

# Exercises of Lab #1

The zip file of `Files4Lab1.zip` contains one video clip, a scene graph, and three java files.

1. Complete software installation on your own computer, if not completed yet.
2. Under the project `Comp2800` created during installation, create a package in the name of `codes**280`, where `**` needs to be replaced by the initials of your first and last name.
3. (a) In your package `codes**280`, create three classes `Lab1**.java`, `Lab1Shapes**.java`, and `Commons**.java` with `**` being your initials;  
(b) Copy the content of the provided files to your corresponding classes;  
(c) Rename the frame's title and refactor the class name and string label (as illustrated in the left figure below) to identify your work with your initials;  
(d) Run your `Lab1**.java` file and make sure that a colored star shape and an orange-colored cone shape show up, with the string label adhered to the bottom surface of the cone as illustrated in the left and middle figures below.
4. Modify the abstract super class and introduce two new shapes as derived classes in `Lab1Shapes**.java`. Render a scene as in the right figure below by including the new shapes in your `Lab1**.java`.

The scene graph describes objects and relationships before adding the new shapes. In the graph, a triangle within a circle denotes a **Node**, which can be a **Leaf** or **Group**. As a **Node** cannot be a **Leaf** and **Group** at the same time, one shape is dashed to emphasize the other. Though not required, students may find it helpful to update the graph before coding.

- (a) The first new shape is a three-axis frame standing for the coordinate system, with Z-axis pointing towards the viewer, X-axis to the right, and Y-axis upwards. The three axes have the same length, which needs to be adjustable at creation, and their colors may be different from what is shown in the (right) figure and video.
  - (b) The second new shape is an approximated circle that encloses the star shape. As an approximation, this circle is a regular polygon with  $n$  sides in equal length, in which the two end points of each sides are in different colors. Shown in the (right) figure and video is what the circle looks like when  $n$  is 15.
  - (c) While the circle goes together with the star in rotation, the three-axis frame remains stationary as a reference to other objects.
  - (d) Make your program easy to comprehend by adding adequate amount of comments.
5. Locate the folder that contains all files of your project `Comp2800`; produce a zip file of your project folder; and submit it online before due.

