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.

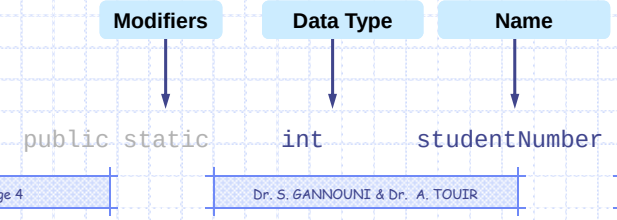
Class Attributes and Objects

- 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.

```
<modifiers>  <data type> <attribute name> ;
```



Class Attributes Access

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

```
<class name>.<attribute name>
```

Class Name **Attribute Name**

```
Course.studentNumber = 0 ;
```



```
class Course {

    // attributes
    public String studentName;
    public String courseCode ;
    public static int studentNumber;

}
```

```
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);
    }
}
```

CourseRegistration
+main()