**Introduction**

For homework 3, I had to write a program that lit and dimmed an LED in a particular fashion. This report details my personal experiences pertaining to the construction of it.

**Preliminary Work**

Before programming, I had to I connect a LED. This seemingly simple circuit turned out to be a disaster. The circuit flow looked like this: vcc-port5-longleg-shortleg-gnd. I tried many variations in the circuit, but all of them led to the LED's death. The LED would blink once, but never again. In the end, I connected port5 to a segment of the counter. This worked instantly.  
 After that, I read the course notes about pulse-width modulation and reread older notes about interrupts. Still, unable to grasp it all, I continued. I started with the example from the notes, and tried to mimic the flowchart on the second-last slide. I added a counter that resets and an OC3\_SVC. I played around with the code, stared at it, reread the notes, and repeated for hours. I’m comfortable with coding statements. I was just having a hard time learning everything about interrupts, OCs and PWM signals.

After trying to mimic the notes, I felt like I could have done the homework in a different way. This was the way I envisioned it.

//init

TIM\_BASE EQU 20000 ;0.5 US \*20000 = 10 MS

T\_90 EQU 18000 ;90% duty cycle @(T=10MS) = 9 ms = 18000

T\_40 EQU 8000

counter=0

//main

if(direction==up) while(counter<50){counter++}

else if(direction==down) while(counter>0){counter--}

//OC1\_SVC

if(time==2s)state=bright

if(time==3s)state=decrease

if(time==5s)state=dim

if(time==6s)state=increase and time=0

//OC3\_SVC

if(direction==up) duty\_cycle=8000+counter\*200

if(direction==down) duty\_cycle=18000-counter\*200

interrupt every time counter changes

OC1\_SVC would interrupt for every state change. For example at 2s, it would branch to the bright state which stores 90% duty cycle onto the LED. The counter in main would be used in the increase and decrease states. The program would be interrupted by OC3\_SVC every time counter changed, which would be frequent enough to create a lighting effect. I changed T\_30 to T\_40 to fit the following equation: 50 (max counter)\*1% DC + 40% DC = 90% DC.

**Conclusion**

Again, I ran into a brick wall and am struggling to get over it. Although it was much worse during the midterm, this homework proved to be discomforting. I’ll try knocking it down throughout the week.