CPE301 – fall 2019

Design Assignment 2C

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Directory: https://github.com/mesah1/submissions

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

Block diagram with pins used in the Atmega328PB



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

/\*

\* Assignment\_2C\_PART\_A.c

\*

\* Created: 10/14/2019 6:16:20 PM

\* Author: Henry M

\* THIS PROGRAM WILL USE TIMER 0 - NORMAL MODE

\* TO CREATE A TIME DELAY OF 10ms

\*/

#define F\_CPU 16000000UL

#include <avr/io.h>

#include <util/delay.h>

int main(void)

{

DDRB |= (1 << DDB5); //set PORTB.5 as output

TCCR0A = 0; //normal operation

TCCR0B |= (1 << CS02) | (1 << CS00); //PS = 1024

TCNT0 = 99.75; //counter preset value = 99.75

PORTB &= ~(1 << DDB5);

while (1)

{

//wait for overflow event

while ((TIFR0 & 0x01)==0);

PORTB ^= (1 << DDB5 );

TCNT0 = 99.75; //counter preset value = 99.75

TIFR0 = 0x01; //reset the overflow flag

}

}

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

/\*

\* Assignment\_2C\_PART\_B.c

\*

\* Created: 10/14/2019 9:46:41 PM

\* Author: Henry M

\* THIS PROGRAM WILL USE TIMER 1 - NORMAL MODE

\* TO CREATE A TIME DELAY OF 1MS WITH AN INTERRUPT

\*/

#define F\_CPU 16000000UL

#include <avr/io.h>

#include <util/delay.h>

#include <avr/interrupt.h>

int main(void)

{

DDRB |= (1 << DDB5); //set PORTB.5 as output

TCCR0A = 0; //set timer control

TCCR0B |= 0x05; //PS = 1024

TCNT0 = 248; //load value

TIMSK0 = (1 << TOIE0); //time capture

sei(); //set global interrupt

while (1)

{

}

}

ISR (TIMER0\_OVF\_vect) //ISR

{

PORTB ^= (1 << 5); //toggle PORTB.5

TCNT0 = 248; //reset value

}

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

/\*

\* Assignment\_2C\_PART\_C.c

\*

\* Created: 10/14/2019 11:09:57 PM

\* Author: Henry M

\* THIS PROGRAM WILL USE TIMER 0 - CTC MODE

\* TO CREATE A TIME DELAY OF 10MS WITH AN INTERRUPT

\*/

#define F\_CPU 16000000UL

#include <avr/io.h>

#include <util/delay.h>

#include <avr/interrupt.h>

int main(void)

{

DDRB |= (1 << DDB5); //set PORTB.5 as output

TCCR0A |= (1 << WGM01); //set timer control CTC

TIMSK0 |= (1 << OCIE0A); //set interrupt on compare match

TCCR0B |= 0x05; //PS = 1024

OCR0A = 156; //load compare reg value

sei(); //set global interrupt

while (1)

{

}

}

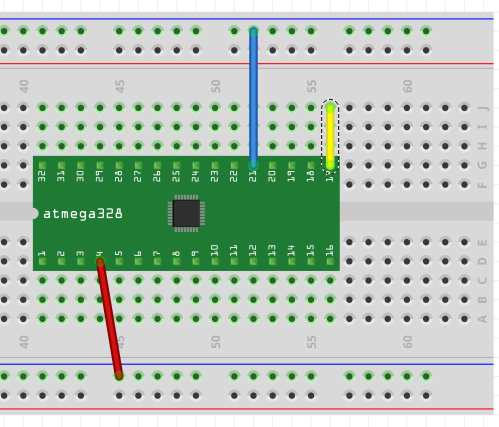
ISR (TIMER0\_COMPA\_vect) //ISR

{

PORTB ^= (1 << 5); //toggle PORTB.5

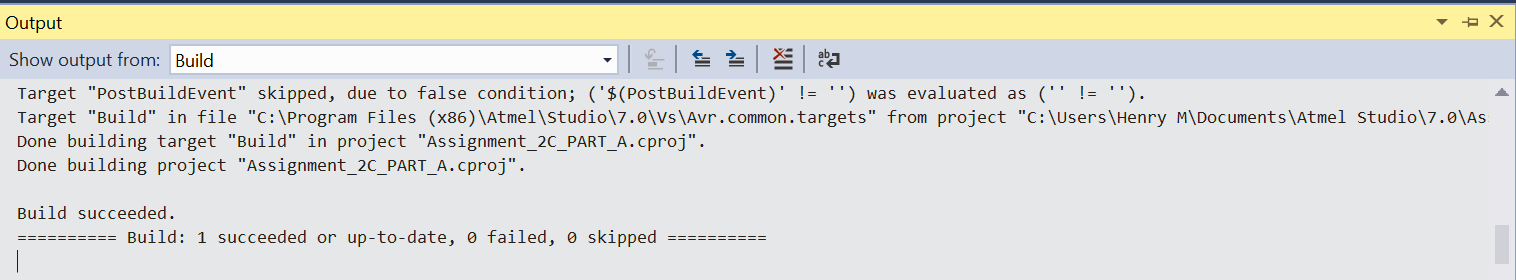
}

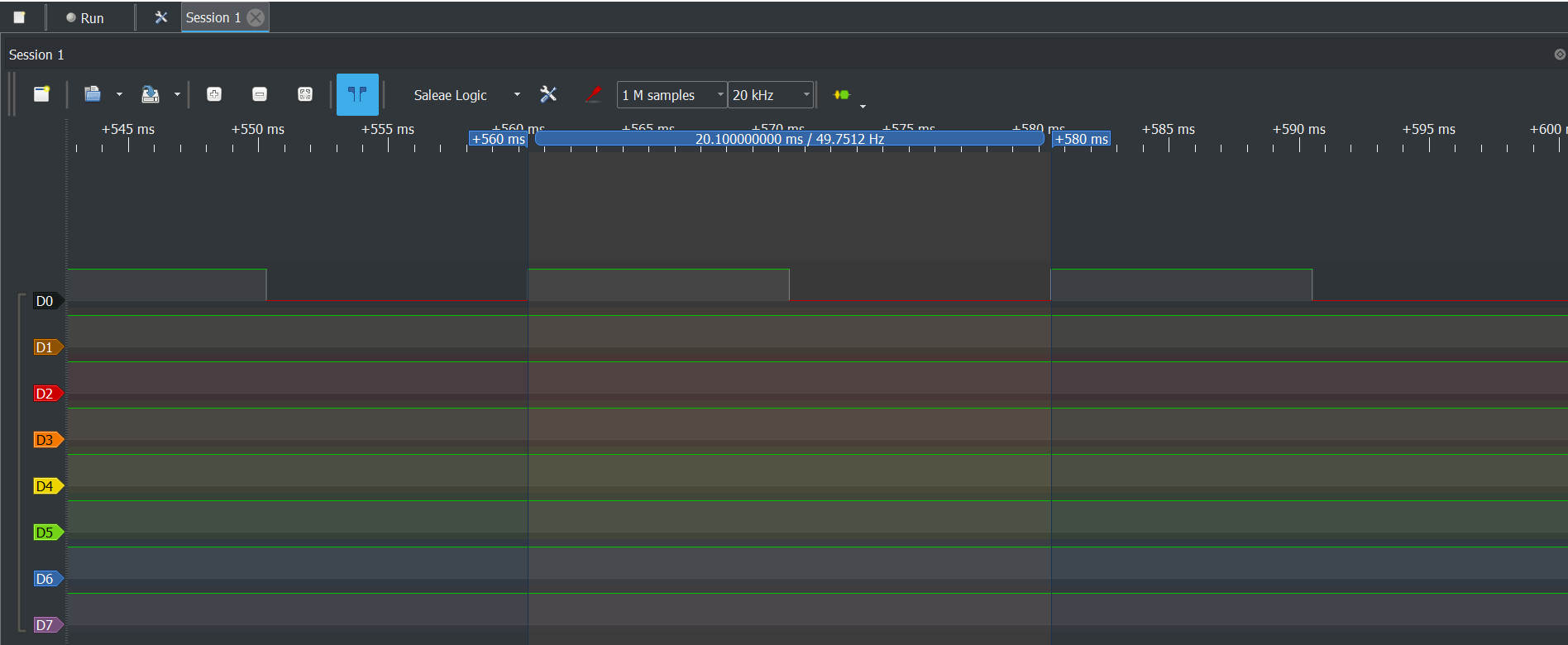
1. **SCHEMATICS**



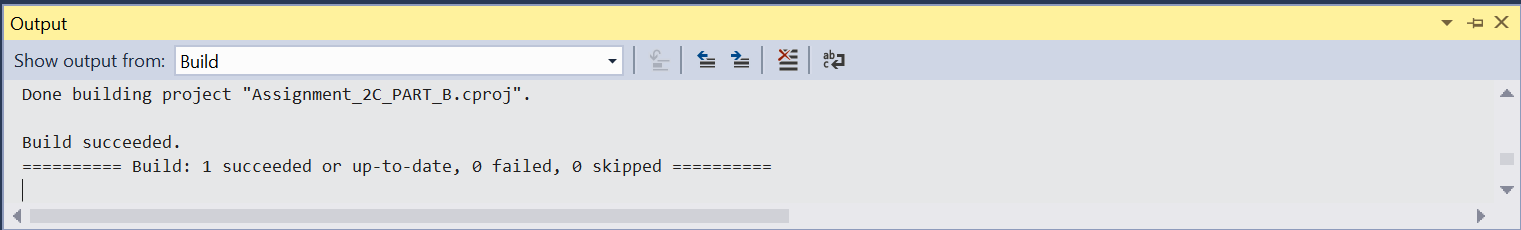
1. **SCREENSHOTS OF EACH TASK OUTPUT (ATMEL STUDIO OUTPUT)**

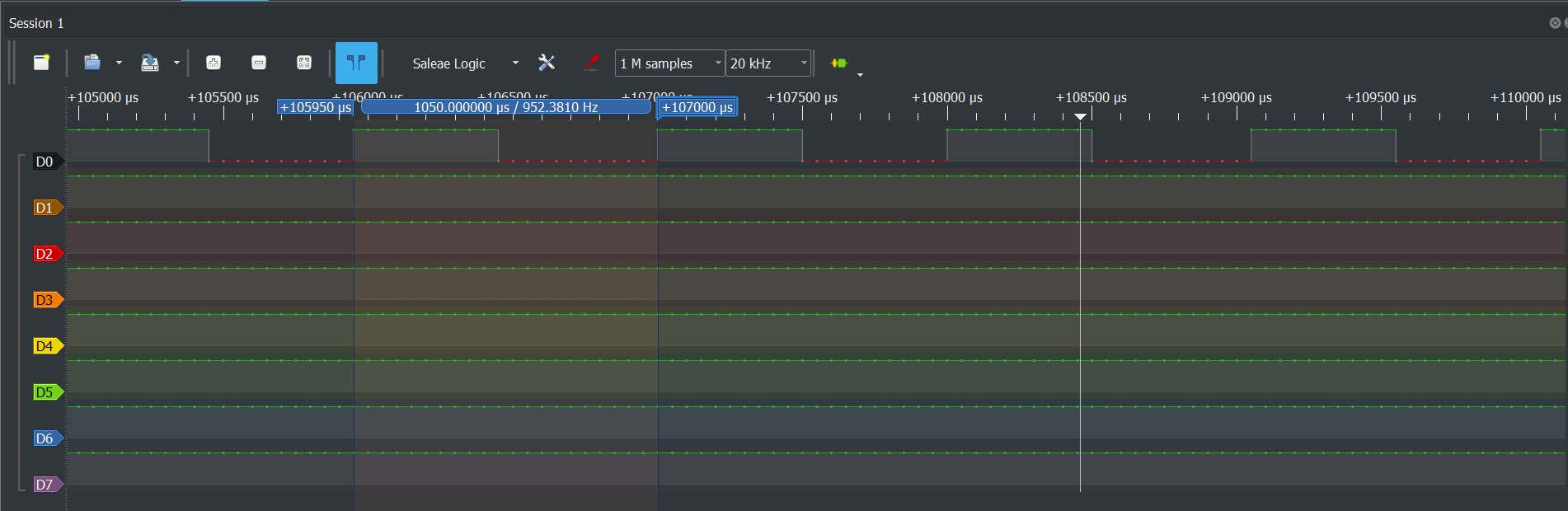
**Part A**



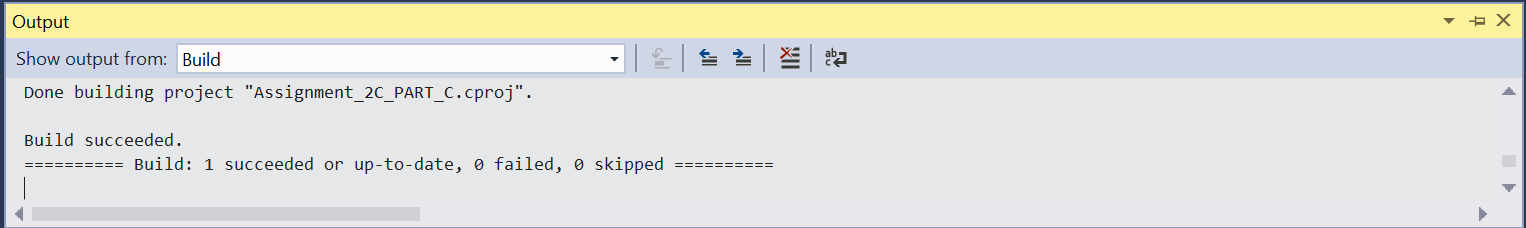


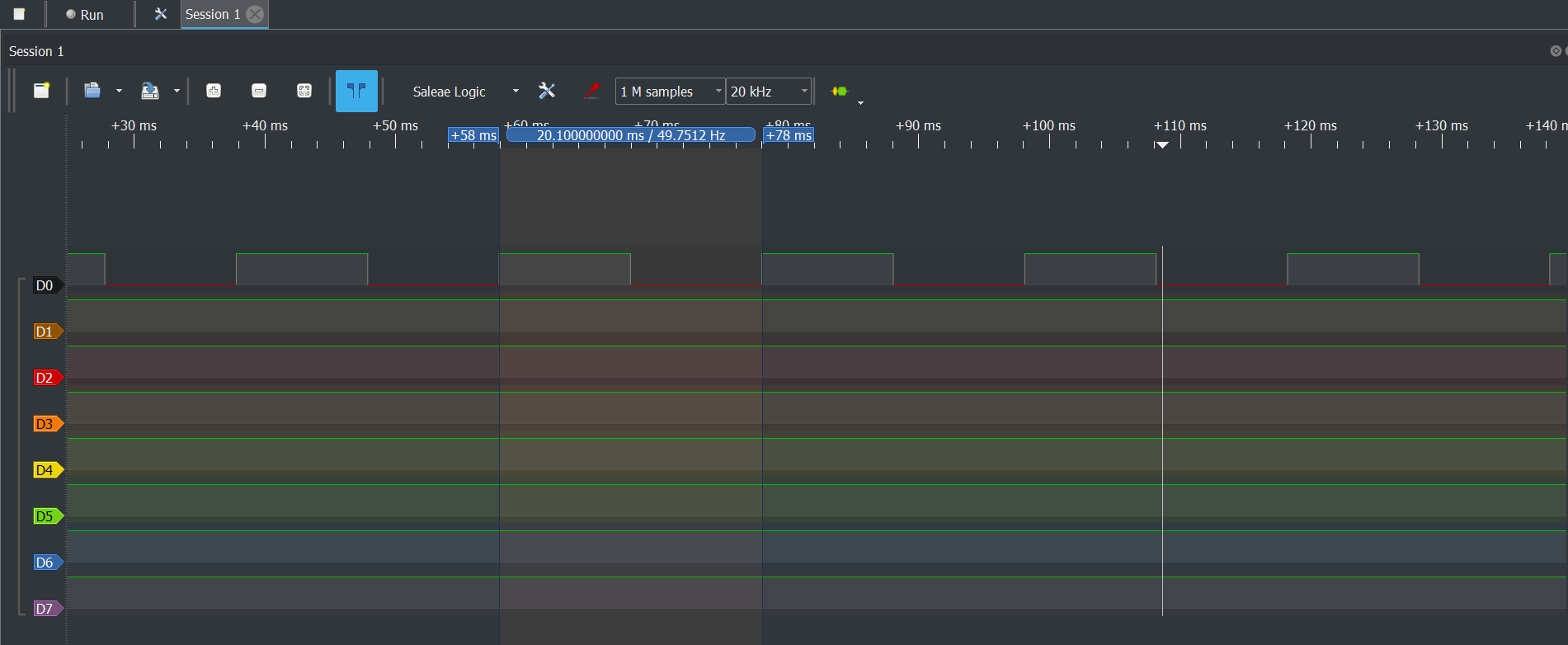
**Part B**





**Part C**





1. **SCREENSHOT OF EACH DEMO (BOARD SETUP)**
2. **VIDEO LINKS OF EACH DEMO**
3. **GITHUB LINK OF THIS DA**

<https://github.com/mesah1/submissions/upload/master/DA2C>

**Student Academic Misconduct Policy**

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

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

Henry Mesa