Exercises of Lab #3

The zip file of `Files4Lab3.zip` contains one video clip `lab3video.mp4` that illustrates the expected result after completing the lab exercises.

1. Within your package `codes**280`, create two new java files `Lab3Shapes**.java` and `Lab3**.java`, where `**` is your initials.

2. Code your `Lab3**.java` file to create a virtual world that simulates the main structure of a wind turbine with three primitive shapes, i.e., a cylinder for the tower, a sphere for the yaw drive, and a box for the nacelle. All the three shapes need to be defined in `Lab3Shapes**.java` as derived classes of an abstract super class modified from the previous lab, and all the three objects use the same appearance definition in the Common's file but in different colors and have the `primflags` set to `Primitive.GENERATE_NORMALS`.

   Though not required, students may find it helpful to create a scene graph before coding.

   (a) Set the cylinder's radius to `0.12`, height to `1.0`, color to `Orange`, and resolution in both X and Y dimensions to `30`. While the cylinder's orientation is illustrated in the figures below, its mass center coincides with the origin of the coordinate frame.

   (b) Set the sphere's color to `Red`, but keep its radius and resolution the same as the cylinder's setting so that exactly half of the sphere shows up when sitting its mass center on the top surface of the cylinder along the Y-axis.

   (c) Set the box's width in Z-axis the same as the sphere's diameter, the height in Y-axis to `0.12`, and the length in X-axis to `0.52`. While the box sits right on top of the sphere, its mass center is shifted so that one end aligns with the sphere's boundary as illustrated in the left figure below.

   (d) Identify your work by place a string on the side of the box and make it visible when the box's long end points to the left, which is illustrated in the left figure below.

   (e) Make your program easy to comprehend by adding adequate amount of comments.

3. 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.