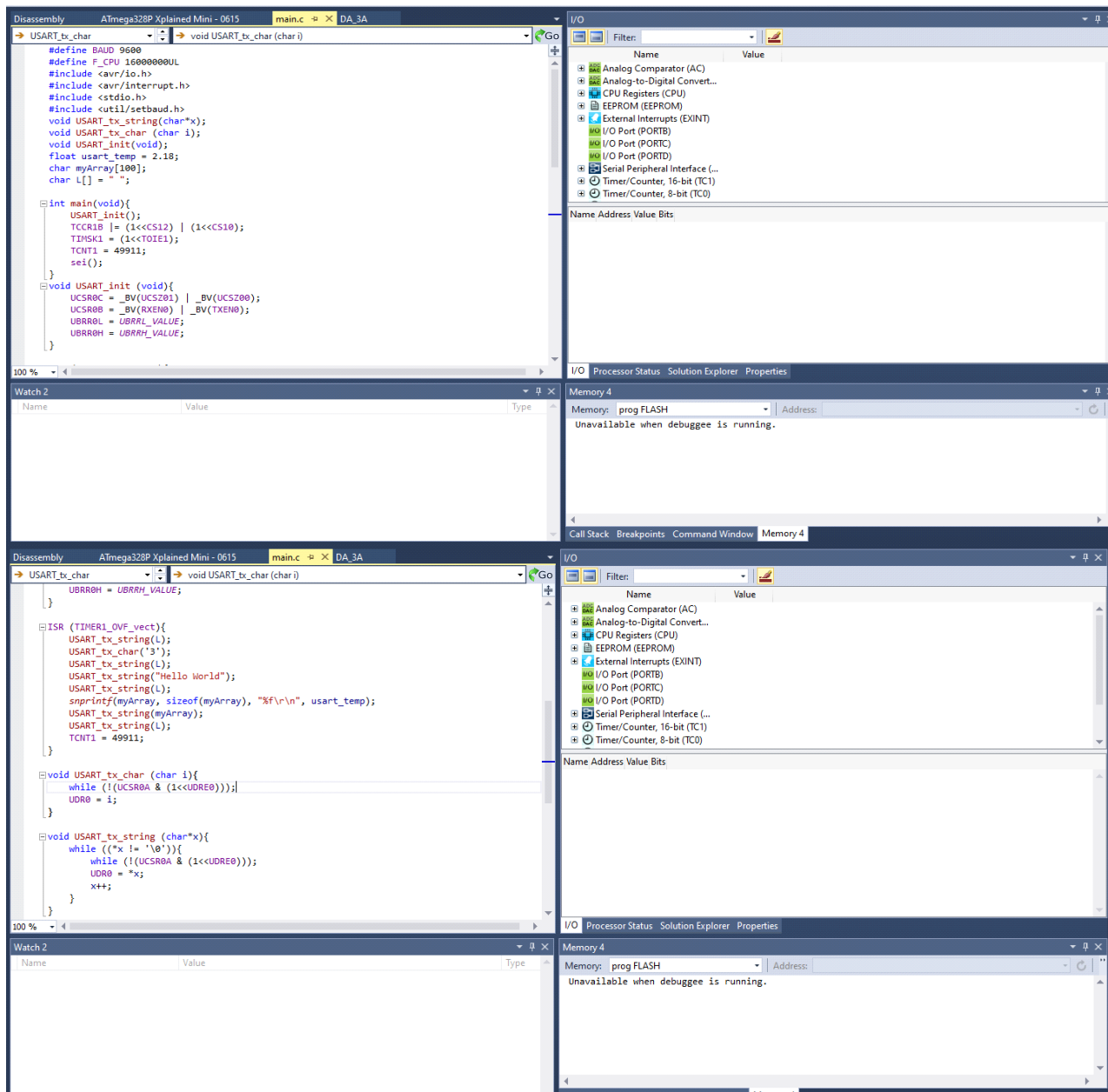
- **SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)**

```c
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#define F_CPU 16000000UL
#include <avr/io.h>
#include <avr/interrupt.h>
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float usart_temp = 2.18;
char myArray[100];
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int main(void){
    USART_init();
    TCCR1B |= (1<<CS12) | (1<<CS10);
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    UCSR0C = _BV(UCSZ01) | _BV(UCSZ00);
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    UBRR0L = UBRRL_VALUE;
    UBRR0H = UBRRH_VALUE;
}
```

```c
    UBRR0H = UBRRH_VALUE;
}

ISR (TIMER1_OVF_vect){
    USART_tx_string(L);
    USART_tx_char('3');
    USART_tx_string(L);
    USART_tx_string("Hello World");
    USART_tx_string(L);
    snprintf(myArray, sizeof(myArray), "%f\r\n", usart_temp);
    USART_tx_string(myArray);
    USART_tx_string(L);
    TCNT1 = 49911;
}

void USART_tx_char (char i){
    while (!(UCSR0A & (1<<UDRE0)));
    UDR0 = i;
}

void USART_tx_string (char*x){
    while ((*x != '\0')){
        while (!(UCSR0A & (1<<UDRE0)));
        UDR0 = *x;
        x++;
    }
}
```
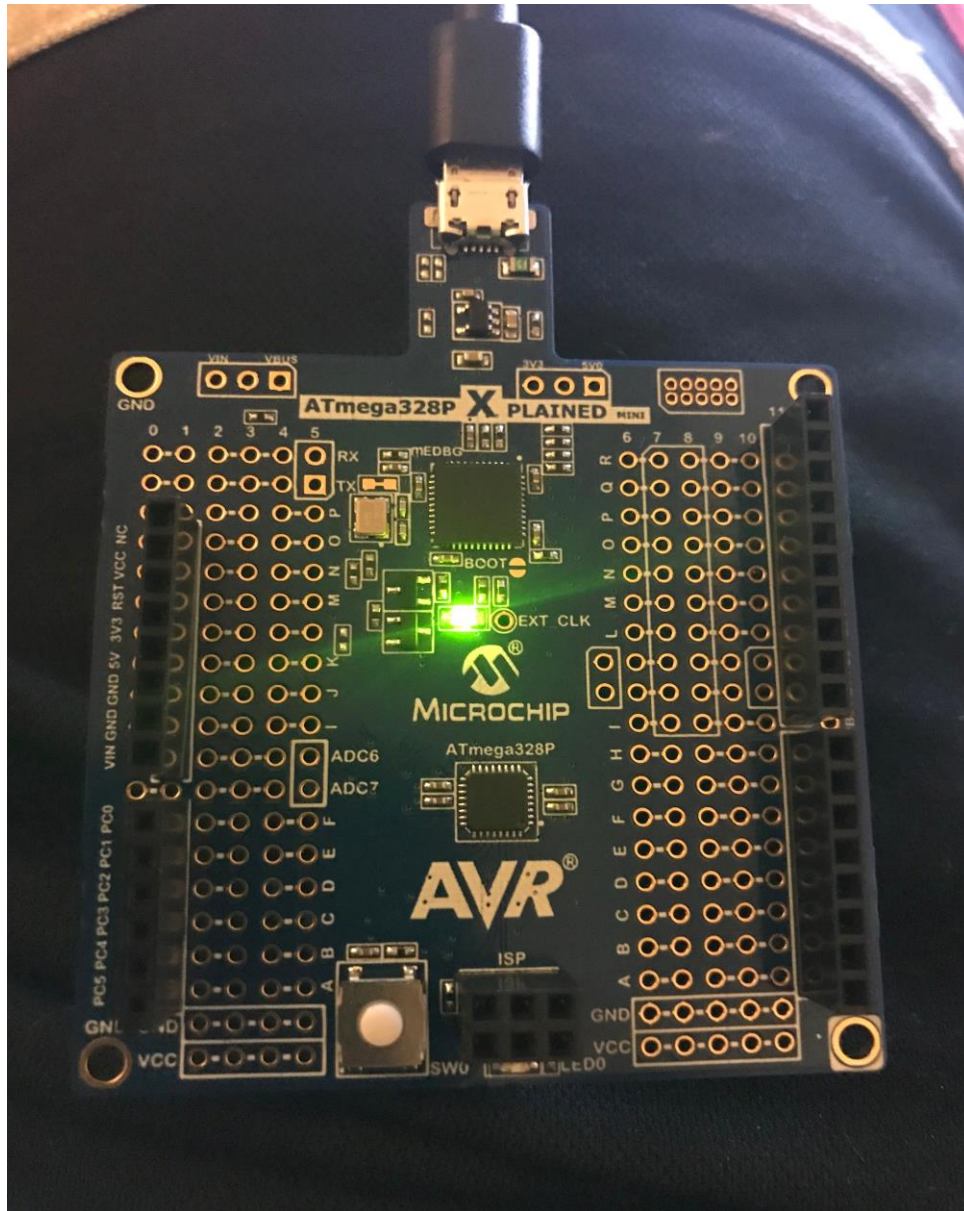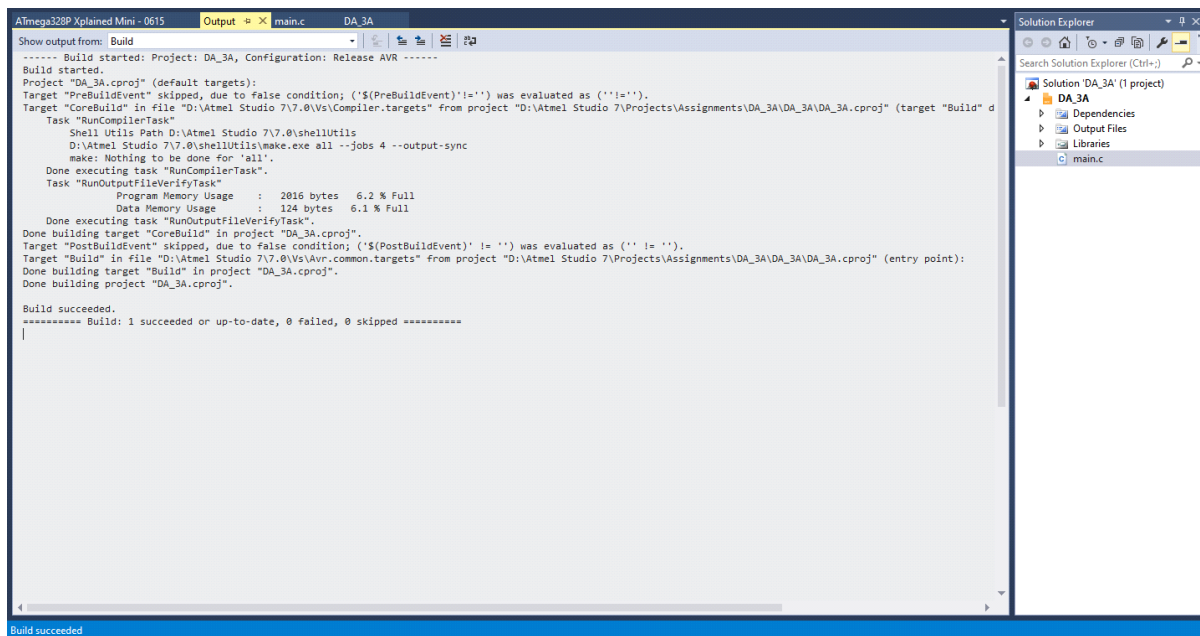
- **SCREENSHOT OF EACH DEMO (BOARD SETUP)**

- **VIDEO LINKS OF EACH DEMO**
  - https://www.youtube.com/watch?v=bG_zpe2rRg8
- **GITHUB LINK OF THIS DA**

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

"This assignment submission is my own, original work".
Worku Tafara