Preface

'Who are *you*?' said the Caterpillar.

This was not an encouraging opening for a conversation. Alice replied, rather shyly, 'I – I hardly know, sir, just at present – at least I know who I was when I got up this morning, but I think I must have been changed several times since then.'

Alice's Adventures in Wonderland

by Lewis Carroll, illustrated by John Tenniel.

Who Are You?

I hardly know, but I'll make a guess. You're a programmer who wants to apply your abilities to 2D, 3D, and network games programming, either for entertainment or as the first step in becoming a games programming professional. You want to write a game that uses the latest Java technology, not an applet showing a penguin waving its flipper.

You've already done an introductory course on Java – been there done that. So you understand about classes, objects, inheritance, exception handling, threads, and basic graphics. But you need information about more advanced stuff like the APIs for Java 2D, Java Sound, networking, and Java 3D.

You're probably most interested in multiplayer 3D games programming, because they're the coolest. They are hard to code, but this book will get you up to speed on how to build one.

You don't want to reinvent the wheel – Java is about abstraction, information hiding, and reuse. That translates into building games with existing libraries/classes/tools.

What this Book is About

This book describes modern (i.e. fast, efficient) Java programming techniques for writing a very broad range of games, including 2D arcade-style, isometric (2.5D), 3D, and network games, with a strong emphasis on 3D programming using Java 3D.

The 3D topics include: loading externally produced 3D models, 3D sprites, first person shooters, terrain generation, particle systems and flocking, and different approaches to animation.

There are several chapters on network games, building to an example where users move sprites around a networked 3D arena.

I focus on J2SE 1.4.2 and J2SE 1.5 (in late beta as I write this in July 2004) and Java 3D 1.3.1. Under the hood, Java 3D utilizes OpenGL or Direct3D, which means that it'll work on all current versions of Windows, various flavours of Linux and Unix, and the Mac. Java 3D requires no special graphics hardware, and is compatible with all modern graphics cards.

J2SE 1.4.2 (or 1.5) and Java 3D 1.3.1 can be downloaded from http://www.java.com:80/en/download/manual.jsp and http://java.sun.com/products/java-media/3D/.

While I'm listing URLs, this book has one, http://fivedots.coe.psu.ac.th/~ad/jg/. There's stuff there that didn't make it in here.

What this Book is Not About

I'm not going to spend 200 pages explaining classes and objects, inheritance, exception handling, and threads. There are many, many books which do that already. A very good Java introduction is:

> *Thinking in Java*
> Bruce Eckel
> Prentice Hall, December 2002, 3rd ed.
> `http://www.mindview.net/Books/TIJ/`

It's won awards, and can be downloaded for free!

You won't find any large games here, such as a complete first person shooter (FPS) or a multiplayer fantasy world. Describing just one of those in detail would require hundreds of pages. Instead, I focus on the building blocks for games -- reuseable elements like loaders, and algorithms such as A* pathfinding. Shooting a gun in a 3D world is described in chapter 15, and chapter 21 explains a simple multiuser 3D space.

I've tried to reduce the quantity of code listings; you won't find page after page of undocumented code here. The documentation uses modern visual aids, including UML class diagrams, sequence diagrams, state charts, and 3D scene graphs.

The 3D material concentrates on Java 3D, because it's a high-level 3D API using a scene graph, that's stable and well-documented. There are a growing number of alternative ways of programming 3D applications in Java, including JOGL, LWJGL, Xith3D, jME OpenMind, and more. I'll discuss them briefly in chapter 7 which begins the Java 3D coverage.

I won't be taking about J2ME games programming on mobiles device. Its an exciting subject, especially now that a mobile 3D API is available (for example, in the J2ME Wireless Toolkit v2.2, http://java.sun.com/products/j2mewtoolkit/). Unfortunately, this book is already groaning at the seams, and something has to be left out. For those interested in J2ME games programming, I suggest:

> *J2ME Games with MIDP2*
> Carol Hamer
> APress, June 2004
> ISBN: 1-59059-382-0
> http://www.apress.com/book/bookDisplay.html?bID=339

(But, it doesn't cover the 3D API, which is too new.)

This is not a games design text, a topic deserving its own book or two. Two I like are:

> *Game Architecture and Design: A New Edition*
> Andrew Rollings, Dave Morris

New Riders, October 2003
ISBN: 0-73571-363-4

and

Chris Crawford on Game Design
Chris Crawford
New Riders, June 2003
ISBN: 0-13146-099-4

If you prefer online sources, then the following sites are full of gaming articles, reviews, and opinions:

- Gamasutra (http://www.gamasutra.com/)
- GameDev.net (http://www.gamedev.net/)
- flipCode (http://www.flipcode.com/)
- IGDA, the International Game Developers forum (http://www.igda.org/Forums/)

Comparisons with Other Java Gaming Texts

This is where I put the boot into the competition. No, no, just joking.

Many books are seriously out of date (e.g. covering JDK 1.1), and many spend hundreds of pages introducing Java, which is best done elsewhere. Before you buy a book, browse through the contents, preface, and first chapter to get an idea of what's on offer. Look at the book's publication date.

In my opinion, there are three good Java gaming texts on offer at the moment (July 2004), aside from this one of course:

Advanced Java Game Programming
David Wallace Croft
APress, April 2004
ISBN: 1-59059-123-2
http://www.apress.com/book/bookDisplay.html?bID=195
http://www.croftsoft.com/library/books/ajgp/

David, who I know through the Java Games User Group, GameJUG, which he founded, has written an excellent overview of 2D and networked gaming. The book describes an open source game library, including a reusable game deployment framework and multiplayer networking classes. He doesn't consider 3D programming.

Developing Games in Java
David Brackeen, Bret Barker, Laurence Vanhelswue
New Riders, August 2003
ISBN: 1-59273-005-1
http://www.brackeen.com/javagamebook/

This book contains good coverage of 2D, networking, and less standard topics like scripting, persistence, and performance optimizations. There are four chapters on 3D programming using a DIY approach from first principles. No use is made of Java 3D or a Java wrapper for OpenGL, such as JOGL. However, the "first principles" approach is a great way of understanding the concepts behind writing a graphics pipeline.

Practical Java Game Programming
Dustin Clingman, Shawn Kendall, Syrus Mesdaghi
Charles River Media, June 2004
ISBN: 1-58450-326-2
http://www.charlesriver.com/titles/javagame.html

This text focuses on several topics not easily found elsewhere, including JOAL for audio, and speeding up maths operations. The book's main emphasis is on JOGL (four chapters), and its use to build a 3D scene graph layer with collision detection capabilities.

JOGL and Java 3D are aimed at different levels of 3D programming abstraction. JOGL gives the programmer direct access to OpenGL, but higher-level elements, such as a scene graph, must be implemented. Java 3D already supports a scene graph, picking, collision detection, and so on, and mostly hides the underlying graphics API (which may be OpenGL or Direct3X).

