

Date Submitted: 10/1/2018

Task 01:

Youtube Link:

<https://youtu.be/wpKVRQnxOE8>

40 MHz = 25 ns delay. The number of clock cycles for a 0.425s delay is $0.425s/25ns = 17000000$. since SysctlDelay(x) takes $3*x$ cycles; $17000000/3 = 5666667$.

in the first picture the clock cycle counter is reset to 0 (note: the value shown is not reset until the next clock cycle, thus the value shown is not the actual value which is 0)

The first screenshot shows the SysctlDelay function being called with the value 5666667. The clock cycle counter is 301913. The second screenshot shows the clock cycle counter at 17000006. The third screenshot shows the clock cycle counter at 17000006.

Identity	Name	Condition	Count
<input checked="" type="checkbox"/> Count Event	Count Event		301913
<input checked="" type="checkbox"/> main.c, line 20 (! Breakpoint			0 (0)
<input checked="" type="checkbox"/> main.c, line 21 (! Breakpoint			0 (0)

```
7
8 int main(void)
9 {
10  uint8_t ui8PinData=2;
11  SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);
12  SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
13  GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3);
14
15  while(1)
16  {
17      GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, ui8PinData);
18      //40 MHz = 25 ns delay so 0.425/25ns = 17000000. since SysctlDelay(x) takes 3*x cycles 17000000/3 = 5666667.
19      // this will give a delay of 0.425s
20      SysCtlDelay(5666667);
21      GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, 0x00);
22      SysCtlDelay(5666667);
23      if(ui8PinData==8) {ui8PinData=2;} else {ui8PinData=ui8PinData*2;}
24  }
```

Identity	Name	Condition	Count
<input checked="" type="checkbox"/> Count Event	Count Event		17000006
<input checked="" type="checkbox"/> main.c, line 20 (! Breakpoint			0 (0)
<input checked="" type="checkbox"/> main.c, line 21 (! Breakpoint			0 (0)

```
7
8 int main(void)
9 {
10  uint8_t ui8PinData=2;
11  SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);
12  SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
13  GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3);
14
15  while(1)
16  {
17      GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, ui8PinData);
18      //40 MHz = 25 ns delay so 0.425/25ns = 17000000. since SysctlDelay(x) takes 3*x cycles 17000000/3 = 5666667.
19      // this will give a delay of 0.425s
20      SysCtlDelay(5666667);
21      GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, 0x00);
22      SysCtlDelay(5666667);
23      if(ui8PinData==8) {ui8PinData=2;} else {ui8PinData=ui8PinData*2;}
24  }
```

The total count of 17000006 informs us that based on the 40MHz clock the delay is roughly 0.425s.

Modified Code:

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

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

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

int main(void)
{
    uint8_t ui8PinData=2;
    SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);
    SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
    GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3);

    while(1)
    {
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, ui8PinData);
        //40 MHz = 25 ns delay so 0.425/25ns = 17000000. since SysCtlDelay(x) takes
3*x cycles 17000000/3 = 5666667.
        // this will give a delay of 0.425s
        SysCtlDelay(5666667);
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, 0x00);
        SysCtlDelay(5666667);
        if(ui8PinData==8) {ui8PinData=2;} else {ui8PinData=ui8PinData*2;}
    }
}
```

Task 02:

Youtube Link:

<https://youtu.be/UI0688uy7O8>

Modified Code:

```
#include "inc/hw_memmap.h"
#include "inc/hw_types.h"
#include "driverlib/sysctl.h"
#include "driverlib/gpio.h"

int main(void)
{
    uint8_t ui8PinData=2;
    SysCtlClockSet(SYSCTL_SYSDIV_5|SYSCTL_USE_PLL|SYSCTL_XTAL_16MHZ|SYSCTL_OSC_MAIN);
    SysCtlPeripheralEnable(SYSCTL_PERIPH_GPIOF);
    GPIOPinTypeGPIOOutput(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3);

    while(1)
    {
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, ui8PinData);
        //40 MHz = 25 ns delay so 0.425/25ns = 17000000. since SysCtlDelay(x) takes
3*x cycles 17000000/3 = 5666667.
        // this will give a delay of 0.425s
        SysCtlDelay(5666667);
        GPIOPinWrite(GPIO_PORTF_BASE, GPIO_PIN_1|GPIO_PIN_2|GPIO_PIN_3, 0x00);
        SysCtlDelay(5666667);
        //for the sequence R, G, B, RG, RB, GB, RGB, R, G, ...
        // R = 2, B = 4, G = 8. thus a mapping from blink to the next is made based
on the change in value
```

```
        if(ui8PinData==2 | ui8PinData==4 | ui8PinData== 6) {ui8PinData=ui8PinData+6;}
// R->G, B->RG, RB->GB: add 6 to current value
        else if (ui8PinData==8 | ui8PinData==10) {ui8PinData=ui8PinData-4;}
// G-> B, RG-> RB: subtract 4 from current value
        else if (ui8PinData==12) {ui8PinData=ui8PinData+2;}
// if GB add 2 to get to RGB
        else {ui8PinData=2;}
// if RGB or any other non specified value occurs, go to R

    }
}
```


