

In this report we are going to write three simple programs with Python to explore the basic functions of this programming language.

TASKS

#1

Write a Python program that, based on the user's choice, allows calculating the perimeter of different geometric shapes (feel free to choose the ones you prefer).

For solving the exercise, we have chosen:

- Square (perimeter = side * 4)
- Circle (circumference = $2 * \pi * r$)
- Rectangle (perimeter = base * 2 + height * 2).

#2

Adapt the previous exercise so that it acquires from the keyboard the value entered by the user, calculates the perimeter and the area of a geometric figure chosen by the user, and automatically uses the value of the area as the value to calculate the perimeter and the area of the next geometric figure newly chosen by the user.

- Therefore, create a multiple selection of figures to propose to the user for each new calculation.
- The initial value is entered by the user only once at the start of the software.
- Each time the user selects a figure, it is removed from the options presented in subsequent choices.

#3

Let's write a keylogger:

It records what we type on the keyboard into a list, and then prints it when we stop the program (special input combination)

EXECUTION

Task #1

```
1  # Perimeter Calculator for Different Geometric Shapes
2  # This program calculates the perimeter of a square, circle, or rectangle based on user input.
3  print("\r\n")
4  print("Welcome to the Perimeter Calculator!")
5  print("Choose a geometric shape to calculate the perimeter:")
6  print("1. Square")
7  print("2. Circle")
8  print("3. Rectangle")
9  choice = int(input("\nEnter the number corresponding to your chosen shape: "))
10 if choice == 1:
11     side = float(input("\nEnter the length of the square's side: "))
12     perimeter = side * 4
13     print(f"\nThe perimeter of the square is: {perimeter}")
14 elif choice == 2:
15     radius = float(input("\nEnter the radius of the circle: "))
16     perimeter = 2 * 3.14 * radius
17     print(f"\nThe perimeter of the circle is: {perimeter}")
18 elif choice == 3:
19     base = float(input("\nEnter the length of the rectangle's base: "))
20     height = float(input("Enter the height of the rectangle: "))
21     perimeter = 2 * (base + height)
22     print(f"\nThe perimeter of the rectangle is: {perimeter}")
23 else:
24     print("\nInvalid choice. Please try again.")
25
26
27
```

//comment

This program works mainly through the `if/elif/else` commands, which allows selecting the shape and handling any incorrect input.

#output_example

```
Welcome to the Perimeter Calculator!
Choose a geometric shape to calculate the perimeter:
1. Square
2. Circle
3. Rectangle

Enter the number corresponding to your chosen shape: 3

Enter the length of the rectangle's base: 1
Enter the height of the rectangle: 2

The perimeter of the rectangle is: 6.0
```

Task #2

```
1  import math
2
3  # Functions
4  def intro():
5      print("\r\n")
6      print("Welcome to the Epicode Calculator!")
7
8  def square(side):
9      return side * 4, side ** 2
10
11 def circle(radius):
12     return 2 * math.pi * radius, math.pi * radius ** 2
13
14 def rectangle(base, height):
15     return 2 * (base + height), base * height
16
17 # Main program
18 aviable_shapes = ["Square", "Circle", "Rectangle"]
19 intro()
20 value = float(input("Enter a value: "))
21
22 while aviable_shapes:
23     print("\nChoose a geometric shape:")
24     for i, shape in enumerate(aviable_shapes):
25         print(f"{i+1}: {shape}")
26     selected = int(input("Enter the number corresponding to your chosen shape: "))
27     chosen_shape = aviable_shapes.pop(selected - 1)
28
29     if chosen_shape == "Square":
30         perimeter, area = square(value)
31         print(f"Perimeter of the square: {perimeter:.2f}")
32         print(f"Area of the square: {area:.2f}")
33         value = area # Update value to area for next shape calculation
34     elif chosen_shape == "Circle":
35         perimeter, area = circle(value)
36         print(f"Perimeter of the circle: {perimeter:.2f}")
37         print(f"Area of the circle: {area:.2f}")
38         value = area # Update value to area for next shape calculation
39     elif chosen_shape == "Rectangle":
40         height = float(input("Enter the height of the rectangle: "))
41         perimeter, area = rectangle(value, height)
42         print(f"Perimeter of the rectangle: {perimeter:.2f}")
43         print(f"Area of the rectangle: {area:.2f}")
44         value = area # Update value to area for next shape calculation
45
46 print("\nNo more shapes available. Program terminated.")
```

//comment

In this second program, the management of the shapes is handled through a list, and in each cycle of the program, the selected shape is removed from the list using the `.pop` command.

#output_example

```
Welcome to the Epicode Calculator!
Enter a value: 1

Choose a geometric shape:
1: Square
2: Circle
3: Rectangle
Enter the number corresponding to your chosen shape: 1
Perimeter of the square: 4.00
Area of the square: 1.00

Choose a geometric shape:
1: Circle
2: Rectangle
Enter the number corresponding to your chosen shape: 2
Enter the height of the rectangle: 2
Perimeter of the rectangle: 6.00
Area of the rectangle: 2.00

Choose a geometric shape:
1: Circle
Enter the number corresponding to your chosen shape: 1
Perimeter of the circle: 12.57
Area of the circle: 12.57

No more shapes available. Program terminated.
```

Task #3

```
1  # Create an empty list
2  my_list = []
3
4  # Loop to insert values into the list
5  while True:
6      value = input("Enter a value (type 'stop' to finish): ")
7
8      # Check if the user wants to stop
9      if value.lower() == "stop":
10         break
11
12     # Add the value to the list
13     my_list.append(value)
14
15 # Print the list
16 print("\nHere are the values you entered:")
17 print(my_list)
18
```