Contents

Figures, Tables, and Listings   xv

Preface

About This Book   xxiii

Format of a Typical Chapter   xxiv
Conventions Used in This Book   xxv
  Special Fonts   xxv
  Types of Notes   xxv
  Assembly-Language Information   xxvi
  The Development Environment   xxvi

Chapter 1
Introduction to Interapplication Communication   1-1

Overview of Interapplication Communication   1-3
Sharing Data Among Applications   1-6
Sending and Responding to Apple Events   1-9
  Standard Apple Events   1-10
  Handling Apple Events   1-12
Supporting AppleScript and Other Scripting Languages   1-13
  Scriptable Applications   1-16
  Recordable Applications   1-18
  Applications That Manipulate and Execute Scripts   1-19
Exchanging Message Blocks   1-22

Chapter 2
Edition Manager   2-1

Introduction to Publishers, Subscribers, and Editions   2-4
About the Edition Manager   2-12
Using the Edition Manager   2-12
  Receiving Apple Events From the Edition Manager   2-13
  Creating the Section Record and Alias Record   2-15
  Saving a Document Containing Sections   2-19
  Opening and Closing a Document Containing Sections   2-22
Reading and Writing a Section   2-24
  Formats in an Edition   2-24
  Opening an Edition   2-26
  Format Marks   2-27
  Reading and Writing Edition Data   2-27
  Closing an Edition   2-28
Chapter 3

Introduction to Apple Events

About Apple Events 3-3
Apple Events and Apple Event Objects 3-6
Apple Event Attributes and Parameters 3-7
  Apple Event Attributes 3-8
  Apple Event Parameters 3-9
  Interpreting Apple Event Attributes and Parameters 3-10
Data Structures Within Apple Events 3-12
  Descriptor Records 3-12
  Keyword-Specified Descriptor Records 3-15
  Descriptor Lists 3-16
Responding to Apple Events 3-20
  Accepting and Processing Apple Events 3-20
  About Apple Event Handlers 3-23
    Extracting and Checking Data 3-23
    Interacting With the User 3-25
      Performing the Requested Action and Returning a Result 3-25
Creating and Sending Apple Events 3-28
  Creating an Apple Event Record 3-29
    Adding Apple Event Attributes and Parameters 3-29
    Sending an Apple Event and Handling the Reply 3-30
Working With ObjectSpecifier Records 3-32
  Data Structures Within an ObjectSpecifier Record 3-34
  The Classification of AppleEvent Objects 3-39
    Object Classes 3-39
    Properties and Elements 3-42
  Finding AppleEvent Objects 3-46
About the AppleEvent Manager 3-48
  Supporting AppleEvents as a Server Application 3-48
  Supporting AppleEvents as a Client Application 3-49
  Supporting AppleEvent Objects 3-49
  Supporting AppleEvent Recording 3-50
# Chapter 4  Responding to Apple Events

**Handling Apple Events** 4-1

- Accepting an Apple Event 4-5
- Installing Entries in the Apple Event Dispatch Tables 4-7
  - Installing Entries for the Required Apple Events 4-8
  - Installing Entries for Apple Events Sent by the Edition Manager 4-9
- How Apple Event Dispatching Works 4-9

**Handling the Required Apple Events** 4-11

- Required Apple Events 4-11
  - Handling the Open Application Event 4-14
  - Handling the Open Documents Event 4-15
  - Handling the Print Documents Event 4-17
  - Handling the Quit Application Event 4-19
- Handling Apple Events Sent by the Edition Manager 4-20
  - The Section Read, Section Write, and Section Scroll Events 4-21
- Handling the Create Publisher Event 4-22

**Getting Data Out of an Apple Event** 4-25

- Getting Data Out of an Apple Event Parameter 4-26
- Getting Data Out of an Attribute 4-28
- Getting Data Out of a Descriptor List 4-31

**Writing Apple Event Handlers** 4-33

- Replying to an Apple Event 4-36
- Disposing of Apple Event Data Structures 4-39

**Interacting With the User** 4-45

- Setting the Client Application’s User Interaction Preferences 4-46
- Setting the Server Application’s User Interaction Preferences 4-48
- Requesting User Interaction 4-49

**Reference to Responding to Apple Events** 4-56

- Data Structures Used by the Apple Event Manager 4-56
  - Descriptor Records and Related Data Structures 4-56
  - Apple Event Array Data Types 4-60

**Routines for Responding to Apple Events** 4-61

- Creating and Managing the Apple Event Dispatch Tables 4-61
- Dispatching Apple Events 4-66
- Getting Data or Descriptor Records Out of Apple Event Parameters and Attributes 4-68
- Counting the Items in Descriptor Lists 4-74
- Getting Items From Descriptor Lists 4-74
- Getting Data and Keyword-Specified Descriptor Records Out of AE Records 4-78

**Requesting User Interaction** 4-81

- Requesting More Time to Respond to Apple Events 4-84
- Suspending and Resuming Apple Event Handling 4-85
- Getting the Sizes and Descriptor Types of Descriptor Records 4-89
- Deleting Descriptor Records 4-92
Chapter 5
Creating and Sending Apple Events

Creating an Apple Event 5-3
Adding Parameters to an Apple Event 5-5
Specifying Optional Parameters for an Apple Event 5-7
Specifying a Target Address 5-10
Creating an Address Descriptor Record 5-11
Addressing an Apple Event for Direct Dispatching 5-13
Sending an Apple Event 5-13
Dealing With Timeouts 5-21
Writing an Idle Function 5-22
Writing a Reply Filter Function 5-24
Reference to Creating and Sending Apple Events 5-25
Routines for Creating and Sending Apple Events 5-25
Creating Apple Events 5-26
Creating and Duplicating Descriptor Records 5-27
Creating Descriptor Lists and AE Records 5-29
Adding Items to Descriptor Lists 5-30
Adding Data and Descriptor Records to AE Records 5-33
Adding Parameters and Attributes to Apple Events 5-34
Sending Apple Events 5-38
Application-Defined Routines 5-42
Summary of Creating and Sending Apple Events 5-45
Pascal Summary 5-45
Constants 5-45
Data Types 5-49
Routines for Creating and Sending Apple Events 5-51
Application-Defined Routines 5-52
C Summary 5-52
Constants 5-52
Data Types 5-57
Routines for Creating and Sending Apple Events 5-58
Application-Defined Routines 5-60
Assembly-Language Summary 5-60
Trap Macros 5-60
Result Codes 5-61

Chapter 6
Resolving and Creating Object Specifier Records 6-1
Resolving Object Specifier Records 6-4
Descriptor Records Used in Object Specifier Records 6-8
Object Class 6-9
Container 6-9
Key Form 6-11
Key Data 6-12
Key Data for a Property ID 6-13
Key Data for an Object’s Name 6-14
Key Data for a Unique ID 6-14
Key Data for Absolute Position 6-14
Key Data for Relative Position 6-15
Key Data for a Test 6-15
Key Data for a Range 6-20
Installing Entries in the Object Accessor Dispatch Tables 6-21
Installing Object Accessor Functions That Find Apple Event Objects 6-23
Installing Object Accessor Functions That Find Properties 6-27
Writing Object Accessor Functions 6-28
Writing Object Accessor Functions That Find Apple Event Objects 6-29
Writing Object Accessor Functions That Find Properties 6-37
Defining Tokens 6-39
Handling Whose Tests 6-41
Writing Object Callback Functions 6-45
Writing an Object-Counting Function 6-48
Writing an Object-Comparison Function 6-50
Writing Marking Callback Functions 6-53
Creating Object Specifier Records 6-55
Creating a Simple Object Specifier Record 6-57
Specifying the Container Hierarchy 6-61
Specifying a Property 6-63
Specifying a Relative Position 6-64
Creating a Complex Object Specifier Record 6-64
Specifying a Test 6-64
Specifying a Range 6-72
Reference to Resolving and Creating Object Specifier Records 6-75
Data Structures Used in Object Specifier Records 6-75
Routines for Resolving and Creating Object Specifier Records 6-77
Initializing the Object Support Library 6-77
Setting Object Accessor Functions and Object Callback Functions 6-77
Getting, Calling, and Removing Object Accessor Functions 6-81
Resolving Object Specifier Records 6-85
Deallocating Memory for Tokens 6-87
Creating Object Specifier Records 6-88
Application-Defined Routines 6-94
Object Accessor Functions 6-94
Object Callback Functions 6-96
Summary of Resolving and Creating Object Specifier Records 6-104
Pascal Summary 6-104
Constants 6-104
Data Types 6-106
Routines for Resolving and Creating Object Specifier Records 6-106
Application-Defined Routines 6-108
C Summary 6-109
Constants 6-109
Data Types 6-111
Routines for Resolving and Creating Object Specifier Records 6-112
Application-Defined Routines 6-114
Assembly-Language Summary 6-115
Trap Macros 6-115
Result Codes 6-115

Chapter 7

Introduction to Scripting 7-1
About Scripts and Scripting Components 7-4
Script Editors and Script Files 7-6
Scripting Components and Scriptable Applications 7-8
Scripting Components and Applications That Execute Scripts 7-11
Making Your Application Scriptable 7-14
About Apple Event Terminology Resources 7-15
How AppleScript Uses Terminology Information 7-17
Dynamic Loading of Terminology Information 7-20
Making Your Application Recordable 7-20
Manipulating and Executing Scripts 7-22
Compiling, Saving, Modifying, and Executing Scripts 7-24
Using a Script Context to Handle an Apple Event 7-25
Chapter 11

Program-to-Program Communications Toolbox 11-1

About the PPC Toolbox 11-4
  Ports, Sessions, and Message Blocks 11-4
  Setting Up Authenticated Sessions 11-6
Using the PPC Toolbox 11-10
  PPC Toolbox Calling Conventions 11-14
  Specifying Port Names and Location Names 11-17
    Opening a Port 11-20
    Browsing for Ports Using the Program Linking Dialog Box 11-22
    Obtaining a List of Available Ports 11-27
Preparing for a Session 11-29
  Initiating a PPC Session 11-29
  Receiving Session Requests 11-35
  Accepting or Rejecting Session Requests 11-37
Exchanging Data During a PPC Session 11-39
  Reading Data From an Application 11-40
  Sending Data to an Application 11-42
Ending a Session and Closing a Port 11-43
Invalidating Users 11-44
PPC Toolbox Reference 11-46
  Data Structures 11-46
    The PPC Toolbox Parameter Block 11-46
    The PPC Port Record 11-49
    The Location Name Record 11-50
    The Port Information Record 11-51
PPC Toolbox Routines 11-51
  Initializing the PPC Toolbox 11-52
  Using the Program Linking Dialog Box 11-52
  Obtaining a List of Ports 11-55
  Opening and Closing a Port 11-57
  Starting and Ending a Session 11-60
  Receiving, Accepting, and Rejecting a Session 11-67
  Reading and Writing Data 11-72
  Locating a Default User and Invalidating a User 11-76
Chapter 12  Data Access Manager  12-1

About the Data Access Manager  12-5
The High-Level Interface  12-7
  Sending a Query Through the High-Level Interface  12-8
  Retrieving Data Through the High-Level Interface  12-9
The Low-Level Interface  12-9
  Sending a Query Through the Low-Level Interface  12-10
  Retrieving Data Through the Low-Level Interface  12-11
Comparison of the High-Level and Low-Level Interfaces  12-11
Using the Data Access Manager  12-12
  Executing Routines Asynchronously  12-13
  General Guidelines for the User Interface  12-13
    Keep the User in Control  12-13
    Provide Feedback to the User  12-13
  Using the High-Level Interface  12-14
  Writing a Status Routine for High-Level Functions  12-22
  Using the Low-Level Interface  12-28
  Getting Information About Sessions in Progress  12-36
Processing Query Results  12-37
  Getting Query Results  12-37
  Converting Query Results to Text  12-43
Creating a Query Document  12-47
  User Interface Guidelines for Query Documents  12-47
Contents of a Query Document  12-49
Query Records and Query Resources  12-52
Writing a Query Definition Function  12-52