**Date Submitted:**

**Task 00: Execute provided code**

**Youtube Link:**

<https://youtu.be/EDhTy25-CvI>

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**Task 01:**

Youtube Link:

<https://youtu.be/gHlqudAA_ZQ>

**Modified Code:**

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_memmap.h"

**#include** "inc/hw\_types.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "driverlib/debug.h"

**#include** "driverlib/pwm.h"

**#include** "driverlib/pin\_map.h"

**#include** "inc/hw\_gpio.h"

**#include** "driverlib/rom.h"

**#define** PWM\_FREQUENCY 55

**int** **main**(**void**)

{

**volatile** uint32\_t ui32Load;

**volatile** uint32\_t ui32PWMClock;

**volatile** uint8\_t ui8Adjust;

ui8Adjust = 35;

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_OSC\_MAIN|SYSCTL\_XTAL\_16MHZ);

ROM\_SysCtlPWMClockSet(SYSCTL\_PWMDIV\_64);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_PWM1);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOD);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

ROM\_GPIOPinTypePWM(GPIO\_PORTD\_BASE, GPIO\_PIN\_0);

ROM\_GPIOPinConfigure(GPIO\_PD0\_M1PWM0);

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = GPIO\_LOCK\_KEY;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_CR) |= 0x01;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = 0;

ROM\_GPIODirModeSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_DIR\_MODE\_IN);

ROM\_GPIOPadConfigSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_STRENGTH\_2MA, GPIO\_PIN\_TYPE\_STD\_WPU);

ui32PWMClock = **SysCtlClockGet**() / 64;

ui32Load = (ui32PWMClock / PWM\_FREQUENCY) - 1;

**PWMGenConfigure**(PWM1\_BASE, PWM\_GEN\_0, PWM\_GEN\_MODE\_DOWN);

**PWMGenPeriodSet**(PWM1\_BASE, PWM\_GEN\_0, ui32Load);

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_PWMOutputState(PWM1\_BASE, PWM\_OUT\_0\_BIT, true);

ROM\_PWMGenEnable(PWM1\_BASE, PWM\_GEN\_0);

**while**(1)

{

ui8Adjust++;

**if** (ui8Adjust > 135)

{

ui8Adjust = 135;

**while**(1){

ui8Adjust--;

**if** (ui8Adjust < 35)

{

ui8Adjust = 35;

**break**;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_SysCtlDelay(200000);

}

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_SysCtlDelay(200000);

}

}

**------------------------------------------------------------------------------------**

**Task 02:**

Youtube Link:

<https://youtu.be/uhJO5IFZkxI>

**Modified Code:**

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_memmap.h"

**#include** "inc/hw\_types.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "driverlib/debug.h"

**#include** "driverlib/pwm.h"

**#include** "driverlib/pin\_map.h"

**#include** "inc/hw\_gpio.h"

**#include** "driverlib/rom.h"

**#define** PWM\_FREQUENCY 50

**int** **main**(**void**)

{

**volatile** uint32\_t ui32Load;

**volatile** uint32\_t ui32PWMClock;

**volatile** uint32\_t ui8Adjust;

ui8Adjust = 900;

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_OSC\_MAIN|SYSCTL\_XTAL\_16MHZ);

ROM\_SysCtlPWMClockSet(SYSCTL\_PWMDIV\_64);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_PWM1);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOD);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

ROM\_GPIOPinTypePWM(GPIO\_PORTD\_BASE, GPIO\_PIN\_0);

ROM\_GPIOPinConfigure(GPIO\_PD0\_M1PWM0);

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = GPIO\_LOCK\_KEY;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_CR) |= 0x01;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = 0;

ROM\_GPIODirModeSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_DIR\_MODE\_IN);

ROM\_GPIOPadConfigSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_STRENGTH\_2MA, GPIO\_PIN\_TYPE\_STD\_WPU);

ui32PWMClock = **SysCtlClockGet**() / 64;

ui32Load = (ui32PWMClock / PWM\_FREQUENCY) - 1;

**PWMGenConfigure**(PWM1\_BASE, PWM\_GEN\_0, PWM\_GEN\_MODE\_DOWN);

**PWMGenPeriodSet**(PWM1\_BASE, PWM\_GEN\_0, ui32Load);

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

ROM\_PWMOutputState(PWM1\_BASE, PWM\_OUT\_0\_BIT, true);

ROM\_PWMGenEnable(PWM1\_BASE, PWM\_GEN\_0);

**GPIOPinTypeGPIOOutput**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3);

**while**(1)

{

**if**(ROM\_GPIOPinRead(GPIO\_PORTD\_BASE,GPIO\_PIN\_0)==0x00)

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0); //too fast to notice by human eye

//ROM\_SysCtlDelay(1000000); //delay set because the PWM is to fast to notice by human eye

}

**else**

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 4); //turns on blue led

}

/\*

if(ROM\_GPIOPinRead(GPIO\_PORTF\_BASE,GPIO\_PIN\_4)==0x00)

{

ui8Adjust--;

if (ui8Adjust < 56)

{

ui8Adjust = 56;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

}

if(ROM\_GPIOPinRead(GPIO\_PORTF\_BASE,GPIO\_PIN\_0)==0x00)

{

ui8Adjust++;

if (ui8Adjust > 111)

{

ui8Adjust = 111;

}

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Adjust \* ui32Load / 1000);

}

ROM\_SysCtlDelay(100000);

\*/

}

}

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**Task 03:**

Youtube Link:

<https://youtu.be/_aJVk97IBG8>

**Modified Code:**

**#include** <stdint.h>

**#include** <stdbool.h>

**#include** "inc/hw\_memmap.h"

**#include** "inc/hw\_types.h"

**#include** "inc/hw\_ints.h"

**#include** "driverlib/sysctl.h"

**#include** "driverlib/gpio.h"

**#include** "driverlib/debug.h"

**#include** "driverlib/pwm.h"

**#include** "driverlib/pin\_map.h"

**#include** "inc/hw\_gpio.h"

**#include** "driverlib/rom.h"

**#include** "driverlib/qei.h"

**#include** "driverlib/adc.h"

**#define** PWM\_FREQUENCY 50

**int** **main**(**void**)

{

**volatile** uint32\_t ui32Load;

**volatile** uint32\_t ui32PWMClock;

**volatile** **int** qeiPosition;

uint32\_t ui8Adjust[4];

**volatile** uint32\_t ui8Avg;

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_ADC0);

ROM\_ADCSequenceConfigure(ADC0\_BASE, 1, ADC\_TRIGGER\_PROCESSOR, 0);

ROM\_ADCSequenceStepConfigure(ADC0\_BASE, 1, 0, ADC\_CTL\_CH1); //SS1

ROM\_ADCSequenceStepConfigure(ADC0\_BASE, 1, 1, ADC\_CTL\_CH1);

ROM\_ADCSequenceStepConfigure(ADC0\_BASE, 1, 2, ADC\_CTL\_CH1);

ROM\_ADCSequenceStepConfigure(ADC0\_BASE,1,3,ADC\_CTL\_CH1|ADC\_CTL\_IE|ADC\_CTL\_END);

ROM\_ADCSequenceEnable(ADC0\_BASE, 1);

ROM\_GPIOPinTypeADC(GPIO\_PORTE\_BASE, GPIO\_PIN\_2); //PE2 AIN1

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_OSC\_MAIN|SYSCTL\_XTAL\_16MHZ);

ROM\_SysCtlPWMClockSet(SYSCTL\_PWMDIV\_64);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_PWM1);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOD);

ROM\_SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

ROM\_GPIOPinTypePWM(GPIO\_PORTD\_BASE, GPIO\_PIN\_0);

ROM\_GPIOPinConfigure(GPIO\_PD0\_M1PWM0);

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = GPIO\_LOCK\_KEY;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_CR) |= 0x01;

HWREG(GPIO\_PORTF\_BASE + GPIO\_O\_LOCK) = 0;

ROM\_GPIODirModeSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_DIR\_MODE\_IN);

ROM\_GPIOPadConfigSet(GPIO\_PORTF\_BASE, GPIO\_PIN\_4|GPIO\_PIN\_0, GPIO\_STRENGTH\_2MA, GPIO\_PIN\_TYPE\_STD\_WPU);

ui32PWMClock = **SysCtlClockGet**() / 64;

ui32Load = (ui32PWMClock / PWM\_FREQUENCY) - 1;

**PWMGenConfigure**(PWM1\_BASE, PWM\_GEN\_0, PWM\_GEN\_MODE\_DOWN);

**PWMGenPeriodSet**(PWM1\_BASE, PWM\_GEN\_0, ui32Load);

ROM\_PWMOutputState(PWM1\_BASE, PWM\_OUT\_0\_BIT, true);

ROM\_PWMGenEnable(PWM1\_BASE, PWM\_GEN\_0);

**while** (1) //This is the main loop of the program

{

ROM\_ADCIntClear(ADC0\_BASE, 1);

ROM\_ADCProcessorTrigger(ADC0\_BASE, 1);

**while**(!ROM\_ADCIntStatus(ADC0\_BASE, 1, false))

{

}

ROM\_ADCSequenceDataGet(ADC0\_BASE, 1, ui8Adjust);

ui8Avg = (ui8Adjust[0] + ui8Adjust[1] + ui8Adjust[2] + ui8Adjust[3] + 2)/4;

ROM\_PWMPulseWidthSet(PWM1\_BASE, PWM\_OUT\_0, ui8Avg \* ui32Load / 1000);

}

}

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