Introduction

What was it like working with John Carmack on Quake? Like being strapped onto a rocket during takeoff—in the middle of a hurricane. It seemed like the whole world was watching, waiting to see if id Software could top Doom; every casual e-mail tidbit or conversation with a visitor ended up posted on the Internet within hours. And meanwhile, we were pouring everything we had into Quake's technology; I'd often come in in the morning to find John still there, working on a new idea so intriguing that he couldn't bear to sleep until he had tried it out. Toward the end, when I spent most of my time speeding things up, I would spend the day in a trance writing optimized assembly code, stagger out of the Town East Tower into the blazing Texas heat, and somehow drive home on LBJ Freeway without smacking into any of the speeding pickups whizzing past me on both sides. At home, I'd fall into a fitful sleep, then come back the next day in a daze and do it again. Everything happened so fast, and under so much pressure, that sometimes I wonder how any of us made it through that without completely burning out.

At the same time, of course, it was tremendously exciting. John's ideas were endless and brilliant, and Quake ended up establishing a new standard for Internet and first-person 3-D game technology. Happily, id has an enlightened attitude about sharing information, and was willing to let me write about the Quake technology—both how it worked and how it evolved. Over the two years I worked at id, I wrote a number of columns about Quake in *Dr. Dobb's Sourcebook*, as well as a detailed overview for the 1997 Computer Game Developers Conference. You can find these in the latter part of this book; they represent a rare look into the development and inner workings of leading-edge software development, and I hope you enjoy reading them as much as I enjoyed developing the technology and writing about it.

The rest of this book is pretty much everything I've written over the past decade about graphics and performance programming that's still relevant to programming today, and that covers a lot of ground. Most of *Zen of Graphics Programming, 2nd Edition* is in there (and the rest is on the CD); all of *Zen of Code Optimization* is there too, and even my 1989 book *Zen of Assembly Lan-*

guage, with its long-dated 8088 cycle counts but a lot of useful perspectives, is on the CD. Add to that the most recent 20,000 words of Quake material, and you have most of what I've learned over the past decade in one neat package.

I'm delighted to have all this material in print in a single place, because over the past ten years I've run into a lot of people who have found my writings useful—and a lot more who would like to read them, but couldn't find them. It's hard to keep programming material (especially stuff that started out as columns) in print for very long, and I would like to thank The Coriolis Group, and particularly my good friend Jeff Duntemann (without whom not only this volume but pretty much my entire writing career wouldn't exist), for helping me keep this material available.

I'd also like to thank Jon Erickson, editor of *Dr. Dobb's*, both for encouragement and general good cheer and for giving me a place to write whatever I wanted about realtime 3-D. It still amazes me that I was able to find time to write a column every two months during Quake's development, and if Jon hadn't made it so easy and enjoyable, it could never have happened.

I'd also like to thank Chris Hecker and Jennifer Pahlka of the Computer Game Developers Conference, without whose encouragement, nudging, and occasional well-deserved nagging there is no chance I would ever have written a paper for the CGDC—a paper that ended up being the most comprehensive overview of the Quake technology that's ever likely to be written, and which appears in these pages.

I don't have much else to say that hasn't already been said elsewhere in this book, in one of the introductions to the previous volumes or in one of the astonishingly large number of chapters. As you'll see as you read, it's been quite a decade for microcomputer programmers, and I have been extremely fortunate to not only be a part of it, but to be able to chronicle part of it as well.

And the next decade is shaping up to be just as exciting!

—Michael Abrash
Bellevue, Washington
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