241-302, Computer Engineering Lab II
Semester 2, 2014-2015

3SB01, Introduction to Java 3D

Instructor: Andrew Davison

Objectives

To teach the basics of Java 3D, a high-level API for building interactive 3D applications and applets.

Submission Information

Place a **hard copy** of your answers to the exercises at the end of this lab sheet in the relevant lab box outside the CoE office by **Friday 6th February, 4pm**.

Do **not** submit an electronic version.

Score

Your final score will be based on the exercises at the end of this lab sheet and the exam. The exercises are marked out of 10, and the exam out of 10.

Background Information

Background information is on the Powerpoint slides "Introduction to Java 3D", available at `http://fivedots.coe.psu.ac.th/Software.coe/LAB/Java3D/`. I will go through these slides during the lab.

References

See the Powerpoint slides "Introduction to Java 3D", section 9.

Lab Instructions

1. Check that Java is installed on your machine (I will explain how to do this in the lab). If it isn't installed then download the Java SDK (full) version from `http://java.coe.psu.ac.th/RefImp.html#J2SE`
2. Check that the `javac` and `java` tools work from the command line. I will explain how to do this in the lab.
3. Install Java 3D from `http://java.coe.psu.ac.th/RefImp.html#Java3D`. I will explain how to do this in the lab (also see section 9 of the slides)
4. Download HelloUniverse.java, from `http://fivedots.coe.psu.ac.th/Software.coe/LAB/Java3D/`. Test the Java 3D installation by running HelloUniverse.java (see slide 41).

5. Download the Checkers3D example. Go to `http://fivedots.coe.psu.ac.th/~ad/jg/ch8/`, and download the zipped source code for ch.15 (6.7 KB). Extract, compile, and run:

```
C> cd Checkers3D
C> javac *.java
     // ignore any warnings about 'unchecked' operations
C> java Checkers3D
```

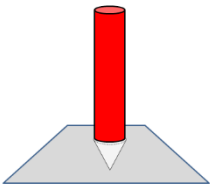
Lab Questions

Place a **hard copy** of your answers to all the following exercises in the relevant lab box outside the CoE office. Do **not** submit an electronic version. Also, remember:

1. Illustrate your answers to each exercise with *small* screen shots, where possible.
2. Do **not** copy the entire Checkers3D program into your exercise answers. Only include the methods and other code which you have *changed*.
3. Properly indent (tab) your code. Use two spaces to indent, not the tab key.
4. Document your code.
5. Do **not** write out the lab sheet text or Exercise questions (I know those already). I only want your answers.

Exercise 1

Replace the sphere in Checkers3D by a downward-pointing **pencil shape**, consisting of a cylinder, with a downward pointing cone at its bottom.



Hint: look at the Cone and Cylinder classes in the Java 3D documentation.

The point of the cone should be touching the floor, and the cylinder should be on top of the cone. The cone should be light gray, and the cylinder red. Do not change the colours of the checkboard floor.

Include a small screen shot of the application showing the pencil in your report.

Explain in words what you have done.

Exercise 2

Explain in words what keys and/or mouse operations cause the user's viewpoint to change. (*Hint*: look at the OrbitBehavior class in the Java 3D documentation.) Do **not** include any code in your answer.

Write using your **own** words; do not just copy and paste the documentation. I do not deduct marks for poor English, but I do deduct marks for copying.