THE EXPERT'S VOICE® IN .NET

Beginning VB 2005 Databases

From Novice to Professional

What every VB programmer needs to know about SQL Server 2005, T-SQL, ADO.NET 2.0, and LINQ

James Huddleston
Ranga Raghuram, Syed Fahad Gilani,
Jacob Hammer Pedersen, and Jon Reid

Apress®

Beginning VB 2005 Databases

From Novice to Professional

James Huddleston
Ranga Raghuram
Syed Fahad Gilani
Jacob Hammer Pedersen
Jon Reid

Apress®

Beginning VB 2005 Databases: From Novice to Professional

ISBN-13 (pbk): 978-1-59059-810-8

ISBN-10 (pbk): 1-59059-810-5

Printed and bound in the United States of America 9 8 7 6 5 4 3 2 1

Lead Editor: Jonathan Hassell
Technical Reviewer: Fabio Claudio Ferracchiati
Editorial Board: Steve Anglin, Ewan Buckingham, Gary Cornell, Jason Gilmore, Jonathan Gennick, Jonathan Hassell, James Huddleston, Chris Mills, Matthew Moodie, Dominic Shakeshaft, Jim Sumser, Keir Thomas, Matt Wade
Project Manager: Laura Esterman
Copy Edit Manager: Nicole Flores
Copy Editors: Liz Welch, Susannah Davidson Pfalzer
Assistant Production Director: Kari Brooks-Copony
Senior Production Editor: Laura Cheu
Compositor: Dina Quan
Proofreaders: Liz Berry, Lori Bring, Nancy Sixsmith
Indexer: Valerie Perry
Cover Designer: Kurt Krames
Manufacturing Director: Tom Debolski

Distributed to the book trade worldwide by Springer-Verlag New York, Inc., 233 Spring Street, 6th Floor, New York, NY 10013. Phone 1-800-SPRINGER, fax 201-348-4505, e-mail `orders-ny@springer-sbm.com`, or visit `http://www.springeronline.com`.

For information on translations, please contact Apress directly at 2560 Ninth Street, Suite 219, Berkeley, CA 94710. Phone 510-549-5930, fax 510-549-5939, e-mail `info@apress.com`, or visit `http://www.apress.com`.

The source code for this book is available to readers at `http://www.apress.com` in the Source Code/Download section.

To Jared, Quinn, and Tess
I love you.
—Jim Huddleston

Contents at a Glance

Contents

About the Authors

JAMES HUDDLESTON worked with computers, primarily as a database designer and developer, for more than 30 years before becoming an Apress editor in 2006. He has a bachelor's degree in Latin and Greek from the University of Pennsylvania and a juris doctor degree from the University of Pittsburgh. Author also of *Beginning C# 2005 Databases* (Apress, 2006), he still finds databases an endlessly fascinating area of study. However, what he currently finds most interesting in computing is F#, which is almost as intriguing as his lifelong hobby, translating ancient Greek and Latin epic poetry.

His translations of Homer's *Odyssey* and the pseudo-Hesiodic *Shield of Heracles* are available at The Chicago Homer (`http://www.library.northwestern.edu/homer/`). His translation of the last and longest Greek epic poem, the *Dionysiaca* of Nonnus, will start to appear online in early 2007. He can be reached via his classical blog, `http://onamissionunaccomplished.blogspot.com/`, or at `james.huddleston@apress.com`.

RANGA RAGHURAM has a bachelor's degree in engineering from Birla Institute of Technology and Science in Pilani, India, and a master's degree from Virginia Tech in Virginia.

SYED FAHAD GILANI has more than 15 years of experience in computing. He sold his first program at the age of ten.

JACOB HAMMER PEDERSEN started programming in the early 1990s, moving gradually from Pascal to C++ to Visual Basic. In the summer of 2000 he discovered C# and has explored it happily ever since.

JON REID was editor for the C++ and Object Query Language components of the Object Data Management Group standard and has coauthored several C# books.

About the Technical Reviewer

FABIO CLAUDIO FERRACCHIATI is a senior consultant and a senior analyst/developer using Microsoft technologies. He works for Brain Force (`http://www.brainforce.com`) in its Italian branch (`http://www.brainforce.it`). He is a Microsoft Certified Solution Developer for .NET, a Microsoft Certified Application Developer for .NET, a Microsoft Certified Professional, and a prolific author and technical reviewer. Over the past ten years he's written articles for Italian and international magazines, and has coauthored more than ten books on a variety of computer topics, including *LINQ for Visual C# 2005* (Apress, 2006) and *LINQ for VB 2005* (Apress, 2007). You can find his blog on LINQ at `http://www.ferracchiati.com`.

Acknowledgments

First, I'd like to thank Ewan Buckingham of Apress for convincing me to write this book now rather than wait until all the goodies for VB 9.0 and ADO.NET 3.0 come sometime in the future. SQL Server 2005 and LINQ are both exciting topics that deserve current coverage, and I've tried to do them justice in a way that will keep this book fresh and valuable for readers for quite a while.

Second, I'd like to thank my tech reviewer, Fabio Claudio Ferracchiati, for his thorough and careful checking of both the manuscript and code. His extraordinary professionalism and dedication made this book a better one. Of course, any errors that remain are entirely my responsibility, not his. Thanks so much, Fabio.

Third, I want to thank my editor, Jonathan Hassell; project manager, Laura Esterman; and production editor, Laura Cheu. All made this endeavor far less of an effort than it otherwise could have been. Thanks too to my copy editors, Susannah Davidson Pfalzer and Liz Welch, whose trained eyes saved me from a variety of inelegancies and inadvertencies and who were invariably polite in pointing out even the most embarrassing glitches. All of you make Apress the warm and wonderful place for authors that it truly is.

A variety of people contributed encouragement and support. Thank you, Amy Abrams, Nicholas Andrea, Laurie Apgar, Tiffany Armstrong, Elizabeth A. Baker, Wesley R. Bowman, W. Truxton Boyce, Robert Chodoroff, Liam Patrick Clerkin, Wydell Conley, Chip Deaton, Rebecca Doeltz, Melissa Dupre, Elrod S. Ferreira, Justin Finucan, Francoise Friedlaender, David Gaines, Milo Gibbons, Lania Herman, Sarah James, Jackie Jones, Renee L. Kane, Elizabeth Keelan, Cary Kerrigan, Gil Lachance, Jeff Lee, Joel Lipman, Darren R. Lloyd, Ron Maguire, Jason B. Majewski, Rosemarie Naguski, Edna Ocampo, Susan Paul, Jax Pierson, Paul Preiss, John Reda, Helen Rei, Eric Robson, Michael P. Small, Teri Small, Michael Thompson, Susan Tussey, James Tuzun, and Paul Yip.

Finally, special thanks to very special people for extra-special help: Roy Beatty, Michael Green, Judith Lane Gregory, David Moffitt, Joseph Rickert, Yi Soon-Shin, and Yi Ui-Min.

Jim Huddleston

Introduction

Every program manipulates data. Most real-world programs use data stored in relational databases, so every VB programmer needs to know how to access relational data. This book explains how to do this in VB, with ADO.NET and Language-Integrated Query (LINQ), against SQL Server 2005. The same principles and techniques apply to VB programming against other relational database management systems, such as DB2, MySQL, Oracle, and PostgreSQL, so what you learn here is valuable whatever database you use.

Who Is This Book For?

This book is for anyone interested in how to access relational data with VB. Only a bit of experience with VB is assumed, and no prior experience with relational databases or the relational database language SQL is required. We cover all fundamentals carefully and in an order we believe leads easily from one topic to another, building knowledge and experience as you progress through the book. So, chapters are best read in sequence.

What Does This Book Cover?

This book covers all the fundamentals of relational database and ADO.NET that every VB programmer needs to know and understand. These concepts and techniques are the foundation for all database programming. Even if you never learn anything else, by the end of the book you'll be able to handle the vast majority of real-world database applications in a professional way. The chapters progress as follows:

- *Getting started*: The first three chapters set things up for our later work. Chapter 1 explains how to download and install our tools (all free from Microsoft). Chapter 2 gives us some practice with them as we configure a few things. Chapter 3 is a primer on Transact-SQL (T-SQL), SQL Server's dialect of the standard database language, SQL.

- *Learning ADO.NET basics*: Chapters 4 through 8 describe the essential features of ADO.NET, the interface between VB programs and databases. Each major feature is explained with example programs that can be used as the basis for your own programs, whatever part of ADO.NET you need.

- *Building Windows applications*: Chapter 9 covers data binding: mapping database data to graphical user interface controls. We provide simple Windows Forms examples, but the principles are equally applicable to ASP.NET Web controls.

- *Learning more about SQL and relational databases*: Chapters 10 through 12 delve more deeply into relational database concepts and techniques, from designing and creating tables, to more advanced queries and data manipulation, to a full chapter on writing stored procedures in T-SQL.

- *Using advanced features*: Chapters 13 through 15 cover exception handling, transactions, and ADO.NET events.

- *Using special data types*: Chapter 16 explains how to handle large data objects, such as images and documents. Chapter 17 covers the new XML data type and other features for conveniently using XML with T-SQL. It carefully explains some techniques that even experienced T-SQL users puzzle over, and demonstrates their power.

- *Introducing LINQ*: Chapter 18 is an exciting one. It describes how to use Language-Integrated Query (LINQ), Microsoft's new technology for accessing any kind of data. LINQ is easy to use and is the future direction of ADO.NET and .NET database programming.

What Do You Need to Use This Book?

You need Windows XP Professional (or any other operating system that can run SQL Server 2005 Express Edition), 512MB of memory, and a couple of spare gigs of disk space, so you can download and install the tools in Chapter 1. After that, you need just the willingness to read carefully and the patience to actually perform the steps we fully describe for building VB database applications and using SQL. Nothing teaches better than hands-on practice, and that's what our code is designed to provide.

How to Download the Sample Code

All the source code is available at `http://www.apress.com`.