

Contents

■ Contents at a Glance	v
■ About the Author	xxi
■ About the Technical Reviewer	xxii
■ Acknowledgments	xxiii
■ Part 1: Introducing ASP.NET MVC 4	1
■ Chapter 1: What's the Big Idea?	3
A Brief History of Web Development	3
Traditional ASP.NET Web Forms	4
What Is Wrong with ASP.NET Web Forms?	5
Web Development Today	6
Web Standards and REST	6
Agile and Test-Driven Development	7
Ruby on Rails	7
Sinatra	8
Node.js	8
Key Benefits of ASP.NET MVC	9
MVC Architecture	9
Extensibility	9
Tight Control over HTML and HTTP	10
Testability	10
Powerful Routing System	10
Built on the Best Parts of the ASP.NET Platform	11
Modern API	11
ASP.NET MVC Is Open Source	11

Who Should Use ASP.NET MVC?	12
Comparisons with ASP.NET Web Forms	12
Migrating from Web Forms to MVC	12
Comparisons with Ruby on Rails	13
Comparisons with MonoRail	13
What's New in ASP.NET MVC 4?	13
Summary	13
Chapter 2: Your First MVC Application	15
Preparing the Workstation	15
Creating a New ASP.NET MVC Project	16
Adding the First Controller	19
Understanding Routes	21
Rendering Web Pages	22
Creating and Rendering a View	22
Adding Dynamic Output	25
Creating a Simple Data-Entry Application	27
Setting the Scene	27
Designing a Data Model	28
Linking Action Methods	29
Building the Form	32
Handling Forms	35
Adding Validation	38
Completing the Example	44
Summary	45
Chapter 3: The MVC Pattern	47
The History of MVC	47
Understanding the MVC Pattern	47
Understanding the Domain Model	48
The ASP.NET Implementation of MVC	49
Comparing MVC to Other Patterns	49
Applying Domain-Driven Development	53
Modeling an Example Domain	53
Ubiquitous Language	54
Aggregates and Simplification	54
Defining Repositories	56

Building Loosely Coupled Components.....	57
Using Dependency Injection	58
An MVC-Specific DI Example	59
Using a Dependency Injection Container	60
Getting Started with Automated Testing	62
Understanding Unit Testing	62
Understanding Integration Testing	70
Summary	71
Chapter 4: Essential Language Features	73
Creating the Example Project.....	73
Using Automatically Implemented Properties.....	74
Using Object and Collection Initializers.....	78
Using Extension Methods	80
Applying Extension Methods to an Interface	82
Creating Filtering Extension Methods.....	84
Using Lambda Expressions.....	86
Using Automatic Type Inference.....	89
Using Anonymous Types	90
Performing Language Integrated Queries	91
Understanding Deferred LINQ Queries.....	95
Using Async Methods	97
Applying the async and await Keywords	99
Summary	100
Chapter 5: Working with Razor	101
Creating the Example Project.....	101
Defining the Model.....	101
Defining the Controller.....	102
Creating the View.....	103
Working with the Model Object	104
Working with Layouts.....	106
Creating the Layout.....	107
Applying a Layout	108
Using a View Start File.....	109
Demonstrating Shared Layouts	110

Using Razor Expressions	114
Inserting Data Values	115
Setting Attribute Values	117
Using Conditional Statements	118
Enumerating Arrays and Collections	121
Dealing with Namespaces	123
Summary	124
■ Chapter 6: Essential Tools for MVC	125
Creating the Example Project	126
Creating the Model Classes	126
Adding the Controller	127
Adding the View	128
Using Ninject	129
Understanding the Problem	129
Adding Ninject to the Visual Studio Project	130
Getting Started with Ninject	131
Setting up MVC Dependency Injection	133
Creating Chains of Dependency	136
Specifying Property and Constructor Parameter Values	138
Using Conditional Binding	140
Unit Testing with Visual Studio	141
Creating the Unit Test Project	142
Creating the Unit Tests	143
Running the Unit Tests (and Failing)	147
Implementing the Feature	148
Testing and Fixing the Code	148
Using Moq	150
Understanding the Problem	150
Adding Moq to the Visual Studio Project	152
Adding a Mock Object to a Unit Test	153
Creating a More Complex Mock Object	156
Summary	159
■ Chapter 7: SportsStore—A Real Application	161
Getting Started	162
Creating the Visual Studio Solution and Projects	162

Adding References.....	164
Setting Up the DI Container	165
Starting the Application	167
Starting the Domain Model.....	168
Creating an Abstract Repository	169
Making a Mock Repository	169
Displaying a List of Products.....	170
Adding a Controller	170
Adding the View	172
Setting the Default Route.....	173
Running the Application.....	174
Preparing a Database.....	175
Creating the Database	175
Defining the Database Schema	177
Adding Data to the Database.....	179
Creating the Entity Framework Context.....	179
Creating the Product Repository.....	181
Adding Pagination	183
Displaying Page Links.....	185
Improving the URLs.....	193
Styling the Content	194
Defining Common Content in the Layout	195
Adding CSS Styles	196
Creating a Partial View	197
Summary	199
■ Chapter 8: SportsStore: Navigation.....	201
Adding Navigation Controls.....	201
Filtering the Product List.....	201
Refining the URL Scheme	205
Building a Category Navigation Menu.....	207
Correcting the Page Count.....	216
Building the Shopping Cart.....	219
Defining the Cart Entity	219
Adding the Add to Cart Buttons	223
Implementing the Cart Controller.....	224

Displaying the Contents of the Cart	226
Summary	230
■ Chapter 9: SportsStore: Completing the Cart	231
Using Model Binding	231
Creating a Custom Model Binder	231
Completing the Cart	236
Removing Items from the Cart	236
Adding the Cart Summary	237
Submitting Orders	240
Extending the Domain Model	240
Adding the Checkout Process	241
Implementing the Order Processor	244
Registering the Implementation	247
Completing the Cart Controller	248
Displaying Validation Errors	252
Displaying a Summary Page	253
Summary	254
■ Chapter 10: SportsStore: Administration	255
Adding Catalog Management	255
Creating a CRUD Controller	255
Creating a New Layout	258
Implementing the List View	260
Editing Products	263
Creating New Products	277
Deleting Products	279
Summary	281
■ Chapter 11: SportsStore: Security & Finishing Touches	283
Securing the Administration Controller	283
Applying Authorization with Filters	284
Creating the Authentication Provider	286
Creating the Account Controller	288
Creating the View	289
Image Uploads	292
Extending the Database	293

Enhancing the Domain Model	294
Creating the Upload User Interface Elements	295
Saving Images to the Database	296
Implementing the GetImage Action Method	297
Displaying Product Images	299
Summary	300
■ Part 2: ASP.NET MVC 4 in Detail	301
■ Chapter 12: Overview of MVC Projects	303
Working with Visual Studio MVC Projects	303
Understanding MVC Conventions	308
Debugging MVC Applications	310
Creating the Project	310
Launching the Visual Studio Debugger	312
Causing the Visual Studio Debugger to Break	314
Using Edit and Continue	319
Summary	322
■ Chapter 13: URL Routing	323
Creating the Example Project	323
Introducing URL Patterns	326
Creating and Registering a Simple Route	327
Using the Simple Route	330
Defining Default Values	333
Using Static URL Segments	336
Defining Custom Segment Variables	340
Using Custom Variables as Action Method Parameters	343
Defining Optional URL Segments	344
Defining Variable-Length Routes	347
Prioritizing Controllers by Namespaces	349
Constraining Routes	353
Constraining a Route Using a Regular Expression	353
Constraining a Route to a Set of Specific Values	353
Constraining a Route Using HTTP Methods	354
Defining a Custom Constraint	355
Routing Requests for Disk Files	357

Configuring the Application Server	358
Defining Routes for Disk Files.....	360
Bypassing the Routing System.....	361
Summary	362
■ Chapter 14: Advanced Routing Features	363
Preparing the Example Project.....	363
Generating Outgoing URLs in Views	364
Using the Routing System to Generate an Outgoing URL	364
Targeting Other Controllers	368
Passing Extra Values.....	369
Specifying HTML Attributes	371
Generating Fully Qualified URLs in Links	371
Generating URLs (and Not Links)	372
Generating Outgoing URLs in Action Methods	373
Generating a URL from a Specific Route.....	374
Customizing the Routing System	375
Creating a Custom RouteBase Implementation	375
Creating a Custom Route Handler.....	379
Working with Areas.....	381
Creating an Area	381
Populating an Area.....	383
Resolving the Ambiguous Controller Issue	385
Generating Links to Actions in Areas	387
URL Schema Best Practices	388
Make Your URLs Clean and Human-Friendly	388
GET and POST: Pick the Right One.....	389
Summary	389
■ Chapter 15: Controllers and Actions	391
Introducing the Controller	391
Preparing the Example Project	391
Creating a Controller with IController	391
Creating a Controller by Deriving from the Controller Class	393
Receiving Input.....	394
Getting Data from Context Objects	395
Using Action Method Parameters	396

Producing Output.....	398
Understanding Action Results.....	399
Returning HTML by Rendering a View	403
Passing Data from an Action Method to a View.....	407
Performing Redirections.....	411
Returning Errors and HTTP Codes.....	415
Summary	417
■ Chapter 16: Filters.....	419
Using Filters	419
Introducing the Four Basic Types of Filters	421
Applying Filters to Controllers and Action Methods.....	421
Creating the Example Project.....	422
Using Authorization Filters.....	423
Applying the Custom Authorization Filter	425
Using the Built-In Authorization Filter	426
Using Exception Filters.....	427
Creating an Exception Filter.....	427
Applying the Exception Filter	429
Using a View to Respond to an Exception.....	431
Using the Built-In Exception Filter	434
Using Action Filters	437
Implementing the OnActionExecuting Method.....	437
Implementing the OnActionExecuted Method.....	439
Using Result Filters	441
Using the Built-In Action and Result Filter Class	442
Using Other Filter Features.....	444
Filtering Without Attributes.....	444
Using Global Filters	446
Ordering Filter Execution	447
Using the Built-in Filters.....	449
Using the RequireHttps Filter	450
Using the OutputCache Filter	450
Summary	454
■ Chapter 17: Controller Extensibility	455

Creating the Example Project	455
Creating a Custom Controller Factory	457
Dealing with the Fallback Controller	459
Instantiating Controller Classes	460
Implementing the Other Interface Methods	460
Registering a Custom Controller Factory	460
Working with the Built-In Controller Factory	461
Prioritizing Namespaces	462
Customizing DefaultControllerFactory Controller Instantiation	463
Creating a Custom Action Invoker	466
Using the Built-In Action Invoker	468
Using a Custom Action Name	468
Using Action Method Selection	470
Improving Performance with Specialized Controllers	476
Using Sessionless Controllers	476
Using Asynchronous Controllers	478
Summary	483
■ Chapter 18: Views	485
Creating a Custom View Engine	485
Creating the Example Project	487
Creating a Custom IView	488
Creating an IViewEngine Implementation	489
Registering a Custom View Engine	490
Testing the View Engine	490
Working with the Razor Engine	492
Creating the Example Project	493
Understanding Razor View Rendering	493
Configuring the View Search Locations	495
Adding Dynamic Content to a Razor View	498
Using Sections	498
Using Partial Views	504
Using Child Actions	508
Summary	510
■ Chapter 19: Helper Methods	511

Creating the Example Project	511
Creating Custom Helper Methods	513
Creating an Inline Helper Method	513
Creating an External Helper Method	515
Managing String Encoding in a Helper Method	518
Using the Built-In Form Helper Methods	523
Creating Form Elements	523
Specifying the Route Used by a Form	530
Using Input Helpers.....	532
Creating Select Elements.....	537
Summary	539
Chapter 20: Templated Helper Methods	541
Reviewing the Example Project	541
Using Templated Helper Methods	543
Generating Label and Display Elements	547
Using Whole-Model Template Helpers.....	550
Using Model Metadata	552
Using Metadata to Control Editing and Visibility	553
Using Metadata for Labels	555
Using Metadata for Data Values	557
Using Metadata to Select a Display Template	559
Applying Metadata to a Buddy Class	561
Working with Complex Type Properties.....	562
Customizing the Templated View Helper System	564
Creating a Custom Editor Template	564
Creating a Generic Template	565
Replacing the Built-in Templates.....	566
Summary	567
Chapter 21: URL and Ajax Helper Methods	569
Reviewing and Preparing the Example Project	569
Creating Basic Links and URLs	571
Using MVC Unobtrusive Ajax	573
Creating the Synchronous Form View.....	574
Preparing the Project for Unobtrusive Ajax.....	575



Creating an Unobtrusive Ajax Form.....	577
Preparing the Controller.....	577
Creating the Ajax Form.....	578
Understanding How Unobtrusive Ajax Works.....	580
Setting Ajax Options.....	581
Ensuring Graceful Degradation.....	581
Providing the User with Feedback While Making an Ajax Request.....	583
Prompting the User Before Making a Request.....	584
Creating Ajax Links.....	585
Ensuring Graceful Degradation for Links.....	587
Working with Ajax Callbacks.....	587
Working with JSON.....	590
Adding JSON Support to the Controller.....	590
Processing JSON in the Browser.....	591
Preparing Data for Encoding.....	593
Detecting Ajax Requests in the Action Method.....	595
Summary.....	598
Chapter 22: Model Binding.....	599
Preparing the Example Project.....	599
Understanding Model Binding.....	601
Using the Default Model Binder.....	603
Binding to Simple Types.....	603
Binding to Complex Types.....	607
Binding to Arrays and Collections.....	614
Manually Invoking Model Binding.....	619
Dealing with Binding Errors.....	621
Customizing the Model Binding System.....	621
Creating a Custom Value Provider.....	622
Creating a Custom Model Binder.....	625
Registering the Custom Model Binder.....	627
Summary.....	628
Chapter 23: Model Validation.....	629
Creating the Example Project.....	629
Explicitly Validating a Model.....	631

Displaying Validation Errors to the User	633
Displaying Validation Messages.....	634
Displaying Property-Level Validation Messages	638
Using Alternative Validation Techniques.....	639
Performing Validation in the Model Binder	639
Specifying Validation Rules Using Metadata	641
Defining Self-Validating Models	647
Performing Client-Side Validation	649
Enabling and Disabling Client-Side Validation	649
Using Client-Side Validation	650
Understanding How Client-Side Validation Works	652
Performing Remote Validation	653
Summary	656
■ Chapter 24: Bundles and Display Modes.....	657
Understanding the Default Script Libraries	657
Preparing the Example Application	659
Managing Scripts and Style Sheets.....	662
Profiling Script and Style Sheet Loading	662
Using Script and Style Bundles	664
Applying Bundles	667
Using the Scripts Section.....	669
Profiling the Changes.....	670
Targeting Mobile Devices	673
Taking Stock of the Application	673
Using Mobile Specific Layouts and Views	674
Creating Custom Display Modes.....	676
Summary	678
■ Chapter 25: Web API.....	679
Understanding the Web API.....	679
Creating the Web API Application.....	680
Creating the Model and Repository.....	680
Creating the Home Controller	682
Creating the View and the CSS	683
Creating the API Controller.....	685

Testing the API Controller	687
Understanding How the API Controller Works.....	689
Understanding API Controller Action Selection	689
Mapping HTTP Methods to Action Methods	690
Writing the JavaScript Code to Use the Web API.....	691
Creating the Basic Functionality	692
Adding Support for Editing New Reservations	694
Adding Support for Deleting Reservations	696
Adding Support for Creating Reservations	697
Summary	698
■ Chapter 26: Deployment.....	699
Preparing an Application for Deployment	700
Detecting View Errors	700
Disabling Debug Mode	702
Removing Unused Connection Strings	703
Preparing Windows Azure	704
Creating the Web Site and Database	705
Preparing the Database for Remote Administration	707
Creating the Schema	708
Deploying the Application	710
Summary	716
■ Index.....	717