

# CPE403 – Advanced Embedded Systems

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## Design Assignment #

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DO NOT REMOVE THIS PAGE DURING SUBMISSION:

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Github Repository link (root):

<https://github.com/saibalaji1997/githubfiles/tree/main/TIVAC/Assignment%201>

Youtube Playlist link (root): <https://www.youtube.com/playlist?list=PLEYwuhAoBI1ROjaOdZn-LBSkJ3wdOhjrM>

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**Follow the submission guideline to be awarded points for this Assignment.**

Submit the following for all Assignments:

1. In the document, for each task submit the modified or included code (from the base code) with highlights and justifications of the modifications. Also include the comments. If no base code is provided, submit the base code for the first task only.
2. Create a private Github repository with a random name (no CPE/403, Lastname, Firstname). Place all labs under the root folder TIVAC, sub-folder named Assignment1, with one document and one video link file for each lab, place modified c files named as asng\_taskxx.c.
3. If multiple c files or other libraries are used, create a folder asng1\_t01 and place these files inside the folder.
4. The folder should have a) Word document (see template), b) source code file(s) with startup\_ccs.c and other include files, c) text file with youtube video links (see template).
5. Submit the doc file in canvas before the due date. The root folder of the github assignment directory should have the documentation and the text file with youtube video links.
6. Organize your youtube videos as playlist under the name “cpe403”. The playlist should have the video sequence arranged as submission or due dates.
7. Only submit pdf documents. Do not forget to upload this document in the github repository and in the canvas submission portal.

1. Code for Tasks. for each task submit the modified or included code (from the base code) with highlights and justifications of the modifications. Also include the comments. If no base code is provided, submit the base code for the first task only. Use separate page for each task.

## Code Using Joysticks:

```
#include <stdint.h>
#include <stdbool.h>
#include "inc/hw_memmap.h"
#include "inc/hw_types.h"
#include "driverlib/gpio.h"
#include "driverlib/pin_map.h"
#include "driverlib/sysctl.h"
#include "driverlib/timer.h"

// Function prototypes
void ConfigureTimer(void);
void Timer0IntHandler(void);

int main(void)
{
    // Set the clock frequency

    SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);

    // Enable the peripherals
    SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOA);
    SysCtlPeripheralEnable(SYSCTL_PERIPH_TIMER0);

    // Configure the timer interrupt
    ConfigureTimer();
```

```

// Enable the timer interrupt
TimerIntEnable(TIMER0_BASE, TIMER_TIMA_TIMEOUT);
IntEnable(INT_TIMER0A);

// Configure the joystick pins as input
GPIOPinTypeGPIOInput(GPIO_PORTA_BASE, GPIO_PIN_2 | GPIO_PIN_3);

// Enable the interrupt
IntMasterEnable();

// Loop forever
while(1)
{
    // Read the joystick values
    uint32_t xVal = GPIOPinRead(GPIO_PORTA_BASE, GPIO_PIN_2);
    uint32_t yVal = GPIOPinRead(GPIO_PORTA_BASE, GPIO_PIN_3);

    // Print the values to the terminal
    printf("X: %d, Y: %d\n", xVal, yVal);
}
}

// Configure the timer interrupt
void ConfigureTimer(void)
{
    // Set the timer period
    TimerConfigure(TIMER0_BASE, TIMER_CFG_PERIODIC);
    TimerLoadSet(TIMER0_BASE, TIMER_A, SysCtlClockGet()/2);

    // Enable the timer
    TimerEnable(TIMER0_BASE, TIMER_A);

```

```

}

// Timer interrupt handler
void Timer0IntHandler(void)
{
    // Clear the interrupt
    TimerIntClear(TIMER0_BASE, TIMER_TIMA_TIMEOUT);

    // Read the joystick values
    uint32_t xVal = GPIOPinRead(GPIO_PORTA_BASE, GPIO_PIN_2);
    uint32_t yVal = GPIOPinRead(GPIO_PORTA_BASE, GPIO_PIN_3);

    // Print the values to the terminal
    printf("X: %d, Y: %d\n",
}

```

## Code to toggle RGB LEDs in a sequence:

```

#include <stdint.h>          //Variable definitions for the C99 standard
#include <stdbool.h>         //Boolean definitions for the C99 standard
#include "inc/tm4c123gh6pm.h" //def. for the interrupt and register assignments on the Tiva
C Series device on the launchPad board
#include "inc/hw_memmap.h"   //Macros defining the memory map of the Tiva C Series
#include "inc/hw_types.h"    //Defines common types and macros
#include "driverlib/sysctl.h" //Defines macros for System Control API of Driverlib
#include "driverlib/interrupt.h" //defines & macros for NVIC Controller(Interrupt)API of
driverlib.
#include "driverlib/gpio.h"   //Defines macros for GPIO API of Driverlib
#include "driverlib/timer.h"  //Defines and macros for Timer API of driverLib.

uint32_t ui32Period;

```

```
int led_state = 0;
```

```
void GPIOF0IntHandler(void)
```

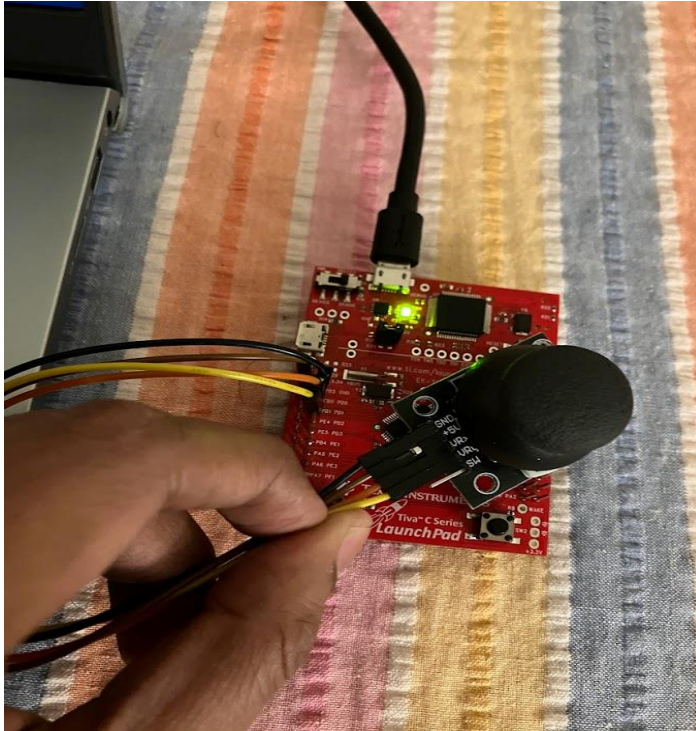
```
{  
    //clear interrupt flag on pin F0  
    GPIOIntClear(GPIO_PORTF_BASE, GPIO_PIN_0);  
    // increment the state variable  
    led_state++;  
    if(led_state > 3){  
        led_state = 0;  
    }  
    // Turn on LED based on the led_state  
    if(led_state == 0){  
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, 0);  
    }  
    else if(led_state == 1){  
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1, 2);  
    }  
    else if(led_state == 2){  
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_2, 4);  
    }  
    else if(led_state == 3){  
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_3, 8);  
    }  
}
```

```
int main(void)
```

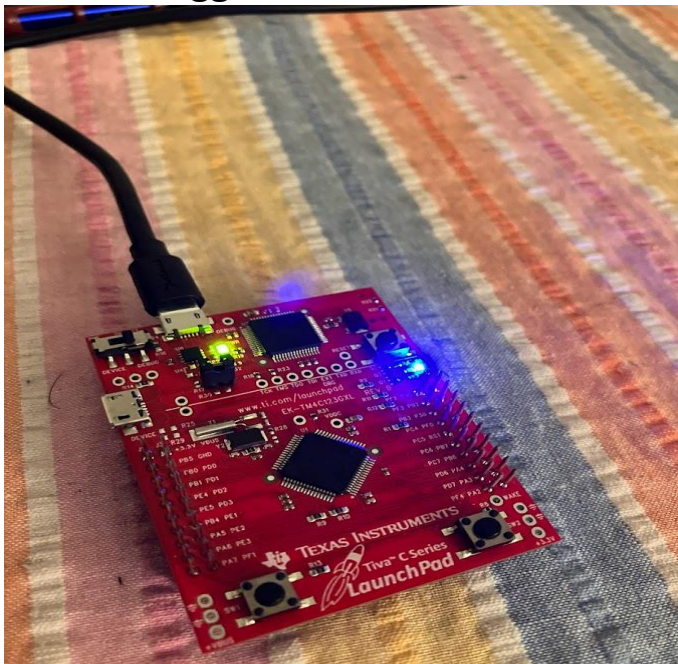
```
{  
    //System clock to 40Mhz (PLL= 400Mhz / 10 = 40Mhz)  
  
    SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);  
}
```

2. Block diagram and/or Schematics showing the components, pins used, and interface.

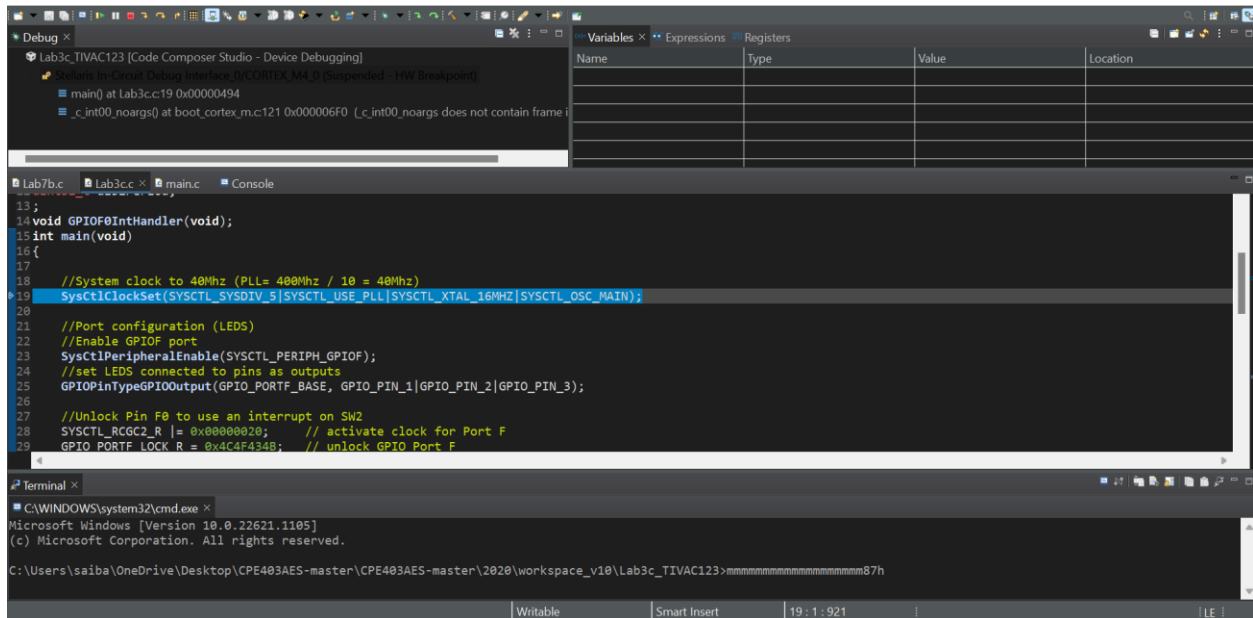
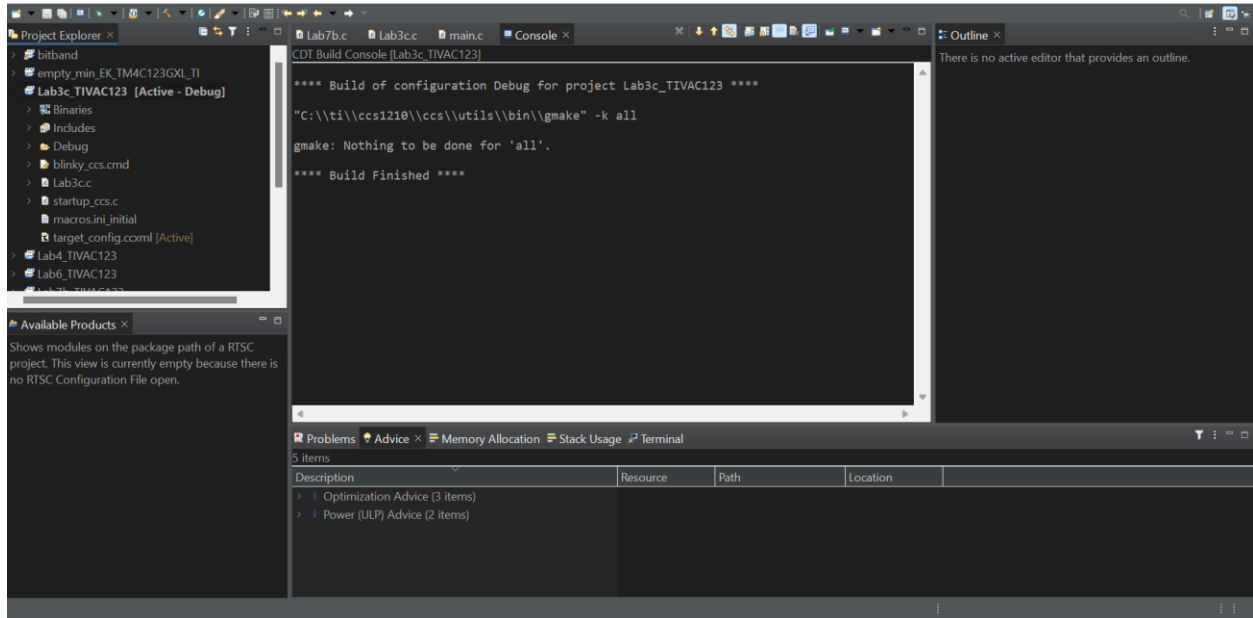
### Wiring Using Joystick:



### For LED Toggle:



3. Screenshots of the IDE, physical setup, debugging process - Provide screenshot of successful compilation, screenshots of registers, variables, graphs, etc.



4. Declaration

I understand the Student Academic Misconduct Policy -  
<http://studentconduct.unlv.edu/misconduct/policy.html>

"This assignment submission is my own, original work".

Name of the Student

Sai Balai Jai Kumar