CSc600 – Homework: Ruby **Dr. Jozo Dujmović**

The goal of this homework is to practice programming in Ruby and prepare for the final exam. For each problem, your homework must contain the source program followed by the results of its execution.

1. Write a single Ruby demo program that illustrates the use of all main Ruby iterators (loop, while, until, for, upto, downto, times, each, map, step, collect, select, reject). The program should have a few lines illustrating loop, followed by a few lines illustrating while, and so on).

2. Write Ruby recognizer methods **limited?** and **sorted?** that expand the Ruby class Array. The expression **array.limited?(amin,amax)** should return **true** if amin ≤ a[i] ≤ amax for all values of i. The expression **array.sorted?** should return the following:

   - 0 if the array is not sorted
   - +1 if a[0] ≤ a[1] ≤ a[2] ≤ … (increasing sequence)
   - -1 if a[0] ≥ a[1] ≥ a[2] ≥ … (decreasing sequence)

   Show examples of the use of this method.

3. Create a Ruby class **triangle** with initalizer, accessors, and member functions for computing the *perimeter* and the *area* of arbitrary triangles. Make also a member function *test* that checks sides **a**, **b**, and **c** and classifies the triangle as (1) equilateral, (2) isosceles, (3) scalene, (4) right, and (5) not a triangle. Right triangle can be either isosceles or scalene. Compute the perimeter and area only for valid triangles (verified by *test*). Show examples of the use of this class.

4. Create a Ruby class **Sphere**. Each sphere is characterized by the instance variable *radius*. For this class create the initializer and the following methods:
   - **area** – a method that returns the area of the sphere $(a = 4r^2\pi)$
   - **volume** – a method that returns the volume of the sphere $(v = 4r^3\pi / 3)$

   Create the class **Ball** that inherits properties from the class **Sphere** and adds a new instance variable *color*. Then create the class **MyBall** that inherits properties from the class **Ball** and adds a new instance variable *owner*. Write the method **show** that displays the instance variables of the class **MyBall**. Show sample applications of the class MyBall.