Solving Simple Problems in C

LAB # 2

SECTION # 11

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9/13/2021

Problem 1: Creating Your Own Program

Modify the lab02-skeleton.c file to display your full name as well as the course title and today's date, each on a new line.

Analysis

Since the skeleton of the code is already given simply modifying the .c file will be simple.

Design

Changing the placeholder text for the program to output the data I need as seen in Figure 1 screenshot.

Testing

Test once to make sure I didn't delete any important syntax, and then clear for screenshot.

Comments

Problem was a nice way to get my code sided brain functioning.

Screen Shots

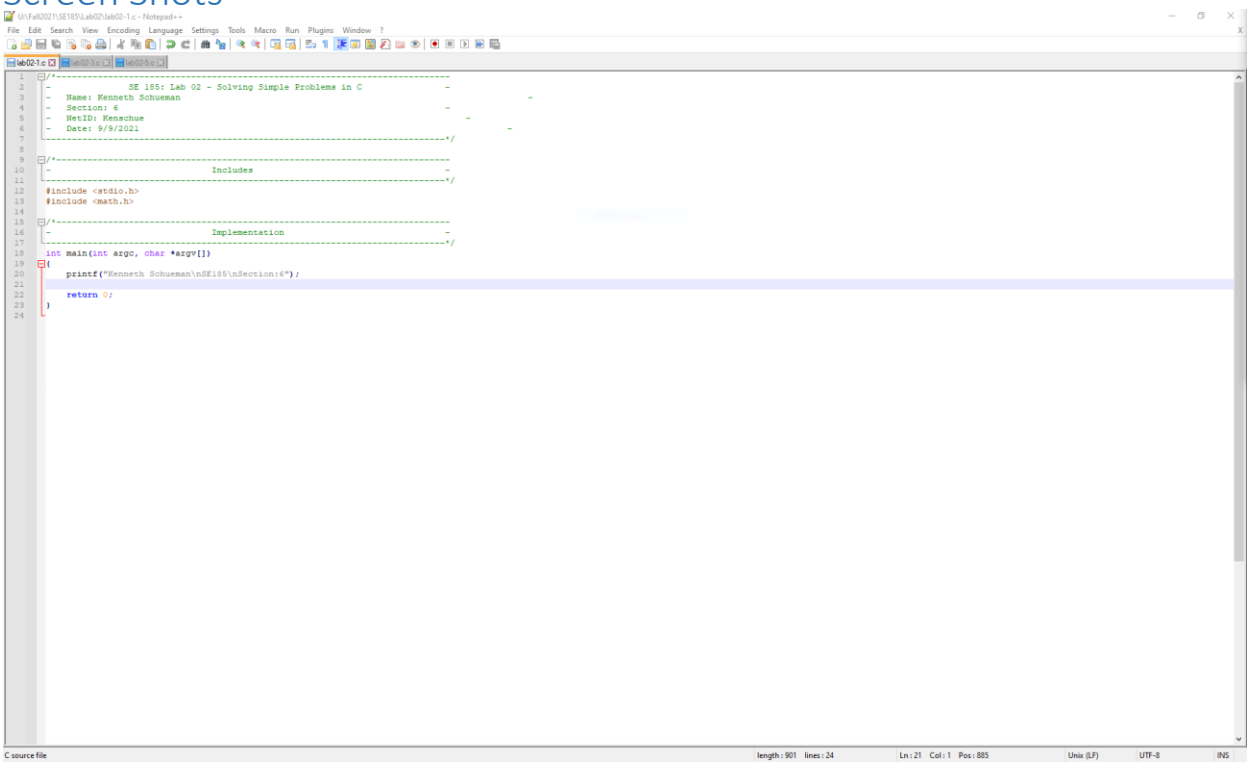


Figure 1

Figure 2

Problem 2: A Simple Program with Input

```
    int x, y;
printf("Enter a width: ");
scanf("%d", &x);
printf("Enter a height: ");
scanf("%d", &y);
printf("A %d by %d rectangle's area is %d\n", x, y, x*y);
```

Use this given code above and modify it to account for rectangular cubes.

Analysis

I recognized that all I need to do was add another int variable for the third dimension and then multiply them all together to get the volume of a three-dimensional rectangle.

Design

Added another int and respective printf and scanf statements to correctly output users request as seen in figure 3 below.

Testing

Tested multiple different integer values to make sure that the program was outputting current mathematics.

Comments

There was no need to grab the formula from outside source because of previous knowledge.

Screen Shots

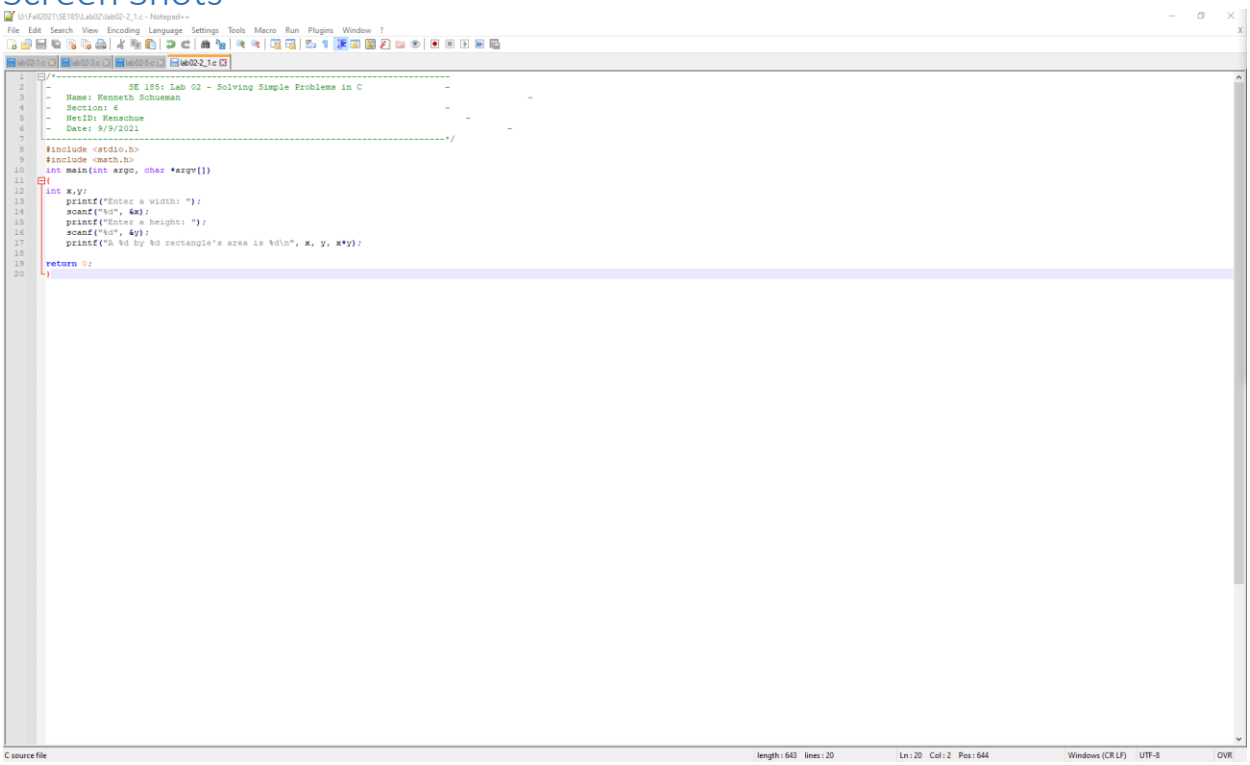


Figure 3

Figure 4

Problem 3: A Mysterious Output

In this problem we are given a code that seems to be outputting multiple incorrect answers and are tasked with fixing each line of code.

Analysis

There are multiple lines of code that have a variety of errors.

Design

All errors have been corrected and the program is now outputting the correct int as seen in figures 5 & 6.

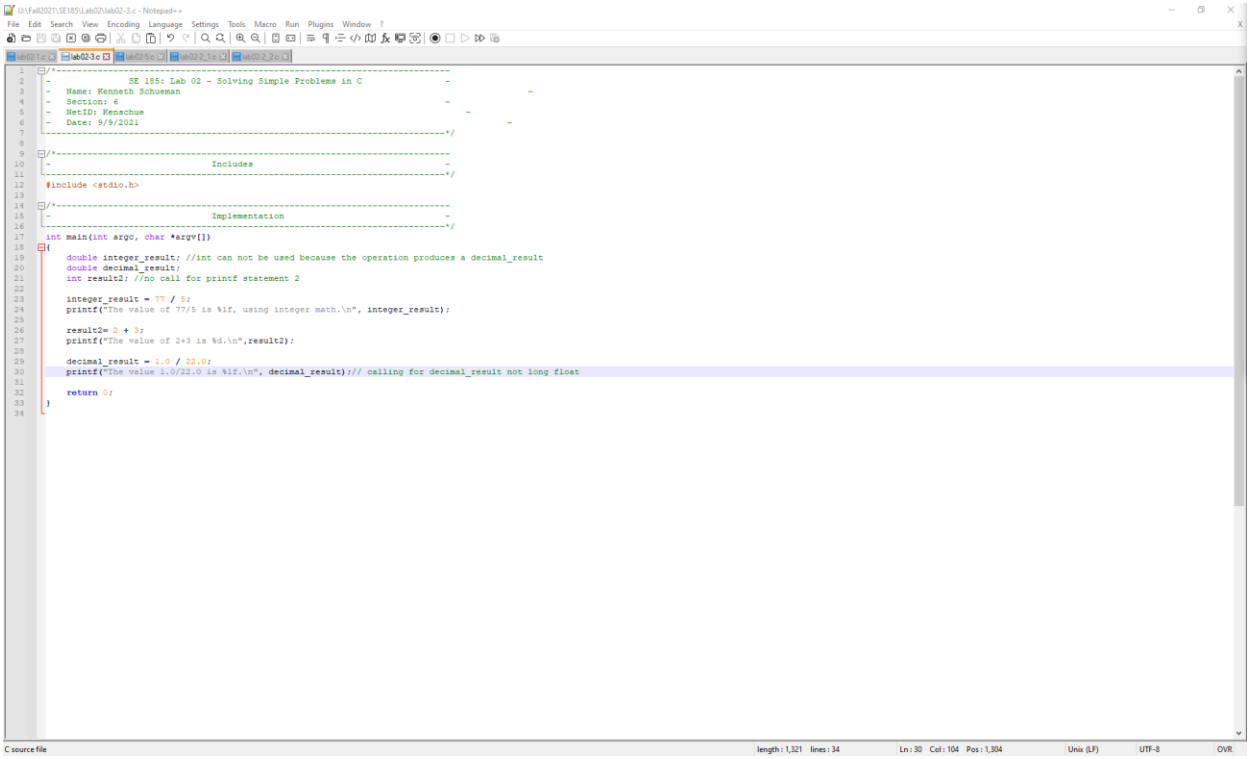
Testing

I recompiled and ran the program after reach attempt to fix the string in order not to get ahead of myself and make sure my corrections worked.

Comments

These errors are very often oversights from even experienced coders because I have made quite a few of these errors myself.

Screen Shots



```
/*-------------------------------------------------------------------------
-              SE 185: Lab 02 - Solving Simple Problems in C              -
-   Name: Kenneth Schueman                                                -
-   Section: 6                                                            -
-   NetID: Kenschue                                                       -
-   Date: 9/9/2021                                                        -
-------------------------------------------------------------------------*/

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

/*-------------------------------------------------------------------------
-                            Implementation                               -
-------------------------------------------------------------------------*/
int main(int argc, char *argv[])
{
    double integer_result; //int can not be used because the operation produces a decimal_result
    double decimal_result;
    int result2; //no call for printf statement 2

    integer_result = 77 / 5;
    printf("The value of 77/5 is %lf, using integer math.\n", integer_result);

    result2= 2 + 3;
    printf("The value of 2+3 is %d.\n",result2);

    decimal_result = 1.0 / 22.0;
    printf("The value 1.0/22.0 is %lf.\n", decimal_result);/// calling for decimal_result not long float

    return 0;
}
```

Figure 5

```
/cygdrive/U/Fall2021/SE185/Lab02

Kenschue@CO1318-19 /cygdrive/U/Fall2021/SE185/Lab02
$ gcc lab02-3.c -o lab02-3

Kenschue@CO1318-19 /cygdrive/U/Fall2021/SE185/Lab02
$ ./lab02-3
The value of 77/5 is 15.000000, using integer math.
The value of 2+3 is 5.
The value 1.0/22.0 is 0.045455.

Kenschue@CO1318-19 /cygdrive/U/Fall2021/SE185/Lab02
$
```

Figure 6

Problem 4: Simple Arithmetic

Part 1.

a. `int = 6427 + 1725`
b. `int = (6971 * 3925) – 95`
c. `double = 79 + 12 / 5`
d. `double = 3640.0 / 107.9`
e. `int = (22 / 3) * 3`
f. `int = 22 / (3 * 3)`
g. `double = 22 / (3 * 3)`
h. `double = 22 /  3* 3`
i. `double = (22.0 / 3) * 3.0`
j. `int = 22.0 / (3 * 3.0)`
k. `double = 22.0 / 3.0 * 3.0`

`Part 2`

a. Calculate the area of a circle with circumference 23.567

a. Convert 14 feet to meters.
b. Convert 76 degrees Fahrenheit to Celsius.
   (1 ft. = 0.3048 m $T_c = (T_F - 32) / 1.8$)

Analysis

This problem is asking for multiple arithmetic functions to be completed in a single program and for all for there outputs to be organized. The key to this problem will be to stay organized in my lines of code.

Design

I spaced each different part of the problem into its own section with comments as seen in figure 7 and the consequence of this extra effort is a neatly printed program as seen in figure 8

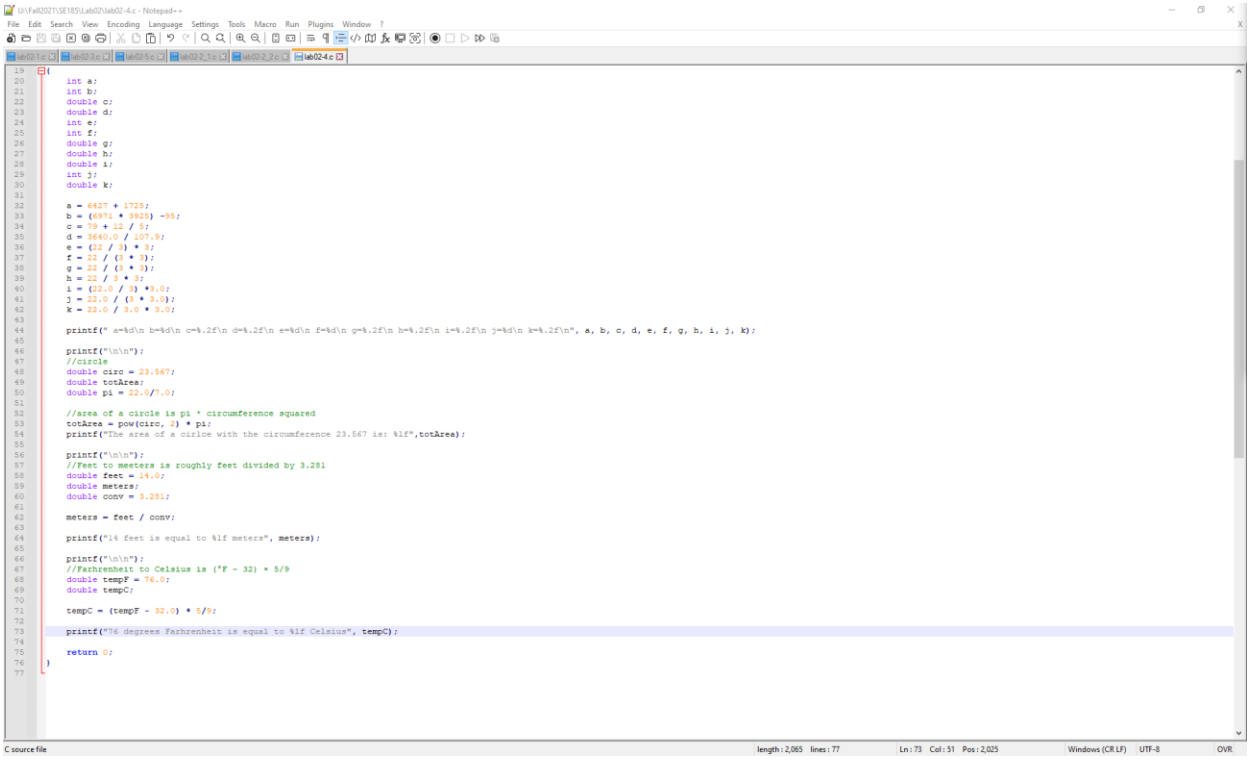
Testing

After each part of the function, I paused and recompiled and ran the program to make sure the equations and arithmetic was outputting correctly and neatly.

Comments

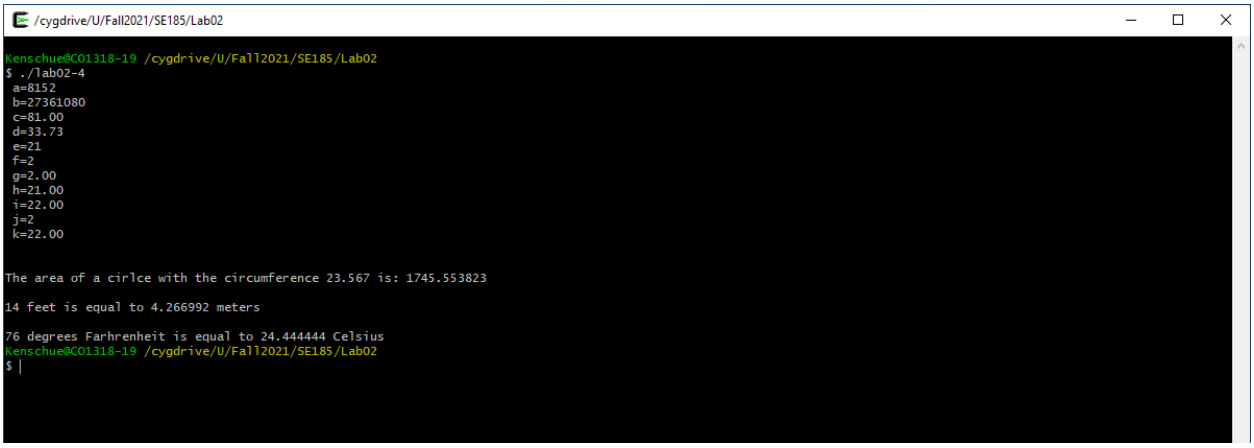
This problem was very tedious simple because of the amount of looking back and forth inorder to copy the equations correctly.

Screen Shots



```c
{
    int a;
    int b;
    double c;
    double d;
    int e;
    int f;
    double g;
    double h;
    double i;
    int j;
    double k;

    a = 6427 + 1725;
    b = (6971 * 3925) -95;
    c = 79 + 12 / 5;
    d = 3640.0 / 107.9;
    e = (32 / 3) * 3;
    f = 22 / (3 * 3);
    g = 22 / (3 * 3);
    h = 22 / 3 * 3;
    i = (22.0 / 3) *3.0;
    j = 22.0 / (3 * 3.0);
    k = 22.0 / 3.0 * 3.0;

    printf(" a=%d\n b=%d\n c=%.2f\n d=%.2f\n e=%d\n f=%d\n g=%.2f\n h=%.2f\n i=%.2f\n j=%d\n k=%.2f\n", a, b, c, d, e, f, g, h, i, j, k);

    printf("\n\n");
    //circle
    double circ = 23.567;
    double totArea;
    double pi = 22.0/7.0;

    //area of a circle is pi * circumference squared
    totArea = pow(circ, 2) * pi;
    printf("The area of a cirlce with the circumference 23.567 is: %lf",totArea);

    printf("\n\n");
    //Feet to meeters is roughly feet divided by 3.281
    double feet = 14.0;
    double meters;
    double conv = 3.281;

    meters = feet / conv;

    printf("14 feet is equal to %lf meters", meters);

    printf("\n\n");
    //Farhrenheit to Celsius is (°F - 32) * 5/9
    double tempF = 76.0;
    double tempC;

    tempC = (tempF - 32.0) * 5/9;

    printf("76 degrees Farhrenheit is equal to %lf Celsius", tempC);

    return 0;
}
```

Figure 7



```
/cygdrive/U/Fall2021/SE185/Lab02

Kenschue@C01318-19 /cygdrive/U/Fall2021/SE185/Lab02
$ ./lab02-4
 a=8152
 b=27361080
 c=81.00
 d=33.73
 e=21
 f=2
 g=2.00
 h=21.00
 i=22.00
 j=2
 k=22.00


The area of a cirlce with the circumference 23.567 is: 1745.553823

14 feet is equal to 4.266992 meters

76 degrees Farhrenheit is equal to 24.444444 Celsius
Kenschue@C01318-19 /cygdrive/U/Fall2021/SE185/Lab02
$
```

Figure 8

Problem 5: Working with I/O – Pythagorean Theorem

Creating a program that calculates the missing side of the triangle using Pythagorean's theorem (a + b = c) ^2.

Analysis

At first the problem seemed to be simple but proved to be much more difficult then intended, I know I need to square both of my inputted integers and then run them through a square root function.

Design

I ended up doing all calculations in a separate function and then assigning it to c so the sqrt function could be kept simple as seen in figure 9.

Testing

There was a lot of testing because of mysterious outputs being caused by integer overflow.

Comments

The defining and limits of the sqrt function caused some headache.

Screen Shots

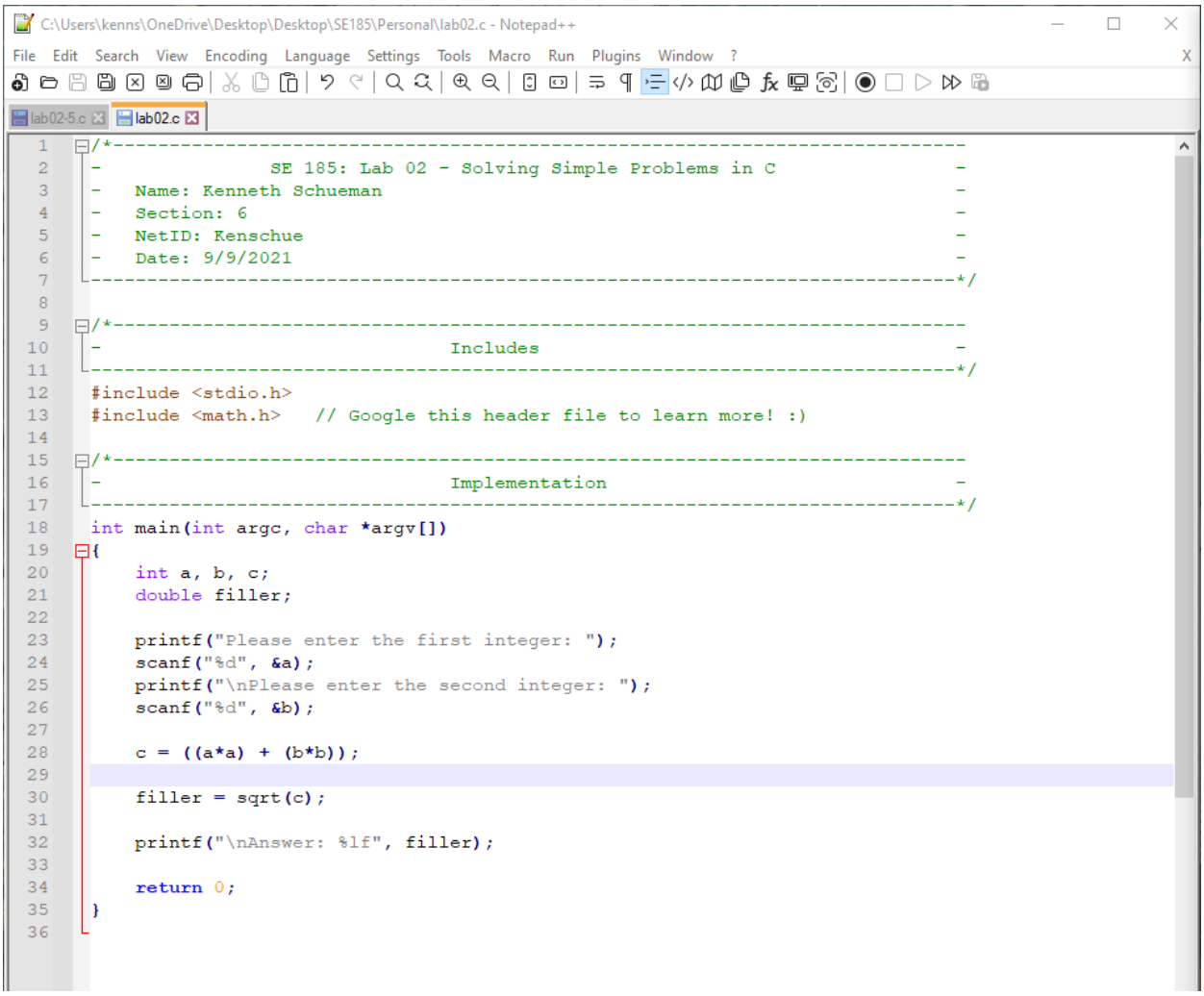


Figure 9

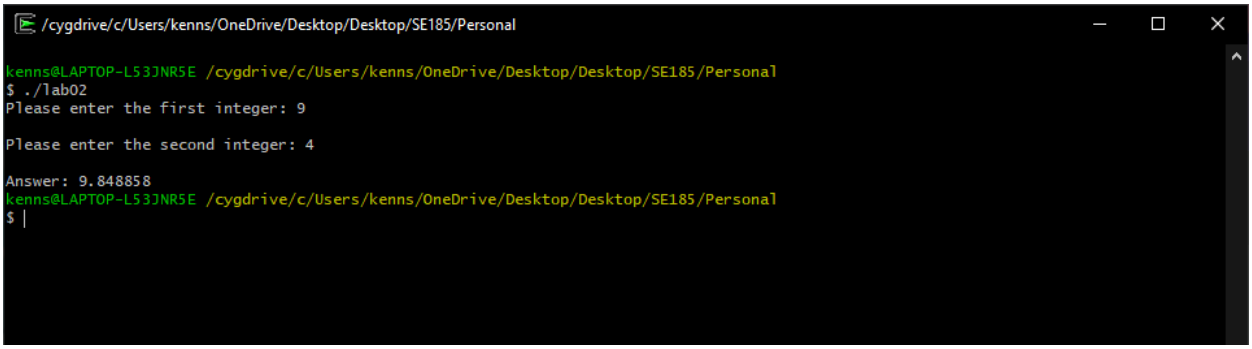


Figure 10