Labwork 3. LaTeX

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Github for review: https://github.com/llemonthefrog/geometric$_l ib$

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About the Project

The project is a calculator for the area and perimeter of various geometric shapes. It supports the following shapes:

- Circles
- Squares
- Rectangles
- Triangles

The user can select the shape and type of operation (area or perimeter) to perform calculations. Functions are implemented in accordance with their mathematical formulas.

How to Use Calculator

1. Run `python calculate.py`
2. Enter the figure name. Available are Circle, Square.
3. Enter the function: Area or Perimeter.
4. Enter figure sizes. Radius for circle, one side for square.
5. Get the answer!

Math Formulas

Area

- Circle: $S = \pi R^2$
- Rectangle: $S = ab$
- Square: $S = a^2$
- Triangle: $S = \sqrt{p \cdot (p-a) \cdot (p-b) \cdot (p-c)}$ where p is the semiperimeter

Perimeter

- Circle: $P = 2\pi R$
- Rectangle: $P = 2a + 2b$
- Square: $P = 4a$
- Triangle: $P = a + b + c$

Functions

Rectangles

Finds the area using the formula for the area of a rectangle

```
def area(a, b):
return a * b

# Examples:
area(10, 20) # 200

area(1, 2) # 2
```

Listing 1: Area Function for Rectangle

Finds the perimeter using the formula for the perimeter of a rectangle

```
def perimeter(a, b):
return 2 * (a + b)

# Examples:
perimeter(10, 20) # 60

perimeter(1, 2) # 6
```

Listing 2: Perimeter Function for Rectangle

Circle

Finds the area using the formula for the area of a circle

```
def area(r):
return 3.14159 * (r ** 2)

# Examples:
area(10)# 314.159...

area(300)# 282743.338...
```

Listing 3: Area Function for Circle

Finds the perimeter using the formula for the perimeter of a circle

```
def perimeter(r):
return 2 * 3.14159 * r

# Examples:
perimeter(10)# 62.831...

perimeter(300)# 1884.955...
```

Listing 4: Perimeter Function for Circle

Triangle

Finds the area using the formula for the area of a triangle

```
def area(a, b, c):
p = (a + b + c) / 2
return (p * (p - a) * (p - b) * (p - c)) ** 0.5

# Examples:
area(3, 4, 5)# 6

area(7, 8, 9)# 12
```

Listing 5: Area Function for Triangle

Finds the perimeter using the formula for the perimeter of a circle

```
def perimeter(a, b, c):
return a + b + c

# Examples:
perimeter(3, 4, 5)# 12

perimeter(7, 8, 9)# 24
```

Listing 6: Perimeter Function for Triangle

Square

Finds the area using the formula for the area of a square

```
def area(a):
return a ** 2

# Examples:
area(10)# 100

area(300)# 90000
```

Listing 7: Area Function for Square

Finds the perimeter using the formula for the perimeter of a square

```
def perimeter(a):
"""Takes the value of side a."""
return 4 * a

# Examples:
# perimeter(10)
# 40

# perimeter(300)
# 1200
```

Listing 8: Perimeter Function for Square

Calculate

A function that calculates values for certain predefined shapes.

```
def calc(fig, func, size):
if fig == "circle" and func == "area":
return area(size[0])
# Continue with other conditions

# Examples:
calc("circle", "area", [5])# 78.539...

calc("rectangle", "perimeter", [5, 10])# 30
```

Listing 9: Calculate Function