CPE301 – SPRING 2020

Design Assignment 2A

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Directory: <https://github.com/jasonvillanuevagit/submission_designAssignments-/tree/master/DesignAssignment2A>

1. **COMPONENTS LIST AND CONNECTION BLOCK DIAGRAM w/ PINS**

Atmel Studio 7.0 Atmega328PB-Xmini PC Multi-Function Shield

- Switches

- LEDs

Port Pins used for 2A 1

Port Pins used for 2A Part2

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

Assembly Code for Task 1A

;designed for clock frequency of 16MHz

DUTY\_CYCLE:

SBI DDRB, 3 ;DIRECTION PORTB.3 OUTPUT

SBI PORTB, 3 ;SETTING PORTB.3 BIT "LED ON"

nop

nop

CALL DELAY\_337ms ;CALL DELAY\_413ms (.413s)

CBI PORTB, 3 ;CLEARING PORTB.3 BIT "LED OFF"

CALL DELAY\_337ms ;CALL DELAY\_337ms (.337s)

RJMP DUTY\_CYCLE

DELAY\_413ms: ;DELAY OF .413s

LDI r18, 34

LDI r19, 134

LDI r20, 185

L1: DEC r20

BRNE L1

DEC r19

BRNE L1

DEC r18

BRNE L1

NOP

RET

DELAY\_337ms: ;DELAY OF .337s

LDI r18, 28

LDI r19, 91

LDI r20, 132

L2: DEC r20

BRNE L2

DEC r19

BRNE L2

DEC r18

BRNE L2

RET

C Code for Task 1A

#include <avr/io.h>

#define F\_CPU 16000000UL

#include<util/delay.h>

int main(void)

{

DDRB |= (1<<3);//MAKING PORTB.3 OUTPUT

PORTB &= ~(1<<3);//MAKING PORTB.3 OUTPUT "OFF"

while (1)

{

PORTB |=(1<<3);//OUTPUT "LED ON"

\_delay\_ms(413);//DELAY FOR 413ms @16MHz

PORTB &=~(1<<3);//OUTPUT "LED OFF"

\_delay\_ms(337);//DELAY FOR 337ms @16MHz

}

return 1;

}

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

Assembly Code for Task 2A

SBI PORTC, 3;SETS PORTC.3 TO ACTIVE HIGH

;PULL UP RESISTOR ACTIVATED

DUTY\_CYCLE:

SBIS PINC, 3;IF BUTTON @PORTC.3 PRESSED

RJMP IF\_BUTTON;JUMP TO IF\_BUTTON LABEL ELSE CONTINUE

SBI DDRB, 3 ;DIRECTION PORTB.3 OUTPUT

SBI PORTB, 3;SETTING PORTB.3 BIT "LED ON"

CALL DELAY\_413ms;CALL DELAY\_413ms (.413s)

CBI PORTB, 3;CLEARING PORTB.3 BIT "LED OFF"

CALL DELAY\_337ms;CALL DELAY\_337ms (.337s)

RJMP DUTY\_CYCLE

IF\_BUTTON:

CBI DDRB, 3 ;CLEARING DIRECTION PORTB.3 OUTPUT

CBI PORTB, 3;CLEARING PORTB.3 BIT "LED OFF"

SBI DDRB, 2 ;DIRECTION OF PORTB.2 OUTPUT "LED ON"

CALL DELAY\_BUTTON;CALL DELAY OF 2s

CBI DDRB, 2 ;CLEARING DIRECTION PORTB.2 OUTPUT

CBI PORTB, 2;CLEARING PORTB.2 BIT "LED OFF"

SBIS PINC, 3;IF BUTTON @PORTC.3 PRESSED

RJMP IF\_BUTTON;JUMP TO IF\_BUTTON LABEL ELSE CONTINUE

RJMP DUTY\_CYCLE

DELAY\_413ms:;DELAY OF .413s

LDI r18, 34

LDI r19, 134

LDI r20, 185

L1: DEC r20

BRNE L1

DEC r19

BRNE L1

DEC r18

BRNE L1

NOP

RET

DELAY\_337ms:;DELAY OF .337s

LDI r18, 28

LDI r19, 91

LDI r20, 132

L2: DEC r20

BRNE L2

DEC r19

BRNE L2

DEC r18

BRNE L2

RET

DELAY\_BUTTON:;DELAY OF 2s

ldi r18, 163

ldi r19, 87

ldi r20, 2

L3: dec r20

brne L3

dec r19

brne L3

dec r18

brne L3

RET

C Code for Task 2A

#include <avr/io.h>

#define F\_CPU 16000000UL

#include<util/delay.h>

int main(void)

{

DDRB |= (1<<3); //MAKING PORTB.3 OUTPUT

PORTB &= ~(1<<3);//MAKING PORTB.3 OUTPUT "OFF"

DDRC &=~(1<<3); //MAKING PORTC.3 INPUT

PORTC |= (1<<3);//PULL UP RESISTOR ACTIVATED PINC.3 BUTTON

while (1)

{

PORTB |=(1<<3);//OUTPUT "LED ON"

\_delay\_ms(413);//DELAY FOR 413ms @16MHz

PORTB &=~(1<<3);//OUTPUT "LED OFF"

\_delay\_ms(337); //DELAY FOR 337ms @16MHz

if(!(PINC & (1<<3)))

{

DDRB &=~(1<<3);//MAKING PORTB.3 OUTPUT "LED OFF"

DDRB |= (1<<2);//MAKING PORTB.2 OUTPUT "LED ON"

\_delay\_ms(2000);//DELAY FOR 3s

DDRB &=~(1<<2); //MAKING PORTB.2 OUTPUT "OFF"

PORTB &=~(1<<2);//PORTB.2 OUTPUT "LED OFF"

DDRB |= (1<<3); //MAKING PORTB.3 OUTPUT "ON"

}

}

return 1;

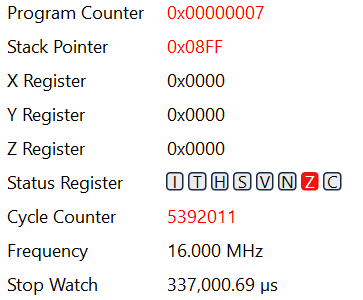
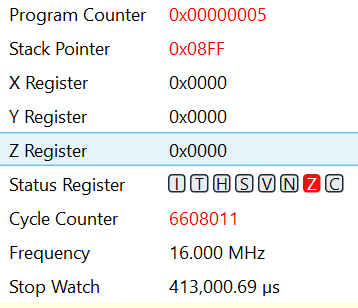
}

1. **SCHEMATICS “Using Fritzing”**

A close up of a map

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1. **SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)**

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1. **SCREENSHOT OF EACH DEMO (BOARD SETUP)**

A circuit board

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1. **VIDEO LINKS OF EACH DEMO**

Assembly

<https://youtu.be/4jQf7CkVU1A>

C

<https://youtu.be/SibJXrQxjCI>

1. **GITHUB LINK OF THIS DA**

<https://github.com/jasonvillanuevagit/submission_designAssignments-/tree/master/DesignAssignment2A>

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

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

Jason Villanueva