LAB REPORT

LAB #3

SECTION #2

FULL NAME

Alvin John Thomas

SUBMISSION DATE:

9/16/2023

DATE

9/12/2023

Problem

1: DualShock 4 Data Collection

Analysis

ds4rd.exe was downloaded and saved to lab03 folder.

Design

When I moved the controller, the outputted values changed.

Testing

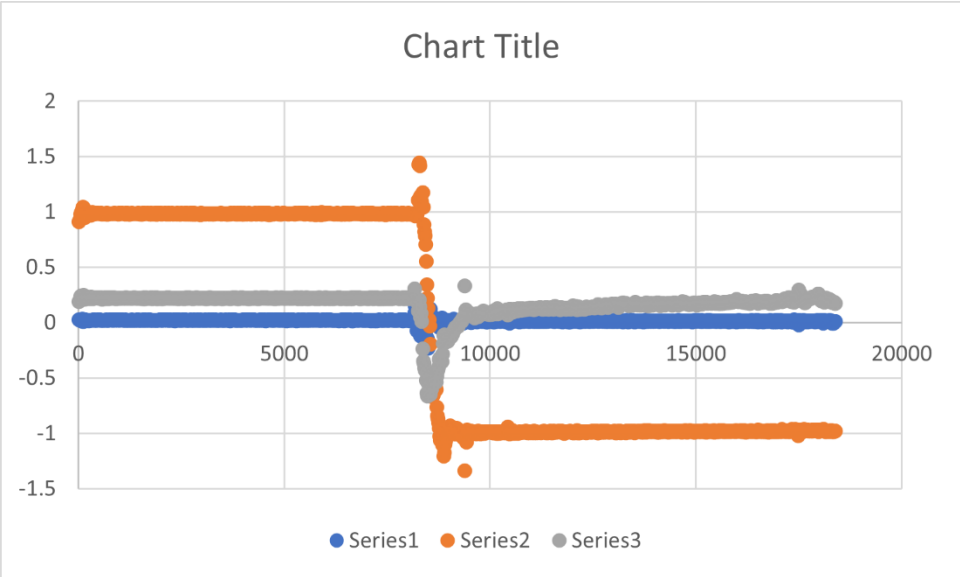
I took 3 data samples saved to a .csv file. I then opened them in a spreadsheet and created a scatter plot based on the values.

Comments

The scatter point changed as the values changed.

Screen Shots

1.1



1.2

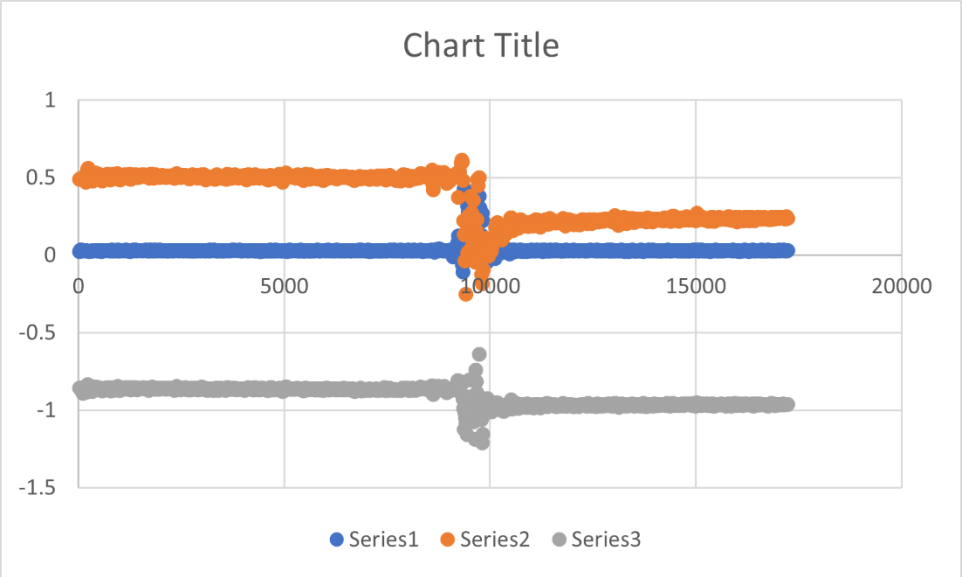


Chart Title
1
0.5
0
-0.5
-1
-1.5
0
5000
10000
15000
20000
Series1
Series2
Series3

1.3

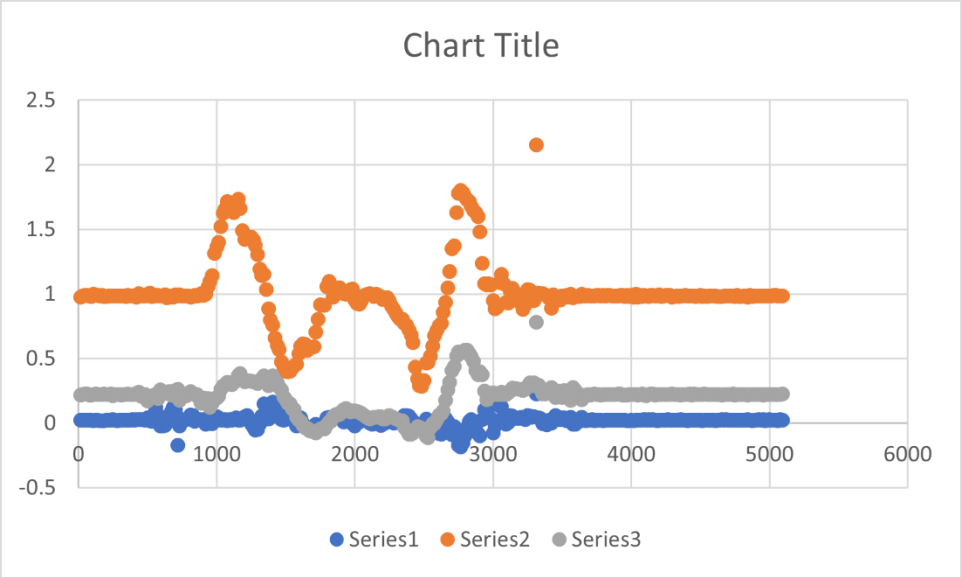


Chart Title
2.5
2
1.5
1
0.5
0
-0.5
0
1000
2000
3000
4000
5000
6000
Series1
Series2
Series3

Problem

2: Write a function to calculate magnitude of acceleration. Also write three functions to convert milliseconds to minutes, seconds and milliseconds.

Analysis

Magnitude of acceleration is $\sqrt{x^2+y+z^2}$

Design

I wrote three functions which accept milliseconds and return values of minutes, seconds and milliseconds as integers.

Testing

I moved the controller around to see if the magnitude of acceleration changed.

Comments

I did not encounter any problems.

Source Code

```
/*--------------------------------------------------------------------------
-                    SE 185: Lab 03 - Introduction to the DS4 and Functions                    -
-          Name: Alvin Thomas
                                                                                -
-          Section: 2
                                                                -
-          NetID: alvin
                                                        -
-          Date: 9/12/2023
                                                                                -
--------------------------------------------------------------------------*/
```

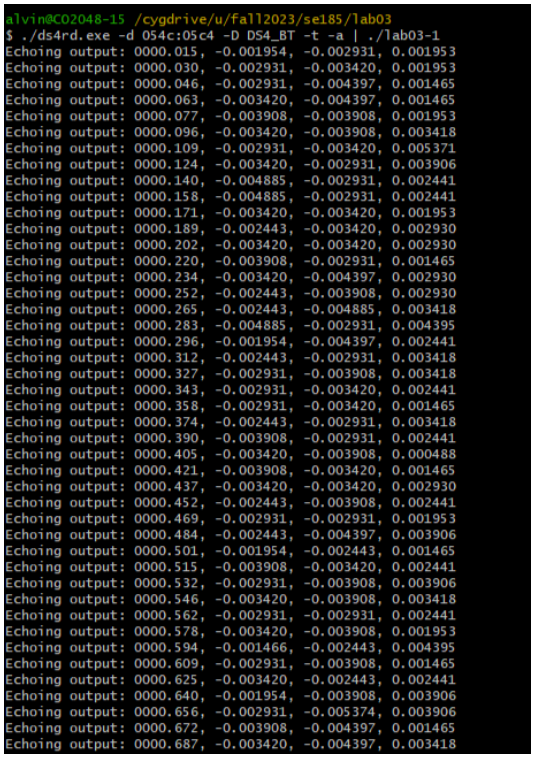
```
/*----------------------------------------------------------------------
-                                                              Includes
                                                                    -
----------------------------------------------------------------------*/
#include <stdio.h>
#include <math.h>

/*----------------------------------------------------------------------
-                          Prototypes                          -
----------------------------------------------------------------------*/
double magnitude(double x, double y, double z);

/*----------------------------------------------------------------------
-                             Notes                            -
----------------------------------------------------------------------*/
// Compile with gcc lab03-1.c

/*----------------------------------------------------------------------
-                                                              Implementation
                                                                    -
----------------------------------------------------------------------*/
int main(int argc, char *argv[])
{
   /* DO NOT MODIFY THESE VARIABLE DECLARATIONS */
   int t;
   double ax, ay, az;

   while (1)
   {
```

```
        scanf("%d, %lf, %lf, %lf", &t, &ax, &ay, &az);

        /* CODE SECTION 0 */
        printf("Echoing output: %08.3lf, %07.4lf, %07.4lf, %07.4lf\n", t/1000.0, ax, ay, az);



        /*   CODE SECTION 1 */
        printf("At %d ms, the acceleration's magnitude was: %lf\n", t, magnitude(ax, ay, az));



        /*   CODE SECTION 2 */

           printf("At %d minutes, %d seconds, and %d milliseconds it was: %lf\n",
           minutes(t), seconds(t), milliseconds(t), magnitude(ax, ay, az));

    }

    return 0;
}

/* Put your functions here */
int minutes(int t)
{
    int m = t/60000;
    return m;
}
int seconds(int t)
{
```

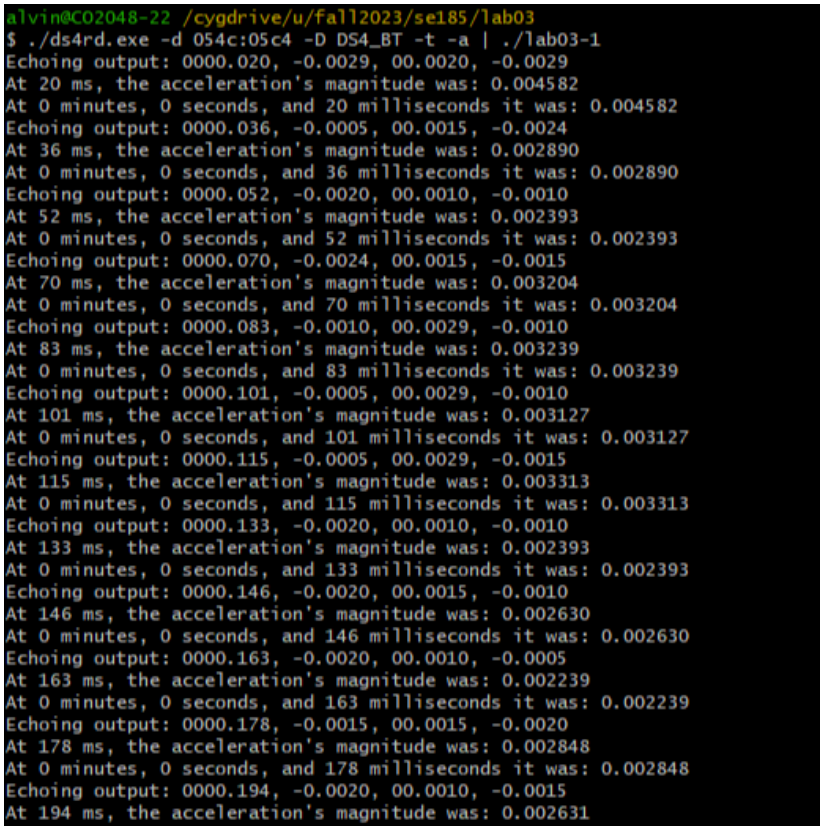
```
   int s = (t%60000)/1000;
   return s;
}
int milliseconds (int t)
{
   int ms = t%1000;
   return ms;
}
/*
 * Calculates and returns the magnitude of three given values.
 *
 * @param x - The x-axis scanned values from the DS4 controller.
 * @param y - The y-axis scanned values from the DS4 controller.
 * @param z - The z-axis scanned values from the DS4 controller.
 * @return - The magnitude of the given values.
 */
double magnitude(double x, double y, double z)
{
   // Step 8, uncomment and modify the next line
   return sqrt(x*x+y*y+z*z);
}
```

Screen Shots

2.1



2.2



Problem

3: Write a program to count the number of buttons being pressed on the controller

Analysis

When a button is pressed the value changes from 0 to 1.

Design

I wrote a function which added up the values to know how many buttons are being pressed.

Testing

I tried pressing different combinations of buttons on the controller to see if it outputted the correct number of buttons being pressed

Comments

I did not encounter any problems.

Source Code

```
/*-------------------------------------------------------------------------
-                    SE 185: Lab 03 - Introduction to the DS4 and Functions                    -
-          Name: Alvin Thomas
                                                                                -
-          Section: 2
                                                -
-          NetID: alvin
                                                    -
-          Date: 9/16/2023
                                                                            -
-------------------------------------------------------------------------*/

/*-------------------------------------------------------------------------
```

```
-                                                                    Includes
                                                                    -
----------------------------------------------------------------------------*/
#include <stdio.h>
#include <math.h>

/*----------------------------------------------------------------------------
-                                Prototypes                                -
----------------------------------------------------------------------------*/



/*----------------------------------------------------------------------------
-                                  Notes                                   -
----------------------------------------------------------------------------*/
// Compile with gcc lab03-2.c -o lab03-2
// Run with ./ds4rd.exe -d 054c:05c4 -D DS4_BT -b | ./lab03-2

/*----------------------------------------------------------------------------
-                                                                    Implementation
                                                                    -
----------------------------------------------------------------------------*/
int main(int argc, char *argv[])
{
   int triangle;
   int circle;
   int x;
   int square;
   while (1)
   {
```

```
        scanf("%d, %d, %d, %d", &triangle, &circle, &x, &square);
        printf("Number of buttons being pressed: %d\n", buttons(triangle, circle, x, square));
        fflush(stdout);
    }

    return 0;
}

/* Put your functions here, and be sure to put prototypes above. */
int buttons(int triangle, int circle, int x, int square)
{   int numButtons = triangle + circle + x + square;
    return numButtons;
}
```

Screen Shots

3.1