**Lab03**

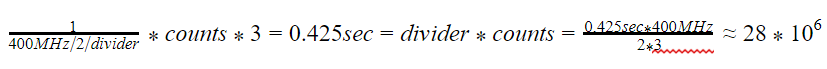
Task 1:

Considering the implied division of 2 as well as the devision of 5 that we apply to the clock frequency, as well as each delay count giving 3 clock cycles of delay (according to the lab write up), the on-time for each of the LEDs is,



Ignoring the clock cycles for the other lines of code, this means that the LEDs will stay on for 50ms, then be off for 50ms, then turn on, etc. So the period of the blinking is **300ms**.

To find the new period of oscillation, the same equation as before will be used, but with different algebra.



So, if we use a clock divider of 7, we need to use 4\*10^6 counts.

Code:

#include <stdint.h>

#include <stdbool.h>

#include "inc/hw\_types.h"

#include "inc/hw\_memmap.h"

#include "driverlib/sysctl.h"

#include "driverlib/gpio.h"

uint8\_t ui8PinData=2;

int main(void)

{

// Set the clock to 400MHz/2/7 = 28.5MHz

SysCtlClockSet(SYSCTL\_SYSDIV\_7|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

// Enable clock usage for pin F

SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

// Set the 3 on-board LEDs to outputs

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

while(1)

{

// Turn specific LEDs on

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, ui8PinData);

SysCtlDelay(4000000);

// Turn all LEDs off

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

SysCtlDelay(4000000);

// Update the LED value

if(ui8PinData==8) {ui8PinData=2;} else {ui8PinData=ui8PinData\*2;}

}

}

Task02-a:

The original code given in the lab actually gave the sequence Red, Blue, Green, Red. So, to alter the sequence to Blue, Green, Red, the code just needs to be altered to start at 4 (Blue) instead of 2 (Red), which gives the sequence: Blue, Green, Red, Blue. For ease in viewing the sequence, the slower clock cycle found in Task01 was kept.

Code:

#include <stdint.h>

#include <stdbool.h>

#include "inc/hw\_types.h"

#include "inc/hw\_memmap.h"

#include "driverlib/sysctl.h"

#include "driverlib/gpio.h"

uint8\_t ui8PinData=4;

int main(void)

{

// Set the clock to 400MHz/2/7 = 28.5MHz

SysCtlClockSet(SYSCTL\_SYSDIV\_7|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

// Enable clock usage for pin F

SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

// Set the 3 on-board LEDs to outputs

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

while(1)

{

// Turn specific LEDs on

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, ui8PinData);

SysCtlDelay(4000000);

// Turn all LEDs off

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

SysCtlDelay(4000000);

// Update the LED value

if(ui8PinData==8) {ui8PinData=2;} else {ui8PinData=ui8PinData\*2;}

}

}

Task02-b:

To get the sequence R (2),G (8), B (4), RG, RB, GB, RGB, R, G, we just need the number combination: 2, 8, 4, 2+8, 2+4, 8+4, 2+4+8, 2, 8. To accomplish this, because there is not a clear pattern in the number values, I decided to use nested if statements.

Code:

#include <stdint.h>

#include <stdbool.h>

#include "inc/hw\_types.h"

#include "inc/hw\_memmap.h"

#include "driverlib/sysctl.h"

#include "driverlib/gpio.h"

uint8\_t ui8PinData=2;

int main(void)

{

// Set the clock to 400MHz/2/7 = 28.5MHz

SysCtlClockSet(SYSCTL\_SYSDIV\_7|SYSCTL\_USE\_PLL|SYSCTL\_XTAL\_16MHZ|SYSCTL\_OSC\_MAIN);

// Enable clock usage for pin F

SysCtlPeripheralEnable(SYSCTL\_PERIPH\_GPIOF);

// Set the 3 on-board LEDs to outputs

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

while(1)

{

// Turn specific LEDs on

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, ui8PinData);

SysCtlDelay(4000000);

// Turn all LEDs off

GPIOPinWrite(GPIO\_PORTF\_BASE, GPIO\_PIN\_1|GPIO\_PIN\_2|GPIO\_PIN\_3, 0x00);

SysCtlDelay(4000000);

// Update the LED value

if(ui8PinData==2) {ui8PinData=8;} else {

if(ui8PinData==8) {ui8PinData=4;} else {

if(ui8PinData==4) {ui8PinData=10;} else {

if(ui8PinData==10) {ui8PinData=6;} else {

if(ui8PinData==6) {ui8PinData=12;} else {

if(ui8PinData==12) {ui8PinData=14;} else {ui8PinData=2;}}}}}}

}

}