Project Name

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Doc Version: 1.0.0
Software Version: 1.0
Git URL: NA
Language Used: C

D-Doc / Code **Shape Calc**

DSU Assignment for CSC-150: Ask the user for an int value that represents the radius of a circle. Compute and display the area and circumference of the circle. Also, use the same value given as a side of a square and calculate and display the area and perimeter.

DETAILED SUMMARY

Final Design Plan (high level)

The user will be prompted to give a whole number representing the radius of a circle.

> if the number is not a valid int and or is equal or less than 0, prompt a message giving the user what constitutes valid input and re-start the loop.

When a valid number is given (valid includes 3dd or INF due to limited reasonable SCANF options), display to the user the information on the circle, including:

> Area of circle is pi * r^2 as a float.
>
> Circumference is 2 * (pi * radius)

Then display square information, including:

> Area of the square is radius * radius remains as int
>
> Perimeter of the square is: radius * 4 (or radius + radius + radius + radius)

Ask the user if they want to continue or exit.

Major Concerns [C] & Features [F] listed below.

- **[C] Use of scanf() is unsecured**
- **[C] Not protection from C recognized input, like INF**
- **[C] Printf() is unsecured to buffer overflow attacks**
- **[F] Input is an INT**
- **[F] Compute area of a circle based on radius and display FLOAT results**
- **[F] Compute circumference of a circle based on radius and display FLOAT results.**
- **[F] Compute and display area and perimeter of a square with a side length of the input (int). Displays as INT.**

Requirements

Requires input for quantity is an int greater than 0.

Requires C with GNU compiler.

HOW TO/USAGE

How To/Usage

Compiling:

Run: gcc -o p1b p1b.c

Running:

Logon to the Linux server using putty.

Run: ./p1b

Input & Output Examples

The following input produces the following output when all criteria are met for the assignment.

OUTPUT	Please enter the radius of a circle as a whole number:
INPUT	1
OUTPUT	Circle Information: Area of the circle is: 3.140000 Circumference of the circle is: 6.280000 Square Information: Area of the square is: 1 Perimeter of the square is: 4 Would you like to calculate another area and perimeter (0) or exit (1-9)?

Source Code (Paste-able)

The C Language Compilable Code

```
#include <stdio.h>

#include <stdlib.h>

/*H*****************************************************************

* FILENAME :        main.c            DESIGN REF: D-Doc / Cashier

*

* DESCRIPTION :
```

```
*       DSU PROGRAMMING ASSIGNMENT 1, WEEK 2, PROGRAM IS REQUIRED TO TAKE AN PRICE AS AN INPUT (FLOAT)

*       AND QUANTITY PURCHASED (INT) AND CALCUATE/DISPLAY THE SUB-TOTAL, TAX, AND TOTAL.

*

* NOTES :

*       This file is part of a DSU assignment completed on 05/28/2020

*       GNU Licensing applied, see more where you got this file or at https://github.com/sbyrne255

*       There are known security vulnerabilities with this code, note-ably the use of scanf without buffer overflow protections

*       There is no protection against input related attacks. The input of INF will result in the output being INF.

*

* AUTHOR :    Steven Byrne        START DATE :    27 May 20

*

**********************************************************************H*/

int main()

{

    //Used to track quantity of current item being listed.

    int qty;

    //Used to track price of current item being listed.

    float unit_price;

    //Price for all items combined (no tax)

    float price;

    //Tax rate (1 is 100%)

    float tax_rate = 0.06;
```

```
//Used for exit condition.
int exit = 0;

//Intro to program
printf("################################################\n");
printf("################################################\n");
printf("#########  Welcome to Cashier 3000  #########\n");
printf("################################################\n");

do{
    printf("Please enter the price of the item: ");
    if((scanf("%f", &unit_price) == 1) && (unit_price > 0)){
        printf("Enter the quantity you are purchasing: ");
        if(scanf("%d", &qty) == 1 && (qty > 0)){
            price = qty * unit_price;
            printf("    Item Cost (sub-total): %.2f\n", price);
            printf("    Tax Collected (Tax): %.2f\n", (tax_rate * price) );
            printf("    Total (Tax and Items): %.2f\n", price + (price*tax_rate));

            printf("Would you like to calculate another item (0) or exit (1-9)? \n");
            scanf("%d", &exit);
        } else {
            printf("Please enter a valid price...\n   Prices should be formatted as: 1.29 without special characters (except the decimal). \n   Prices must be greater than 0.\n");
            int ch;
```

```
            while ((ch = getchar()) != '\n' && ch != EOF);
            continue;
        }
    } else {
        printf("Please enter a valid price...\n   Prices should be formatted as: 1.29 without special characters (except the decimal). \n   Prices must be greater than 0.\n");
        int ch;
        while ((ch = getchar()) != '\n' && ch != EOF);
        continue;
    }
  }
  while(exit == 0);
}
```