## **Contents**

In	trodu	ction		17
	Wel	come .		. 17
		Getting	g the Source-code	. 18
		Windo	ows, Linux or Mac	. 18
		Typog	graphical Conventions	. 19
		Keepin	ng Up To Date	. 19
	Ack	nowledg	gements	. 20
1	Gett	ting Sta	rted With The Tools	21
	1.1	Seleniu	um IDE	. 21
	1.2	Java .		. 22
	1.3	Eclipse	e	. 22
	1.4	Seleniu	um RC	. 23
	1.5	Summa	ary	. 23
2	Sele	nium II	DE Basics	25
	2.1	How T	To Download and Install Firefox	. 25
	2.2	How T	To Install The Selenium IDE	. 26
	2.3	Captur	re Playback - Recording a Script With Selenium IDE	. 28
		2.3.1	Command, Target and Value	. 29
		2.3.2	Save The Test	. 29
		2.3.3	Further reading	. 30
3	How	v To Ins	stall Java	33
	3.1	Is Java	a already installed?	. 33
	3.2	Install	Java	. 33
4	Inst	all and 1	run Selenium RC	35
	4.1	How T	To Download and Install Selenium RC	. 35
		4.1.1	What to Download?	. 35
		4.1.2	Download from Selenium HQ	. 36
		4.1.3	Downloading Selenium 2	. 36

		4.1.4	Downloading Selenium 1.0.3	37
		4.1.5	Downloading Selenium 0.9.2	38
		4.1.6	Downloading Troubleshooting	39
	4.2	Overvi	ew of the Contents of the Selenium Archive	39
		4.2.1	Archive Contents for 2.0	39
		4.2.2	Archive Contents for 1.0.3 and 0.9.2	40
	4.3	How to	o Work With Windows Command Line	41
		4.3.1	Give Your Command Window a Title	41
		4.3.2	An Alternative Command Line Tool	42
	4.4	How to	Open Command Windows At A Specific Folder	42
		4.4.1	On Windows 7 and Vista	42
		4.4.2	On Windows XP	42
	4.5	How to	o start Selenium Server From Command Line	43
		4.5.1	Generic Instructions	43
		4.5.2	Selenium 2.0	44
		4.5.3	Selenium 1.0.3	45
	4.6	How to	Stop the Selenium Server	45
		4.6.1	From the command line	45
		4.6.2	From a browser URL	45
	4.7	How to	Run IDE Tests In Different Browsers	46
		4.7.1	End Notes	50
5	The	Eclipse	IDE	51
	5.1	How to	o Install and Run The Eclipse IDE	51
		5.1.1	Install Eclipse	51
		5.1.2	Run Eclipse	52
	5.2	How to	Create a New Java project	52
6	Crea	ate a JU	Init Test Using Selenium IDE	55
	6.1		lew of Exporting Section	55
	6.2		an IDE script as a JUnit test	55
		6.2.1	Load an existing script into the IDE	55
		6.2.2	Formatting and Exporting using the IDE	

		6.2.3	Create a New Class in Eclipse	57
		6.2.4	Copy and Paste the code generated by Selenium IDE into Eclipse	59
		6.2.5	Resolve Import Errors	62
		6.2.6	Add JUnit to the build path if necessary	64
		6.2.7	Fix the Warning Messages	65
	6.3	Run th	ne JUnit test	67
		6.3.1	Allow it through the Firewall	67
		6.3.2	Seeing the test running	68
		6.3.3	Check the results	69
	6.4	It went	t too quickly!	70
		6.4.1	Run the test in debug mode	71
	6.5	Create	and Import some more IDE Converted tests	74
	6.6	Exerci	ses	76
7	The	Annota	ated Generated Test	77
	7.1	Use At	ttach Source to see the Selenium Driver Source Code	77
	7.2	Why s	hould we do this?	79
	7.3	How to	o find line numbers in Eclipse?	79
	7.4	MyFir	stSeleniumTests.java Annotated	80
	7.5	A little	e about JUnit	86
8	Let'	s get co	ding	87
	8.1	A brie	f pause, because you have already learned some Java	87
	8.2	What v	we will now learn	87
		8.2.1	Create a New Test From Scratch	88
		8.2.2	@Test Annotation Turns Methods Into Tests	88
		8.2.3	Back to Our Selenium Test	90
		8.2.4	Making Something Happen	92
		8.2.5	Your Final Test Code	93
		8.2.6	The DefaultSelenium constructor explained	94
	8.3	Retros	pectives	95
		8.3.1	Well Done	95
	8.4	Why d	lid you do that?	96

		8.4.1	Run Selenium RC in a DOS window?	96
		8.4.2	Stop and Restart Selenium Easily	97
	8.5	Final N	Notes	97
	8.6	Back to	Eclipse	98
		8.6.1	Removing the Source Code Association	98
9	Wha	t if it al	l goes wrong?	99
	9.1	Check	that Selenium Server is running	99
	9.2	Close a	nny Selenium RC windows	100
	9.3	Stop an	nd restart the Selenium RC server	100
	9.4	Remov	e any Java threads from the Debug perspective	101
	9.5	Close a	any blocked browser windows	102
	9.6	Firefox	Update Dialog	102
		9.6.1	Summary	102
10	Esse	ntial Fi	refox Add-Ons	105
	10.1	Firebug	9	105
		10.1.1	What is Firebug?	105
		10.1.2	Install Firebug	106
		10.1.3	Basic Firebug Usage	106
	10.2	FirePat	h For Firebug	108
		10.2.1	What is FirePath?	108
		10.2.2	Install FirePath	108
		10.2.3	Basic Usage of FirePath	109
		10.2.4	Optimise XPath with FirePath	110
11	Test	Automa	ation Thinking 101	113
	11.1	Let's A	Automate Search	113
	11.2	Start w	riting some tests	114
		11.2.1	Make Selenium Type In Some Text	114
		11.2.2	Fix the duplicate method name	115
		11.2.3	Add a Selenium Command	115
		11 2 4	The "type" method	116

		11.2.5	Find the locator with Firebug	117
		11.2.6	A brief introduction to XPath	117
		11.2.7	Add the locator into the code	119
		11.2.8	Check that it works	119
		11.2.9	Now make it Click on the Search Button	120
		11.2.10	Selenium "Click" Method	121
		11.2.11	Locate the button with Firebug	121
		11.2.12	Create an XPath so that selenium can locate it	121
		11.2.13	Add the XPath details to our source code	121
		11.2.14	One last thing to do	122
		11.2.15	Now check that it works	122
		11.2.16	Quick Summary	122
	11.3	But is it	t a test if we don't check any results?	123
		11.3.1	But we can't control the data	124
	11.4	-	ance Criteria: Selenium Remote Control homepage listed in re- results	125
		11.4.1	Look for text in the page	125
		11.4.2	Scan the page source code	129
		11.4.3	Look for a specific URL in the page	131
		11.4.4	Most Robust Method	135
	11.5	Accepta	ance Criteria: Page title has "Selenium-RC" in it	135
	11.6	Accepta	ance Criteria: Search box on the page has Selenium-RC in it	136
	11.7	One tes	t to rule them all	137
	11.8	Summa	ry	138
12	First	Steps w	vith Automation Refactored	139
	12.1	Introdu	cing Refactoring	139
	12.2	Automa	atically refactoring the start up code into a new method	140
	12.3	Automa	atically refactor the tear down code into a new method	142
	12.4	JUnit @	Before and @After	143
		12.4.1	Refactoring Plan and Analysis	144
		12.4.2	$Remove\ parameter\ from\ stop Selenium And Close Browser\ .\ .\ .\ .\ .$	145
		12.4.3	Move setup code into a new method	145

		12.4.4 Remove the setup code from each @Test method	6
		12.4.5 Annotate stopSeleniumAndCloseBrowser with @After 14	<b>ļ</b> 7
		12.4.6 Remove the tear down code from each @Test method 14	<b>ļ</b> 7
		12.4.7 The Refactored Code	8
		12.4.8 @BeforeClass & @AfterClass	9
	12.5	Automatically create JUnit Test Structure	52
	12.6	Summary	j4
13	How	to upgrade Selenium 15	55
	13.1	First Download the New Version	5
	13.2	Configure Eclipse Project	5
	13.3	Remember to re-attach the source	6
14	Basic	e HTML Theory 15	57
	14.1	Page Structure	57
	14.2	Elements & Tags	8
	14.3	Attributes	8
	14.4	Expanded	8
15	Basic	e XPath Theory 15	59
	15.1	XPath Expressions	59
	15.2	Node Types	0
	15.3	Selections	0
		15.3.1 Start from root	0
		15.3.2 Start from Anywhere	0
		15.3.3 By Element Attributes	51
	15.4	Predicates	51
		15.4.1 Predicates can be indexes	51
		15.4.2 Predicates can be attribute selections	51
		15.4.3 Predicates can be XPath functions	52
		15.4.4 Predicates can be comparative statements	52
	15.5	Combining Match Queries	52
	15.6	Wild Card Matches	52

		15.6.1	node()	162
		15.6.2	*	163
	15.7	XPath 1	Functions	163
		15.7.1	contains()	164
		15.7.2	starts-with()	164
		15.7.3	Many More	165
	15.8	Boolea	n Operators	165
		15.8.1	and	165
		15.8.2	or	165
	15.9	XPath	optimisation	166
		15.9.1	Use the ID	166
		15.9.2	Use the attributes	166
		15.9.3	Start at the first unique element	166
	15.10	)Seleniu	ım XPath Usage	167
16	Rasio	· CSS S	elector Theory	169
			th for Firebug	
			elector Expressions	
			ım and CSS	
			ons	
			Direct Descendents and Absolute Paths	
			Sub Elements and Relative Paths	
	16.5		te and Index matching	
		16.5.1	Attribute Matching	171
		16.5.2	Special attribute selectors	172
		16.5.3	Indexed Matching	172
	16.6	Advano	ced	174
		16.6.1	Combining Matches	174
			Wild Card Matches	
		16.6.3	Attribute Substring matching	175
			Boolean Operators	
			Sibling Combinators	
	16.7		Links	

17	Lear	ning Tł	ne Selenium API	179
	17.1	Tips fo	r Learning	179
18	Testi	ng HTI	ML Forms	181
	18.1	An HT	ML Form	182
	18.2	Submit	a Form with Default Values	183
		18.2.1	Commands Used	185
		18.2.2	Submit Form without clicking button	186
	18.3	Amend	l a Text, Password, TextArea or File Field	186
		18.3.1	Text Fields	186
		18.3.2	type vs typekeys	187
		18.3.3	Password Fields	187
		18.3.4	TextArea Fields	187
		18.3.5	File Field	189
	18.4	Amend	ling Checkboxes and Radio Items	190
		18.4.1	Click	191
		18.4.2	Check	191
		18.4.3	Uncheck	192
	18.5	Amend	ling Multiple Select Values	193
	18.6	Amend	ling Dropdown Elements	195
	18.7	Amend	ling Hidden Field Values	196
	18.8	Checki	ng the Values of the Input Fields	197
		18.8.1	Text, Password, TextArea	197
		18.8.2	CheckBox & Radio Items	198
		18.8.3	Multiple Select & DropDown	199
19	Testi	ng Stat	ic HTML	205
	19.1	A Basi	c Static HTML Test	206
		19.1.1	getTitle - Check the page title	207
		19.1.2	getText - Check the username	209
		19.1.3	isTextPresent - check the heading	210
		19.1.4	isElementPresent - check comments and filename	211
		19.1.5	getXPathCount - count the checkboxes entered	212

		19.1.6 click - navigate to the form	213
		19.1.7 The rest of the test	213
		19.1.8 The full test and summary	214
	19.2	getAttribute	215
	19.3	assignId	216
	19.4	getBodyText and getHtmlSource	217
	19.5	goBack	218
	19.6	highlight	219
20	Hein	g JavaScript with Selenium	221
20		·	
		A Basic JavaScript Enabled Page	
		The Class	
		FireEvent, isAlertPresent, and getAlert	
		getEval	
		runScript	
	20.6	addScript and removeScript	226
21	Start	ting Selenium From Code	227
	21.1	Add Selenium Server to the project	227
		21.1.1 For Selenium 2.0.0 and above	227
		21.1.2 For Selenium 1.0.3 and below	227
	21.2	Start it in the code	228
	21.3	The Start Up routine explored	229
		21.3.1 BindException Handling	229
		21.3.2 Stop Existing Server	229
		21.3.3 Custom Remote Control Configurations	231
22	Dun	ning Tests Outside Eclipse	233
<i>44</i>		•	
		What is Ant?	
		What is Hudson?	
	773	What is Subversion?	234

23	Using Ant to Run Selenium Tests	235
	23.1 Prerequisite: Install Java JDK	235
	23.1.1 Install Java JDK	235
	23.1.2 Update the Environment Variables and Path For Java	236
	23.1.3 Check that Java works	237
	23.2 Install Ant	237
	23.2.1 Install Ant Automatically	238
	23.2.2 Install Ant Manually	238
	23.3 Check that Ant works	239
	23.4 Create a Lib Folder	240
	23.5 Amend Eclipse Project Properties	241
	23.6 Create an initial build.xml file	241
	23.7 Running the Ant file	249
	23.8 Add the Tests which require no server	250
	23.9 Refactor The Build File	251
	23.10Summary	255
	23.11 Additional Reading	256
24	Using Hudson to Run Ant	259
	24.1 Introducing Hudson	259
	24.2 Install Hudson	259
	24.3 Using Hudson without Version Control	261
	24.4 Configure the Hudson Project	264
	24.5 Scheduling the build automatically	267
25	Adding Subversion to the mix	269
26	Take Stock of Where we are	271
	26.1 Plan Of Action	272
27	Evolving A Selenium Manager Class	275

28	Crea	te Our First Page Objects	283
	28.1	Create a SearchPageTests class	283
	28.2	Add the SeleniumManager	284
	28.3	Convert startSeleniumAndSearchForSeleniumRC	285
	28.4	typeInASearchTermAndAssertThatHomePageTextIsPresent	290
	28.5	typeInASearchTermAndAssertThatHomePageURLExists	291
	28.6	typeInASearchTermAndCheckPageTitleHasSearchTermInIt	293
	28.7	typeInASearchTermAndCheckSearchInputHasSearchTermInIt	293
	28.8	After all that	294
		28.8.1 SearchPageTests.java	294
		28.8.2 SearchPage.java	295
	28.9	Final Notes	296
20	<b>N</b>	n oli (C. t)	205
29		<del> </del>	297 207
	29.1	The Tests	
		29.1.1 HTML_form_tests.java	
		29.1.2 Static_HTML_tests.java	306
		29.1.3 JavaScript_With_Selenium_Tests.java	312
	29.2	The Page Objects	315
		29.2.1 BasicHTMLForm.java	315
		29.2.2 HTMLFormResultsPage.java	319
		29.2.3 BasicAjaxPage.java	321
30	Dogo	e Object Models Summary	323
30	_	· ·	
		What is a Page Object Model?	
		Grow an abstraction layer	
		Refactor the Page Objects internally	
		Create Domain Level Abstractions	
	30.5	Lessons learned	325
	30.6	Related Study	326

31	Data	Driven Tests in JUnit	327
	31.1	Basic Data Driven Testing	327
	31.2	JUnit parameterized Class Runner And Constructor	328
	31.3	Data supplied by an @parameters annotated method	329
	31.4	A Data Driven Test	329
	31.5	Running a Data Driven Test	330
	31.6	The full code for the test	330
	31.7	Multiple Tests	331
	31.8	Reading Data From Tab Delimited Files	332
	31.9	General Hints	334
32	Scree	en Capture on Failure	335
33	Run	the tests on multiple browsers	341
	33.1	Browser Codes	341
	33.2	Property Files	343
	33.3	System Properties	345
34	Java	Script And Dynamic HTML Testing Redux	349
	34.1	Example Dynamic HTML Page	349
	34.2	First Model the behaviour in the test	350
	34.3	Code the check in the page object model	351
		34.3.1 First understand the page	351
	34.4	Summary	352
35	Cook	xie Handling	353
	35.1	Cookies in the example application	353
	35.2	How to see cookies on a web page?	353
		35.2.1 Firefox by Default	354
		35.2.2 Firecookie - Firebug Plugin	354
	35.3	Selenium Cookie Commands	356
	35.4	Example Code For Cookie Testing	357
		35.4.1 Basic Class	357

		35.4.2	Check Cookie Creation using deleteAllVisibleCookies and is- CookiePresent	358	
		35.4.3	Get Cookie values using getCookie and getCookieByName	359	
36	The	Future	of Selenium	365	
	36.1	If you	want to experiment with WebDriver	366	
37	Stru	cturing	the tests and code	369	
	37.1	Java pr	roject folder and package structures	370	
	37.2 Changing what goes into Version Control				
		37.2.1	Configuring Source-code Folders in Eclipse	372	
		37.2.2	Add libraries	373	
	37.3	Re-org	anise the Classes and Packages	373	
	37.4	Share t	the Server among tests and create a base test class	375	
		37.4.1	Share the Server using a Singleton	375	
		37.4.2	Create a Base Class	376	
	37.5	Get An	nt Working	379	
	37.6	Make s	sure all tests are valid tests	380	
		37.6.1	Create end to end tests where we assert after executing functionality	381	
		37.6.2	Have all tests pass on multiple browsers	381	
		37.6.3	Locators as constants or methods	382	
	37.7	Get Hu	idson Working	384	
	37.8	Speed	up the test execution with a suite	387	
	37.9	Runnin	ng Different Suites for Different Browsers	392	
		37.9.1	Nested Suites	392	
		37.9.2	Browser Specific Groups	393	
		37.9.3	Create a conditional Ant File	394	
	37.10Get WebDriver working				
	37.11 Ways of using what we have built				
	37.12Exercises For the reader:				
38	In C	losing		<b>39</b> 9	
	38.1	Additio	onal Reading	399	

A	Playing along at home					
	A.1	Prerequisites	403			
	A.2	Get The Code	403			
		A.2.1 From A Zip Archive	403			
		A.2.2 From the Subversion Repositories	404			
	A.3	Create a Project	404			
В	The	The SeleneseTestCase Class				
	B.1	What is SeleneseTestCase	405			
	B.2	Details	405			
	B.3	A look at SeleneseTestCase.java	405			
	B.4	Use the SeleneseTestCase Functionality	407			
		B.4.1 Using the IDE to add asserts and verifies	407			
		B.4.2 What is the difference between an Assert and a Verify?	409			
Inc	Index					
Ah	About the Author					