

# CONTENTS

<b>FOREWORD</b>	<b>xxiii</b>
<b>INTRODUCTION</b>	<b>xxv</b>
<b>CHAPTER 1: GETTING STARTED</b>	<b>1</b>
<b>A Quick Introduction to ASP.NET MVC</b>	<b>1</b>
How ASP.NET MVC Fits in with ASP.NET	2
The MVC Pattern	2
MVC as Applied to Web Frameworks	3
The Road to MVC 3	3
ASP.NET MVC 1 Overview	4
ASP.NET MVC 2 Overview	4
ASP.NET MVC 3 Overview	5
Razor View Engine	5
Validation Improvements	8
.NET 4 Data Annotation Support	8
Streamlined Validation with Improved Model Validation	8
Rich JavaScript Support	9
Unobtrusive JavaScript	9
jQuery Validation	9
JSON Binding	9
Advanced Features	10
Dependency Resolution	10
Global Action Filters	10
MVC 3 Feature Summary: Easier at All Levels	10
<b>Creating an MVC 3 Application</b>	<b>11</b>
Software Requirements for ASP.NET MVC 3	11
Installing ASP.NET MVC 3	11
Installing the MVC 3 Development Components	11
Installing MVC 3 on a Server	12
Creating an ASP.NET MVC 3 Application	12
The New ASP.NET MVC 3 Dialog	14
Application Templates	15
View Engines	15
Testing	15
<b>Understanding the MVC Application Structure</b>	<b>18</b>
ASP.NET MVC and Conventions	21

---

Convention over Configuration	21
Conventions Simplify Communication	22
<b>Summary</b>	<b>22</b>
<b>CHAPTER 2: CONTROLLERS</b>	<b>23</b>
<hr/>	
<b>The Controller's Role</b>	<b>23</b>
<b>A Brief History of Controllers</b>	<b>24</b>
<b>A Sample Application: The MVC Music Store</b>	<b>25</b>
<b>Controller Basics</b>	<b>29</b>
A Simple Example: The Home Controller	29
Writing Your First (Outrageously Simple) Controller	32
Creating the New Controller	32
Writing Your Action Methods	33
A Few Quick Observations	35
Parameters in Controller Actions	35
<b>Summary</b>	<b>37</b>
<b>CHAPTER 3: VIEWS</b>	<b>39</b>
<hr/>	
<b>What a View Does</b>	<b>40</b>
<b>Specifying a View</b>	<b>42</b>
<b>Strongly Typed Views</b>	<b>43</b>
<b>View Models</b>	<b>45</b>
<b>Adding a View</b>	<b>46</b>
Understanding the Add View Dialog Options	46
Customizing the T4 View Templates	49
<b>Razor View Engine</b>	<b>50</b>
What is Razor?	50
Code Expressions	52
Html Encoding	53
Code Blocks	54
Razor Syntax Samples	55
Implicit Code Expression	55
Explicit Code Expression	56
Unencoded Code Expression	56
Code Block	56
Combining Text and Markup	56
Mixing Code and Plain Text	57
Escaping the Code Delimiter	57
Server Side Comment	58
Calling a Generic Method	58
Layouts	58

---

ViewStart	60
<b>Specifying a Partial View</b>	<b>60</b>
<b>The View Engine</b>	<b>61</b>
Configuring a View Engine	62
Finding a View	63
The View Itself	64
Alternative View Engines	65
<b>New View Engine or New ActionResult?</b>	<b>67</b>
<b>Summary</b>	<b>67</b>
<b>CHAPTER 4: MODELS</b>	<b>69</b>
<hr/>	
<b>Modeling the Music Store</b>	<b>70</b>
<b>Scaffolding a Store Manager</b>	<b>72</b>
What Is Scaffolding?	72
Empty Controller	73
Controller with Empty Read/Write Actions	73
Controller with Read/Write Actions and Views, Using Entity Framework	73
Scaffolding and the Entity Framework	74
Code First Conventions	74
The DbContext	75
Executing the Scaffolding Template	75
The Data Context	76
The StoreManagerController	76
The Views	78
Executing the Scaffolded Code	79
Creating Databases with the Entity Framework	79
Using Database Initializers	80
Seeding a Database	81
<b>Editing an Album</b>	<b>83</b>
Building a Resource to Edit an Album	83
Models and View Models Redux	85
The Edit View	85
Responding to the Edit POST Request	86
The Edit Happy Path ☺	87
The Edit Sad Path ☹	87
<b>Model Binding</b>	<b>88</b>
The DefaultModelBinder	88
A Word on Model Binding Security	89
Explicit Model Binding	89
<b>Summary</b>	<b>91</b>

---

<b>CHAPTER 5: FORMS AND HTML HELPERS</b>	<b>93</b>
<b>Using Forms</b>	<b>93</b>
The Action and the Method	94
To GET or To POST	94
Searching for Music with a Search Form	95
Searching for Music by Calculating the Action Attribute Value	97
<b>HTML Helpers</b>	<b>98</b>
Automatic Encoding	99
Make Helpers Do Your Bidding	99
Inside HTML Helpers	100
Setting Up the Album Edit Form	101
Html.BeginForm	101
Html.ValidationSummary	101
Adding Inputs	102
Html.TextBox (and Html.TextArea)	103
Html.Label	103
Html.DropDownList (and Html.ListBox)	104
Html.ValidationMessage	105
Helpers, Models, and View Data	106
Strongly-Typed Helpers	108
Helpers and Model Metadata	109
Templated Helpers	109
Helpers and ModelState	110
<b>Other Input Helpers</b>	<b>110</b>
Html.Hidden	110
Html.Password	111
Html.RadioButton	111
Html.CheckBox	112
<b>Rendering Helpers</b>	<b>112</b>
Html.ActionLink and Html.RouteLink	112
URL Helpers	113
Html.Partial and Html.RenderPartial	114
Html.Action and Html.RenderAction	115
Passing Values to RenderAction	116
Cooperating with the ActionName Attribute	116
<b>Summary</b>	<b>116</b>
<b>CHAPTER 6: DATA ANNOTATIONS AND VALIDATION</b>	<b>117</b>
<b>Annotating Orders for Validation</b>	<b>118</b>
Using Validation Annotations	119

Required	119
StringLength	120
RegularExpression	121
Range	121
Validation Attributes from System.Web.Mvc	121
Custom Error Messages and Localization	122
Looking Behind the Annotation Curtain	123
Validation and Model Binding	124
Validation and Model State	124
Controller Actions and Validation Errors	125
<b>Custom Validation Logic</b>	<b>126</b>
Custom Annotations	126
IValidatableObject	130
<b>Display and Edit Annotations</b>	<b>131</b>
Display	131
ScaffoldColumn	132
DisplayFormat	132
ReadOnly	133
DataType	133
UIHint	133
HiddenInput	133
<b>Summary</b>	<b>134</b>
<b>CHAPTER 7: SECURING YOUR APPLICATION</b>	<b>135</b>
<b>Using the Authorize Attribute to Require Login</b>	<b>137</b>
Securing Controller Actions	138
How the AuthorizeAttribute Works with Forms Authentication and the AccountController	143
Windows Authentication in the Intranet Application Template	144
Securing Entire Controllers	145
<b>Using the Authorize Attribute to Require Role Membership</b>	<b>145</b>
<b>Extending Roles and Membership</b>	<b>146</b>
<b>Understanding the Security Vectors in a Web Application</b>	<b>147</b>
Threat: Cross-Site Scripting (XSS)	147
Threat Summary	147
Passive Injection	147
Active Injection	150
Preventing XSS	151
Threat: Cross-Site Request Forgery	157
Threat Summary	157

Preventing CSRF Attacks	160
Threat: Cookie Stealing	161
Threat Summary	162
Preventing Cookie Theft with HttpOnly	163
Threat: Over-Posting	163
Threat Summary	163
Preventing Over-Posting with the Bind Attribute	164
Threat: Open Redirection	165
Threat Summary	165
Protecting Your ASP.NET MVC 1 and MVC 2 Applications	170
Taking Additional Actions When an Open Redirect Attempt Is Detected	172
Open Redirection Summary	174
<b>Proper Error Reporting and the Stack Trace</b>	<b>174</b>
Using Configuration Transforms	174
Using Retail Deployment Configuration in Production	175
Using a Dedicated Error Logging System	176
<b>Security Recap and Helpful Resources</b>	<b>176</b>
<b>Summary: It's Up to You</b>	<b>177</b>
<b>CHAPTER 8: AJAX</b>	<b>179</b>
<b>jQuery</b>	<b>180</b>
jQuery Features	180
The jQuery Function	180
jQuery Selectors	182
jQuery Events	182
jQuery and AJAX	183
Unobtrusive JavaScript	183
Using jQuery	184
Custom Scripts	185
Placing Scripts in Sections	186
And Now for the Rest of the Scripts	186
<b>AJAX Helpers</b>	<b>187</b>
AJAX ActionLinks	187
HTML 5 Attributes	189
AJAX Forms	190
<b>Client Validation</b>	<b>192</b>
jQuery Validation	192
Custom Validation	194
IClientValidatable	195
Custom Validation Script Code	196

---

<b>Beyond Helpers</b>	<b>198</b>
jQuery UI	198
Autocomplete with jQuery UI	200
Adding the Behavior	200
Building the Data Source	201
JSON and jQuery Templates	203
Adding Templates	204
Modifying the Search Form	204
Get JSON!	206
jQuery.ajax for Maximum Flexibility	207
<b>Improving AJAX Performance</b>	<b>208</b>
Using Content Delivery Networks	208
Script Optimizations	208
<b>Summary</b>	<b>209</b>
<b>CHAPTER 9: ROUTING</b>	<b>211</b>
<b>Understanding URLs</b>	<b>212</b>
<b>Introduction to Routing</b>	<b>213</b>
Comparing Routing to URL Rewriting	213
Defining Routes	213
Route URLs	214
Route Values	215
Route Defaults	217
Route Constraints	220
Named Routes	221
MVC Areas	223
Area Route Registration	223
Area Route Conflicts	224
Catch-All Parameter	225
Multiple URL Parameters in a Segment	225
StopRoutingHandler and IgnoreRoute	226
Debugging Routes	227
Under the Hood: How Routes Generate URLs	228
High-Level View of URL Generation	229
Detailed Look at URL Generation	230
Ambient Route Values	232
Overflow Parameters	233
More Examples of URL Generation with the Route Class	234
<b>Under the Hood: How Routes Tie Your URL to an Action</b>	<b>235</b>
The High-Level Request Routing Pipeline	235

---

RouteData	235
<b>Custom Route Constraints</b>	<b>236</b>
<b>Using Routing with Web Forms</b>	<b>237</b>
<b>Summary</b>	<b>238</b>
<b>CHAPTER 10: NUGET</b>	<b>239</b>
<hr/>	
<b>Introduction to NuGet</b>	<b>239</b>
<b>Installing NuGet</b>	<b>240</b>
<b>Adding a Library as a Package</b>	<b>242</b>
Finding Packages	242
Installing a Package	244
Updating a Package	247
Recent Packages	248
Using the Package Manager Console	248
<b>Creating Packages</b>	<b>250</b>
Folder Structure	251
NuSpec File	251
Metadata	252
Dependencies	253
Specifying Files to Include	254
Tools	255
Framework and Profile Targeting	258
<b>Publishing Packages</b>	<b>260</b>
Publishing to NuGet.org	260
Publishing Using NuGet.exe	263
Using the Package Explorer	264
Hosting A Private NuGet Feed	266
<b>Summary</b>	<b>270</b>
<b>CHAPTER 11: DEPENDENCY INJECTION</b>	<b>271</b>
<hr/>	
<b>Understanding Software Design Patterns</b>	<b>271</b>
Design Pattern: Inversion of Control	272
Design Pattern: Service Locator	274
Strongly-Typed Service Locator	274
Weakly-Typed Service Locator	275
The Pros and Cons of Service Locators	278
Design Pattern: Dependency Injection	278
Constructor Injection	278
Property Injection	279

---

Dependency Injection Containers	280
<b>Using the Dependency Resolver</b>	<b>281</b>
Singly-Registered Services	283
Multiply-Registered Services	284
Creating Arbitrary Objects	287
Creating Controllers	288
Creating Views	289
<b>Summary</b>	<b>290</b>
<b>CHAPTER 12: UNIT TESTING</b>	<b>291</b>
<hr/>	
<b>The Meaning of Unit Testing and Test-Driven Development</b>	<b>292</b>
Defining Unit Testing	292
Testing Small Pieces of Code	292
Testing in Isolation	292
Testing Only Public Endpoints	293
Automated Results	293
Unit Testing as a Quality Activity	293
Defining Test-Driven-Development	294
The Red/Green Cycle	294
Refactoring	295
Structuring Tests with Arrange, Act, Assert	295
The Single Assertion Rule	296
<b>Creating a Unit Test Project</b>	<b>296</b>
Examining the Default Unit Tests	297
Only Test the Code You Write	300
<b>Tips and Tricks for Unit Testing Your ASP.NET MVC Application</b>	<b>301</b>
Testing Controllers	301
Keep Business Logic out of Your Controllers	302
Pass Service Dependencies via Constructor	302
Favor Action Results over HttpContext Manipulation	303
Favor Action Parameters over UpdateModel	305
Utilize Action Filters for Orthogonal Activities	306
Testing Routes	306
Testing Calls to IgnoreRoute	307
Testing Calls to MapRoute	308
Testing Unmatched Routes	309
Testing Validators	309
<b>Summary</b>	<b>313</b>

---

<b>CHAPTER 13: EXTENDING MVC</b>	<b>315</b>
<b>Extending Models</b>	<b>316</b>
Turning Request Data into Models	316
Exposing Request Data with Value Providers	316
Creating Models with Model Binders	317
Describing Models with Metadata	322
Validating Models	324
<b>Extending Views</b>	<b>328</b>
Customizing View Engines	328
Writing HTML Helpers	330
Writing Razor Helpers	331
<b>Extending Controllers</b>	<b>332</b>
Selecting Actions	332
Choosing Action Names with Name Selectors	332
Filtering Actions with Method Selectors	332
Action Filters	333
Authorization Filters	334
Action and Result Filters	334
Exception Filters	335
Providing Custom Results	335
<b>Summary</b>	<b>337</b>
<b>CHAPTER 14: ADVANCED TOPICS</b>	<b>339</b>
<b>Advanced Razor</b>	<b>339</b>
Templated Razor Delegates	339
View Compilation	341
<b>Advanced Scaffolding</b>	<b>342</b>
Customizing T4 Code Templates	343
The MvcScaffolding NuGet Package	343
Updated Add Controller Dialog Options	344
Using the Repository Template	344
Adding Scaffolders	347
Additional Resources	347
<b>Advanced Routing</b>	<b>347</b>
RouteMagic	347
Editable Routes	348
<b>Templates</b>	<b>353</b>
The Default Templates	353
MVC Futures and Template Definitions	354

---

Template Selection	356
Custom Templates	357
<b>Advanced Controllers</b>	<b>359</b>
Defining the Controller: The IController Interface	359
The ControllerBase Abstract Base Class	361
The Controller Class and Actions	361
Action Methods	363
The ActionResult	367
Action Result Helper Methods	368
Action Result Types	369
Implicit Action Results	373
Action Invoker	375
How an Action Is Mapped to a Method	375
Invoking Actions	378
Using Asynchronous Controller Actions	379
Choosing Synchronous versus Asynchronous Pipelines	380
Writing Asynchronous Action Methods	381
The MVC Pattern for Asynchronous Actions	382
Performing Multiple Parallel Operations	382
Using Filters with Asynchronous Controller Actions	384
Timeouts	384
Additional Considerations for Asynchronous Methods	385
<b>Summary</b>	<b>387</b>
<b>INDEX</b>	<b>389</b>