**Assignment 3: 3D Scene Editor**

**1.1 Scene Editor**

Press 1 to add a cube.

Press 2 to add a bunny\_cube.

Press 3 to add a bunny.

All model will be rescaled so that their bounding boxes are unit cubes.

A picture containing indoor, object, table, sitting

Description automatically generated

A picture containing indoor, object, table

Description automatically generated

**1.2 Object Control**

Press X to switch between wireframe and solid mode.

A close up of a logo

Description automatically generated

Press Z to switch between flat and phong shading.

A picture containing object, indoor, dark, sitting

Description automatically generated

Click an object to mark it as selected. The selected object has a red color.

A picture containing object

Description automatically generated

When an object is selected:

1. Use J, K and L to rotate it around global x, y, and z axis. Hold shift to rotate it in reversed direction.
2. Use U, I and O to translate it along x, y and z axis. Hold shift to translate it in reversed direction.
3. Use N and M to scale the object up and down by 20%.

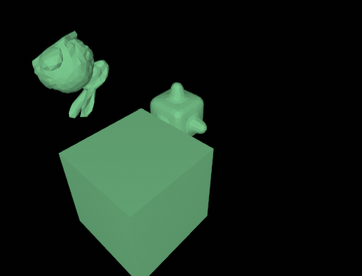
**1.3 Camera Control**

Press W and S to move the camera along y axis. Press A and D to move the camera along x axis.

Scroll middle mouse button to zoom in and out. Moving along z axis is achieved using scrolling.

A picture containing object

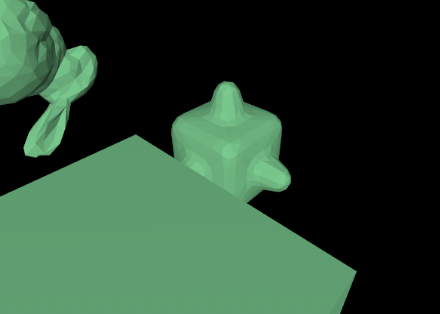
Description automatically generated



Left: Init camera position, Right: Rotated camera along the trackball

A picture containing object

Description automatically generated



Camera zoom in and out

Press C to switch between perspective and orthographic projection.

A picture containing object

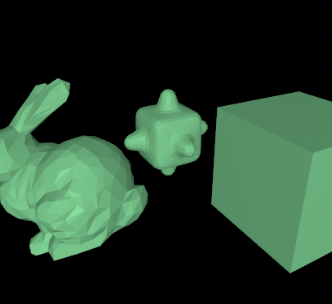
Description automatically generated

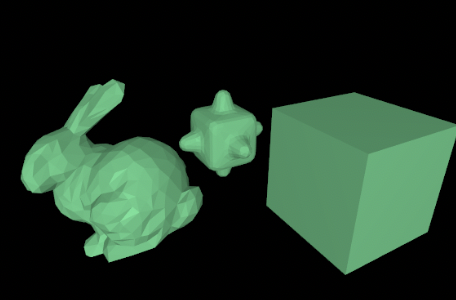
A picture containing object, sitting, indoor

Description automatically generated

Left: Orthographic, Right: Perspective

Resizing window can be properly handled.





**1.6 Trackball (Optional)**

Hold left mouse button and drag to rotate camera around a trackball.

**Warning:** The trackball mode and keyboard translate mode for camera are not expected to be used simultaneously. You should always only use one mode through the running of the program!

The camera control is implemented using a trackball. The camera is fixed on a sphere and it always faces the origin. When left mouse button is hold while panning, it moves along the sphere. When scrolling the mouse, the radius of the sphere will change.