Chapter Objectives:

- Briefly introduce scene graph structure and Java3D programming

8.1 Introduction

Java3D is another API by Sun Microsystems that provides 3D graphics capabilities to Java applications. It is built on OpenGL and therefore has higher level of abstractions and architectures than OpenGL/JOGL. Java3D programmers work with high-level constructs, called scene graphs, for creating and manipulating 3D geometric objects. The details of rendering are handled automatically. Java3D programs can be stand-alone applications as well as applets in browsers that have been extended to support Java3D. A comprehensive tutorial, advanced books, and other information are available at http://java.sun.com/products/java-media/3D/collateral/

In this chapter, we provide a shortcut to scene graph structure and Java3D programming.

8.2 Scene Graph

A 3D virtual environment, or universe, is constructed by graphics models and their relations. A group of graphics models and their relations can be represented by an abstract tree structure, called scene graph, where nodes are models and link arcs
represent relations. A Java3D virtual universe is created from a scene graph, as shown in Fig. 8.1.

The nodes in the scene graph are the objects or the instances of Java3D classes. The arcs represent the two kinds of relationships between nodes: parent-child or reference. A Group node can have any number of children but only one parent. A Leaf node has no children. A Reference associates a NodeComponent with a Leaf node. A NodeComponent specifies the geometry, appearance, texture, or material properties of