Java
Assignment 4

Note:

1. The answer to the theory question should be submitted in a text file (DOC, DOCX, TXT, or PDF).
2. In implementing your programs, please use only those language features which have been discussed so far in the class.

Questions:

1. Discuss the following (with examples):
   (a) Modules and modularity
   (b) Java packages as a way to define modules
   (c) Access specifiers: `private` and `public`
   (d) `final` attributes. How are `final` attributes given their values?
   (e) Getters and setters
   (f) Static and non-static class members
   (g) `public` and non-`public` classes
   (h) Consider the three keywords: `public/private`, `static`, `final`. Discuss the scenarios in which these could be mixed in different ways.
   (i) Relation between package declarations and class file directory structure

   (theory.doc)
2. Implement two classes `Circle` and `Square` each with a method `area` that returns the area of the respective shape object.
   (a) Use a object attributes `radius` in `Circle`, and `length` in `Square`. Would you like to make these attributes `public` or `private`, `static` or non-`static`, `final` or non-`final`?
   (b) Implement appropriate constructors to initialise the attributes appropriately.

   All classes should be in their own respective source files. (`directory Q2/`)

3. Implement two classes `Circle` and `Square` as above. Place each class in its own package (`Circle` in `shapes.circle` and `Square` in `shapes.square`). Compile to generate the bytecode into a directory named `classes`. Use classpath option (`-cp`) with `java` to run the application from an arbitrary directory. (`directory Q3/`)