Lab 2 - Exercises

1. **Develop a class called `Student` with the following fields:**

```
public class Student {

   private String name;
   private int id;
   private float gpa;
...
```

   A. Add four constructors to your class.
   B. The constructor with three params must have only two statements.
   C. Add getters for all fields and setter for `gpa` field.
   D. Create a method called `printStudent` to print an object of type `Student`.
   E. Implement `main` method and test your class.

2. **Develop an `enum` type called `Season` with the name of the four seasons and a class called `Literals` with the following requirements:**

   a. The main must print the maximum values of a `byte` and a `short` type
   b. It must print an integer defined in octal and hexadecimal format
      Hint: use `Integer.toOctalString` from the class `java.lang.Integer`
   c. Define a print `float` and `double` values

3. **Develop a class called `Automobile` with the following fields:**

```
public class Automobile {

      private String carName;
      private Wheel frontWheel;
      private Wheel rearWheel;
      private Wheel extra;
```

   The class must have an inner class with the following fields

```
      private class Wheel {

         private String hubcapType;
         private float radius;
```

   Implement a method with the following signature:

```
      public Wheel thirdWheel(Automobile car) { … }
```

Implement **`main`** method and test your classes. The program must print something similar to this:

For the car: VW
Extra type wheel: Reserve
Extra radius wheel: 1.1

4. **Does the following program compile? If it does, what is its output?**

```
public class Outer {

  private int x;
  private int y;

   class Inner {

       private int x;
       public Inner(int x) {
           this.x = x;
       }
   }

  private Outer(int x) {
     this.x = x;
  }

  public Outer(int x, int y) {
     this(x);
     this.y = y;
  }

  public static void main(String[] args) {
     Outer outer = new Outer(1, 2);

     Outer.Inner inner = new Outer(10, 20).new Inner(30);
     System.out.println(" outer.x = " + outer.x +
           " inner.x = " + inner.x +
           " outer.y = " + outer.y);
  }
}
```

5. **Given the following class definition:**

```
public class Matrix {

  //matrix is an array of arrays
  private int nrows;
  private int ncols;
  private int[][] cells;

  //constructor that takes another matrix
  public Matrix(int[][] cells) {
     this.cells = cells;
     this.nrows = cells.length;
     this.ncols = cells[0].length;
  }

  //constructor that defines the number of rows and columns
  public Matrix(int nrows, int ncols) {
     this.nrows = nrows;
     this.ncols = ncols;
     cells = new int[nrows][ncols];
  }
```

a. Develop a method to print the matrix object
b. Create a matrix with three rows and two columns. Print it.
c. Initialize a matrix with one row and four columns. Print it.
d. Initialize a matrix with three rows and one column. Print it.