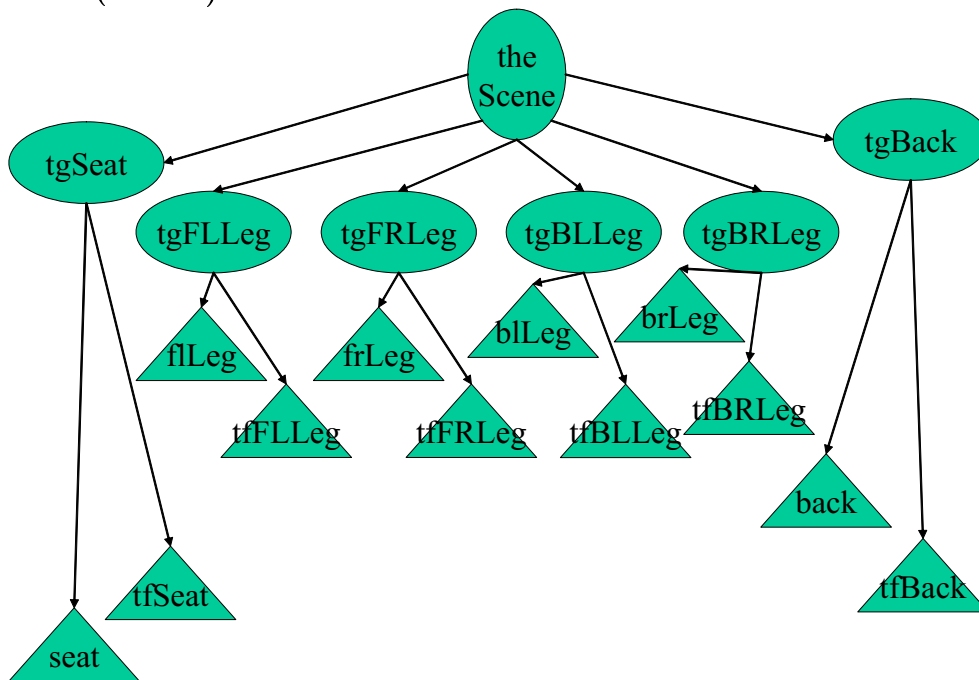


**Exercise 5.1:**

Draw a scenegraph for the chair in figure 5.2. Construct the chair with the following basic geometric objects: `box(x,y,z)` which generates a box of width  $2x$ , height  $2y$  and depth  $2z$  centred around the origin of the coordinate system, and `cylinder(r,h)` which creates a cylinder with radius  $r$  and height  $h$  also centred around the origin. Specify in each leaf of the tree the geometric object to be constructed or the corresponding transformation to be applied. The chair stands on the  $x/z$ -plane centred over the origin of the coordinate system with its rest in the back. The chair has the following measurements.

- Legs of height 1.0 with a squared profile with width 0.1
- A squared seat with width 0.8 and thickness 0.2
- A cylindrical backrest with radius 0.4 and thickness 0.2

**Solution (sketch):**



**seat:** box(0.4,0.1,0.4)

**flLeg,frLeg,blLeg,brLeg:** box(0.05,0.5,0.05)

**back:** cylinder(0.4,0.2)

**tfSeat:**  $T(0, 1.05, 0)$

**tfFLLeg:**  $T(-0.35, 0.5, 0.35)$

**tfFRLeg:**  $T(0.35, 0.5, 0.35)$

**tfBLLeg:**  $T(-0.35, 0.5, -0.35)$

**tfBRLeg:**  $T(0.35, 0.5, -0.35)$

**tfSeat:**  $T(0, 1.5, 0.4) \cdot R_x(\pi/2)$

For the program, see GDVStuhlWS0405.java.