Designed for Microsoft Windows NT Windows 98

CD-ROM

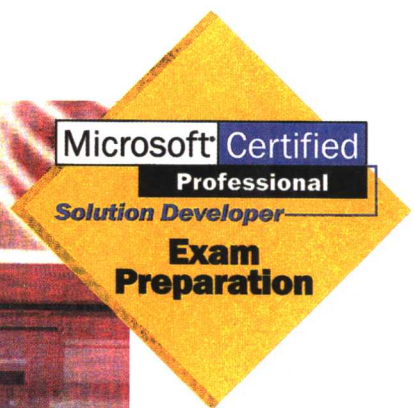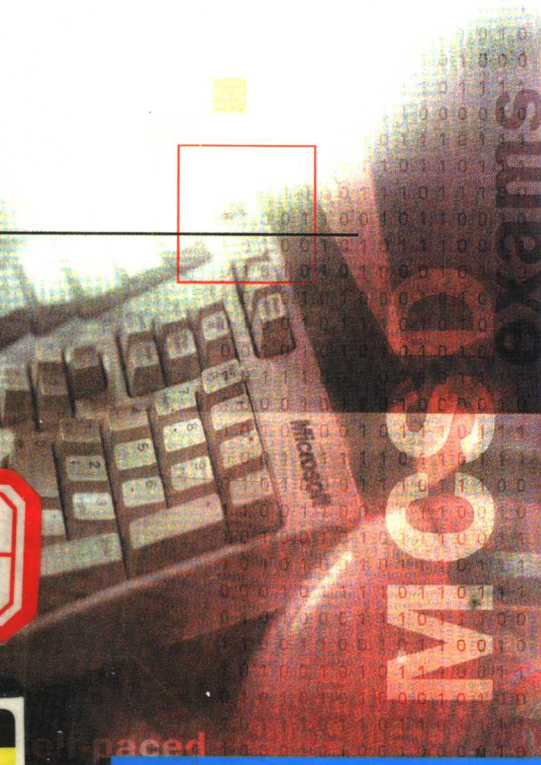**Microsoft·Press**

微软指定 MCSD 教材（影印第 2 版）

微软全球唯一指定的教材　高薪职位通行证
深入专业的编程技术　高级程序员必备

Microsoft
Visual Basic 6.0
桌面应用程序开发
（影印第 2 版）

Desktop
Applications with
Microsoft
Visual Basic 6.0
MCSD
Training Kit

For Exam
70-176

Microsoft Certified
Professional
Solution Developer
Exam Preparation

[美] Microsoft 公司　著

Microsoft Visual Basic 6.0

桌面应用程序开发

Microsoft 公司 著

北京大学出版社

内 容 简 介

本书是《微软指定 MCSD 教材（影印第2版）》丛书中的一本，讲述 Visual Basic 6.0 桌面应用程序开发技巧，内容包括系统安装与配置、性能设计、创建用户服务、COM 组件、使用 ADO 创建数据服务等。本书还可指导您准备 MCP 70-176 考试（微软认证解决方案开发人员证书的三门核心考试之一）。

本书由微软公司专家编写，技术深入，权威性强，可作为 Visual Basic 6.0 中级开发人员和 MCP 考试应试者的参考书。

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前　言

　　微软认证是一项综合性认证计划，是对个人的与软件有关的技能的重要评测标准，其证书授予那些能够使用微软公司的产品完成特定任务和实施解决方案的人。微软认证被全世界的技术管理者视为质量的标志，是雇主聘用和考核职员的重要参考依据，又是个人求职和升迁的金钥匙。MCSD 即微软认证解决方案开发人员，获得此证书表明能够使用微软的开发工具、技术和平台（包括 Microsoft Office 和 Microsoft BackOffice）开发自定义商务解决方案。所以，这套面向 MCSD 认证考试的培训教材一经推出，就受到了广大读者的欢迎。针对这种情况，我们及时地推出了它的影印第 2 版，并为每本书附上了 Microsoft SQL Server 2000 的 120 天试用版或者 Microsoft Windows 2000 Advanced Server 的 120 天试用版。

　　本套影印丛书共分 6 册，分别是《Microsoft Visual Basic 6.0 桌面应用程序开发》、《Microsoft Visual Basic 6.0 分布式应用程序开发》、《Microsoft Visual C++ 6.0 桌面应用程序开发》、《Microsoft Visual C++ 6.0 分布式应用程序开发》、《需求分析和解决方案结构定义》和《Microsoft Visual InterDev 6.0 Web 应用程序开发》。6 册书分别针对不同的用户群体以及 MCSD 认证计划的不同考试，讲述不同的内容，各有侧重，互为补充。

　　本套丛书具有以下共同特点：

　　每一章一开始，首先对本章内容作以概括性介绍，让读者有一个总体性认识。然后说明在学习本章内容之前需要具有哪些预备知识，安装哪些软件。

　　书中提供了大量操作训练实例，让读者能够即时地对所学技能进行有效的练习。

　　配套光盘中提供了丰富的辅助资料，包括多媒体演示、示例数据和操作训练文件等。多媒体演示所涉及的是本书中的一些关键概念。操作训练文件则给了读者一个亲自动手的机会。可以直接在光盘上练习，也可以安装到硬盘上之后再使用。

　　为了进一步提高本丛书及其配套光盘的质量，希望广大读者把有关的意见或建议反馈给微软出版社。联系方法是：

　　电子邮件地址：

　　tkinput@microsoft.com

　　微软出版社将通过以下网址提供对本丛书及其配套光盘的修正意见：

　　http://mspress.microsoft.com/support/

出版者

2000 年 11 月

About This Book

Welcome to Desktop Applications for Microsoft Visual Basic 6.0 MCSD Training Kit. By completing the lessons and associated exercises in this course, you will acquire the knowledge and skills necessary to develop solutions using Visual Basic 6.0.

This book also addresses the objectives of the Microsoft Designing and Implementing Desktop Applications with Microsoft® Visual Basic® 6.0 (70-176) exam. This self-paced course provides content that supports the skills measured by this exam.

Note For more information on becoming a Microsoft Certified Solutions Developer, see the section titled "The Microsoft Certified Professional Program" later in this chapter.

Each chapter in this book is divided into lessons. Most lessons include hands-on procedures that allow you to practice or demonstrate a particular concept or skill. Each chapter ends with a short summary of all chapter lessons, a hands-on lab, and a set of review questions to test your knowledge of the chapter material.

The "Getting Started" section of this chapter provides important setup instructions that describe the hardware and software requirements to complete the exercises in this course. Read through this section thoroughly before you start the lessons.

Intended Audience

This course is designed for students interested in developing Visual Basic solutions at an intermediate level. This includes developing desktop applications that conform to the Microsoft Solution Framework. More complex topics, such as creating class modules and ActiveX controls, are included in this course.

Prerequisites

Before beginning this self-paced course, you should be able to:

- Create a simple application using Visual Basic.
- Describe the relationship between controls and events.
- Describe the purpose and use of basic controls and menus in a Visual Basic application.
- View and understand a simple hypertext markup language (HTML) page.
- Create and work with Word documents, Excel worksheets, and Access databases.

Getting Started

This self-paced training course contains hands-on procedures to help you learn about Visual Basic. To complete the exercises, your computer must meet the following hardware and software requirements.

Hardware Requirements

All hardware should be on the Microsoft Windows 98 or Microsoft Windows NT Hardware Compatibility List.

Computer/ Processor	PC with a 486DX, 66MHz or higher processor; Pentium or higher processor recommended
Memory	16 MB of RAM for Windows 95 or later (32 MB recommended); 24 MB for Windows NT 4.0 (32 MB recommended)
Hard Disk	VB6.0: 76MB typical;94MB maximum
	IE: 43MB typical;59MB maximum
	MSDN: 57MB typical;493MB maximum
	Windows NT 4.0 Option Pack: 20MB Windows 95 or later;200MB Windows NT 4.0
Drive	CD-ROM drive
Display	VGA or higher-resolution monitor; Super VGA recommended
Operating System	Microsoft Windows 95 or later operating system or Microsoft Windows NT operating system version 4.0 with Service Pack 3 or later
Peripheral/ Miscellaneous	Microsoft Internet Explorer 4.01 Service Pack 1
	Microsoft Mouse or compatible pointing device
	A sound card and speakers or headphones for the multimedia clips

Software Requirements

The following software is required to complete the procedures in this course:

- Visual Basic 6, Professional Edition
- Visual SourceSafe
- Microsoft Word 97
- Microsoft Excel 97

Course Overview

This self-paced course combines text, graphics, hands-on procedures, multimedia presentations, and review questions to teach you about Visual Basic. The course is designed for you to work through the book from beginning to end, but you can choose a customized track and complete only the sections that interest you. If you choose to customize your study, see the "Before You Begin" section in each chapter for important information regarding prerequisites.

The self-paced training book is divided into the following chapters:

- "About This Book" contains a self-paced training overview and introduces the components of this book. Read this section thoroughly to get the greatest educational value from this self-paced training and to plan which lessons you will complete.
- Chapter 1, "Planning the Design of an Application," describes the elements of designing a Visual Basic application in relation to Microsoft design concepts. This chapter explains the issues that you should consider in planning your design. After working through the chapter, you will be able to describe these elements and their relationship to the Microsoft Solution Framework.
- Chapter 2, "Creating the User Interface," describes the elements of the interface and the steps you take in creating it. It explains navigation features, menus, buttons, labels, and controls. After completing the lessons in this chapter, you will be able to explain the role of each of these elements and incorporate them in your application.
- Chapter 3, "Validating and Processing User Input," explains how to manage user input, including input validation techniques. At the end of this chapter, you will be able to perform field and form-level validation, and design forms and controls based on input.
- Chapter 4, "Using the Debugging Tools," describes the types of errors you may encounter and the process of debugging the application. After completing the lesson in this chapter, you will be able to use the various debugging tools such as setting break points and creating watch expressions.
- Chapter 5, "Implementing Error Handling," explains how to incorporate error handling techniques in your application. After you have completed the lessons

in this chapter, you will be able to build applications with inline, procedural, and centralized error handling.

- Chapter 6, "Introduction to Class Modules," explains how to design, create, and use class modules in a Visual Basic application. It also includes an explanation of the Class Builder. After completing the lessons in this chapter, you will be able to use class modules in your application.

- Chapter 7, "Introduction to ActiveX Data Objects (ADO)," explains the ActiveX Data Objects architecture and the use of the ActiveX Data Control. After you have completed the lessons in this chapter, you will be able to implement fundamental database connectivity in a Visual Basic application.

- Chapter 8, "Developing Solutions Using ADO," explains the ADO Object Model and how it differs from the ActiveX Data Control introduced in Chapter 7. After you have completed the lessons in this chapter, you will be able to implement advanced database functionality using ADO objects in a Visual Basic application.

- Chapter 9, "Connecting to COM Servers," describes the role of COM clients and COM servers. This chapter explains how to use your application to connect to servers and other applications that support COM. After completing the lessons in this chapter, you will be able to develop COM client applications that connect to external COM servers such as Microsoft Word.

- Chapter 10, "Creating and Managing COM Components," explains ActiveX Controls, Active DLLs, ActiveX EXEs, and ActiveX Documents. After completing the lessons in this module, you will be able to create a COM component and debug a COM client.

- Chapter 11, "Creating Internet Applications," explains how to create applications on the Internet or a corporate intranet. This chapter includes Dynamic HTML (DHTML) applications, ActiveX documents, and Internet Information Server (IIS) applications. After you complete the lessons in this chapter, you will be able to use the DHTML Page Designer, create an ActiveX document, and create and use IIS WebClasses.

- Chapter 12, "Packaging and Deploying an Application," provides details on incorporating Help files for your application. This chapter also discusses compiler options and the issues involved in distributing your application, including the use of the Package and Deployment Wizard. At the end of this chapter, you will be able to distribute your application via disk, Web or network.

Features of This Book

- Each chapter opens with a "Before You Begin" section, which prepares you for completing the chapter.

- Each chapter is divided into lessons. Most lessons include hands-on exercises that allow you to practice an associated skill or procedure. Some lessons also

contain references to animations included on the student CD-ROM that further explain conceptual material.

■ Most lessons contain procedures that give you an opportunity to use the skills presented or explore the part of the application described in the lesson. All procedures are identified with an arrow symbol at the left margin.

■ Many lessons also contain Practices that allow you to try the new procedure on your own. The icon shown in the left margin identifies the Practices.

■ Each lesson ends with a short Lesson Summary of the material presented. Each chapter also has a Summary that covers all lessons in the chapter.

■ The Review section at the end of the chapter lets you test what you have learned in the lesson. The icon shown in the left margin identifies the Reviews.

■ The Appendix, "Questions and Answers," located at the end of this book, contains all of the book's lab and review questions and corresponding answers.

■ The Glossary contains key terms and definitions used in the course.

Conventions Used in This Book

Before you start any of the lessons, it is important that you understand the terms and notational conventions used in this book.

Notational Conventions

■ *Italic* in syntax statements indicates placeholders for variable information. *Italic* is also used for book titles.

■ Names of files and folders appear in Title Caps. Unless otherwise indicated, you can use all lowercase letters when you type a file name in a dialog box or at a command prompt.

■ File name extensions appear in all lowercase.

■ Names of folders appear in initial caps. Unless otherwise indicated, you can use all lowercase letters when you type a folder name in a dialog box or at a command prompt.

■ Acronyms appear in all uppercase.

■ Monospace type represents code samples, examples of screen text, or entries that you might type at a command prompt or in initialization files.

■ Square brackets [ ] are used in syntax statements to enclose optional items. For example, [*filename*] in command syntax indicates that you can choose to type a file name with the command. Type only the information within the brackets, not the brackets themselves.

■ Braces { } are used in syntax statements to enclose required items. Type only the information within the braces, not the braces themselves.

Keyboard Conventions

- A plus sign (+) between two key names means that you must press those keys at the same time. For example, "Press ALT+TAB" means that you hold down ALT while you press TAB.

- A comma (,) between two or more key names means that you must press each of the keys consecutively, not together. For example, "Press ALT, F, X" means that you press and release each key in sequence. "Press ALT+W, L" means that you first press ALT and W together, and then release them and press L.

- You can choose menu commands with the keyboard. Press the ALT key to activate the menu bar, and then sequentially press the keys that correspond to the highlighted or underlined letter of the menu name and the command name. For some commands, you can also press a key combination listed in the menu.

- You can select or clear check boxes or option buttons in dialog boxes with the keyboard. Press the ALT key, and then press the key that corresponds to the underlined letter of the option name. Or you can press TAB until the option is highlighted, and then press the spacebar to select or clear the check box or option button.

- You can cancel the display of a dialog box by pressing the ESC key.
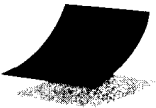
About The CD-ROM

The Supplemental Course Material compact disc contains multimedia presentations, as well as files used in hands-on exercises.

Using the Lab Exercises

The Supplemental Course Material compact disc contains files required to perform the hands-on lab exercises. These files must first be copied onto your hard disk using the setup program located on the CD-ROM.

Using the Multimedia Presentations

The multimedia presentations supplement some of the key concepts covered in the book. You should view these presentations when suggested, and then use them as a review tool while you work through the material. The animations are denoted with the icon that appears in the left margin below.

To play the animation, open the Animations folder on the student CD-ROM, and double-click on the appropriate file. The animation contains controls that can start, pause, and stop the animations, control the volume, and toggle on or off the sound and associated text.

Also Included on the Supplemental CD-ROM

Two additional features on this disc will assist you in this course.

Self-Test Software Visual Basic 6.0 Sample Exam

Install this sample exam from Self-Test Software to experience a sample certification exam. Designed in accordance with the actual Microsoft certification exam, this sample includes questions to help you assess your understanding of the materials presented in this book. Each question includes feedback with an associated course reference so you can review the material presented. Be sure to visit the STS web site at www.selftestsoftware.com for a complete list of available practice exams.

"Learn Visual Basic 6.0 Now" Multimedia Course

Also included is the Microsoft Press multimedia course, "Learn Visual Basic 6.0 Now." Designed to teach programming fundamentals, it is the perfect companion to this book. Use "Learn Visual Basic 6.0 Now" to increase your understanding of the basic concepts of developing applications using the Visual Basic programming language. If you do not meet all the prerequisites for this course, or just want to refresh your fundamental skills, consider using "Learn Visual Basic 6.0 Now" before starting the lessons presented in this book.

Using this Book to Prepare for Certification

Where to Find Specific Skills in This Book

The following tables provide a list of the skills measured on the certification exam Designing and Implementing Desktop Applications with Microsoft® Visual Basic® 6.0. The tables provide the skill, and where in this book you will find the lesson relating to that skill.

Note Exam skills are subject to change without prior notice and at the sole discretion of Microsoft.

Deriving the Physical Design

Skill Being Measured	Location in Book
Assess the potential impact of the logical design on performance, maintainability, extensibility, and availability.	Chapter 1, Lesson 1
Design Visual Basic components to access data from a database.	Chapter 10, Lesson 2
Design the properties, methods, and events of components.	Chapter 6, Lesson 3

Establishing the Development Environment

Skill Being Measured	Location in Book
Establish the environment for source-code version control	Chapter 1, Lesson 3

Creating User Services

Skill Being Measured	Location in Book
Implement navigational design.	
Dynamically modify the appearance of a menu.	Chapter 2, Lesson 4
Add a pop-up menu to an application.	Chapter 2, Lesson 4
Create an application that adds and deletes menus at run time.	Chapter 2, Lesson 4
Add controls to forms.	Chapter 2, Lesson 3
Set properties for controls.	Chapter 2, Lesson 3
Assign code to a control to respond to an event.	Chapter 3, Lesson 3
Create data input forms and dialog boxes.	
Display and manipulate data by using custom controls. Controls include TreeView, ListView, ImageList, Toolbar, and StatusBar.	Chapter 2, Lesson 3
Create an application that adds and deletes controls at run time.	Chapter 2, Lesson 3

Skill Being Measured	Location in Book
Use the Controls collection to manipulate controls at run time.	Chapter 2, Lesson 3
Use the Forms collection to manipulate forms at run time.	Chapter 2, Lesson 2
Write code that validates user input.	
Create an application that verifies data entered at the field level and the form level by a user.	Chapter 3, Lessons 2,3
Create an application that enables or disables controls based on input in fields.	Chapter 3, Lesson 2
Write code that processes data entered on a form.	
Given a scenario, add code to the appropriate form event. Events include Initialize, Terminate, Load, Unload, QueryUnload, Activate, and Deactivate.	Chapter 2, Lesson 2
Add an ActiveX control to the toolbox.	Chapter 2, Lesson 3
Create a Web page by using the DHTML Page Designer to dynamically change attributes of elements, change content, change styles, and position elements.	Chapter 11, Lesson 1
Use data binding to display and manipulate data from a data source.	Chapter 7, Lesson 4
Instantiate and invoke a COM component.	
Create a Visual Basic client application that uses a COM component.	Chapter 10, Lessons 2,3
Create a Visual Basic application that handles events from a COM component.	Chapter 6, Lesson 3
Create callback procedures to enable asynchronous processing between COM components and Visual Basic client applications.	Chapter 9, Lesson 3
Implement online user assistance in a desktop application.	
Set appropriate properties to enable user assistance. Help properties include HelpFile, HelpContextID, and WhatsThisHelp.	Chapter 12, Lesson 1
Create HTML Help for an application.	Chapter 12, Lesson 1
Implement messages from a server component to a user interface.	Chapter 9, Lesson 3
Implement error handling for the user interface in desktop applications.	
Identify and trap run-time errors.	Chapter 5, Lesson 2
Handle inline errors.	Chapter 5, Lesson 3

Creating and Managing COM Components

Skill Being Measured	Location in Book
Create a COM component that implements business rules or logic. Components include DLLs, ActiveX controls, and active documents.	Chapter 10, Lessons 2,3
Create ActiveX controls.	
Create an ActiveX control that exposes properties.	Chapter 10, Lesson 2
Use control events to save and load persistent properties.	Chapter 10, Lesson2
Test and debug an ActiveX control.	Chapter 10, Lesson 2
Create and enable property pages for an ActiveX control.	Chapter 10, Lesson 2
Enable the data-binding capabilities of an ActiveX control.	Chapter 10, Lesson 2
Create an ActiveX control that is a data source.	Chapter 10, Lesson 2
Create an active document.	
Use code within an active document to interact with a container application.	Chapter 11, Lesson 2
Navigate to other active documents.	Chapter 11, Lesson 2
Debug a COM client written in Visual Basic.	Chapter 10, Lesson 3
Compile a project with class modules into a COM component.	
Implement an object model within a COM component.	Chapter 6, Lesson 4
Set properties to control the instancing of a class within a COM component.	Chapter 10, Lesson 3
Use Visual Component Manager to manage components.	Ch 10, Lesson 4
Register and unregister a COM component.	Chapter 9, Lesson 1

Creating Data Services

Skill Being Measured	Location in Book
Access and manipulate a data source by using ADO and the ADO Data control.	Chapter 7, Lessons 4,5

Testing the Solution

Skill Being Measured	Location in Book
Given a scenario, select the appropriate compiler options.	Chapter 12, Lesson 2
Control an application by using conditional compilation.	Chapter 12, Lesson 2
Set watch expressions during program execution.	Chapter 4, Lesson 2
Monitor the values of expressions and variables by using the Immediate window.	
Use the Immediate window to check or change values.	Chapter 4, Lesson 2
Use the Locals window to check or change values.	Chapter 4, Lesson 2

Skill Being Measured	Location in Book
Implement project groups to support the development and debugging process.	
Debug DLLs in process.	Chapter 10, Lesson 3
Test and debug a control in process.	Chapter 10, Lesson 2
Given a scenario, define the scope of a watch variable.	Chapter 4, Lesson 2

Deploying an Application

Skill Being Measured	Location in Book
Use the Package and Deployment Wizard to create a setup program that installs a desktop application, registers the COM components, and allows for uninstall.	Chapter 12, Lesson 3
Plan and implement floppy disk-based deployment or compact disc-based deployment for a desktop application.	Chapter 12, Lesson 3
Plan and implement Web-based deployment for a desktop application.	Chapter 12, Lesson 3
Plan and implement network-based deployment for a desktop application.	Chapter 12, Lesson 3

Maintaining and Supporting an Application

Skill Being Measured	Location in Book
Fix errors, and take measures to prevent future errors.	Chapter 5, Lessons 1,2,3

The Microsoft Certified Professional Program

The Microsoft Certified Professional (MCP) program provides the best method to prove your command of current Microsoft products and technologies. Microsoft, an industry leader in certification, is on the forefront of testing methodology. Our exams and corresponding certifications are developed to validate your mastery of critical competencies as you design and develop, or implement and support, solutions with Microsoft products and technologies. Computer professionals who become Microsoft certified are recognized as experts and are sought after industry-wide.

The Microsoft Certified Professional program offers five certifications, based on specific areas of technical expertise:

- *Microsoft Certified Professional (MCP).* Demonstrated in-depth knowledge of at least one Microsoft operating system. Candidates may pass additional Microsoft certification exams to further qualify their skills with Microsoft BackOffice products, development tools, or desktop programs.
- *Microsoft Certified Professional - Specialist: Internet.* MCPs with a specialty in the Internet are qualified to plan security, install and configure server products, manage server resources, extend servers to run CGI scripts or ISAPI scripts, monitor and analyze performance, and troubleshoot problems.
- *Microsoft Certified Systems Engineer (MCSE).* Qualified to effectively plan, implement, maintain, and support information systems in a wide range of computing environments with Microsoft Windows 98, Microsoft Windows NT, and the Microsoft BackOffice integrated family of server software.
- *Microsoft Certified Solution Developer (MCSD).* Qualified to design and develop custom business solutions with Microsoft development tools, technologies, and platforms, including Microsoft Office and Microsoft BackOffice.
- *Microsoft Certified Trainer (MCT).* Instructionally and technically qualified to deliver Microsoft Official Curriculum through a Microsoft Authorized Technical Education Center (ATEC).

Microsoft Certification Benefits

Microsoft certification, one of the most comprehensive certification programs available for assessing and maintaining software-related skills, is a valuable measure of an individual's knowledge and expertise. Microsoft certification is awarded to individuals who have successfully demonstrated their ability to perform specific tasks and implement solutions with Microsoft products. Not only does this provide an objective measure for employers to consider; it also provides guidance for what an individual should know to be proficient. And as with any skills-assessment and benchmarking measure, certification brings a variety of benefits: to the individual, and to employers and organizations.

Technical Support

Every effort has been made to ensure the accuracy of this book and the contents of the companion disc. If you have comments, questions, or ideas regarding this book or the companion disc, please send them to Microsoft Press using either of the following methods:

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