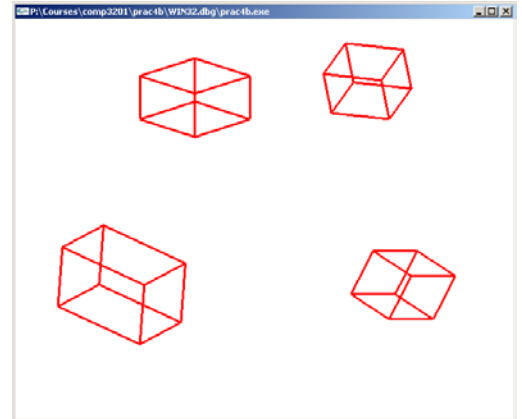


## Module 2: Transformations and Scene Creation

### Lab Exercises for Week 6

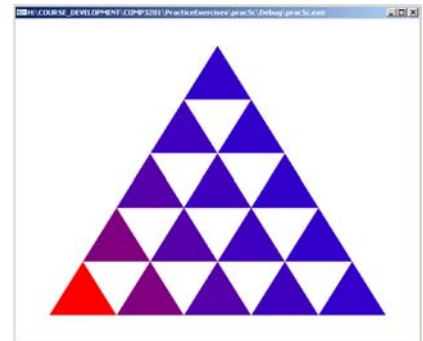
#### (a) Simple Transformations on a cube

- Start with a 1-by-1-by-1 cube, and write code to produce each of the following representations (in 4 viewports).
- The possible operations are:
  - scale by 1.25 in  $x$ -direction
  - scale by 1.75 in  $y$ -direction
  - scale by 1.5 in  $z$ -direction
  - rotate  $-30$  degrees in  $x$ -axis
  - rotate 45 degrees in  $y$ -axis
  - rotate 60 degrees in  $z$ -axis
  - translate  $-0.5$  in  $y$ -direction
- Note that you will need to “undo” the transformations of one viewport before constructing the transformation sequence for the next viewport.



#### (b) Using Push/Pop

- Construct a 5-level triangle tree using `glPushMatrix`, `glPopMatrix` and `glTranslatef`, as given in the following figure.
- The base triangle has vertices at  $(0, 1)$ ,  $(-1, -1)$ ,  $(1, -1)$ .
- Change colour for each level, to accentuate the way the tree has been drawn recursively.



#### (c) Model Manipulation using the Mouse

- Use the cube (or house), and use the mouse to rotate the model. Use polar coordinates and don't use `gluLookAt` as it is adapted to Cartesian coordinates.

