# Lab: Functions

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## Background

A function is a block of code that does a specific task after calling it. You can pass data as parameters to it, and it can return a value.

## Instructions

Use Python IDE to create a solution for the scenario presented in each question.

#### Functions for circumference and area of a circle

Write a program that takes a radius of a circle as input from the user and then computes the circumference and area of the circle. Implement the functions circumference() and area() that each have radius as a parameter. Write a main() function that calls these functions and produces a report as shown in the sample run. Note: Use math.pi.

Sample Run: (user input in bold underline)

Give the radius of a circle: **5**  
Circumference: 31.416, Area: 78.540

#### Simple calculator

Take a copy of the simple calculator (with loops) from Unit 2. Change the program to use functions. You will need to write the following functions:

menu() – prints the menu and retrieves a menu option from the user. This function should return the menu option once a valid choice is entered, i.e., loop until a valid menu option is entered.

add() – receives two numbers as arguments(addends) and returns the sum

subtract() - receives two numbers as arguments(minuend and subtrahend) and returns the difference

mutilply() – receives two numbers as arguments(multiplicand and multiplier) and returns the product

divide() - receives two numbers as arguments (dividend and divisor) and returns message ‘Cannot divide by 0’ if is divisor is 0, otherwise returns the quotient

main() – controls the flow of the program

Sample Run: (user input in bold underline)

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **4**

Enter first number: **5.1**

Enter second number: **1.7**

5.1 / 1.7 = 3.0

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **4**

Enter first number: **5.1**

Enter second number: **0**

5.1 / 0.0 = Cannot divide by 0

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **1**

Enter first number: **5.1**

Enter second number: **1.7**

5.1 + 1.7 = 6.8

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **2**

Enter first number: **5.1**

Enter second number: **1.7**

5.1 - 1.7 = 3.3999999999999995

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **3**

Enter first number: **5.1**

Enter second number: **1.7**

5.1 \* 1.7 = 8.67

Simple Calculator

1. Add

2. Subtract

3. Multiply

4. Divide

0. Exit

Enter menu option: **7**

Enter menu option: **f**

Enter menu option: **0**

Calculator app closed

# Reference

Linge, S. and Langtangen, H. P. (2020). Programming for computations – Python: A gentle introduction to numerical simulations with Python 3.6. (2nd ed.). Springer Open. ([CC BY-SA 4.0](https://creativecommons.org/licenses/by/4.0/deed.en)). Retrieved from https://library.oapen.org/viewer/web/viewer.html?file=/bitstream/handle/20.500.12657/23103/1007055.pdf