

# Transformation

CS 420

Objectives:

- Understand and use the three modeling transformations — translation, rotation, and scale.
- Understand how multiple transformations are composed.
- Understand how to place an object relative to another object.
- Use the modelview matrix stack to isolate transformations.

## Experiments

- Experiments 4.1–4.4. Exercise 4.3.
  1. Why does the box disappear when the `glTranslatef()` call is commented-out in Experiment 4.1?
- Experiments 4.6 and 4.7. Exercise 4.8.
  1. Carefully explain what `glRotatef(45.0, 1.0, 2.0, 3.0)` does.
- Experiment 4.9. Exercises 4.13–4.16.
  1. In what order are multiple transformations applied to objects?
  2. If 42 modeling transformation calls are made prior to rendering an object, how many transformation matrices are actually applied to each vertex of the object?
  3. In Experiment 4.9, carefully explain why the two transformation sequences result in different results.
- Experiments 4.11–4.14. Exercise 4.19.
  1. In Experiment 4.12, explain why the sphere isn't 10 units directly *above* the cube.
- Experiment 4.15. Exercise 4.20.