

# **Simple Arithmetic**

## **LAB 3**

### **SECTION C**

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**SUBMISSION DATE:**

**9/21/2017**

## Problem

The first portion of the lab had us fixing a batch of code which was not working correctly. The second part had us write a program which completed some simple arithmetic operations using both int and double variables. This program also calculates area from circumference, and converts feet to meters and degrees Fahrenheit to degrees Celsius. The third section involved capturing the magnitudes of various actions.

## Analysis

The code in problem 3 takes in the x, y, and z outputs from the Esplora and then prints out the x, y, z, and  $\sqrt{x^2+y^2+z^2}$ . The magnitude would be useful in telling if the controller is still, moving, or being dropped by the user.

## Design

For program 2 I needed to create a formula to calculate area from circumference. I took the formula for circumference and solved for r then substituted it for r in the formula for area.  $r=C/2\pi$   
 $A=C^2/4\pi$

## Testing

I did some testing to make sure the program executed correctly and looked alright doing it. I initially had some slight

## Comments

This lab was more difficult than the first two but except for the third problem it was rather simple and I finished a majority of the work quickly. The third part was more difficult because I had to think about how one would use the magnitude value in another program.

## Source Code

Fixed source code for problem 1:

```
// CprE 185: Lab 2
// Problem 1: Mysterious Output

#include <stdio.h>

int main(void)
{
    int integerResult;
    double decimalResult;

    integerResult = 77 / 5;
    printf("The value of 77/5 is %d\n", integerResult);
    //used incorrect format for int. Corrected %lf to %d

    integerResult = 2 + 3;
    printf("The value of 2+3 is %d\n", integerResult);
    //missing variable to be used

    decimalResult = 1.0 / 22.0;
    printf("The value 1.0/22.0 is %lf\n", decimalResult);
    //incorrect format identifier %d changed to %lf.

    return 0;
}
```

Source code for problem 2:

```
/*
*****
***** CPRE 185 - Lab 3 *****
*****
***** Author -- Kenny Jacobson *****
***** Lab section -- C *****
***** Date started -- 9/15/2017 *****
***** Comments -- Simple Arithmetic *****
*****
*/
```

```
#include <stdio.h>
#include <math.h>
```

```
int main(void){
    int x;
    double y;
```

```
    //3.2a
    x = 6427+1725;
    printf("\r\n6427+1725=%d\r\n",x);
    //output is normal
```

```
    //3.2b
    x = (6971*3825)-95;
    printf("(6971*3825)-95=%d\r\n",x);
    //output is normal
```

```
    //3.2c
    y = 79+12/5;
    printf("79+12/5=%.2lf\r\n",y);
    //output should be 81.4
    //the program outputs 81.00 because 79,12 and,5 are all formatted as
    integers
    //and wont have decimal places when output through double
```

```
    //3.2d
    y = 3640.0/107.9;
    printf("3640.0/107.9=%.2lf\r\n",y);
    //output is normal
```

```
    //3.2e
    x = (22/3)*3;
    printf("(22/3)*3=%d\r\n",x);
    //output should be 22
    //the programs outputs 21 because integer division in c only outputs whole
    numbers without remainders
```

*//22/3=7 7\*3=21*

*//3.2f*

**x = 22/(3\*3);**

**printf("22/(3\*3)=%d\r\n",x);**

*//output should be 2.444*

*//in c int variables truncate values following a decimal point*

*//therefore 2.44 --> 2*

*//3.2g*

**y = 22/(3\*3);**

**printf("22/(3\*3)=%.2lf\r\n",y);**

*//output should be 2.44*

*//integer division truncates numbers after the decimal point. However double adds decimal places to any number*

*//therefore 2 --> 2.00*

*//3.2h*

**y = 22/3\*3;**

**printf("22/3\*3=%.2lf\r\n",y);**

*//output should be 22*

*//output is 21 because int 22/3 is 7 and 7\*3 = 21*

*//3.2i*

**y = (22.0/3)\*3.0;**

**printf("(22.0/3)\*3.0=%.2lf\r\n",y);**

*//output is normal*

*//3.2j*

**x = 22.0/(3\*3.0);**

**printf("22.0/(3\*3.0)=%d\r\n",x);**

*//output should be 2.44*

*//converting from double to int truncates value beyond decimal point*

*//3.2k*

**y = 22.0/3.0\*3.0;**

**printf("22.0/3.0\*3.0=%.2lf\r\n",y);**

*//output is normal*

*//3.2l*

y = pow(23.567,2)/(4\*M\_PI);

printf("A circle with circumference of 23.567 has an area of %.2lf\r\n",y);

*//equation dervied from  $C=2\pi*r$  and  $A=\pi*r^2$*

*//solved for r then input into area equation*

*//final equation:  $A=C^2/4\pi$*

*//3.2m*

y = 14.0 \* .3048;

printf("14 feet is %.2lf meters\r\n",y);

*//3.2n*

y = (76.0-32.0)/1.8;

printf("76 degrees F is %.2lf degrees C\r\n",y);

return 0;

}

6427+1725=8152

(6971\*3825)-95=26663980

79+12/5=81.00

3640.0/107.9=33.73

(22/3)\*3=21

22/(3\*3)=2

22/(3\*3)=2.00

22/3\*3=21.00

(22.0/3)\*3.0=22.00

22.0/(3\*3.0)=2

22.0/3.0\*3.0=22.00

A circle with circumference of 23.567 has an area of 44.20

14 feet is 4.27 meters

76 degrees F is 24.44 degrees C

## Screen Shots