Director® 8 and Lingo™ Bible

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John R. Nyquist and Robert Martin

IDG Books Worldwide, Inc.
An International Data Group Company

Foster City, CA ✦ Chicago, IL ✦ Indianapolis, IN ✦ New York, NY

Director® 8 and Lingo™ Bible

Published by
IDG Books Worldwide, Inc.
An International Data Group Company
919 E. Hillsdale Blvd., Suite 400
Foster City, CA 94404
www.idgbooks.com (IDG Books Worldwide Web site)

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ISBN: 0-7645-3486-6

Printed in the United States of America

10 9 8 7 6 5 4 3 2 1

1B/RU/QY/QQ/FC

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Library of Congress Cataloging-in-Publication Data

Nyquist, John R., 1964-
Director 8 and Lingo bible / John R. Nyquist and Robert Martin.
p. cm.
ISBN 0-7645-3486-6 (alk. paper)
1. Multimedia systems. 2. Director (Computer file) 3. Lingo (Computer program language)
I. Martin, Robert II. Title.
QA76.575. N97 2000
006.7'869--dc21 00-039634

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John R. Nyquist is the principal of Nyquist Art + Logic, a multimedia and game-development firm. An award-winning designer/illustrator, he became obsessed with programming when he started using a Macintosh in 1987. He went on to program in C, Pascal, HyperTalk, Prograph CPX, and Applescript before his introduction to Lingo in 1993. Since then, he's worked with C++, Java, Javascript, and Perl, but he spends most of his days (and nights) with Lingo.

He has worked as senior software engineer/project lead for Ingenius, a Reuters/TCI company, on its award-winning, cable- and Web-delivered educational software *What On Earth*. He now leads software engineering for CurrentWorks, Inc., developing entertaining, educational software — including *QuizWorks*, *Bingo! With Mr. Vern*, and *Quiz 6* — to encourage teamwork, group interaction, and cooperation. He coauthored the previous edition of this book, *Director 7 and Lingo Bible*, as well as the forthcoming *1001 Director and Lingo Tips*. John was technical editor for *The Director 6 Book* and *Advanced Lingo for Games*.

You can reach John at `nyquist@nyquist.net`, or you can visit his Web site at `http://nyquist.net/`. When he isn't programming, writing, or doing artwork, John spends his time enjoying life in Colorado with his wife, Laura, and their children, Alice and Richard.

Robert Martin is the chief imagineer at WorldAdventures.com, an Internet development company that is redefining the way consumers design and purchase travel products on the Internet.

Rob has been using Macromedia Director for almost nine years to create almost every type of application imaginable, from Web-based interactive language tutorials to an award-winning daily multimedia news journal for kids.

Rob began his career over 20 years ago, creating optical special effects for film and multi-image presentations. After 10 years in the dark and up to his elbows in photographic chemicals, he decided the time was right to jump into computer graphics. Not quite ready to leave film entirely, he spent a couple of years running a service bureau that specialized in high-resolution output of computer graphics to film. He went on to design one of the first Director-based interactive presentation systems for a large data-storage company. This experience introduced him to his next career path, interface design. He fine-tuned those skills as the creative director for a company that created educational multimedia applications for kids and teachers.

When he's not off in some exotic country doing "field" research for WorldAdventures, Rob can be found wandering in the mountains near his home in Boulder, Colorado.

You can contact Rob at `robm@worldadventures.com`.

For my late father, Richard O. Nyquist, who implored me to follow my interests. If only he could be here to see the ramifications of that advice . . .

— John R. Nyquist

This book is dedicated to the three most influential women in my life:

My daughter, Alexandra, the first person to make me believe that I can accomplish anything I set my mind to.

Tina, the love of my life, thank you for giving me the freedom to pursue my dreams. I wouldn't have the courage to chase them without the knowledge that you will be there for me if I fail.

My mother, Barbara, who taught me the joy and power of books. You have to love reading books before you can attempt to write one.

— Rob Martin

Preface

Does the idea of creating worlds that are limited only by your imagination appeal to you? When you're creating multimedia applications, that is essentially what you're doing. As the author of a multimedia application, you are temporarily suspending the user's reality, taking the user through a defined space that you've created.

The best tool out there for putting together a multimedia masterpiece is Macromedia Director. It is the tool of choice for thousands of developers around the world. Director 8 is useful right out of the box and gives users the power to create incredibly complex, interactive applications using the software's powerful scripting language, Lingo. Furthermore, because of its cross-platform capabilities and support for Web-based media, Director's Shockwave component has become the standard for creating Internet games and applications.

Yet despite all of Director's power, it is like any other tool in that it works best in the hands of people who can use it to its best advantage. The book you are holding is your means of learning how to do that. Written by veteran multimedia developers with decades of experience in their craft, *Director 8 and Lingo Bible* takes you step by step through the process of making animations, games, kiosks, and more. It's your ticket to mastering the premier multimedia application, Director 8.

Who Should Read This Book?

Director is a flexible and diverse program that you can use to author projects for various purposes — and the range of users is nearly as diverse. This book is designed to span both the power of Director and the variety of people who use it. You're an ideal candidate for reading *Director 8 and Lingo Bible* if you:

- Need a guide to creating animated presentations and projects in Director 8
- Are an educator and/or are creating interactive learning modules
- Want to create interactive kiosks and catalogs
- Are a multimedia developer who needs a comprehensive reference to Director 8 and Lingo
- Are proficient with Director, but you want to become familiar with the changes introduced in Director 8
- Want to learn to use Lingo, Director's scripting language

- Plan to develop powerful Web-based Shockwave projects
- Are well-versed in Lingo, but you want to know more about the new Lingo features added to Director 8
- Have an interest in the latest multi-user technology that's included with Director 8

Because this book was developed as part of IDG Books Worldwide's comprehensive *Bible* series, your own particular experience and proficiency with Director won't matter. Novice users will discover how to add sophisticated behaviors into their programs — without having to do any coding. People who are familiar with Director but want to learn Lingo will find sample scripts and ample information here. Even advanced developers will come away with a more complete understanding of how Director works in general and how Director 8 works in particular. We've designed *Director 8 and Lingo Bible* to take you from the first tentative steps to complete mastery of the program.

What Hardware and Software Do You Need?

You need to have Macromedia Director 8. *Director 8 and Lingo Bible* is written to be platform-independent and covers both Macintosh and Windows 95/98/NT versions of Director 8.

According to Macromedia, the minimum requirements for a Macintosh developer's workstation are as follows:

- A Power Macintosh running system 7.6.1 or later
- 32MB of RAM minimum
- A 13-inch, 8-bit color monitor supporting a minimum of 256 colors (8-bit) and 800 × 600 resolution
- 20MB of free hard disk space
- QuickTime 3.0 or later
- A double-speed or faster CD-ROM drive to install Director and play the companion CD-ROM that accompanies this book

According to Macromedia, the minimum system requirements for a Windows developer's workstation are as follows:

- An Intel Pentium 90 or equivalent processor running Windows 95, 98, or NT version 4.0 or later
- 32MB of RAM minimum

- A 15-inch, 8-bit color monitor supporting a minimum of 256 colors at 800×600 resolution
- QuickTime 3.0 or later
- A double-speed or faster CD-ROM drive to install Director and play the companion CD-ROM that accompanies this book

You cannot author using a 68040 Macintosh or PC running Windows 3.*x*. You must have a Power PC Macintosh or be using a PC running Windows 95/98 or NT 4.0 or later.

How This Book Is Organized

In theory, you could read this book from cover to cover, but you will probably find that you'll focus on one particular section at a time, gaining mastery and understanding by running through the clear and well-documented examples. Most of the chapters have sample Director movies (available on the CD-ROM) that are designed to teach you real-world methods and techniques that you can use in your own Director projects.

This book is organized into the following parts.

Part I: Working with Director

Part I begins by introducing you to the Director program and many of the program concepts, including sprites, cast members, movies, and the Score. In Chapter 1, you learn about the individual components that are used together to create movies like the Cast and Score windows, the Paint and Vector Shape windows that are used to create elements, and the Inspectors that are used to modify elements.

Chapter 2 teaches you how to create media elements using the Paint and Vector Shape windows and how to work with imported graphics. In Chapter 3, you learn how to manipulate sprites on the Stage and in the Score window, how to create and control keyframes for animating sprites, and how to use Ink effects to control the way sprites appear on the Stage. Then, in Chapter 4, you learn about Director's powerful text capabilities, such as embedding fonts into your movies. In Chapters 5 and 6, you learn how to incorporate digital audio and video into your projects.

Part II: Bringing It All Together

In Part II, you learn how to add interactivity to your movies, how to output Director movies to a variety of viewing media, and how to use proven techniques that streamline the authoring of your Director projects.

Chapter 7 shows you the power of Director's extensive library of built-in behaviors, which are found on the new Library Palette. You can use the Palette to create sophisticated interactivity and animation without having to write Lingo code. Chapter 8 shows you the various ways to output your movies for a variety of different playback media, including Shockwave and Java.

In Chapter 9, you build an interactive multimedia application that expands upon the techniques you used in previous chapters, and you learn useful techniques that increase your authoring skills. Chapter 10 focuses on tools and techniques that you can use to identify the scope of your projects, add that extra level of creativity, and streamline production processes for working on large Director projects.

Part III: Learning to Program with Lingo

This is where the fun begins. In Part III, you learn Lingo, the powerful, object-oriented scripting language built into Director. Chapter 11 covers the basics of programming. Even if you've programmed before, Chapter 11 is a good introduction to how Lingo functions. Chapter 12 covers lists, an important data type in Lingo programming. It also touches upon other structures similar to lists. Chapter 13 explains object-oriented programming as it relates to Lingo.

Part IV: Controlling Media with Lingo

You start programming from scratch in Chapters 14 and 15, working with sprites and behaviors. Chapter 16 introduces Director's powerful text handling through Lingo. In Chapter 17, you work with Director 8's new vector shape members and Flash. Chapter 18 deals with playing sounds in Director. Closing out Part IV is Chapter 19, which covers the manipulation of video with Lingo. By the time you finish Part IV, you'll feel comfortable with the most common uses of Lingo.

Part V: Further into Lingo

The last part of this tome begins with troubleshooting Lingo in Chapter 20. Chapter 21 covers memory management. You work with interface elements, such as menus and dialog boxes, in Chapter 22. We discuss the power of playing Director movies within windows in Chapter 23. In Chapter 24, you learn Lingo for Web-related applications. Using Xtras in Chapter 25 teaches you the ins and outs of file i/o. Chapter 26 covers the new imaging Lingo commands; you'll learn to create images on the Stage without using sprites.

Appendixes

This book's appendixes offer important supplemental information for Director users. Here, you can find instructions for installing and configuring your Director

environment, a detailed listing of Director's built-in behaviors, shortcuts for improving your productivity, and a healthy batch of additional resources to keep at hand. There's also a description of everything that's on the CD-ROM that accompanies the book.

Conventions Used in This Book

The following conventions are used throughout the book.

Mac and Windows conventions

When the keystrokes are different on a Macintosh and a Windows system, the differences are noted. For instance, the Command key on the Macintosh is the equivalent to the Ctrl key on a Windows system. Thus, a typical instruction might be:

> Press Command+C (Ctrl+C)

In this case, the first instruction is for Mac users (to press the Command and the C key simultaneously). The instruction in parentheses is for Windows users (to press the Ctrl key and the C key simultaneously).

Key-combinations

When you are instructed to press a key-combination (that is, to hold down the first key and the second key simultaneously, releasing them at the same time as well), the key-combination is separated by a plus sign, as in:

> Command+2 (Ctrl+2)

This example tells you to hold down the Command key (or Ctrl key on a Windows system) and press the 2 key once, and then release keys.

Mouse instructions

When instructed to "point" the mouse, you must move the mouse so that the mouse pointer moves over your screen until it touches or passes over the specified target item.

When instructed to "click" an item, you must move the mouse pointer to the specified item and click the mouse button once. (If you're a Windows user, click the left mouse button, unless instructed otherwise.) "Double-click" means to click the mouse button twice in rapid succession.

When instructed to "click and drag," you must click and hold down the left mouse button while moving the mouse to a new location. This process is used typically to select an element and drag it from one location to another.

Menu commands

When you are instructed to select a command from a menu, the menu and the command are separated by an arrow symbol. For example, when instructed to execute the Open command from the File menu, you see the following notation:

File➪Open

Typographical conventions

Italic type is used for new terms and for emphasis. **Boldface** type is used for text that you need to type directly into a field from the computer keyboard.

Code

A special typeface is used to indicate information that appears on your screen, such as the text of Lingo scripts and handlers, error messages, screen prompts, and so on. As an example, the following sample of code is in the special font:

```
on exitFrame
   go to the frame
end
```

This special typeface is also used within paragraphs to designate Director terms such as `put the number of sprite 10` and `on mouseUp`, and commands such as `set`, `put`, and `go to`.

The line character (¬) at the end of a line means that statement continues onto the next line.

When you see code in italics, such as *`myChannel`* below, the text is serving as a placeholder for a variable or literal expression:

```
sprite(myChannel).loc
```

If the code in italics is surround by <>, then the code is optional.

Navigating This Book

Because of the size and scope of *Director 8 and Lingo Bible*, and the number of processes described, it's important that you're aware of the various signposts we've placed throughout the book to help guide you.

Each chapter begins with an overview of the information it contains, and each chapter ends with a quick summary of what you've learned.

Icons appear throughout the text to indicate something important or especially helpful. Here's a list of these icons and what they represent:

Tips provide you with the extra knowledge that separates the novice from the veteran. Make use of the Tips spread throughout this book to get the most out of Director.

Notes along the way provide additional information or technical data on the subject at hand.

The caution icon is your warning of a potential problem, usually encountered during a process.

Sections marked with a New Feature icon detail an innovation introduced in Director 8.

The CD icon indicates that a sample file is available on the CD-ROM that accompanies this book; we usually list the appropriate folder/directory and filename here.

New Director users tend to find the program intimidating. Indeed, there is much to learn before you can harness all of Director's power. Director doesn't have to be the Goliath application it seems, however. The building-block progression of *Director 8 and Lingo Bible* chapters, combined with solid real-world examples, guides you through the process of creating your own movies, and you'll soon find that you can easily wield the substantial power of this versatile program.

Sidebars

You'll also encounter sidebars throughout the book that offer more extensive background information on particular topics. These sidebars often provide an expanded discussion and insight for the topic at hand. Some sidebars are technical in nature, while others are anecdotal. This book features several sidebars containing interviews with Director veterans who share their knowledge and insight with you.

Acknowledgments

Writing a book the size of the *Director 8 and Lingo Bible* is never done in a vacuum. This is especially true when writing about a program as complex as Macromedia Director. I relied on the advice and wisdom of several individuals to make sure that the content was as accurate and complete as possible.

Thanks first to John Nyquist, my fellow author, good friend, and long-time collaborator. As always it was a joy to work with you.

Many thanks to Kathy Yankton, Colleen Dowling, Greg Roberts, and Joe Kiempisty of IDG Books Worldwide for their infinite patience and support; Jim Looker and Karen Silvey of Macromedia, for their help and for letting me participate in the Director 8 beta; my partners at WorldAdventures.com, Marty Wilson and Andre Vanha, for allowing me to divert valuable time from building our Internet startup; my father, Bob Martin, an avid Director user, for going through the entire Director 8 book, pointing out errors and giving advice that improved this version.

Finally, I want to thank Megan for allowing me to tie up the home computer for several months. I'm sure she was missed by all of her friends in the chat rooms.

— Rob Martin

I'd like to second the "thanks" to the people Rob mentioned, plus thanks to Rob. Without his support, humor, and beautiful images, this book just wouldn't have been enjoyable to work on.

Thanks to all of the folks who sent comments, praise, and suggestions concerning the *Director 7 and Lingo Bible*. I now know people on every continent. Your feedback was and is wonderful to hear and helped make this edition even better. Thanks again to Ron Woodland for taking on the task of technical editor. Given Ron's skill in Director and technical writing, it is an honor to have him review our work.

Thanks to Gary Rosenzweig, Bruce Epstein, W!d (or piM), Zac Belado, Terry Schussler, Roy Pardi, Darrel Plant, Andrew White, Mark Reijnders, Alex Zavatone, Alan Levine, Marvin Hortman, Ron Bearry, Paul Hertz, Raul Silva, Scott Flowers, Peter Lundholm, Brian Gray, Mark Hagers, Oogie McGuire, Bosaiya, Miles Lightwood, Mathew Caldwell, Matt Craig, Eric Coker, Gavin Sade, Paul Farry, Jeff Patterson, Michael Bashista, Glenn Picher, Julian Baker, Dorian Dowse, Simon Biggs, Dana Nuon, Irv Kalb, Kathy Kozel, Shane Atkinson, Tim Fortier, Dan Gregory, Andy Schmitt, and Mark Castle. You guys (and gal) are the best of the best and you always have the

answers (or at least good opinions). Several of you I have never met in person but without your support and feedback through the years, neither the *Director 7 and Lingo Bible* nor the *Director 8 and Lingo Bible* would have been as strong.

Thanks to all of the Macromedia folks who made Director 8 such a solid product. Thanks to Werner Sharp for answering my questions about imaging Lingo, Buzz Kettles who always seemed to have an answer during the beta, David Mendels for his professionalism and leadership, Greg Yachuk for his Valentine's Day surprise, and so many others, too numerous to mention! And while they are not employees (although they worked like it) thanks to the subscribers to the Director 8 beta list for their contributions to making Director 8 the most stable release of Director to date. Special thanks to the engineers involved in making the rect of stage change; I truly appreciate your eleventh-hour efforts and commitment to quality.

Writing this book would have been even more arduous of a task if Bill Haals and Donald Wilson weren't gracious enough to supply me with places of solitude in which to write.

I'd like to thank my wife, Laura, my daughter, Alice, and my son, Richard, for their support and sacrifice during the long hours I spent on this book.

— John R. Nyquist

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