



Microsoft Official Curriculum

微软指定 MCSD 教材 (影印第 2 版)

Microsoft Press

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** 分布式应用程序开发

(影印第 2 版)

Distributed Applications for Microsoft **Visual Basic 6.0** **MCSD** **Training Kit**

**For Exam
70-175**

Microsoft Certified
Professional
Solution Developer

**Exam
Training**

北京大学出版社

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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 分布式应用程序开发技巧，内容包括系统安装与配置、数据模型设计、用户界面、COM 组件、ADO、MTS、安全性等。本书还可指导您准备 MCP 70-175 考试（微软认证解决方案开发人员证书的一门核心考试）。

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 中高级开发人员和 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：

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About This Book

Welcome to Distributed 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 Distributed Applications for Microsoft® Visual Basic® 6.0 (70-175) 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 and advanced level. This includes developing distributed applications that conform to the Microsoft Solution Framework, and is designed to teach Visual Basic programmers, who currently develop desktop applications, how to build n-tier, client/server solutions. More complex topics, such as creating Microsoft Transaction Server components and custom Component Object Model (COM) interfaces, are included in this course.

Prerequisites

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

- Create a simple front-end application using Visual Basic.
- Describe the relationship between objects and events.
- Create a simple database application and have a basic understanding of relational database concepts.
- Compile a Visual Basic project.

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 Pentium-class processor; 166 MHz or higher processor recommended
Memory	24 MB of RAM for Windows 95 or later (32 MB recommended); 24 MB for Windows NT 4.0 (32 MB recommended)
Hard Disk	Visual Basic 6.0 Enterprise Edition: Typical installation: 116 MB Maximum installation: 135 MB IE: 43MB typical;59MB maximum MSDN: 57MB typical;493MB maximum SQL Server 7.0 Enterprise Edition; 180MB maximum; 170MB typical 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, Windows 98, or Windows NT Workstation operating system to be used as a client computer. Microsoft Windows NT Server operating system version 4.0 with Service Pack 4 or later.

Peripheral/ Miscellaneous Microsoft Internet Explorer 4.01 Service Pack 2
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 or Visual Studio 6.0, Enterprise Edition
- Visual SourceSafe
- Microsoft Transaction Server 2.0
- SQL Server 7.0, Enterprise
- DCOM98
- Windows NT 4.0 Option Pack

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, “Application Design Concepts,” discusses the Microsoft Solution Framework and how it relates to developing a multitier application. The software used in the course will also be discussed at a high level to give the reader an understanding of what each product is used for. In addition, tools for development teams will be introduced to explain the benefits of implementing source control and component management. 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,” reviews the Visual Basic basics discussed in Desktop Applications for Microsoft Visual Basic 6.0 MCSD Training Kit. 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.

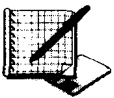
- Chapter 3, “Creating COM DLLs with Visual Basic,” discusses class modules for the purpose of creating COM DLLs. ActiveX DLL project property settings will be explained as well as setting properties for each class contained within a COM DLL. At the end of this chapter, you will be able to create COM components through ActiveX DLL and ActiveX EXE projects in Microsoft Visual Basic.
- Chapter 4, “Advanced COM Programming with Visual Basic 6.0,” discusses how Visual Basic implements default interfaces for COM components automatically. It also explains how to create custom interfaces and the benefits of implementing custom interfaces. In addition, creating custom object models will be introduced. After completing the lesson in this chapter, you will be able to implement custom business objects and use the OLE View tool to read the IDL code created automatically by Visual Basic.
- Chapter 5, “Introducing ActiveX Data Objects,” introduces ActiveX Data Objects as the best data access method available. The benefits of using ADO for data access and the relationship between OLE DB and ADO are discussed. The object model for ADO is explained, as is the use of the Visual Basic Data Environment to connect to a database. After you have completed the lessons in this chapter, you will be able to use the Data Environment to create connections and commands.
- Chapter 6, “Accessing Data with ActiveX Data Objects,” discusses the importance of managing connections to conserve server resources. In addition, considerations for using records from a data source are introduced. The reader also learns how to navigate and manipulate data from a data source. After completing the lessons in this chapter, you will be able to connect to a data source using code, return records from a data source, and return and manage multiple recordsets.
- Chapter 7, “Advanced Database Topics,” introduces more advanced topics for implementing ADO in an enterprise environment. Topics include: managing transactions, embedded transactions, using disconnected recordsets for offline use, and performing asynchronous operations to benefit users. After you have completed the lessons in this chapter, you will be able to add methods, events and enumerations to a COM DLL to provide functionality to a client application.
- Chapter 8, “Using Stored Procedures,” explains what stored procedures are, and the benefits of implementing them. It also explains how to create stored procedures and run them from Visual Basic. After you have completed the lessons in this chapter, you will be able to use the ADO Command object to run stored procedures and create stored procedures with SQL Server.
- Chapter 9, “Using Microsoft Transaction Server,” describes the role of transactions in MTS, and how MTS manages objects and transactions. It includes steps to build MTS components that take advantage of transactions and all of the other services that MTS provides. After completing the lessons in

this chapter, you will be able to use the MTS add-in for Visual Basic and use transactions in MTS components.

- Chapter 10, “Implementing Security in the Enterprise,” emphasizes that security is an important part of application architecture. It also focuses on the privacy of sensitive user information, and protection of the architectural components and processes that run applications from unauthorized tampering or eavesdropping. These issues are addressed for Windows networks, SQL Server, and Microsoft Transaction Server. After completing the lessons in this module, you will be able to create new users and groups in Windows NT Server.
- Chapter 11, “Debugging and Error Handling,” emphasizes the importance of error handling when working with COM components. The reader learns how to include code to handle errors that their components may generate on both the client and server. After you complete the lessons in this chapter, you will be able to create an error handler in a procedure and set watch expressions using the Watch window.

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.
- Appendix A, “Questions and Answers,” located at the end of this book, contains all of the book’s lab and review questions and corresponding answers.
- Appendix B, “Creating ActiveX Controls,” provides a refresher on ActiveX controls.
- Appendix C, “Using the ADO Data Control,” provides a refresher on ADO.
- Appendix D, “Creating Internet Applications,” is an overview of using Visual Basic to create Internet/intranet applications.



- Appendix E, “Preparing a Distributed Application for Deployment” is an overview of how to implement help and how to implement the distribution of a distributed application and COM components. 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.



To play the animation, open the Animations folder on the 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

An additional feature 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.

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.

Developing the Conceptual and Logical Design

Skill Being Measured

Location in Book

Given a conceptual design, apply the principles of modular design to derive the components and services of the logical design.

Chapter 1, Lesson 1
Chapter 4, Lesson 2
Chapter 8, Lesson 1

Deriving the Physical Design

Skill Being Measured

Location in Book

Assess the potential impact of the logical design on performance, maintainability, extensibility, scalability, availability, and security

Chapter 4, Lesson 1
Chapter 10, Lessons 2,3
Chapter 8, Lesson 1
Chapter 7, Lessons 1, 2

Design Visual Basic components to access data from a database in a multi-tier application.

Chapter 6, Lessons 1,2,3,4
Chapter 7, Lessons 1,2,3

Design the properties, methods, and events of components.

Chapter 3, Lessons 1,2,3
Chapter 4, Lessons 1,2

Establishing the Development Environment

Skill Being Measured

Location in Book

Establish the environment for source-code version control

Chapter 1, Lesson 1

Install and configure Visual Basic for developing distributed applications.

Chapter 1, Lessons 1,3

Configure a server computer to run Microsoft Transaction Server (MTS).

Install MTS.

Chapter 1, Lesson 1
Chapter 10 Lesson 2

Skill Being Measured	Location in Book
Set up security on a system package.	Chapter 1, Lesson 1 Chapter 10 Lesson 2
Configure a client computer to use an MTS component.	
Create packages that install or update MTS components on a client computer.	Chapter 9, Lesson 3 Chapter 10, Lesson 3

Creating User Services

Skill Being Measured	Location in Book
Implement navigational design.	
Dynamically modify the appearance of a menu.	Chapter 2, Lessons 1,2
Add a pop-up menu to an application.	Chapter 2, Lessons 1,2
Create an application that adds and deletes menus at run time.	Chapter 2, Lessons 1,2
Add controls to forms.	Chapter 2, Lessons 1,2
Set properties for controls.	Chapter 2, Lessons 1,2
Assign code to a control to respond to an event.	Chapter 2, Lessons 1,2
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, Lessons 1,2
Create an application that adds and deletes controls at run time.	Chapter 2, Lessons 1,2
Use the Controls collection to manipulate controls at run time.	Chapter 2, Lessons 1,2
Use the Forms collection to manipulate forms at run time.	Chapter 2, Lessons 1,2
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 2, Lesson 2
Create an application that enables or disables controls based on input in fields.	Chapter 2, 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 1
Add an ActiveX control to the toolbox.	Chapter 2, Lesson 1
Create dynamic Web pages by using Active Server Pages (ASP) and webclasses.	Appendix D

Skill Being Measured	Location in Book
Create a Web page by using the DHTML Page Designer to dynamically change attributes of elements, change content, change styles, and position elements.	Appendix D
Use data binding to display and manipulate data from a data source.	Chapter 5 Lesson 3 Appendix B
Instantiate and invoke a COM component.	
Create a Visual Basic client application that uses a COM component.	Chapter 3, Lessons 1,2,3
Create a Visual Basic application that handles events from a COM component.	Chapter 3, Lessons 1,2,3
Create callback procedures to enable asynchronous processing between COM components and Visual Basic client applications.	Chapter 3, Lesson 1
Implement online user assistance in a distributed application.	
Set appropriate properties to enable user assistance. Help properties include HelpFile, HelpContextID, and WhatsThisHelp.	Appendix E Chapter 3, Lesson 1
Create HTML Help for an application.	Appendix E Chapter 3, Lesson 1
Implement messages from a server component to a user interface.	Appendix E Chapter 3, Lesson 1
Implement error handling for the user interface in distributed applications.	
Identify and trap run-time errors.	Chapter 11, Lesson 1
Handle inline errors.	Chapter 11, Lesson 1
Determine how to send error information from a COM component to a client computer.	Chapter 11, Lesson 1
Use an active document to present information within a Web browser.	Appendix D

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 4, Lesson 2 Chapter 3, Lesson 3 Appendix B Appendix D
Create ActiveX controls.	
Create an ActiveX control that exposes properties.	Appendix B
Use control events to save and load persistent properties.	Appendix B
Test and debug an ActiveX control.	Appendix B

Skill Being Measured	Location in Book
Create and enable property pages for an ActiveX control.	Appendix B
Enable the data-binding capabilities of an ActiveX control.	Appendix B
Create an ActiveX control that is a data source.	Appendix B
Create an active document.	
Use code within an active document to interact with a container application.	Appendix D
Navigate to other active documents.	Appendix D
Design and create components that will be used with MTS.	Chapter 9, Lesson 3
Debug Visual Basic code that uses objects from a COM component.	Chapter 11, Lesson 2
Choose the appropriate threading model for a COM component.	Chapter 3, Lesson 3
Create a package by using the MTS Explorer.	
Using the Package and Deployment Wizard to create a package.	Chapter 9, Lessons 2,3 Chapter 10, Lesson 3
Import existing packages.	Chapter 9, Lessons 2,3 Chapter 10, Lesson 3
Assign names to packages.	Chapter 9, Lessons 2,3 Chapter 10, Lesson 3
Assign security to packages.	Chapter 9, Lessons 2,3 Chapter 10, Lesson 3
Add components to an MTS package.	
Set transactional properties of components.	Chapter 9, Lessons 2,3
Set security properties of components.	Chapter 9, Lesson 2,3
Use role-based security to limit use of an MTS package to specific users.	
Create roles.	Chapter 10, Lesson 3
Assign roles to components or component interfaces.	Chapter 10, Lesson 3
Add users to roles.	Chapter 10, Lesson 3
Compile a project with class modules into a COM component.	
Implement an object model within a COM component.	Chapter 4, Lesson 2 Chapter 3, Lesson 2
Set properties to control the instancing of a class within a COM component.	Chapter 4, Lesson 2 Chapter 3, Lesson 2
Use Visual Component Manager to manage components.	Chapter 1, Lesson 1
Register and unregister a COM component.	Chapter 3, Lesson 3 Chapter 10, Lesson 4

Creating Data Services

Skill Being Measured	Location in Book
Access and manipulate a data source by using ADO and the ADO Data control.	Appendix C
Access and manipulate data by using the Execute Direct model.	Chapter 6, Lessons 2,4
Access and manipulate data by using the Prepare/Execute model	Chapter 6, Lessons 1,2 Chapter 8, Lessons 1,2
Access and manipulate data by using the Stored Procedures model	
Use a stored procedure to execute a statement on a database.	Chapter 8, Lesson 2
Use a stored procedure to return records to a Visual Basic application.	Chapter 8, Lesson 2
Retrieve and manipulate data by using different cursor locations. Cursor locations include client-side and server-side.	Chapter 6, Lessons 2,3,4 Chapter 7, Lesson 2
Retrieve and manipulate data by using different cursor types. Cursor types include forward-only, static, dynamic, and keyset.	Chapter 6, Lessons 2,3,4
Use the ADO Errors collection to handle database errors.	Chapter 5, Lesson 2
Manage database transactions to ensure data consistency and recoverability.	Chapter 7, Lesson 1 Chapter 8, Lesson 2 Chapter 9, Lesson 1
Write SQL statements that retrieve and modify data.	Chapter 8, Lessons 1,2 Chapter 9, Lesson 3
Write SQL statements that use joins to combine data from multiple tables.	Chapter 8, Lesson 2
Use appropriate locking strategies to ensure data integrity. Locking strategies include read-only, pessimistic, optimistic, and batch optimistic.	Chapter 6, Lessons 2,3

Testing the Solution

Skill Being Measured	Location in Book
Given a scenario, select the appropriate compiler options.	Appendix E
Control an application by using conditional compilation.	Appendix E
Set watch expressions during program execution.	Chapter 11, Lesson 1
Monitor the values of expressions and variables by using the Immediate window.	
Use the Immediate window to check or change values.	Chapter 11, Lesson 1
Use the Locals window to check or change values.	Chapter 11, Lesson 1
Implement project groups to support the development and debugging process.	

Skill Being Measured	Location in Book
Debug DLLs in process.	Chapter 11, Lesson 2 Appendix B
Test and debug a control in process.	Chapter 11, Lesson 2 Appendix B
Given a scenario, define the scope of a watch variable.	Chapter 11, Lesson 1

Deploying an Application

Skill Being Measured	Location in Book
Use the Package and Deployment Wizard to create a setup program that installs a distributed application, registers the COM components, and allows for uninstall.	Appendix E
Register a component that implements DCOM.	Chapter 10, Lesson 4
Configure DCOM on a client computer and on a server computer.	Chapter 10, Lesson 4
Plan and implement floppy disk-based deployment or compact disc-based deployment for a distributed application.	Appendix E
Plan and implement Web-based deployment for a distributed application.	Appendix E
Plan and implement network-based deployment for a distributed application.	Appendix E

Maintaining and Supporting an Application

Skill Being Measured	Location in Book
Implement load balancing..	Chapter 1, Lesson 2 Chapter 10, Lesson 4 Chapter 9, Lesson 3
Fix errors, and take measures to prevent future errors.	Chapter 11, Lessons 1,2 Chapter 4, Lesson 1
Deploy application updates for distributed applications.	Chapter 4, Lessons 1,2 Appendix E

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.