Project Report of *Operating Systems*

Project title: Creating a Shell Interface
Project number: Project 1
Course number: COSC 4337
Student's name:
Date handed in:

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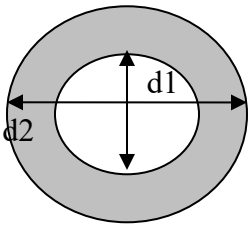
Problem Statement

You work for a hardware company that manufactures flat washers. To estimate shipping costs, your company needs a program that computes the weight of a specified quantity of flat washers.

Analysis

A flat washer resembles a small donut. To compute the weight of a single flat washer, you need to know its rim area, its thickness, and the density of the material used in this construction. The rim area must be computed from two measurements that are provided as inputs: the washer's outer diameter and its inner diameter.



Rim area = π $(d2/2)^2$- π $(d1/2)^2$

Design & Class Prototype

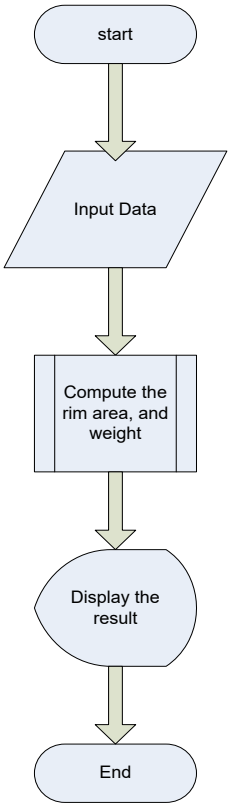
Formulas

- `Area of circle = π*radius²`
- `radius of circle = diameter / 2`
- `rim area = area of outer circle – area of hole`
- `unit weight = rim area * thickness * density`

Pseudo-code Algorithm

1. Get the washer's inner diameter, out diameter, and thickness
2. Get the material density and quantity of washers manufactured.
3. Computer the rim area
   3.1 Compute `holeRadius` and `edgeRadius`.
   3.2 `rimArea = PI*edgeRadius*edgeRadius – PI*holeRadius*holeRadius`
4. Computer the weight of one flat washer.
   4.1 `UnitWeight = rimArea * thickness*density`
5. Computer the weight of the batch of washers.
6. Display the weight of the batch of washers.

Or Flowchart



Testing

To test this program, run it with inner and outer diameters, verify by hand calculation to prove the correctness.

Compile and Run

```
wenjuan@ubuntu20:~/Documents/OS/Project1$ gcc project1.c -o project1
wenjuan@ubuntu20:~/Documents/OS/Project1$ ./project1
osh>
```

Task 1:

Case 1:

```
wenjuan@ubuntu20:~/Documents/OS/Project1$ gcc project1.c -o project1
wenjuan@ubuntu20:~/Documents/OS/Project1$ ./project1
osh> ls -l
total 24
-rwxrwxr-x 1 wenjuan wenjuan 17408 Oct  1 22:59 project1
-rwxrwx--- 1 wenjuan wenjuan  2801 Oct  1 22:57 project1.c
osh>
```

Case 2:

```
osh> sleep 5 &
```

Task 2:

Case1:

```
osh> pwd
osh> /home/wenjuan/Documents/OS/Project1

osh> !!
pwd
osh> /home/wenjuan/Documents/OS/Project1
```

Case 2:

```
osh> ls
osh> project1  project1.c

osh> pwd
osh> /home/wenjuan/Documents/OS/Project1

osh> !!
pwd
osh> /home/wenjuan/Documents/OS/Project1
```

Task 3:

Case1:

```
osh> echo hello World > out.txt
osh> cat out.txt
osh> hello World
```

Case 2:

```
osh> sort < out.txt
osh> hello World
```

Exit:

```
osh> exit
wenjuan@ubuntu20:~/Documents/OS/Project1$
```

Conclusion

The project is a successful one, it completes all the required tasks and the results have been tested correctly.