Department of Electronic Engineering Technology

CPET 1120 – C Programming for Engineering Technology

LAB 2

//

//File	**Lab_2.cpp**
//Author	**Your Name**
//Date	**Day-Month-year**
//Function	**main**
//Formal Parameters	**none**
//Return Type	**none**
//Description	**This program calculates the volume of a donut, after the user enters the**
//	**radius information in inches, and then displays the result on the screen.**

//

Write a program to calculate the volume of a donut using the following equation: $V = 2\ \Pi^2\ R\ r^2$

Use a #define for PI equal to 3.141593. The 'C' convention for constants is to use all uppercase letters.

The program consists of three functions:

void main (void)

The operator inputs the values for the radius of the ring (R) and for the radius of the cross-sectional area (r). Calls user generated functions calc_vol() and display().

float calc_vol (float Rad, float rad)

Calculates the volume of the donut.

void display (float vol, float Radius, float radius)

Displays a statement for the radius and volume information.

Mark the beginning of each user generated function definition with the following format:

//

//Function	**calc_vol**
//Formal Parameters	**float rad, float Rad**
//Return Type	**float Vol**
//Description	**Calculates the volume of a donut using user inputs r and R and then returns**
//	**the volume to the calling function.**

//

Test case: R = 10
r = 2
Volume = 789.6

****

LAB REQUIREMENTS

- ***Print the user inputted text to computer screen***
- ***Print the result to screen***
- ***Comment each of the important program sections***
- ***Attach a copy of the Source Code with the Program results to this page and turn it in.***

Troubleshooting Compile/Build Issues

When building your code, the compiler/builder reads from top to bottom and left to right. This means the errors are typically linking errors first for improper header files or a mismatch in function prototype and definition code, if these errors exist, and then syntax errors once the compiler enters your code.

Below are some examples of these types of errors and how to troubleshoot.

```
// This code works but will be modified to create common errors.  The output window states the Build
// succeeded.
#include <stdio.h>
#pragma warning(disable:4996)        // Needed to compile when using VS19 scanf()
void print_me (int one, int two);
void main(void)
{
        int num1, num2, result;
        printf("Enter a number -> ");
        scanf("%d", &num1);
        while (getchar() != '\n');
        printf("Enter a number -> ");
        scanf("%d", &num2);
        while (getchar() != '\n');

        print_me(num1,num2);
}
void print_me (int one, int two)
{
        printf("\n%d + %d = %d\n", one, two, one+two);
        printf("\n%d - %d = %d\n", one, two, one - two);
        printf("\n%d * %d = %d\n", one, two, one*two);
        printf("\n%d/%d = %d %d/%d\n", one, two, one / two, one%two, two);
}
```

When #include <stdio.h> is commented out, //#include <stdio.h>, the Output window goes to an error list and the standard ANSI functions used such as printf() are listed as undefined – this is a linking error.

When the function prototype and definition lines do not match, you get LNKXXXX errors which are linking errors. Example - void print_me (float one, int two); does not match void print_me (int one, int two) so you get unresolved external symbol errors.

Syntax errors are code errors, example printf("Enter a number -> ") where the semicolon is missing. Code errors take you to the line of code, or the subsequent line of code, where the error occurred. Always fix the very first or lowest numbered line of code error. This first error typically generates many other errors that are fictitious and will disappear once the real error has been corrected. Always Clean the solution before Building again.

Run time errors occur when you use a variable in your code that does not have valid data in it. The code compiles and you can run it, but it creates a new window that pops up and stops program execution. Read the variable name and find out why the data is not valid and then fix it.