

1. Statement of the problem

There is a BlueJ project with an incomplete set of classes and interfaces. The project compiles excepting the class *UsoGrupoFiguras*. The reason is that *Poliedro* (which means polyhedron in English), *Tetraedro* (which means tetrahedron in English) and *Hexaedro* (which means hexahedron in English) classes do not exist. The student must implement these 3 classes (any modification of other classes or interfaces is forbidden) taking into account:

1. The *Poliedro* class implements a regular polyhedron (a geometric figure with volume whose faces are regular polygons which, moreover, are all identical). A *Poliedro* requires 3 attributes: the length of its edge (the name of this attribute will be *arista*) and the coordinates of its position (x, y). A *Poliedro* will have area and volume, but we cannot compute them in the general case (only for particular polyhedrons). This is the reason why you should use some proper mechanism in order to avoid the creation of an instance of the *Poliedro* class.
2. The *Tetraedro* class is used to represent a tetrahedron (a regular polyhedrons with 4 triangular faces). The *Tetraedro* class requires the same attributes as *Poliedro*. The area and volume of a *Tetraedro* are computed as follows:

$$area = a^2 * \sqrt{3}$$

$$volume = a^3 * \sqrt{2}/12$$

where a is the length of its edge (attribute *arista*).

3. An hexahedron or cube (regular polyhedrons with 6 squared faces) is implemented in the class *Hexaedro*. The *Hexaedro* class requires the same attributes as *Poliedro*. The area and volume of a *Tetraedro* are computed as follows:

$$area = 6 * a^2$$

$$volume = a^3$$

where a is the length of its edge (attribute *arista*).

2. Test

If the project is successfully completed, the execution of the *main* method from the *UsoGrupoFiguras* class produces the following result:

Area = 899.6234975559091

Volumen = 980.6036740436648

3. Available time to solve the problem

The student has 45 minutes to solve the problem.