Assignment 7

Exercise 1

Implement the `GeometricObject` class, it should provide

- The `x,y` position

- An empty constructor that initialises it at 0,0
- A constructor that takes the 2 fields

- The getters and setters for all fields
- A method `getArea()` that returns the area
- A method `getPerimeter()` that returns the perimeter

Implement also 3 subclasses (add all necessary fields and methods)

- Circle
- Rectangle
- Triangle

Write a main method that creates an array of `GeometricObject` and to store at least 3 different shapes and computes the total area and total perimeter.

Exercise 2

Write a `Book` class that contains the title and author of a book. Implement the `BookShelf` class that stores a `ArrayList` of books.

Add a method to sort the books (the sorting should first follow the title then the author), and a method find a particular book.

Exercise 3

Write the `Complex` number class. The class must extend `java.lang.Number`.
The conversion to the basic types (e.g., float, double, …) should be done on the real part.

It should provide

- An empty constructor (initialise the number to 0)
- A constructor with one parameter (real number)
- A constructor with 2 parameters (real and imaginary part)

- `re()` that returns the real part
- `im()` that returns the imaginary part
- `conjugate()` that returns the complex conjugate

- addition, subtraction, and multiplication, with complex numbers or doubles
  (see https://en.wikipedia.org/wiki/Complex_number#Elementary_operations)

Instructions

The solution of the exercises must be provides as a **java**. The **files must be zipped** together before upload.

Assignments not respecting these instructions will be ignored.