Chapter 3: Introduction to Classes and Objects

Class attributes

Class and Instance Attributes

- Instance attributes (and methods) are:
  - associated with an instance (object) of the class.
  - and accessed through an object of the class.
  - each object of the class has its own distinct copy of instance attributes (and methods)

- Class attributes (and methods):
  - live in the class
  - can also be manipulated without creating an instance of the class.
  - are shared by all objects of the class.
  - do not belong to objects' states.
Class Attributes and Objects

- A class attribute is in one fixed location in memory.
- Every object of the class shares class attributes with the other objects.
- Any object of the class can change the value of a class attribute.
- Class attributes (and methods) can also be manipulated without creating an instance of the class.

Class Attributes Declaration

- The class attributes (and methods) are declared as instance attribute but with the `static` modifier in addition.

<table>
<thead>
<tr>
<th>Modifiers</th>
<th>Data Type</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>public</td>
<td>int</td>
<td>studentNumber</td>
</tr>
</tbody>
</table>

```java
public static int studentNumber;
```
Class Attributes Access

• Class attributes (and methods) can also be manipulated without creating an instance of the class.

Example:

```java
class Course {
    // attributes
    public String studentName;
    public String courseCode;
    public static int studentNumber;
}
```

```java
public class CourseRegistration {
    public static void main(String[] args) {
        Course course1, course2;
        //Create and assign values to course1
        course1 = new Course();
        Course.studentNumber = 1;
        course1.courseCode = new String("CSC112");
        course1.studentName = new String("Majed AlKebir");
        //Create and assign values to course2
        course2 = new Course();
        Course.studentNumber ++;
        course2.courseCode = new String("CSC107");
        course2.studentName = new String("Fahd AlAmri");
        System.out.println(course1.studentName + " has the course "+
course1.courseCode + " " + course1.studentNumber);
        System.out.println(course2.studentName + " has the course "+
course2.courseCode + " " + course2.studentNumber);
    }
}
```