

# Design Assignment 2A

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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**

## Task 1

; AssemblerApplication1.asm

; Created: 10/5/2019 6:21:20 PM

; Author : Worku Tafara

;

.org 0

sbi DDRB, 3

sbi PORTB, 3

START:

cbi PORTB, 3

```

        ldi R18, 36
        ldi R19, 79
        ldi R20, 221
L1:
    dec R20
        brne L1
        dec R19
        brne L1
        dec R18
        brne L1
        nop
    sbi PORTB, 3
        ldi R18, 51
        ldi R19, 187
        ldi R20, 224
L2:
    dec R20
        brne L2
        dec R19
        brne L2
        dec R18
        brne L2
        rjmp PC+1
    jmp START
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////

```

```

C code
#include <avr/io.h>
#include <util/delay.h>
#define F_CPU 16000000UL
int main(void){
    DDRB |= (1<<3);
    while (1)
        _delay_ms(250);
    PORTB &= ~(1<<3);
    _delay_ms(375);
    PORTB |= (1<<3);
    }
}

```

- **DEVELOPED MODIFIED CODE OF TASK 2/A from TASK 1/A**  
; T2.asm  
; Created: 10/5/2019 6:51:36 PM  
; Author : Worku Tafara

```

;
.org 0
sbi DDRC, 3
sbi PORTC, 3
sbi DDRB, 3
sbi PORTB, 3
START:
cbi PORTC, 3
cbi PORTB, 3
    ldi R18, 109
    ldi R19, 51
    ldi R20, 106
L1:
dec R20
    brne L1
    dec R19
    brne L1
    dec R18
    brne L1
jmp START
////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////////

```

C code

```

#include <avr/io.h>
#include <util/delay.h>
#define F_CPU 16000000UL
int main(void){
    DDRC &= (0<<3);
    PORTC |= (1<<3);
    DDRB |= (1<<3);

    while(1){
        if(!(PINC & (1<<PINC3))){
            PORTB &= ~(1<<3);
            _delay_ms(1333);
        }
        else{
            PORTB |= (1<<3);
        }
    }
    return 0;
}

```

- SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)

## Task 1

```

; AssemblerApplication1.asm
; Created: 10/5/2019 6:21:20 PM
; Author : Worku Tafara
;
.org 0
sbi DDRB, 3
sbi PORTB, 3

START:
cbi PORTB, 3
ldi R18, 36
ldi R19, 79
ldi R20, 221

L1:
dec R20
brne L1
dec R19
brne L1
dec R18
brne L1
nop
sbi PORTB, 3
ldi R18, 51
ldi R19, 187
ldi R20, 224

L2:
dec R20
brne L2
dec R19
brne L2

ldi R20, 224
L2:
dec R20
brne L2
dec R19
brne L2
dec R18
brne L2
rjmp PC+1
jmp START

#include <avr/io.h>
#include <util/delay.h>
#define F_CPU 16000000UL
int main(void){
    DDRB |= (1<<3);
    while (1)
        _delay_ms(250);
    PORTB &= ~(1<<3);
    _delay_ms(375);
    PORTB |= (1<<3);
}

```

## Task 2

```

; T2.asm
; Created: 10/5/2019 6:51:36 PM
; Author : Worku Tafara
;
.org 0
sbi DDRC, 3
sbi PORTC, 3
sbi DDRB, 3
sbi PORTB, 3

START:
cbi PORTC, 3
cbi PORTB, 3
ldi R18, 109
ldi R19, 51
ldi R20, 106

L1:
dec R20
brne L1
dec R19
brne L1
dec R18
brne L1
jmp START

#include <avr/io.h>
#include <util/delay.h>
#define F_CPU 16000000UL
int main(void){
    DDRC &= (0<<3);
    PORTC |= (1<<3);
    DDRB |= (1<<3);

    while(1){
        if(!((PINC & (1<<PINC3)))){
            PORTB &= ~(1<<3);
            _delay_ms(1333);
        }
        else{
            PORTB |= (1<<3);
        }
    }
    return 0;
}

```

- **SCREENSHOT OF EACH DEMO (BOARD SETUP)**

```

main.asm # Output main.asm CFile1.c T2
Show output from: Build
Target "PreBuildEvent" skipped, due to false condition; ('$(PreBuildEvent)' != '') was evaluated as ('' != '').
Target "CoreBuild" in file "D:\Atmel Studio 7\7.0\Vs\Assembler.targets" from project "D:\Atmel Studio 7\Projects\Assignments\DA_2A\T2\T2.asmproj" (target "Build" d
Task "RunAssemblerTask"
D:\Atmel Studio 7\7.0\toolchain\avr8\avrasm\avrasm2.exe -FI -o "T2.hex" -m "T2.map" -l "T2.lss" -S "T2.tmp" -W+ie -I"D:\Atmel Studio 7\7.0\Packs\atm
AVRASM: AVR macro assembler 2.2.7 (build 69 Jul 26 2017 16:25:06)
Copyright (C) 1995-2017 ATMEL Corporation
[buildin](2): Including file 'D:\Atmel Studio 7\7.0\Packs\atmel\ATmega_DFP\1.2.209\avrasm\inc\m328pdef.inc'
[buildin](2): Including file 'D:\Atmel Studio 7\7.0\Packs\atmel\ATmega_DFP\1.2.209\avrasm\inc\m328pdef.inc'
"ATmega328P" memory use summary [bytes]:
Segment Begin End Code Data Used Size Use%
-----
[.cseg] 0x000000 0x000022 34 0 34 32768 0.1%
[.dseg] 0x000100 0x000100 0 0 0 2048 0.0%
[.eseg] 0x000000 0x000000 0 0 0 1024 0.0%
Assembly complete, 0 errors, 0 warnings
Done executing task "RunAssemblerTask".
Done building target "CoreBuild" in project "T2.asmproj".
Target "PostBuildEvent" skipped, due to false condition; ('$(PostBuildEvent)' != '') was evaluated as ('' != '').
Target "Build" in file "D:\Atmel Studio 7\7.0\Vs\Avr.common.targets" from project "D:\Atmel Studio 7\Projects\Assignments\DA_2A\T2\T2.asmproj" (entry point):
Done building target "Build" in project "T2.asmproj".
Done building project "T2.asmproj".

Build succeeded.
===== Build: 1 succeeded or up-to-date, 0 failed, 0 skipped =====

```

- **VIDEO LINKS OF EACH DEMO**

Task 1 <https://youtu.be/9SWl0o-ffY>

Task 2 [https://youtu.be/cm7za-3S\\_6U](https://youtu.be/cm7za-3S_6U)

- **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