

CS103 – Fall 2025

Lab02 Exercises

Objectives:

- To have a better understanding of the difference between data types (bool, int, and float).
- To practice the usage of arithmetic operators and comparators.
- To have better understanding of functions

General Instructions

1. In today's lab, you are required to complete all required exercises during class to receive attendance credit.
2. You are welcome to:
 - Work together with classmates.
 - Search online for help or documentation.
 - Ask the TA for guidance if you are stuck.
3. To receive credit, you must finish and show your solutions to the TA before leaving lab.
4. There are also extra (optional) exercises at the end for those who want to challenge themselves. These are not required for attendance credit but are recommended for practice.

Exercise Instructions

- Make a folder **Lab2** inside your **cs103fa25** folder.
- Create a new notebook inside your Lab2 folder (**lab02.ipynb**).

Required Exercises

Exercise 1: addTwoNumbers (f1, f2)

Write a function `addTwoNumbers (f1, f2)` that takes two floats and returns their sum.

Sample Function Calls:

```
>>> addTwoNumbers(25.2, 7.3)
```

32.5

```
>>>addTwoNumbers(2.0, 3.4)
```

5.4

Exercise 2: subTwoNumbers (f3, f4)

Write a function `subTwoNumbers (f3, f4)` that takes two floats and returns the subtraction result.

Sample Function Calls:

```
>>> subTwoNumbers(6.66, 4.11)
```

2.55

```
>>>addTwoNumbers(15.6, 3.4)
```

12.2

Exercise 3: mulTwoNumbers (f5, f6)

Write a function `mulTwoNumbers (f1, f2)` that takes two floats and returns the multiplication result.

Sample Function Calls:

```
>>> mulTwoNumbers(3.0, 2.0)
```

6.0

```
>>>mulTwoNumbers(7.1, 3.2)
```

22.72

Exercise 4: divTwoNumbers (f7, f8)

(Your Turn!)

Write a function `divTwoNumbers (f7, f8)` that divides two floats and returns the result.**Extra (Optional) Challenges**

These are not required for credit but will help you practice and strengthen your problem-solving skills.

Challenge 1: Math Formula

Write the function `f` that takes two floats; `x` and `y` as input and returns an `integer`. Implement the following formula into your function. Pay attention to the type of the result, make sure you return an integer value. (How to find the square root ? try to import the math library and use `math.sqrt()` function)

$$f(x) = \frac{(X+Y)^3}{\sqrt{X^2+Y^2}}$$

Sample input:`x = 3``y = 4`**Expected Output:**`68`**Challenge 2: Fahrenheit to Celsius**

Write the function “`fahr2celsius`” that takes a float `f` which represents the Fahrenheit value and returns the Celsius degree as a float.

You can check Wikipedia page for the mathematical equation of conversion;

(<https://en.wikipedia.org/wiki/Fahrenheit>)

Sample input:`f = 74`**Expected Output:**`23.333333`

Challenge 3: Average of Three Numbers Without Using +

Write a function `average3(a, b, c)` that returns the average of three numbers without directly using the `+` operator.

(Hint: you can use subtraction `-` or multiplication/division creatively. For example, $a + b$ can be written as $a - (-b)$).

Sample Function Call:

```
>>> average3(3, 6, 9)
```

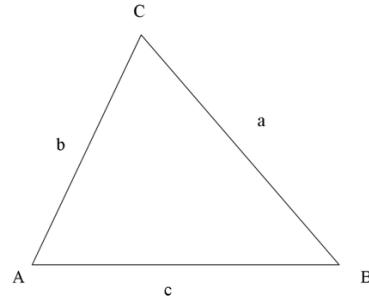
```
6.0
```

Challenge 4: Area of a Triangle (Heron's Formula)

Write a function `triangle_area(a, b, c)` that returns the area of a triangle with sides a , b , and c .

Use Heron's formula:

$$s = \frac{a + b + c}{2}$$
$$\text{Area} = \sqrt{s(s - a)(s - b)(s - c)}$$



To get attendance credit, finish Exercises 1–4.

If you finish early, try the optional challenges!