**Date Submitted: 11/30/19**

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**Task 04:**

Youtube Link: <https://www.youtube.com/watch?v=pTqPnN_wqGo>

**Modified Code:**

//---------------------------------------------------------------------------------

// Project: Blink TM4C Using BIOS (STARTER)

// Author: Eric Wilbur

// Date: June 2014

//

// Note: The function call TimerIntClear(TIMER2\_BASE, TIMER\_TIMA\_TIMEOUT) HAS

// to be in the ISR. This fxn clears the TIMER's interrupt flag coming

// from the peripheral - it does NOT clear the CPU interrupt flag - that

// is done by hardware. The author struggled figuring this part out - hence

// the note. And, in the Swi lab, this fxn must be placed in the

// Timer\_ISR fxn because it will be the new ISR.

//

// Follow these steps to create this project in CCSv6.0:

// 1. Project -> New CCS Project

// 2. Select Template:

// - TI-RTOS for Tiva-C -> Driver Examples -> EK-TM4C123 LP -> Example Projects ->

// Empty Project

// - Empty Project contains full instrumentation (UIA, RTOS Analyzer) and

// paths set up for the TI-RTOS version of MSP430Ware

// 3. Delete the following files:

// - Board.h, empty.c, EK\_TM4C123GXL.c/h, empty\_readme.txt

// 4. Add main.c from TI-RTOS Workshop Solution file for this lab

// 5. Edit empty.cfg as needed (to add/subtract) BIOS services, delete given Task

// 6. Build, load, run...

//----------------------------------------------------------------------------------

//----------------------------------------

// BIOS header files

//----------------------------------------

**#include** <xdc/std.h> //mandatory - have to include first, for BIOS types

**#include** <ti/sysbios/BIOS.h> //mandatory - if you call APIs like BIOS\_start()

**#include** <xdc/runtime/Log.h> //needed for any Log\_info() call

**#include** <xdc/cfg/global.h> //header file for statically defined objects/handles

//------------------------------------------

// TivaWare Header Files

//------------------------------------------

**#include** <stdint.h>

**#include** <stdbool.h>

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

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

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

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

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

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

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

**#include** <time.h>

//----------------------------------------

// Prototypes

//----------------------------------------

**void** **hardware\_init**(**void**);

**void** **ledToggle**(**void**);

**void** **delay**(**void**);

//---------------------------------------

// Globals

//---------------------------------------

**volatile** int16\_t i16ToggleCount = 0;

//---------------------------------------------------------------------------

// main()

//---------------------------------------------------------------------------

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

{

hardware\_init(); // init hardware via Xware

BIOS\_start(); // start BIOS Scheduler

}

//---------------------------------------------------------------------------

// hardware\_init()

//

// inits GPIO pins for toggling the LED

//---------------------------------------------------------------------------

**void** **hardware\_init**(**void**)

{

//Set CPU Clock to 40MHz. 400MHz PLL/2 = 200 DIV 5 = 40MHz

**SysCtlClockSet**(SYSCTL\_SYSDIV\_5|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

// ADD Tiva-C GPIO setup - enables port, sets pins 1-3 (RGB) pins for output

**SysCtlPeripheralEnable**(SYSCTL\_PERIPH\_GPIOF);

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

// Turn on the LED

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 4);

}

//---------------------------------------------------------------------------

// ledToggle()

//

// toggles LED on Tiva-C LaunchPad

//---------------------------------------------------------------------------

**void** **ledToggle**(**void**)

{

// LED values - 2=RED, 4=BLUE, 8=GREEN

**if**(**GPIOPinRead**(GPIO\_PORTF\_BASE, GPIO\_PIN\_2))

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0);

}

**else**

{

**GPIOPinWrite**(GPIO\_PORTF\_BASE, GPIO\_PIN\_2, 4);

}

delay(); // create a delay of ~1/2sec

i16ToggleCount += 1; // keep track of #toggles

}

//---------------------------------------------------------------------------

// delay()

//

// Creates a 500ms delay via TivaWare fxn

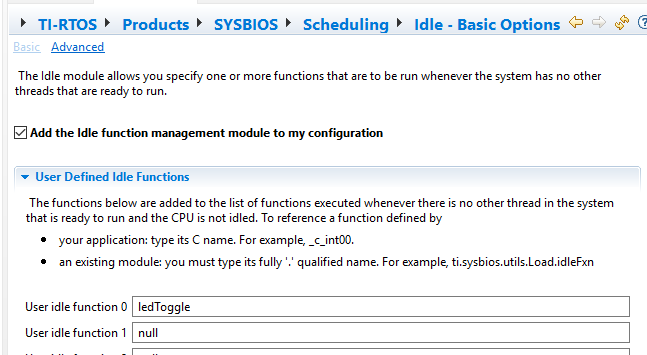
//---------------------------------------------------------------------------

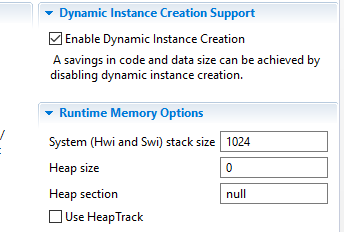
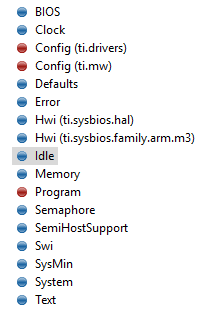
**void** **delay**(**void**)

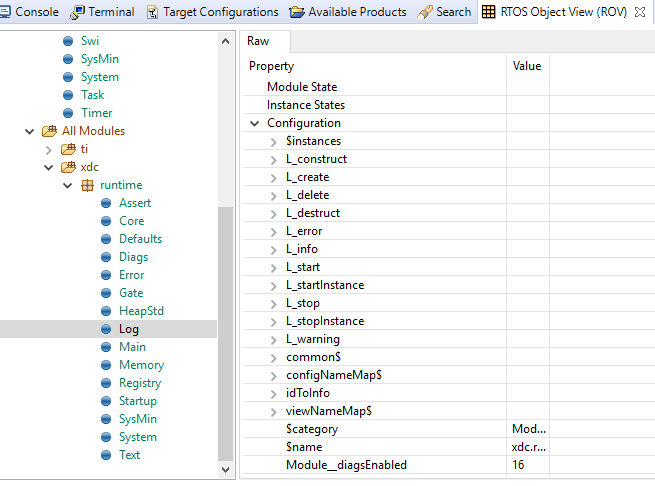
{

**SysCtlDelay**(6700000); // creates ~500ms delay - TivaWare fxn

}







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