Department of Electrical and Computing Engineering

UNIVERSITY OF CONNECTICUT

ECE 3411 Microprocessor Application Lab: Fall 2015

Question XIII

There is 1 question in this quiz. There are 2 pages in this quiz booklet. Answer each question according to the instructions given.

You have **5 minutes** to answer the questions.

If you find a question ambiguous, be sure to write down any assumptions you make.
Be neat and legible. If we can't understand your answer, we can't give you credit!

Write your name in the space below. Write your initials at the bottom of each page.

THIS IS A CLOSED BOOK, CLOSED NOTES QUIZ.
PLEASE TURN YOUR NETWORK DEVICES OFF.

Any form of communication with other students is considered cheating and will merit an F as final grade in the course.

Do not write in the box below

Total (xx/10)

Name:

Student ID:

1. The following code tries to implement a 1kHz PWM signal whose duty cycle is varied in way that it results in 10Hz sawtooth waveform. The MCU clock frequency is 16MHz. List all the bugs that you can identify in this code, and mention how would you fix them.

```
uint16_t step = 80;
uint16_t time_period = 16000;
uint16_t duty_cycle = 0;

void main(void)
{
    /* Configuring Timer 1 for PWM generation */
    OCR1A = time_period-1;
    OCR1B = duty_cycle;
    TCCR1A |= (1<<WGM11) | (1<<WGM10);    // turn on Fast PWM mode
    TCCR1B |= (1<<WGM13) | (1<<WGM12);    // turn on Fast PWM mode
    TIMSK1 |= (1<<OCIE1B);                // Enable Interrupt
    TCCR1B |= (1<<CS10);                  // Set pre-scaler @ 1

    while(1);    // Nothing to do
}

ISR(TIMER0_COMPA_vect)
{
    duty_cycle += step;
    duty_cycle = duty_cycle % (time_period-1);
    OCR1B = duty_cycle;
}
// -------------------------------------------------------------------
```

End of Question

Please double check that you wrote your name on the front of the question.

Initials: