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

The goal of this homework is to practice programming in Ruby and prepare for the final exam.

1. 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.

2. Write a Ruby demo program that illustrates the use of all main Ruby iterators.

3. 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

   - 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.

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.