**Lab09:**

Task01:

The originally provided code was given comments to explain each part of the calculation process.

Code:

#include <stdint.h>

#include <stdbool.h>

#include <math.h>

#include "inc/hw\_memmap.h"

#include "inc/hw\_types.h"

#include "driverlib/fpu.h"

#include "driverlib/sysctl.h"

#include "driverlib/rom.h"

// Used to define pi for later use in calculations

#ifndef M\_PI

#define M\_PI 3.14159265358979323846

#endif

// Number of data points used to create the sine wave

#define SERIES\_LENGTH 100

// Create a data point array

float gSeriesData[SERIES\_LENGTH];

// Counter variable used to count the number of calculated data points

int32\_t i32DataCount = 0;

int main(void)

{

// Used to define the distance between data points in the sine wave

float fRadians;

// Enable floating point unit for later use

ROM\_FPULazyStackingEnable();

ROM\_FPUEnable();

// 50MHz system clock

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_4 | SYSCTL\_USE\_PLL | SYSCTL\_XTAL\_16MHZ | SYSCTL\_OSC\_MAIN);

// Define the distance in between data points

fRadians = ((2 \* M\_PI) / SERIES\_LENGTH);

// Calculate and store all of the desired data point values

while(i32DataCount < SERIES\_LENGTH)

{

// Calculated the value for each point on the sine wave

gSeriesData[i32DataCount] = sinf(fRadians \* i32DataCount);

// Move on to the next data point

i32DataCount++;

}

// Loop indefinitely once the calculation is completed

while(1)

{

}

}

Task02:

The frequency of the new sinusoid is 50Hz (contrary to the lab write-up which says the sinusoid is at 5Hz). To show one full second of the sine wave, 50 periods need to be shown using the graphing tool. Because of this, the total number of calculated points was increased to 5000 (100 points per period).

Code:

#include <stdint.h>

#include <stdbool.h>

#include <math.h>

#include "inc/hw\_memmap.h"

#include "inc/hw\_types.h"

#include "driverlib/fpu.h"

#include "driverlib/sysctl.h"

#include "driverlib/rom.h"

// Used to define pi for later use in calculations

#ifndef M\_PI

#define M\_PI 3.14159265358979323846

#endif

// Number of data points used to create the sine wave

#define SERIES\_LENGTH 5000

// Create a data point array

float gSeriesData[SERIES\_LENGTH];

// Counter variable used to count the number of calculated data points

int32\_t i32DataCount = 0;

int main(void)

{

// Used to define the distance between data points in the sine wave

float fRadians;

// Enable floating point unit for later use

ROM\_FPULazyStackingEnable();

ROM\_FPUEnable();

// 50MHz system clock

ROM\_SysCtlClockSet(SYSCTL\_SYSDIV\_4 | SYSCTL\_USE\_PLL | SYSCTL\_XTAL\_16MHZ | SYSCTL\_OSC\_MAIN);

// Define the distance in between data points. The period is 0.02 sec and there are 50 periods

fRadians = ((0.02) / (SERIES\_LENGTH / 50));

// Calculate and store all of the desired data point values

while(i32DataCount < SERIES\_LENGTH)

{

// Calculated the value for each point on the sine wave

gSeriesData[i32DataCount] = 1.0 \* sinf(2 \* M\_PI \* 50 \* fRadians \* i32DataCount) + 0.5 \* cosf(2 \* M\_PI \* 200 \* fRadians \* i32DataCount);

// Move on to the next data point

i32DataCount++;

}

// Loop indefinitely once the calculation is completed

while(1)

{

}

}