Saul Alejandro Mendoza Guzman
Github root directory: https://github.com/mendos1/Submission_Link/tree/master/Tiva_C

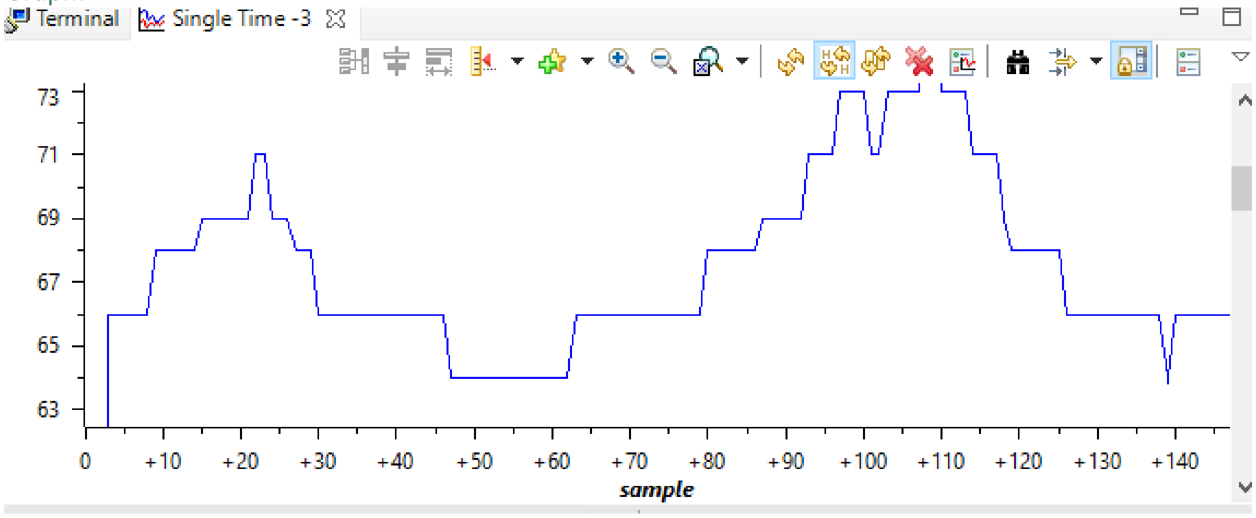
Date Submitted: **10/10/2019**

Task 00: Execute provided code

Youtube Link:
https://www.youtube.com/watch?v=WD3YLFheLXM

Task 01:

Graph:



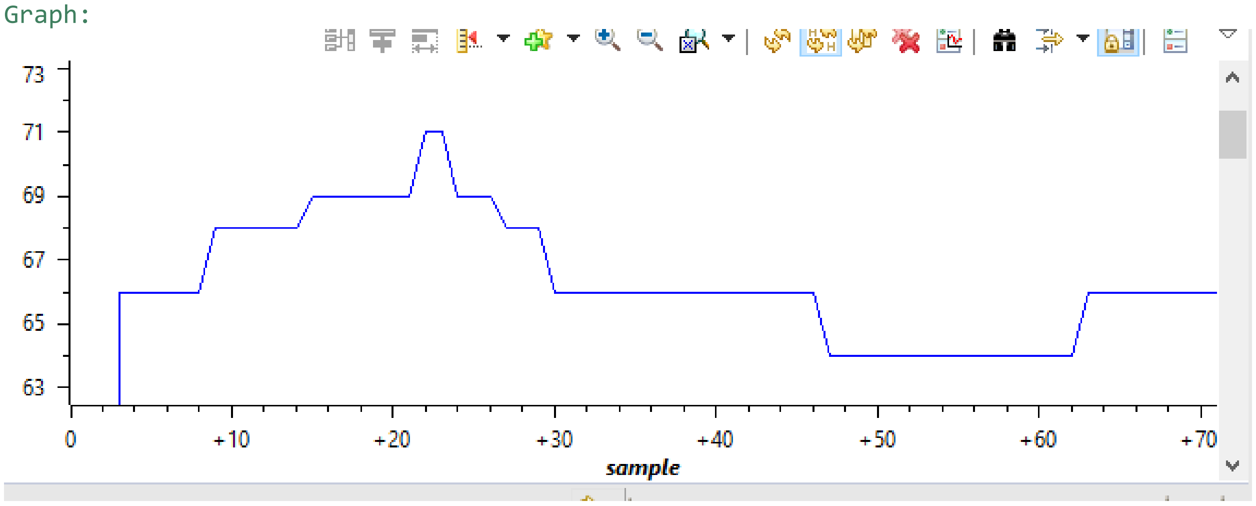
Youtube Link:
https://www.youtube.com/watch?v=9LCvm5uinTg
Modified Schematic (if applicable):

Modified Code:
```
#include <stdint.h>
#include <stdbool.h>
#include "inc/hw_memmap.h"
#include "inc/hw_types.h"
#include "driverlib/debug.h"
#include "driverlib/sysctl.h"
#include "driverlib/adc.h"
#include "driverlib/gpio.h"

int main(void){
	uint32_t ui32ADC0Value[4];
	volatile uint32_t ui32TempAvg;
	volatile uint32_t ui32TempValueC;
	volatile uint32_t ui32TempValueF;

	SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_OSC_MAIN|SYSCTL_XTAL_16MZ
);

	SysCtlPeripheralEnable(SYSCTL_PERIPH_ADC0);

	ADCSequenceConfigure(ADC0_BASE, 2, ADC_TRIGGER_PROCESSOR, 0); // Sequencer 2
	ADCSequenceStepConfigure(ADC0_BASE, 2, 0, ADC_CTL_TS);
	ADCSequenceStepConfigure(ADC0_BASE, 2, 1, ADC_CTL_TS);
	ADCSequenceStepConfigure(ADC0_BASE, 2, 2, ADC_CTL_TS);
	ADCSequenceStepConfigure(ADC0_BASE, 2, 3, ADC_CTL_TS|ADC_CTL_IE|ADC_CTL_END);
	ADCSequenceEnable(ADC0_BASE, 2);

	// Enable PF1 and PF2 LEDs
	SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
	GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2);

	while(1){
	   ADCIntClear(ADC0_BASE, 2);
	   ADCProcessorTrigger(ADC0_BASE, 2);

	   while(!ADCIntStatus(ADC0_BASE, 2, false)){}

	   ADCSequenceDataGet(ADC0_BASE, 2, ui32ADC0Value);
	   ui32TempAvg = (ui32ADC0Value[0] + ui32ADC0Value[1] + ui32ADC0Value[2] +
ui32ADC0Value[3] + 2)/4;
	   ui32TempValueC = (1475 - ((2475 * ui32TempAvg)) / 4096)/10;
	   ui32TempValueF = ((ui32TempValueC * 9) + 160) / 5;

	   // If greater than 68degF change to red, else blue.
	   if (ui32TempValueF > 68) {
	       GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2, 2);
	   }
	   else {
	       GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2, 4);
	   }
	}
}
```

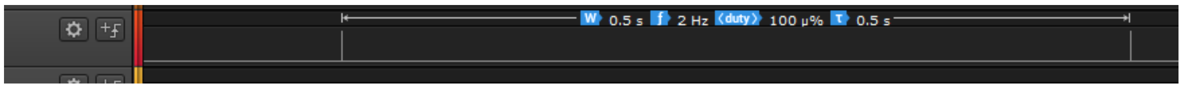
Grading scheme: 30% Coding, 30% Documentation, 40% Execution/Video.

Task 02:

Graph:



*Held down on processor at red marks to generate heat.
Verification of timer:



Youtube Link:
https://www.youtube.com/watch?v=nnmxvSmT4kE
Modified Schematic (if applicable):

Modified Code:

```
#include <stdint.h>
#include <stdbool.h>
#include "inc/hw_types.h"
#include "driverlib/debug.h"
#include "driverlib/sysctl.h"
#include "driverlib/adc.h"
#include "driverlib/gpio.h"
#include "inc/hw_memmap.h"
#include "inc/tm4c123gh6pm.h"
#include "driverlib/timer.h"
#include "driverlib/interrupt.h"
uint32_t ui32Period;
uint32_t ui32ADC0Value[4];
volatile uint32_t ui32TempAvg;
volatile uint32_t ui32TempValueC;
volatile uint32_t ui32TempValueF;

int main(void){
    SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_OSC_MAIN|SYSCTL_XTAL_16MHZ);

    SysCtlPeripheralEnable(SYSCTL_PERIPH_ADC0);
    ADCHardwareOversampleConfigure(ADC0_BASE, 32); // Hardware Averaging of 32
Samples
    ADCSequenceConfigure(ADC0_BASE, 2, ADC_TRIGGER_PROCESSOR, 0); // Sequencer 2
    ADCSequenceStepConfigure(ADC0_BASE, 2, 0, ADC_CTL_TS);
    ADCSequenceStepConfigure(ADC0_BASE, 2, 1, ADC_CTL_TS);
    ADCSequenceStepConfigure(ADC0_BASE, 2, 2, ADC_CTL_TS);
    ADCSequenceStepConfigure(ADC0_BASE, 2, 3, ADC_CTL_TS|ADC_CTL_IE|ADC_CTL_END);

    SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
    GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2);

    SysCtlPeripheralEnable(SYSCTL_PERIPH_TIMER1);
    TimerConfigure(TIMER1_BASE, TIMER_CFG_PERIODIC);

    ui32Period = SysCtlClockGet() / 2;
    TimerLoadSet(TIMER1_BASE, TIMER_A, ui32Period-1);
    IntEnable(INT_TIMER1A);
    TimerIntEnable(TIMER1_BASE, TIMER_TIMA_TIMEOUT);
    IntMasterEnable();
    TimerEnable(TIMER1_BASE, TIMER_A);

    ADCSequenceEnable(ADC0_BASE, 2); // 128 samples
    ADCIntEnable(ADC0_BASE, 2);

    while(1) {}
}

void Timer1AIntHandler(void){
    TimerIntClear(TIMER1_BASE, TIMER_A);
    ADCIntClear(ADC0_BASE, 2);
    ADCProcessorTrigger(ADC0_BASE, 2);

    while(!ADCIntStatus(ADC0_BASE, 2, false)){}

    ADCSequenceDataGet(ADC0_BASE, 2, ui32ADC0Value);
    ui32TempAvg = (ui32ADC0Value[0] + ui32ADC0Value[1] + ui32ADC0Value[2] +
ui32ADC0Value[3] + 2)/4;
    ui32TempValueC = (1475 - ((2475 * ui32TempAvg)) / 4096)/10;
    ui32TempValueF = ((ui32TempValueC * 9) + 160) / 5;

    // If greater than 68degF change to blue, else red.
    if (ui32TempValueF > 68){
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2, 2);
    }
    else{
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2, 4);
    }

}
```