

TP 5: ENCAPSULATION AND INHERITANCE

**Exercise 01**

Consider the *City class* which contains the following private attributes:

- *Name*, *Nhabitat* (number of inhabitants), and *Area* (in Km2).

By applying the notion of inheritance create the *Country class* derived from the *City class* and which contains the additional private attributes: *Capital*: of type *City*, *President*, and *Continent*.

1. Implement the two classes *City* and *Country* with the following methods:

- Default constructor, *Setters* and *Getters*, and *toString* methods

2. Implement *ManipulationPays* then:

- Create an array of 03 Country type objects.
- Complete the table from the following table:

<i>Pays</i>	<i>Capitale</i>	<i>Nbre habitants</i>	<i>Surface</i>	<i>Présidents</i>	<i>Continent</i>
Algérie	Alger	41 300 000	2 381 741	A madjid TABOUNE	Afrique
Turquie	Ankara	80 274 604	783 562	Rajeb tayeb . ERDOGAN	Europe et Asie
Chine	Pékin	1 376 049 000	9 596 961	Xi JINPING	Asie
Alger		2 481 788	1 190		
Ankara		5 150 072	24 521		
Pékin		21 150 000	16 410		

**Exercise 2:**

Consider the *Circle class* which contains two private attributes: a *radius* (double) and a *center* (an instance of the *Point2D class*, which we saw in TP 04).

Implement the *Circle class* with three (03) constructors:

- 1) A constructor whose *center* is point (0.0) and radius r = 1.0
- 2) A constructor to create a circle whose center coordinates are (x,y) and a given *radius r*.
- 3) A constructor whose center of the circle is an object of type Point2D and a given *radius r*.

Implement two methods to construct the perimeter and area

**Noticed:**

In the Point2D class we determined:

1. Two instance variables x and y.
2. A default (or "no argument") constructor that constructs a point at the default location of (0, 0).
3. Another constructor that constructs a point with the given x and y coordinates.

*Perimeter of circle* =  $2 * \pi * r$

*Disc area(circle)* =  $\pi * r^2$