Learn by doing: less theory, more results

MooTools 1.2

Learn how to create dynamic, interactive, and responsive cross-browser web applications using this popular JavaScript framework

Beginner's Guide

Jacob Gube Garrick Cheung

PACKT PUBLISHING

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BIRMINGHAM - MUMBAI

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First published: December 2009

Production Reference: 1111209

Published by Packt Publishing Ltd.
32 Lincoln Road
Olton
Birmingham, B27 6PA, UK.

ISBN 978-1-847194-58-9

`www.packtpub.com`

Cover Image by Vinayak Chittar (`vinayak.chittar@gmail.com`)

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Preface

This book is geared towards web developers who have a basic understanding of JavaScript and the related technologies that are involved with it, namely HTML and CSS. If you're familiar with a programming or server-side scripting language, code authoring in MooTools will be very familiar.

The goal of this book is to give you a functional and pragmatic understanding of MooTools and is not intended for learning JavaScript, HTML, CSS, and concepts such as the DOM and unobtrusive JavaScript.

This is the first book specifically designed for absolute newcomers to MooTools. It is a Packt Beginner's Guide, which means it is packed with clear step-by-step instructions for performing the most useful tasks.

MooTools is an open source, lightweight, modular object-oriented programming JavaScript web application framework. The goal of the software is to provide a means for intermediate to advanced web developers to write cross-browser JavaScript in an elegant, flexible, and efficient fashion. The MooTools JavaScript framework includes built-in functions for manipulation of CSS, DOM elements, native JavaScript objects, AJAX requests, and more.

You will start learning by 'doing' immediately. As each chapter in the book progresses, the topics get more complex. First you get to grips with the fundamentals of MooTools including downloading, installation, and basic syntax. Once you've grasped the basics you learn to make the most of MooTools' powerful framework. You will learn to bring web pages to life with animation and create exciting web pages with AJAX. You will also learn to customize MooTools to suit your own needs by creating your own plug-ins. You will soon be well on the way to creating web applications and web pages worthy of the Web 2.0 world

What this book covers

Chapter 1, *MooTools and Me* shows how to download and install Mootools. It demonstrates how to troubleshoot the most common installation problems. Writing a simple MooTools code block to test that the installation has worked is also explained.

Chapter 2, *Writing JavaScript with MooTools* demonstrates the difference between normal JavaScript against MooTools code. It explains how MooTools code can be far simpler and more efficient than ordinary JavaScript to achieve the same task.

Chapter 3, *Selecting DOM Elements* gives an overview of the Document Object Model tree and an in-depth discussion of the $() function in the Element class. It showcases basic DOM relationships such as parents, children, and siblings. It also demonstrates how to select page links and then give them a certain color or style

Chapter 4, *The Core's Useful Utility Functions* introduces native JavaScript variable definitions. It goes through each function and demonstrates how it works.

Chapter 5, *Working with Events* explains different browser events such as mouse click, mouse hover, mouse moving and key press. It demonstrates how to build a super-charged web form in MooTools. Events are covered showing how to add event listeners to web page elements.

Chapter 6, *Bringing Web Pages to Life Using Animation* introduces the different animation options available in MooTools. It demonstrates how to create a featured area slider. It demonstrates the MooTools Fx class and its useful methods for working with MooTools effects.

Chapter 7, *Going 2.0 with Ajax* shows the basics of Ajax. It demonstrates how MooTools makes working with Ajax easy. It will explain how XML files can be used to simulate a relational database.

Chapter 8, *Beefing up MooTools Using the MooTools More Plugins* demonstrates how to install and use the plug in system. It will explain how the Accordion area can be used to display content in an engaging and compact manner using the Fx Accordian plugin. It will also cover creating user-friendly forms using the OverText plugin.

Chapter 9, *Creating Your Own Plugin* will show the benefits of creating your own plugin such as reusability and customization. It will explain the guidelines and standards that should be adhered to for creating a plugin. It will also demonstrate how to build a simple plugin.

What you need for this book

You will need a computer. It can be running any operating system of your preference. To be able to complete the exercises and examples in each chapter, you will need to have a text editor. Operating systems usually come with one, such as Notepad, on Microsoft Windows, or TextEdit, on Mac OS X. To view the results of the exercises and examples, you will need access to a web browser. The web browsers used in this book are free and can be found on the internet.

Below is a list of the web browsers used in this book:

- Mozilla FireFox
- Opera
- Apple Safari
- Google Chrome
- Internet Explorer

Who this book is for

This book is perfect for MooTools newcomers. You do not require any familiarity with MooTools whatsoever, only a willingness to learn. Basic knowledge of JavaScript syntax and concepts is the only requirement. This book will allow you to grasp the basics of MooTools so that you will be well on the way to creating exciting, customizable web pages and applications.

Conventions

In this book, you will find a number of styles of text that distinguish between different kinds of information. Here are some examples of these styles, and an explanation of their meaning.

Code words in text are shown as follows: "We build a function called `pageCustomizer` that will customize our page."

A block of code will be set as follows:

```
if(Browser.Engine.trident){
   alert('You\'re using Internet Explorer');
} else{
   alert('You\'re not using Internet Explorer');
}
```

When we wish to draw your attention to a particular part of a code block, the relevant lines or items will be shown in bold:

```
    if(userPlatform!='other' || userPlatform!='ipod' ) {
      $$('.download-options').destroy();
 }
```

New terms and **important words** are shown in bold. Words that you see on the screen, in menus or dialog boxes for example, appear in our text like this: "Click on the **#child** div ".

[Warnings or important notes appear in a box like this.]

[Tips and tricks appear like this.]

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1
MooTools and Me

In recent years, the Web has undergone a major evolution, an evolution towards highly-interactive, dynamic, responsive web pages and web applications. We're at a time where users expect (and often, demand) web interfaces that talk to them.

Gone are the days where only desktop software was associated with smooth and feature-packed user interfaces that performed complicated tasks. In fact, applications that we normally think of as traditionally being for the desktop (such as Word Processors, Image editors, and Spreadsheet software) are now moving to browser-based environments because of the many advantages of web-based applications (such as operating system/platform interdependency, interoperability with other systems, and collaborative possibilities).

JavaScript is the technology that's driving this evolution by giving web developers the capability to create complex, robust, interactive web page components and Rich Internet Applications (RIA) that respond effortlessly to user actions through a combination of techniques such as Ajax, on-the-fly DOM manipulation, and smooth, animated effects.

However, JavaScript isn't perfect (in fact, it's far from it), its syntax is sometimes unintuitive and repetitive, and often requires a great deal of code-authoring to perform complicated and cross-browser-compatible operations.

This is where MooTools steps in! By providing web developers with a set of useful and cross-browser-compatible functions, methods, and classes within an intuitive framework for writing client-side scripts, we can side-step a lot of frustration and time, typically associated with code-authoring in JavaScript:

In this chapter we shall:

- Learn about what MooTools is
- Discuss some advantages of using MooTools
- Learn how to download and install MooTools
- Learn about notable MooTools resources on the web

So let's get on with it!

What is MooTools?

MooTools (which stands for My Object-Oriented "JavaScript" Tools) is a lightweight, modular, object-oriented JavaScript framework. It greatly speeds up and enhances the development cycle of feature-rich Ajax/JavaScript web applications. Created by Valerio Proietti—who originally intended it to be an extension to the Prototype JavaScript framework—MooTools has since grown into an independent, open-source, and very robust JavaScript framework with a solid team of core developers and thousands of users who support, contribute, and rabidly evangelize the project.

MooTools, in essence, abstracts normal JavaScript code so that you can write more terse and elegant client-side scripts. It has a host of useful functions, methods, and classes that'll let you develop robust web components and web applications.

The developers of MooTools strongly believe in applying **Object-Oriented Programming** (**OOP**) principles to JavaScript, a structural programming language. Since everything in JavaScript is an object, MooTools provides a cleaner, easier, and more elegant way to manipulate the object to our will. MooTools also helps make the JavaScript code cross-browser compatible.

Why use MooTools?

I've already mentioned that JavaScript isn't perfect; it's a language that's unintuitive at times and doesn't have a lot of native functions and methods to deal with modern user demands.

For example, Ajax is all the rage these days; the concept of Ajax allows us to communicate with our server-side scripts asynchronously. We heftily rely on Ajax requests and responses to give users an uninterrupted experience as we update the **Document Object Model** (**DOM**) behind the scenes after he or she performs an action such as submitting a web form or adding an item to their shopping cart.

If all of that sounds complicated and seems like it would take an insurmountable heap of JavaScript code to write, then you're right.

If you believe that MooTools will save you a lot of time and will help you write more efficient and terse JavaScript, then you're two for two!

Let's look at the advantages of using MooTools.

The advantages of using MooTools

There are many benefits to be had from learning and using MooTools.

Writing terse and elegant code

I think most would agree that what makes coding in JavaScript awful is stuff like browser quirks and non-standard behavior. In addition, it's very long-winded and even simple operations can sometimes take several lines of code to author because the language is very lightweight.

MooTools, like many of the other JS frameworks, aims at allowing web developers to write complicated procedures with clean, reusable, and understandable code. Not only will this improve the speed at which you complete your projects, but it also makes your code easier to read and maintain.

Extending native JavaScript

There are many functions and methods that web developers think JavaScript should have. For example, Ajax can be challenging because there are no set standards to working with it in JavaScript. MooTools attempts to address these missing parts in JavaScript by providing web developers with a set of standardized and useful classes, methods, and functions.

For example, to address the lack of an Ajax class in JavaScript, MooTools has the `Request` class which deals with operations involving `XMLHttpRequest` objects.

MooTools also has a variety of utility functions and methods that are extremely helpful on many occasions, like the `$each()` function which allows you to easily loop through objects such as non-regular arrays or function arguments, and the `addEvent` method which attaches event listeners to page objects so that we can react to user actions like mouseovers and mouse clicks.

Cross-browser compatibility

JavaScript has to run in a wide array of environments such as web browsers. Unlike server-side scripting languages like PHP and Python, where the server is responsible for compiling and interpreting your code, JavaScript is different in that the web browser interprets your code. Web browsers all have different quirks and ways of interpreting JavaScript, resulting in countless hours of debugging and browser testing.

MooTools handles these browser quirks for you. For example, web browsers have different ways of dealing with Ajax requests. Internet Explorer 6 has the `ActiveX` object while Mozilla-based browsers like Firefox have the `XMLHttpRequest` class.

Traditionally, whenever you create an Ajax request object in JavaScipt, you would have to check first which web browser the user is using. Thus, creating Ajax request objects results in a lot of `if` statements and browser-sniffing.

For example, this is one way of creating an Ajax request object in JavaScript:

```
var request;
//Try Compatible Browser
if ( window.XMLHttpRequest ) {
  request = new XMLHttpRequest();
}
//Try IE6
else if (window.ActiveXObject) { // IE
    request = new ActiveXObject("Microsoft.XMLHTTP");
}
<... More browsers here...>
else {
  //Code that deals with the event that a browser doesn't support
XMLHttpRequest objects
  document.write('Browser is unsupported');
}
```

In MooTools, you can forego all of that browser-sniffing. All you have to do to create an `XMLHttpRequest` object is the following code:

```
var myRequest = new Request([insert arguments here]);
```

There are two important things to note here:

- You've just saved a ton of code to write
- The request object you created will function the same way in all browsers

MooTools officially fully-supports and tests in the following web browsers (though it's very likely that it'll work perfectly in most other web browsers):

- Safari 2+
- Internet Explorer 6+
- Firefox 2+ (and browsers based on gecko)
- Opera 9+

Working with the Document Object Model

A defining feature of most JavaScript frameworks and libraries is that they provide you with a set of useful tools for working with the Document Object Model. Traversing and manipulating the DOM in JavaScript can take massive amounts of code and can be unintuitive to many web developers (not to mention having to deal with browser quirks that can add to the length and development time of your functions).

MooTools has an intuitive syntax for selecting and working on page objects.

For example, if you want to select all the <a> hyperlinks with a class of `big` that links to a `.jpg` file in a web page, it only takes a line of code:

```
var jpgLinks = $$('a.big[href$=.jpg]');
```

This line of code creates an array called `jpgLinks` containing the aforementioned set of hyperlinks.

In ordinary JavaScript, this same complex selection operation would involve several `for` loops and *regular expression* matching to accomplish. Modern browsers, such as Safari 4, FireFox 3.5, and IE8 (only CSS 2.1 compliant), are slowly catching up by implementing `document.querySelector` and `document.querySelectorAll` methods to simplify things.

The advantage of using open-source projects

Remember the saying, "Two heads are better than one"? Now multiply that two by several magnitudes of a thousand and that's the number of developers that constantly review, use, and contribute to the MooTools project.

MooTools leverages the collective knowledge and skills of thousands of MooTools users worldwide. Therefore, when a new bug is discovered, it is quickly reported and addressed. Also, you'll encounter some of the most efficient JavaScript code written in MooTools because it has been widely tested and inspected by MooTools users and the MooTools development team.

By using MooTools, you'll have access to a tried-and-tested JavaScript code base.

Downloading and installing MooTools

The first thing we need to do is download a copy of MooTools from the official MooTools website (`http://www.mootools.net`).

> It's important to note that, at the time of this writing, `http://www.mootools.com` is not associated with MooTools. If you've mistakenly navigated to `mootools.com`, don't worry, MooTools is alive and well. A simple Google search for "mootools" should result in `http://mootools.net/`.

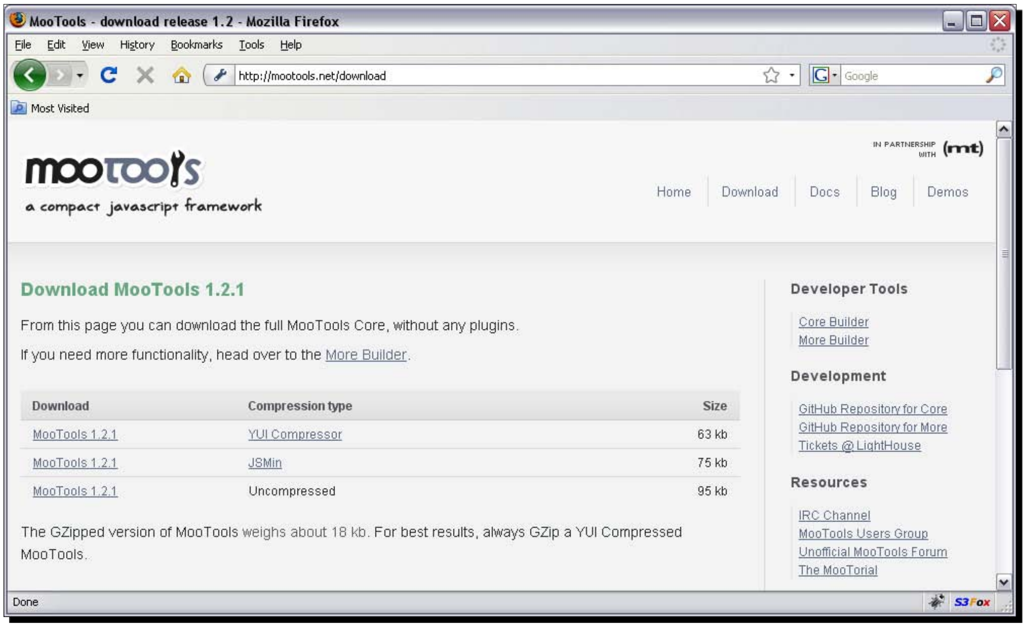
What's great about MooTools is that it's extremely modular. You can—as I fondly refer to it—roll your own version of it by downloading only the components that you're going to use. This is important if you want to keep your web applications as light as possible.

For the purpose of this book, you should download the entire MooTools Core so that we can make sure we're all in the same page.

Time for action – downloading and installing the MooTools Core

The following steps will help you to download and install MooTools Core:

1. Go to the MooTools Download page located at `http://mootools.net/download`. You'll see three options, choose the **Uncompressed** version.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File Edit View History Bookmarks Tools Help
http://mootools.net/download
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mootools
a compact javascript framework
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Core Builder
More Builder
Development
GitHub Repository for Core
GitHub Repository for More
Tickets @ LightHouse
Resources
IRC Channel
MooTools Users Group
Unofficial MooTools Forum
The MooTorial
Done

Download MooTools 1.2.1

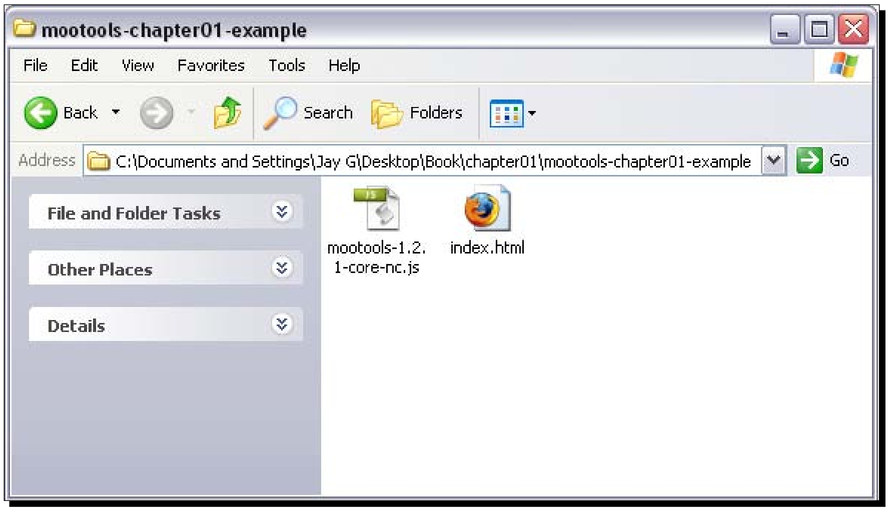
From this page you can download the full MooTools Core, without any plugins.

If you need more functionality, head over to the More Builder.

Download	Compression type	Size
MooTools 1.2.1	YUI Compressor	63 kb
MooTools 1.2.1	JSMin	75 kb
MooTools 1.2.1	Uncompressed	95 kb

The GZipped version of MooTools weighs about 18 kb. For best results, always GZip a YUI Compressed MooTools.

2. Create an HTML document, call it whatever you want, but I'll call mine `index.html`, as shown:


mootools-chapter01-example
File Edit View Favorites Tools Help
Back
Search
Folders
Address
C:\Documents and Settings\Jay G\Desktop\Book\chapter01\mootools-chapter01-example
Go
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Other Places
Details
mootools-1.2.1-core-nc.js
index.html

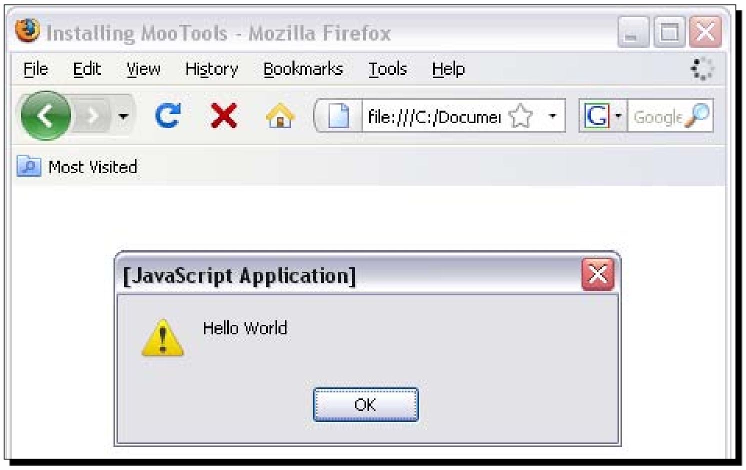
3. Install MooTools by referencing it in the <head> of your HTML document with the following code:

```
<script type="text/javascript" src="mootools-1.2.1-core-nc.js"></
script>
```

Right below the MooTools script reference, place the following block of code:

```
<script type="text/javascript">
window.addEvent('domready', function() {
  alert("Hello World!");
});
</script>
```

4. Test your code by opening your HTML document in your favorite web browser. If everything went according to plan, you should see something like this:


Installing MooTools - Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Docume
Google
Most Visited

[JavaScript Application]

Hello World

OK

What just happened?

We've just downloaded and installed MooTools by referencing it in an HTML document that we created and then tested to see if we referenced the file correctly by writing a line of JavaScript that displays "Hello World" in an alert box.

For your reference, your HTML markup should look similar to the following:

```
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<meta http-equiv="Content-Type" content="text/html; charset=utf-8" />
<title>Installing MooTools</title>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>
<script type="text/javascript">
  window.addEvent('domready', function() {
    alert("Hello World!");
  });
</script>
</head>
<body>

</body>
</html>
```

If all went well, congratulations! You're on your way to becoming a MooTools rockstar!

Different MooTools downloads

When you went to the MooTools download page, you had three options: **YUI Compressor**, **JSMin**, and **Uncompressed**. These options have the same source code and differ only in the source code format. The YUI Compressor and JSMin versions are compressed. They are smaller in file size because unnecessary characters (such as those involved in code formatting, like tabs, extra spaces, and inline comments) have been removed.

The process of removing extraneous characters in the source code is called **Minification**. The trade-off in minifying your source code is that it's virtually unreadable, so we downloaded the **Uncompressed** version, in case you wanted to see how MooTools works by studying the source code.

The domready event listener

When writing MooTools code, you will often want to execute the code as soon as possible, otherwise it'll wait until other webpage components are loaded before it runs.

Let's take a closer look at the code we wrote earlier:

```
window.addEvent('domready', function() {
  alert('Hello World');
});
```

In this block of code, we used the `addEvent` method and we tell it to watch out for the event that the window's DOM is ready (`'domready'`). Once the DOM is ready, we ask the method to run the following function:

```
function() {
  alert("Hello World");
}
```

We will discuss the MooTools syntax and concepts in detail in Chapter 2, but for now, let's just say that all code we write throughout this book will be wrapped inside the `domready` event listener so they are executed as soon as possible.

Rolling your own MooTools

MooTools is one of the few JavaScript frameworks that come in different components; it has a very modular design—it is divided into several interdependent parts. Because of its modularity, we're able to pick and choose which parts of MooTools we want. However, if you have a project that doesn't use all of the MooTools components, then it's a good practice to only include the components that you need to reduce page weight and improve response times.

MooTools is organized into two major parts: the **MooTools Core** and **MooTools More** (plugins that extend MooTools). Let's take a look at these two components.

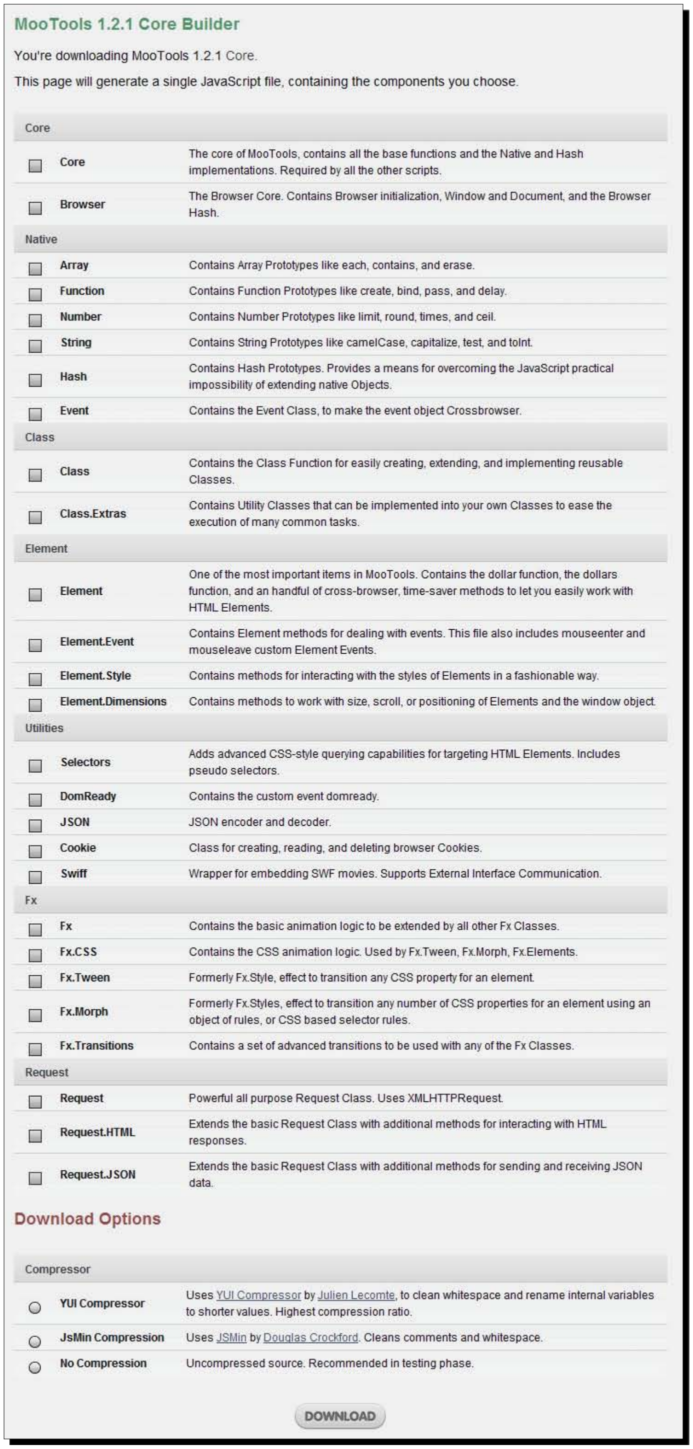
MooTools Core

Let's explore the MooTools Core by using the `MooTools Core Builder` on the official MooTools website. This will give us a basic understanding of the MooTools Core file structure.

Time for action – exploring the MooTools Core Builder

To explore the MooTools Core Builder, perform the following steps:

1. Go to the MooTools Core Builder webpage by navigating to: `http://mootools.net/core`.
2. Notice that the MooTools Core is subdivided into 7 sections. Each section has 2 to 6 JavaScript libraries associated with it. Take the time to read each description to help you get a better understanding of what each file does.



MooTools 1.2.1 Core Builder

You're downloading MooTools 1.2.1 Core.

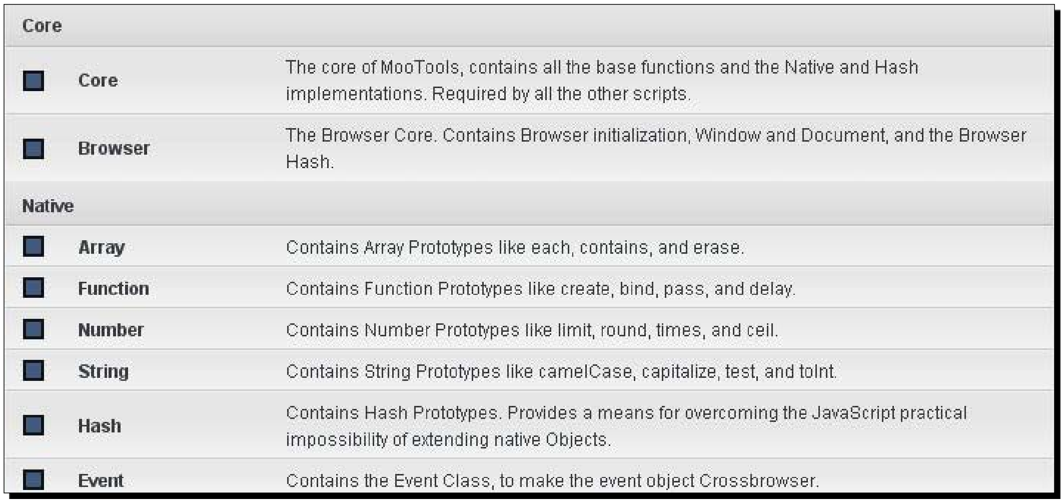
This page will generate a single JavaScript file, containing the components you choose.

Core		
☐	Core	The core of MooTools, contains all the base functions and the Native and Hash implementations. Required by all the other scripts.
☐	Browser	The Browser Core. Contains Browser initialization, Window and Document, and the Browser Hash.
Native		
☐	Array	Contains Array Prototypes like each, contains, and erase.
☐	Function	Contains Function Prototypes like create, bind, pass, and delay.
☐	Number	Contains Number Prototypes like limit, round, times, and ceil.
☐	String	Contains String Prototypes like camelCase, capitalize, test, and toInt.
☐	Hash	Contains Hash Prototypes. Provides a means for overcoming the JavaScript practical impossibility of extending native Objects.
☐	Event	Contains the Event Class, to make the event object Crossbrowser.
Class		
☐	Class	Contains the Class Function for easily creating, extending, and implementing reusable Classes.
☐	Class.Extras	Contains Utility Classes that can be implemented into your own Classes to ease the execution of many common tasks.
Element		
☐	Element	One of the most important items in MooTools. Contains the dollar function, the dollars function, and an handful of cross-browser, time-saver methods to let you easily work with HTML Elements.
☐	Element.Event	Contains Element methods for dealing with events. This file also includes mouseenter and mouseleave custom Element Events.
☐	Element.Style	Contains methods for interacting with the styles of Elements in a fashionable way.
☐	Element.Dimensions	Contains methods to work with size, scroll, or positioning of Elements and the window object.
Utilities		
☐	Selectors	Adds advanced CSS-style querying capabilities for targeting HTML Elements. Includes pseudo selectors.
☐	DomReady	Contains the custom event domready.
☐	JSON	JSON encoder and decoder.
☐	Cookie	Class for creating, reading, and deleting browser Cookies.
☐	Swiff	Wrapper for embedding SWF movies. Supports External Interface Communication.
Fx		
☐	Fx	Contains the basic animation logic to be extended by all other Fx Classes.
☐	Fx.CSS	Contains the CSS animation logic. Used by Fx.Tween, Fx.Morph, Fx.Elements.
☐	Fx.Tween	Formerly Fx.Style, effect to transition any CSS property for an element.
☐	Fx.Morph	Formerly Fx.Styles, effect to transition any number of CSS properties for an element using an object of rules, or CSS based selector rules.
☐	Fx.Transitions	Contains a set of advanced transitions to be used with any of the Fx Classes.
Request		
☐	Request	Powerful all purpose Request Class. Uses XMLHTTPRequest.
☐	Request.HTML	Extends the basic Request Class with additional methods for interacting with HTML responses.
☐	Request.JSON	Extends the basic Request Class with additional methods for sending and receiving JSON data.

Download Options

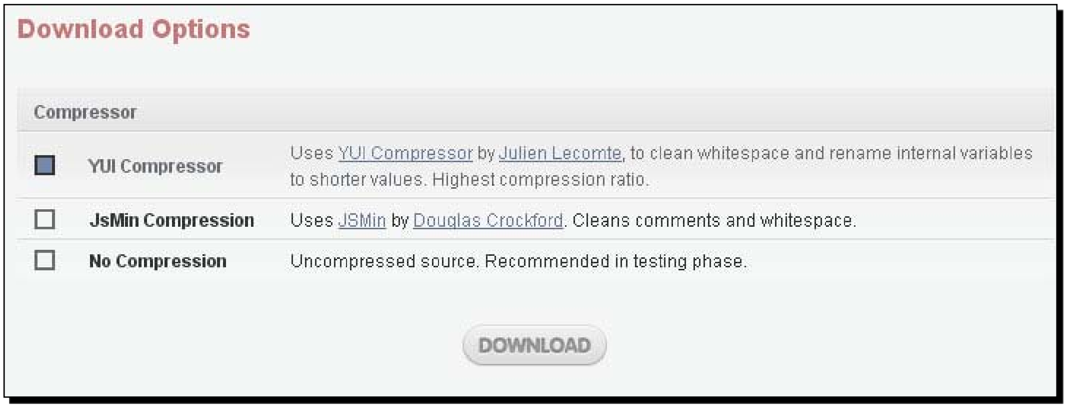
Compressor		
○	YUI Compressor	Uses YUI Compressor by Julien Lecomte, to clean whitespace and rename internal variables to shorter values. Highest compression ratio.
○	JsMin Compression	Uses JSMin by Douglas Crockford. Cleans comments and whitespace.
○	No Compression	Uncompressed source. Recommended in testing phase.

3. Click on the **Event** component. Notice that several other components were automatically selected for you. This ensures that you also include the dependency files that are required for the Event component to run.



Core		
■	Core	The core of MooTools, contains all the base functions and the Native and Hash implementations. Required by all the other scripts.
■	Browser	The Browser Core. Contains Browser initialization, Window and Document, and the Browser Hash.
Native		
■	Array	Contains Array Prototypes like each, contains, and erase.
■	Function	Contains Function Prototypes like create, bind, pass, and delay.
■	Number	Contains Number Prototypes like limit, round, times, and ceil.
■	String	Contains String Prototypes like camelCase, capitalize, test, and toInt.
■	Hash	Contains Hash Prototypes. Provides a means for overcoming the JavaScript practical impossibility of extending native Objects.
■	Event	Contains the Event Class, to make the event object Crossbrowser.

4. Notice the different compression types. **YUI Compressor** is selected by default.



Download Options

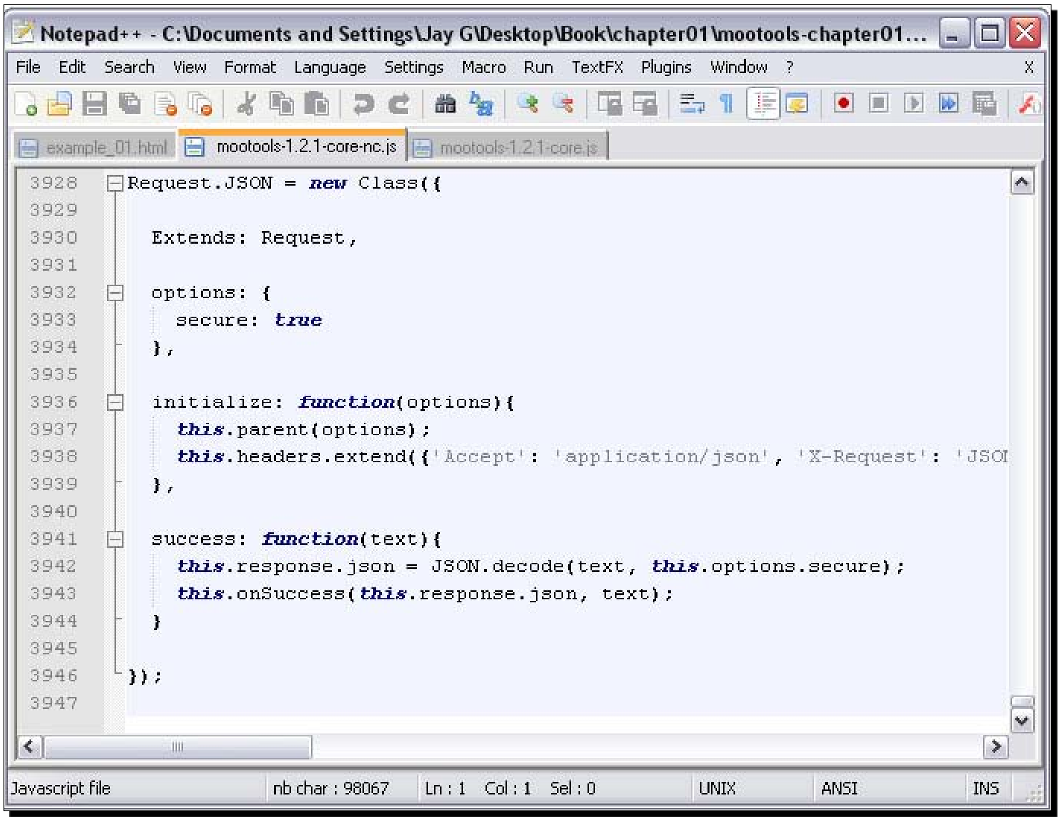
Compressor		
■	YUI Compressor	Uses YUI Compressor by Julien Lecomte, to clean whitespace and rename internal variables to shorter values. Highest compression ratio.
☐	JsMin Compression	Uses JSMin by Douglas Crockford. Cleans comments and whitespace.
☐	No Compression	Uncompressed source. Recommended in testing phase.

What just happened?

We just covered how to roll your own MooTools Core file and learned about the MooTools Core structure by exploring the MooTools Core builder. Once you're comfortable with how MooTools works, you should use the MooTools Core Builder to create a MooTools Core file that includes only the components you need.

Have a go hero – explore the MooTools Core Builder output

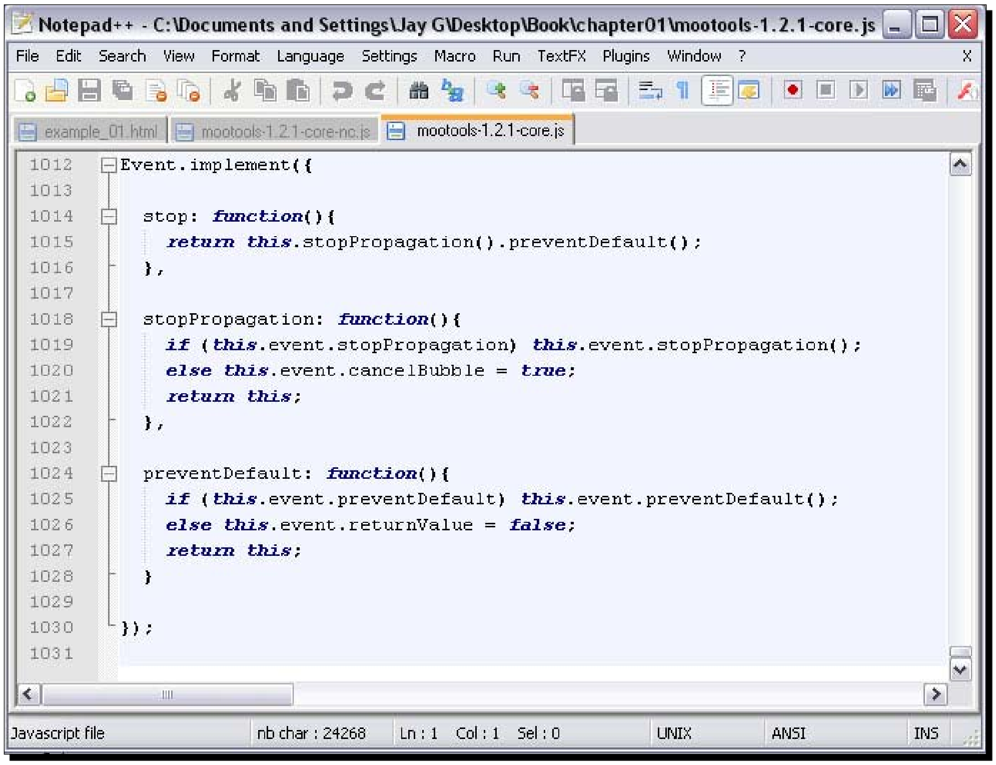
Try to download the previous example with the Events component checked. After downloading your own version of the MooTools Core, open the file in your favorite text editor. Also open the MooTools Core file that you downloaded earlier. Notice that the one you just downloaded is significantly shorter; that's because you only downloaded the Events component and its dependency files.


Notepad++ - C:\Documents and Settings\Jay G\Desktop\Book\chapter01\mootools-chapter01...
File Edit Search View Format Language Settings Macro Run TextFX Plugins Window ?
example_01.html
mootools-1.2.1-core-nc.js
mootools-1.2.1-core.js

```
Request.JSON = new Class({

  Extends: Request,

  options: {
    secure: true
  },

  initialize: function(options){
    this.parent(options);
    this.headers.extend({'Accept': 'application/json', 'X-Request': 'JSOI
  },

  success: function(text){
    this.response.json = JSON.decode(text, this.options.secure);
    this.onSuccess(this.response.json, text);
  }

});
```

Javascript file
nb char : 98067
Ln : 1 Col : 1 Sel : 0
UNIX
ANSI
INS

The entire uncompressed MooTools Core is close to 4,000 lines long (and has a file size of 96 KB).


Notepad++ - C:\Documents and Settings\Jay G\Desktop\Book\chapter01\mootools-1.2.1-core.js
File Edit Search View Format Language Settings Macro Run TextFX Plugins Window ?
example_01.html
mootools-1.2.1-core-nc.js
mootools-1.2.1-core.js
Javascript file
nb char : 24268
Ln : 1 Col : 1 Sel : 0
UNIX
ANSI
INS

```
Event.implement({

  stop: function(){
    return this.stopPropagation().preventDefault();
  },

  stopPropagation: function(){
    if (this.event.stopPropagation) this.event.stopPropagation();
    else this.event.cancelBubble = true;
    return this;
  },

  preventDefault: function(){
    if (this.event.preventDefault) this.event.preventDefault();
    else this.event.returnValue = false;
    return this;
  }

});
```

In comparison, the Core Builder output where only Events and its dependencies are included is just a little over 1,000 lines of code (and weighing only 24 KB).

MooTools More

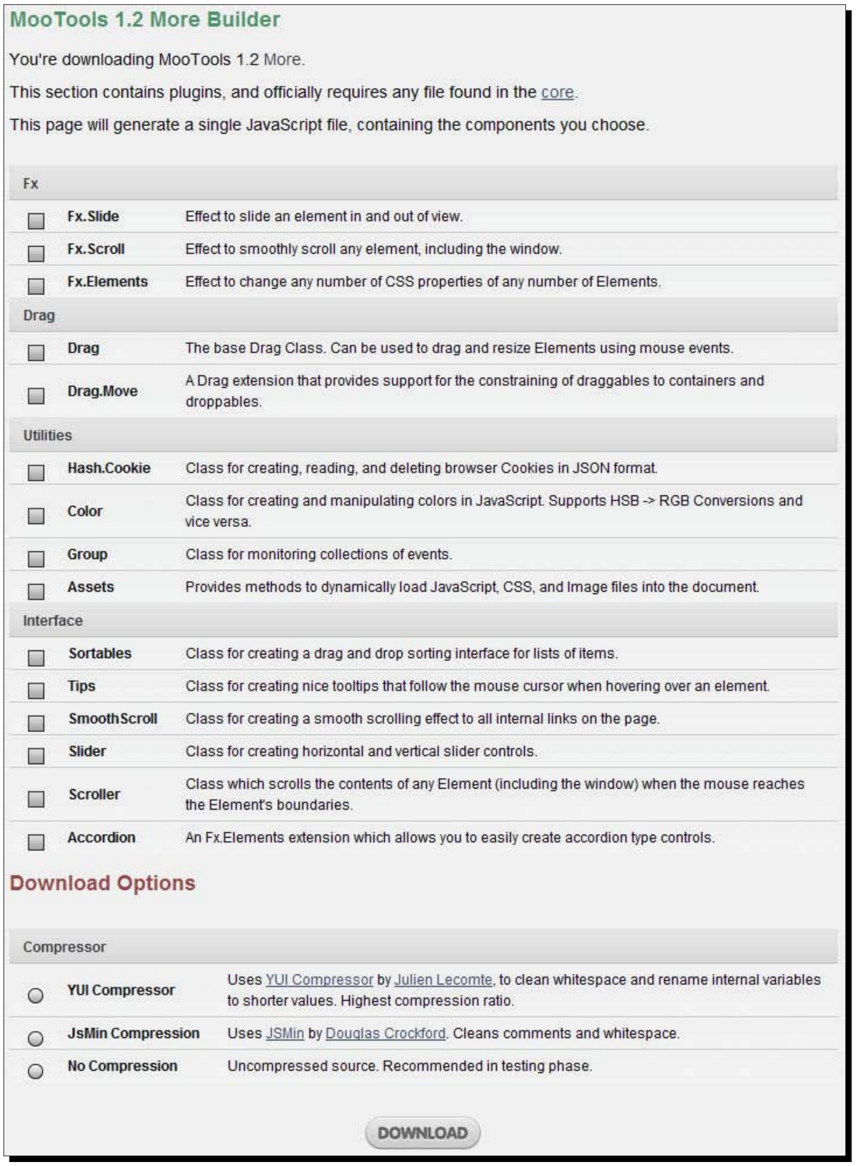
The second part of the MooTools framework is simply called **More**. As the name implies, it is a collection of useful plugins, functions, classes, and methods that extends the MooTools Core.

Time for action – exploring the MooTools More Builder

To explore through the MooTools More Builder, perform the following steps

1. Go to the MooTools More Builder page: `http://mootools.net/more`.

2. You'll see the same interface as the MooTools Core Builder.
Take some time to read the descriptions of each component.



MooTools 1.2 More Builder

You're downloading MooTools 1.2 More.

This section contains plugins, and officially requires any file found in the core.

This page will generate a single JavaScript file, containing the components you choose.

Fx		
☐	Fx.Slide	Effect to slide an element in and out of view.
☐	Fx.Scroll	Effect to smoothly scroll any element, including the window.
☐	Fx.Elements	Effect to change any number of CSS properties of any number of Elements.
Drag		
☐	Drag	The base Drag Class. Can be used to drag and resize Elements using mouse events.
☐	Drag.Move	A Drag extension that provides support for the constraining of draggables to containers and droppables.
Utilities		
☐	Hash.Cookie	Class for creating, reading, and deleting browser Cookies in JSON format.
☐	Color	Class for creating and manipulating colors in JavaScript. Supports HSB -> RGB Conversions and vice versa.
☐	Group	Class for monitoring collections of events.
☐	Assets	Provides methods to dynamically load JavaScript, CSS, and Image files into the document.
Interface		
☐	Sortables	Class for creating a drag and drop sorting interface for lists of items.
☐	Tips	Class for creating nice tooltips that follow the mouse cursor when hovering over an element.
☐	SmoothScroll	Class for creating a smooth scrolling effect to all internal links on the page.
☐	Slider	Class for creating horizontal and vertical slider controls.
☐	Scroller	Class which scrolls the contents of any Element (including the window) when the mouse reaches the Element's boundaries.
☐	Accordion	An Fx.Elements extension which allows you to easily create accordion type controls.

Download Options

Compressor		
○	YUI Compressor	Uses YUI Compressor by Julien Lecomte, to clean whitespace and rename internal variables to shorter values. Highest compression ratio.
○	JsMin Compression	Uses JSMin by Douglas Crockford. Cleans comments and whitespace.
○	No Compression	Uncompressed source. Recommended in testing phase.

What just happened?

You've just learned where to download the More components of MooTools. This knowledge will come into play in later chapters when we utilize these plugins in our code.

The API concept

MooTools is designed in such a way that instead of modifying the MooTools Core files, you use its API (Application Programming Interface) to utilize MooTools function. This makes MooTools easier to maintain your projects and makes it easily extensible.

A plugin is a JavaScript file that's dependent on MooTools but is not part of the standard MooTools code base. We'll learn about writing plugins in a later chapter, but for now, just think of plugins as MooTools extensions that do a specific function, such as hiding and showing a page element or managing browser cookies.

> It is important to note that—unless you know exactly what you're doing—you shouldn't modify the MooTools Core files. Even if you know what you're doing, it's best to keep the file "as is" so that it's standardized and can be easily updated.

MooTools resources

In order to take full advantage of MooTools, you should check out these excellent resources:

MooTools Docs

MooTools Docs (`http://mootools.net/docs/`) contains the official MooTools documentation. Created by the MooTools team, it's the most comprehensive online resource for MooTools syntax and usage. As you write in MooTools, you'll find that this is a handy resource to have open for quickly finding references to particular MooTools code.

MooTools Users Google groups

The MooTools Users Google groups (`http://groups.google.com/group/mootools-users`) is a discussion group on the topic of MooTools. You'll find a variety of topics here and if you run into specific MooTools problems, it's a great place to seek help.

mooforum

mooforum (`http://www.mooforum.net/`) is the unofficial forum for MooTools. If you're looking for help on specific things or simply want to interact with other MooTools developers, you should sign up for a free user account.

The MooTorial

The MooTorial (`http://mootorial.com/wiki/`) is an online wiki-style tutorial on the MooTools framework written by Aaron Newton. It's a good starting point for learning the basics of the MooTools framework and is a great online supplement to the things you learn throughout this book.

Summary

In this chapter we specifically covered:

- What MooTools is and some of the advantages of using MooTools
- How to download and install MooTools
- The MooTools Core and More Builders
- Online resources about MooTools

We also learned that all of our MooTools code will go inside the `window.addEvent('domready', function)` method, so that they can run as soon as the DOM is ready. In addition, we talked a little bit about the API concept and how we shouldn't modify the MooTools Core files.

Now that we've learned a little bit about MooTools, we're ready to delve into the MooTools syntax and concepts, which is the topic of the next chapter.

2
Writing JavaScript with MooTools

Using MooTools means you'll be coding in a web application framework that excels in object-oriented programming and JavaScript best practices. Modern development principles, such as unobtrusive JavaScript programming and object-based logic is the bread and butter of MooTools.

For example, modern development practices dictate that we separate our site's functional and behavioral layers (server-side and client-side scripts) from our site's content structural layer (HTML markup). This concept is known as unobtrusive JavaScript, and we'll delve into this best practice here in this chapter. You'll see one of the more important ways of how MooTools makes us write better JavaScript.

But we're going to be covering more than just unobtrusive JavaScript. We're going to work with classes, which is the design pattern of the entire MooTools framework.

MooTools is structured into classes. In programming, a class is simply a template of an object. A class can contain many methods or properties such as normal variables or even references to other classes and objects.

To understand how to write great MooTools code that adheres to best practices, you have to understand its fundamental structure and the concept of classes, which I must admit, can be confusing and hard to grok.

If you know another programming language, especially an object-oriented one, or a pseudo-object-oriented one like PHP (this is where I learned the concept of a class), then the stuff we'll discuss here will look very familiar to you. You can then compare and contrast the difference in syntax of classes in your particular language. As an example, for you PHP folks out there, in PHP 5, we have the `__construct()` *function, which you'll soon see, is exactly like the* `initialize` *method of a MooTools class.*

In this chapter we shall:

- Learn how MooTools helps us write unobtrusive JavaScript
- Work with classes by creating our own class
- See how MooTools works by exploring a couple of classes
- Learn about the concept of chainability by working through a simple animation example

So let's get on with it!

Writing unobtrusive JavaScript with MooTools

Unobtrusive JavaScript is a set of techniques and principles for writing code that's separated from your web page's structure.

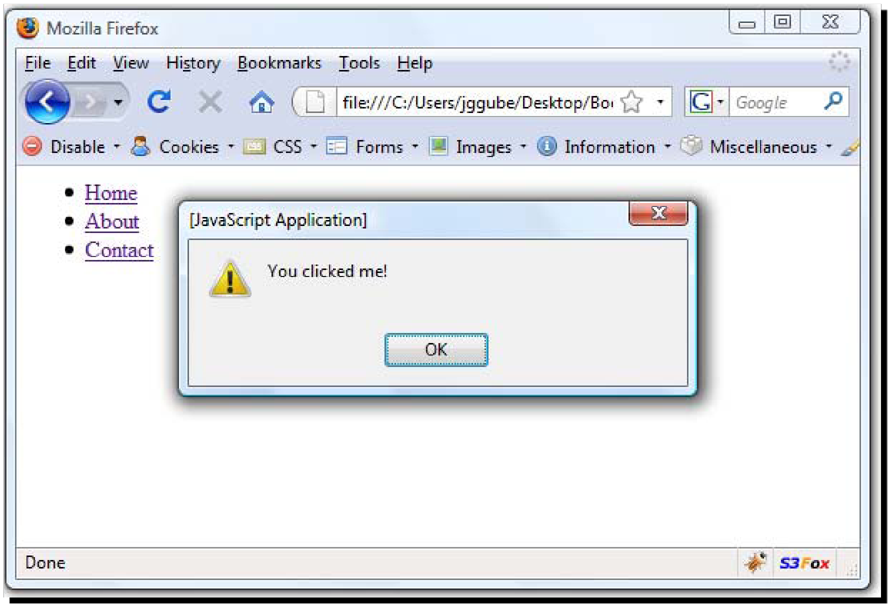
It's best to learn about unobtrusive JavaScript by way of example.

An "obtrusive" JavaScript example

In this example, you'll see JavaScript code that works perfectly fine but doesn't adhere to unobtrusive JavaScript principles. The script contains a function called `mouseClick()` that, when triggered, opens up an alert dialog box with the message, **You clicked me!**.

The HTML markup is a simple unordered list of links. The hyperlinks <a> are assigned an `onclick` attribute which triggers the `mouseClick()` function when you click on them.

```
<html>
<head>
  <script type="text/javascript">
  // A simple function that opens an alert dialog box with a message
  function mouseClick()
  {
    alert( 'You clicked me!' );
  }
</script>
</head>
<body>
<ul id="nav">
  <li><a onclick="javascript:mouseClick();" href="#">Home</a></li>
  <li><a onclick="javascript:mouseClick();" href="#">About</a></li>
  <li><a onclick="javascript:mouseClick();" href="#">Contact</a></li>
</ul>
</body>
</html>
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Google
Disable Cookies CSS Forms Images Information Miscellaneous
Home
About
Contact
[JavaScript Application]
OK
Done
S3Fox

You clicked me!

What's so bad about it?

If the script works as intended, then what's the big deal?

Imagine this scenario: you have a 30 page website and each web page has to have that list of links; if you noticed, the unordered list (`<ul>`) tag has an `id` attribute of nav, so let's pretend that this is your site's primary navigation. You would have to go through all 30 pages to add `mouseClick()` to the list of links found on each page. This would be very time consuming.

Don't repeat it if you don't have to

That's a lot of repetition, and you'll be breaking a lot of MooTools' core developers' hearts because they designed the framework with the **Don't Repeat Yourself (DRY)** principle.

If you have to manually implement that block of code, there's a big chance that you'll commit an error that can result in your web pages rendering incorrectly or behaving unexpectedly.

It'll be hard to maintain

Say that for some reason, you want to add something else to the `onclick` attributes of the links (like calling another function) or remove it entirely. Whenever there's a change to the `onclick` attribute, you'll have to go through each page and change them. That's not an ideal situation, especially because by writing unobtrusively, you can sidestep this issue and write a more maintainable code base.

It's a bad practice to have functionality in your content structure

Modern web development best practices encourage separating your web page's content/structure (HTML) from its presentation (CSS) and behavior/functionality (client-side/server-side scripts). By relying on the `onclick` attribute, we're intermixing our web page's structure with its behavior (opening a dialog box when the link is clicked).

Separating structure, style, and functionality goes back to maintainability; it allows us to keep things separate so that we can work with each component individually without affecting the other components. This involves taking out all inline event handlers (namely, the `onclick` attribute on our <a> tags).

Adding on event handlers directly into the HTML could also cause memory leaks in Internet Explorer and make adding multiple events of the same type impossible.

Time for action – rewriting our script unobtrusively

Let's rewrite the previous example to follow unobtrusive JavaScript principles:

1. First, we'll remove all the `onclick` attributes. By doing so, we've effectively separated our website's functionality from its content structure. Here's the revised code:

```
<html>
<head>
<script type="text/javascript">
function mouseClick()
{
  alert( 'You clicked me!' );
}
</script>
</head>
<body>
<ul id="nav">
  <li><a href="#">Home</a></li>
  <li><a href="#">About</a></li>
  <li><a href="#">Contact</a></li>
</ul>
</body>
</html>
```

2. Now remove the `mouseClick()` function; we don't need it anymore.

```
<html>
<head>
<!-- mouseClick() function is now bye-bye. -->
</head>
<body>
<ul id="nav">
  <li><a href="#">Home</a></li>
  <li><a href="#">About</a></li>
  <li><a href="#">Contact</a></li>
</ul>
</body>
```

3. Include the MooTools framework and put our code inside `window.addEvent('domready')`.

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>
<script type="text/javascript">
window.addEvent('domready', function()
{
  // Our code will go in here
});
</script>
</head>
<body>
<ul id="nav">
  <li><a href="#">Home</a></li>
  <li><a href="#">About</a></li>
  <li><a href="#">Contact</a></li>
</ul>
</body>
</html>
```

4. Add an event listener to all child links of `<ul id="nav">`. You'll learn more about event listeners in Chapter 5.

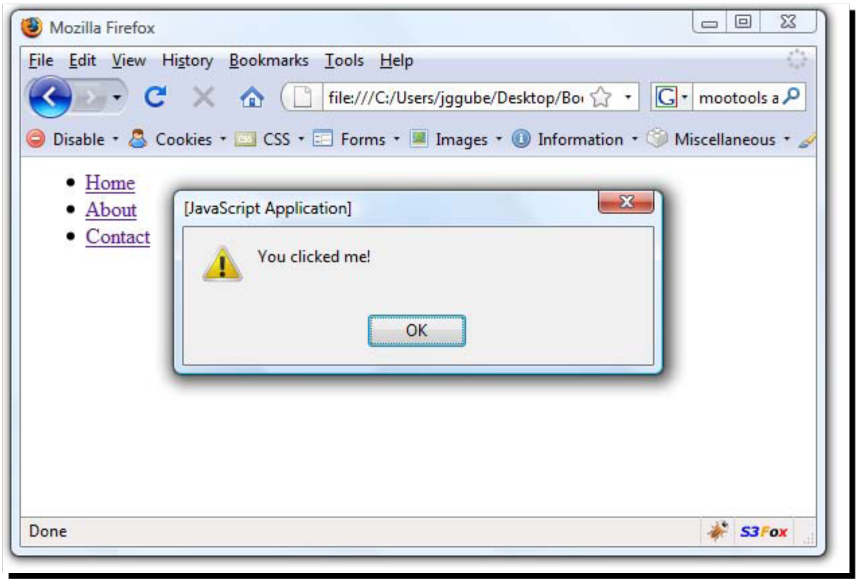
```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>
<script type="text/javascript">
window.addEvent('domready', function()
{
  $$('#nav a').addEvent('click', function()
  {
    // The alert function will go in here
  });
});
</script>
</head>
<body>
<ul id="nav">
  <li><a href="#">Home</a></li>
  <li><a href="#">About</a></li>
  <li><a href="#">Contact</a></li>
</ul>
</body>
</html>
```

5. Put our `alert()` function back, inside the `addEvent` method.

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>
<script type="text/javascript">
window.addEvent('domready', function()
{
  $$('#nav a').addEvent('click', function()
  {
    alert( 'You clicked me!' );
  });
});
</script>
</head>
<body>
```

```
<ul id="nav">
  <li><a href="#">Home</a></li>
  <li><a href="#">About</a></li>
  <li><a href="#">Contact</a></li>
</ul>
</body>
</html>
```

6. Save your work and open it in a web browser. Click on any link. It should open up a dialog box just like in our obtrusive example.


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools a
Disable Cookies CSS Forms Images Information Miscellaneous
Home
About
Contact
[JavaScript Application]
OK
Done
S3Fox

You clicked me!

Just like before, if you did it correctly, you should see a dialog box that says **You clicked me!**

What just happened?

What we did was fix our poorly-written and obtrusive JavaScript example by rewriting our code without the use of inline event handlers. We leaned on MooTools to help us do this effortlessly by using the `$$()` function to select all <a> elements inside our `<ul id="nav">` element and then added an unobtrusive `click` event listener/handler.

Now we can go onto explore key aspects of what we just did.

Removing our inline event handlers

The first step we did was to remove all of our `onclick` attributes. This not only makes our HTML and JavaScript leaner and cleaner, but we also effectively separated our web page's structure from its functionality. Now, whenever we want to add, remove, or edit our event handler for clicks, we just have to do it in one place—MooTools code.

Using the DOM to handle events

In step 4, we leveraged the DOM to add events to our <a> elements, first matching all elements in the DOM that match our criteria via the `$$() function`, namely all <a> elements that are the children of `<ul id="nav"> element`, which translates to `$$('#nav a')` (notice that we selected it using **CSS selectors** syntax). Then we call the MooTools Element method, `.addEvent()`, gave it a `click` argument. The `.addEvent()` method with a `click` argument, in plain English, just says: *add an event handler to perform this function when a 'click' event is triggered*.

```
function()
{
  alert( 'You clicked me!' );
}
```

Now, when we clicked on any link on our web page, the `alert()` function was triggered and we saw a dialog box.

You'll learn plenty more about selecting DOM elements and adding event handlers in Chapters 3 and 5 respectively. For now, suffice it to say that we were able to revolutionize our "obtrusive" JavaScript code into something magnitudes better. Now, if we wanted to later on remove the event handler, we just remove it from our MooTools script, instead of going to multiple pages to remove the inline event handler.

Pop quiz – rewriting our script unobstrusively

Which of the following statements is wrong?

1. Unobtrusive JavaScript separates JavaScript from your content's structure.
2. Unobtrusive JavaScript makes updating scripts easier.
3. **Unobtrusive JavaScript is exclusive to the MooTools framework.**
4. Unobtrusive JavaScript, oftentimes, can reduce the amount of code you have to write.

Alright, I think you've had more than your fair share of unobtrusive-ness, but if you want to learn more, check out this URL: `http://www.onlinetools.org/articles/unobtrusivejavascript/`.

Now it's time to move onto another topic: MooTools classes.

Creating MooTools classes

I've mentioned it, like, a million times already, but here I go again, MooTools is an object-oriented web application framework. And what's OOP without classes? Not OOP, that's for sure! MooTools is, to me, the only JavaScript library that effectively implements and promotes the use of classes.

What the heck is a class?

A **class**, in terms of object-oriented programming, is a definition of an object, or an object's blueprint, its design, its structure, its template, I can go on, but I think you get the picture. Classes are best described in real-world terms.

Real-world analogy

Let's say our class is "Dog". A dog can have a lot of traits, such as its name, its type (for example, Golden Retriever or Poodle), its age, and so on. In MooTools, these traits are called **options**, which is an object that contains default key/value pairs specific to a particular class.

A dog can also do a lot of things, such as bark, sit, or eat. In the context of JavaScript and classes, these are called class **methods**. A method is a function for a particular class or object. For example, `myPoodle.bark()` can mean that we make my poodle bark by triggering the `bark()` method.

Let's create a Dog class in MooTools.

Creating a MooTools class

We create a MooTools class using the following format:

```
var ClassName = new Class({ properties });
```

So for our Dog class, here's what we'll start with:

```
var Dog = new Class(
{
 // Implements is a class property
 // upon which other classes methods will be added
  Implements : [ Options ],
 // Default options for our Dog
 options : {
   name : 'Barkee',
   type : 'Poodle',
   age : 4
 },
 // initialize is a MooTools method/constructor that executes the
 //following function whenever a new instance of a class is created
 initialize : function( options )
 {
   this.setOptions( options );     },

 // Create a method which when passed to a instance of Dog will
 //tell us our dog is barking.
 bark : function()
 {
   alert( this.options.name + ' is barking.' );
 },
 // This method is similar to .bark() but will tell us our dog
 //is sitting.
 sit : function()
 {
   alert( this.options.name + ' is sitting.' );
 }
});
```

That's a big code block, but let me break it down for you all. Let's go through what's going on inside the Dog class.

The Implements property

The `Implements` property basically tells our new class what other class properties/methods to include as part of our new class. Either its classes are created by us or our MooTools classes (like `Options` and `Events`).

`Options` and `Events` are MooTools utility classes in the `Class.Extras` component of MooTools. `Class.Extras` includes the `Chain` class (which queues up and executes one function after the next) and `Events` class (which adds customizable events to a class). In our case, we're giving our class the instruction to implement the `Options` class.

```
Implements : [ Options ]
```

The Options class provides us a way to deal with setting default options for our class, and automatically decides what options to overwrite and leave alone depending on what parameters are passed to it.

It also includes the .setOptions() method which is the method that triggers the setting of these options.

The options property

The options property lets us set default options for our Dog class.

```
options : {
  name : 'Barkee',
  type : 'Poodle',
  age : 4
},
```

For example, if we don't pass a name option value when we create an instance of the Dog class, then it's assumed that our dog's name is "Barkee". Likewise, if we don't pass a value for type, then we're going to assume that it's a "Poodle" (and if your dog is really a Chihuahua, it might get offended, so be sure you set the right type).

The initialize method

The initialize method executes the code block; it's paired with when a new instance of your class is created. In our example, we definitely want to set our class options (name, type, and age), so we write:

```
initialize : function( options )
{
  this.setOptions( options );   }
```

Remember we implemented the Options class earlier? Well, in doing so, we get access to the .setOptions() method which does all the hard work of merging our options for us. For example, we don't have to check using if conditional statements, whether there is or isn't value passed for name or type, and declare what to do in the case that they are or aren't passed—it just does it for us. It sets the options to this instance.

Our own Dog class methods: .bark() and .sit()

For our class, we create two methods, .bark() and .sit(). When we trigger them from an instance of Dog, they'll tell us that our dog is either barking or sitting, respectively.

Alright, now that we've set up the template of the Dog class, it's time for you to try out the Dog class.

Time for action – creating an instance of Dog

Let's create an instance of a Dog class by deploying the following the steps:

1. Create an HTML document for this. Use the following code taken from our Dog class.

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>

<script type="text/javascript">
  var Dog = new Class(
  {
    Implements : [ Options ],

   options : {
     name : 'Barkee',
     type : 'Poodle',
     age : 4
   },

   initialize : function( options )
   {
     this.setOptions( options );
   },

   bark : function()
   {
     alert( this.options.name + ' is barking.' );
   },

   sit : function()
   {
     alert( this.options.name + ' is sitting.' );
   }
  });
</script>
</head>
<body>
</body>
</html>
```

Apart from taking out the comments, referencing the MooTools framework, and putting in the basic tags for an HTML document, nothing has changed so far.

2. Create an instance of our Dog class, you can call the class instance anything you like, but I'll call mine simply `myDog`. Place the following code right below our class declaration.

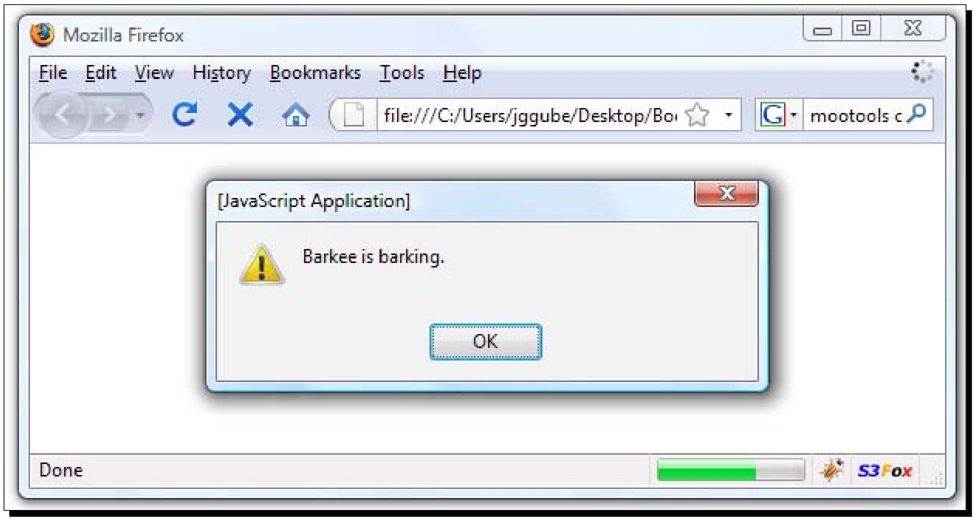
```
var myDog = new Dog({ });
```

You've now created an instance of Dog, but we didn't declare any values for options properties, so the options for `myDog` will be set to our default values that we declared in the class.

3. Let's make `myDog` bark. Right below the code that we just wrote, place the following code, which will pass the `.bark()` method to `myDog`:

```
myDog.bark();
```

4. Save your work and preview the HTML document in the web browser. It should immediately open up a dialog box like this:



What just happened?

We just created a new instance of the Dog class called myDog. We didn't give myDog any replacement options, so it used as the default option in our class. When we used the .bark() method on myDog, it alerted us that "Barkee", the default name, "is barking".

If you followed along, this is the entire code you should have thus far:

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>
<script type="text/javascript">
  var Dog = new Class(
  {
    Implements : [ Options ],
   options : {
     name : 'Barkee',
     type : 'Poodle',
     age : 4
   },
   initialize : function( options )
   {
     this.setOptions( options );
   },
   bark : function()
   {
     alert( this.options.name + ' is barking.' );
   },
   sit : function()
   {
     alert( this.options.name + ' is sitting.' );
   }
  });
  var myDog = new Dog({ });
  myDog.bark();
</script>
</head>
<body>
</body>
</html>
```

Have a go hero – use the .sit() class method

We still haven't used the `.sit()` method. Why don't you modify our example to use the `.sit()` method on `myDog` instead of `.bark()`?

Time for action – giving our class instance some custom options

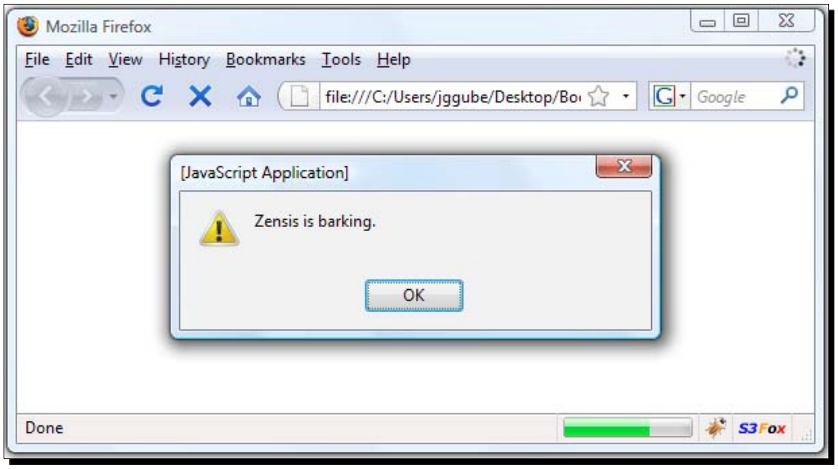
Let's give some custom options to our class by deploying the following:

1. Go back to the source code of the HTML document you just created. Go to the `var myDog = new Dog({ });` line.

2. Pass property values to name, type, and age like so:

```
var myDog = new Dog({
  name : 'Zensis',
  type : 'German Sheperd',
  age : 10
});
```

3. Open your HTML document in the web browser, and now, you should see something like this:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Google
[JavaScript Application]
OK
Done
S3Fox

Zensis is barking.

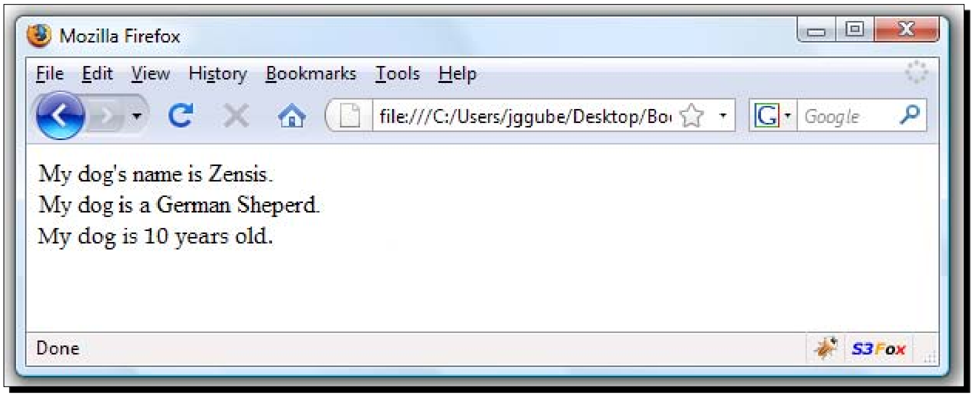
Time for action – determining the value of our options

The following steps help us to determine the value of our options:

1. Right below where we use the `.bark()` method on `myDog`, type in the following code:

```
document.write( 'My dog\'s name is ' + myDog.options.name +
  '.<br />');
document.write( 'My dog is a ' + myDog.options.type + '.<br />');
document.write( 'My dog is ' + myDog.options.age +
  ' years old.<br />');
```

2. Open up your HTML document on the web browser, and after you exit out of the dialog box that `.bark()` calls, you should see something like this:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Google
Done
S3Fox

```
My dog's name is Zensis.
My dog is a German Sheperd.
My dog is 10 years old.
```

Extending classes

Oftentimes, you'll want to extend a class with another class. For example, we might want to extend our `Dog` class with a class for show dogs that may use the same options, but may do other special things.

We can extend classes with the `Extends` property. `Extends` is a property specifically for classes, that not only inherits properties and methods from a parent class, it makes all parent methods available inside a method.

Time for action – extending the ShowDog class with the Dog class

Let's see how we can extend our Dog class using the `Extends` property:

1. Let's clean up the `Dogs` class first by removing the things we don't need any more to tidy up our code. We'll delete the `.sit()` class method, the `myDog.bark()` call, and the `document.write`'s that we used to show the option property values of `myDog`. Here's our revised code:

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>

<script type="text/javascript">
window.addEvent('domready', function()
{
  var Dog = new Class(
  {
    Implements : [ Options ],

   options :
   {
     name : 'Barkee',
     type : 'Poodle',
     age : 4
   },

   initialize : function( options )
   {
     this.setOptions( options );
   },

   bark : function()
   {
     alert( this.options.name + ' is barking.' );
   }
  });
});
</script>
</head>
```

```
<body>
</body>
</html>
```

2. Create the ShowDog class right below the Dog class. Use the following code:

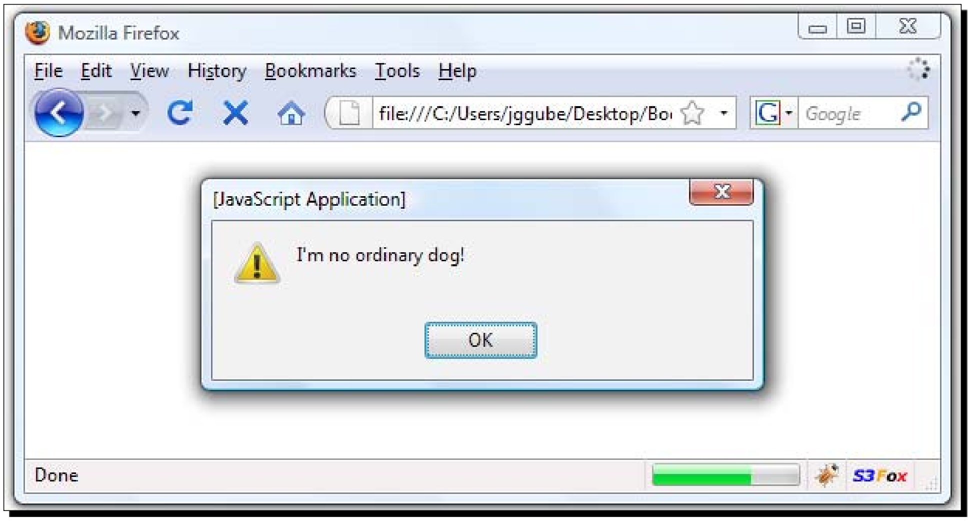
```
var ShowDog = new Class(
{
  Extends : Dog,

  options :
  {
    name : 'Xythian'
  },

  initialize : function( options )
  {
    this.parent( options );
    alert( 'I\'m no ordinary dog!' );
    document.write( 'My name is ' + this.options.name + '<br />');
    document.write( 'I\'m a ' + this.options.type + '<br />');
    document.write( 'I\'m ' + this.options.age + '<br />');
  }
});
```

3. Instantiate a new ShowDog object, like so:

```
var myOtherDog = new ShowDog();
```

We now have the `myOtherDog` object, which is an instance of the ShowDog class that extends the Dog class.

4. Test your HTML document in a browser, and if everything went according to plan, then you should see the following:

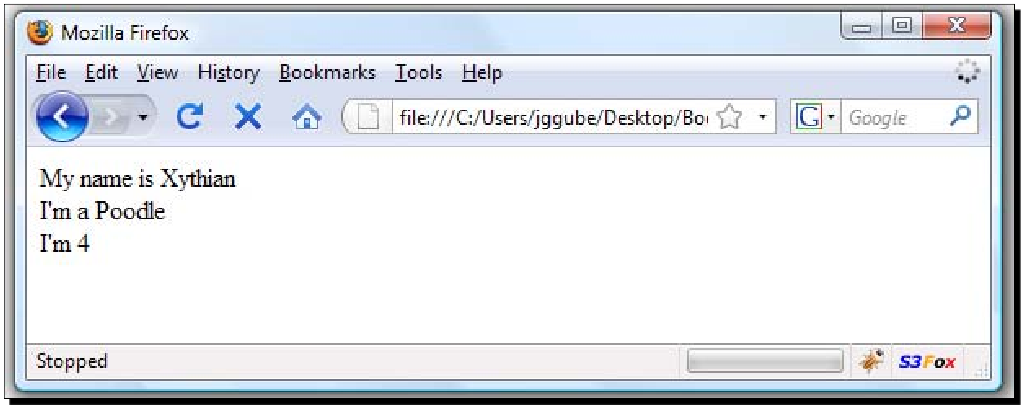

Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Google
Done
S3Fox

[JavaScript Application]

I'm no ordinary dog!

OK

Then, the next thing you would see is as shown:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Google
Stopped
S3Fox

```
My name is Xythian
I'm a Poodle
I'm 4
```

What just happened?

We extended the ShowDogs class with the Dogs class. We did this by using the special class property called Extends, which allows us to assign it the class we're extending it with.

Before we move onto the next topic, we should go over **class inheritance** a little bit.

Class inheritance

Note that the ShowDogs class takes on properties and methods of its parent class (Dogs) if we don't explicitly define them.

For example, since we already defined an Implements property in `Dogs`, we need not do it again for `ShowDogs`. We explicitly defined the name option value (Xythian), when we print the value of it in the document, using the following line:

```
document.write( 'My name is ' + this.options.name + '<br />');
```

It printed "My name is Xythian".

However, we didn't explicitly define the `type` and age option values that we created in the parent class when we performed the following:

```
document.write( 'I\'m a ' + this.options.type + '<br />');
document.write( 'I\'m ' + this.options.age + '<br />');
```

The values took on the default property values we set in `Dogs` (Poodle, and 4).

Have a go hero – doing more with the thing

Why don't you try using the `.bark()` method that's in the `Dog` class on the `myOtherDog` object? What happens? Did it behave like you expected it to?

Using MooTools classes

Now that you know how to create a class in MooTools, it'll be a piece of cake to use the already-existing classes in the MooTools framework. You've already used a MooTools class, whether you know it or not, with the `Options` class that we implemented in the `Dogs` class.

Let's look at another class, the `Chain` class, so that we can explore how to use MooTools classes. And we're going to hit three birds with one stone here: by covering the `Chain` class to see how MooTools classes work in general, you'll also discover a key concept in the MooTools framework—**chainability,** and be able to witness the power of the `Chain` class. Once we're done, it'll be a cinch to use other MooTools classes such as `Fx` class for animation effects (we'll cover in greater detail in a later chapter).

The concept of chainability

Alright, so you caught me, chainability isn't a real word. Chainability refers to MooTools' ability to chain functions in sequence. It follows the concept of a **Stack**, a data structure that follows the principle of "last in, first out". Chaining allows you to create a stack of functions that you can execute in sequential order.

The Chain class

The Chain class, as you would expect, is a class for dealing with a chain of functions. It contains the following useful methods:

- .chain()—pushes one or more functions onto a chain stack
- .callChain()—executes the highest stack order function in our chain stack
- .clearChain()—clears our chain stack

A Chain example

Let's set up an example for showcasing the concept of chaining and the abilities of the Chain class. We're going to create a box using a <div> element that has a width and height of 50px and a background color of blue (hexadecimal value of **#00f**). For convenience, we're going to break my rule of separating style and structure that I discussed in the beginning of this chapter by declaring an inline style attribute. Here's our HTML markup for the <div> element:

```
<div id="box" style="background-color: #00f; height:50px;
width:50px;">&nbsp;</div>
```

> Avoid using inline styles. It's a bad practice, and though development best practices for style and content separation is beyond the scope of this book, I'll make all the efforts I can in advocating the use of best practices. We'll break this rule in this case so that we're focused on the topic at hand and not our CSS and HTML.

Now that we have a nice <div> box to work with, what are we going to do with it?

A look ahead: Chaining Fx.Tween

I don't think I can let you read any more chapters without seeing some cool animation effects. So I'm going to cheat a bit (I hope the editors of this book don't notice that I snuck in some animation effects in this chapter), and jump ahead to use a Fx.Tween class, except that it's just like any other class in MooTools and that it deals with taking two CSS property values and transitions between them.

This is what we're going to do:

1. Move the blue box to the right by tweening its left margin.
2. Double its width (100px).
3. Fade it out.
4. Fade it back in.
5. Tween it back to its original position.

We're going to do this by chaining these four methods one after the other.

Let's write out the methods now:

```
.start('margin-left', 150)
.start('width', 100)
.start(opacity, 0)
.start(opacity, 1)
.start('margin-left', 0)
```

Alright, so we have our HTML markup set up and we already know what methods we're going to stack. Let's get your chain on!

Time for action – create a chain of Fx.Tween methods

Let's see how to create a chain of `Fx.Tween` methods by carrying out the following steps:

1. Create a new HTML document like we always do. It should have the following code:

```
<html>
<head>
<script type="text/javascript" src="mootools-1.2.1-core-nc.js">
</script>

<script type="text/javascript">
window.addEvent('domready', function()
{

});
</script>
</head>
<body>
<div id="box" style="background-color: #00f; height:50px;
width:50px;">&nbsp;</div>
</body>
</html>
```

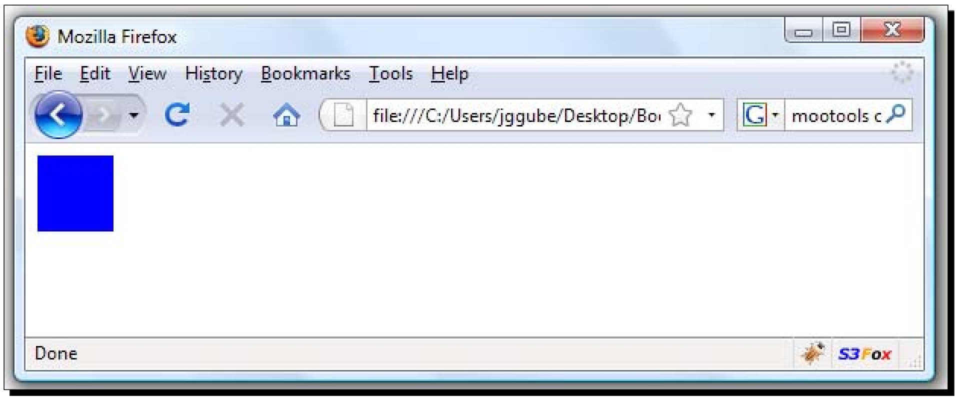
2. Create a new object called `boxAnimation`, an instance of the `Fx.Tween` class, and giving it the target of our box element, which has an `id` of `box`, using the following code in our `domready` event handler:

```
var boxAnimation = new Fx.Tween( $('box') );
```

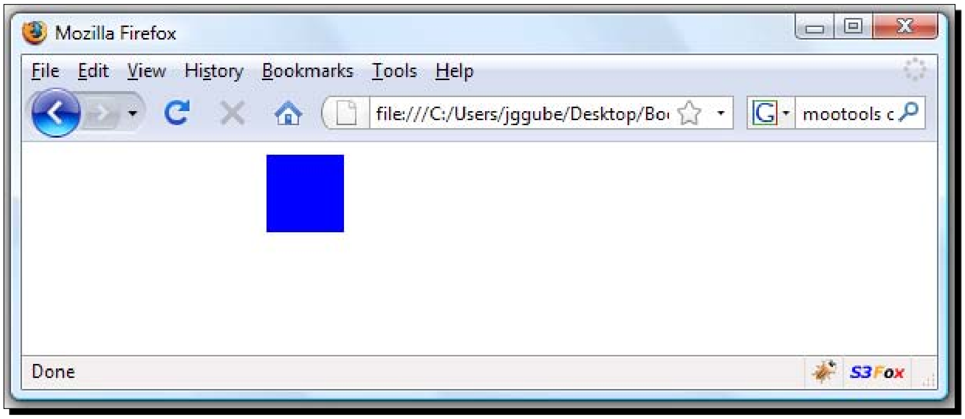
3. Now that we have our `boxAnimation` object, let's apply the first method (moving it to the right by adjusting the left margin) by entering this line of code:

```
boxAnimation.start( 'margin-left', 150 );
```

4. We'll pause here and test our work. Save your document, and open it up in your web browser. You should see the following animation:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

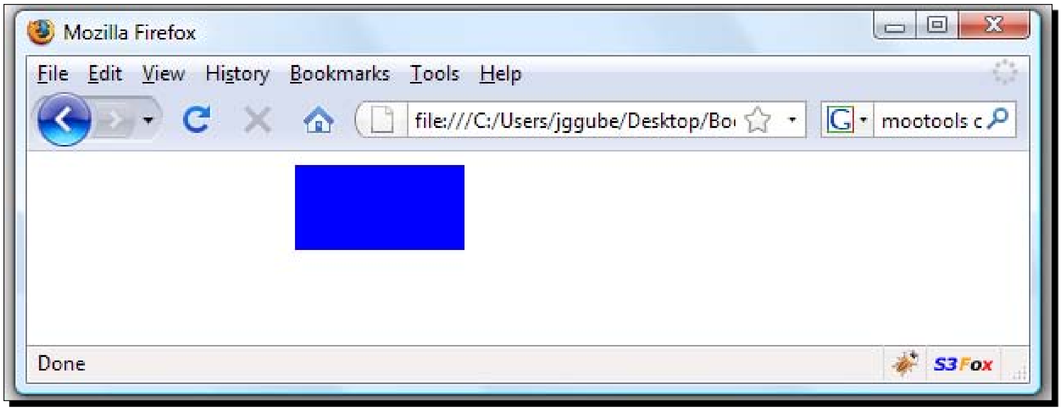
Then, you will see the following animation:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

5. Now, we'll add the second method, and we'll chain it to the previous method. That way, as soon as the first method gets completed, it will start our next method. Here's how to do it:

```
boxAnimation.start( 'margin-left', 150 )
  .chain(function()
  {
   boxAnimation.start( 'width', 100 );
  })
```

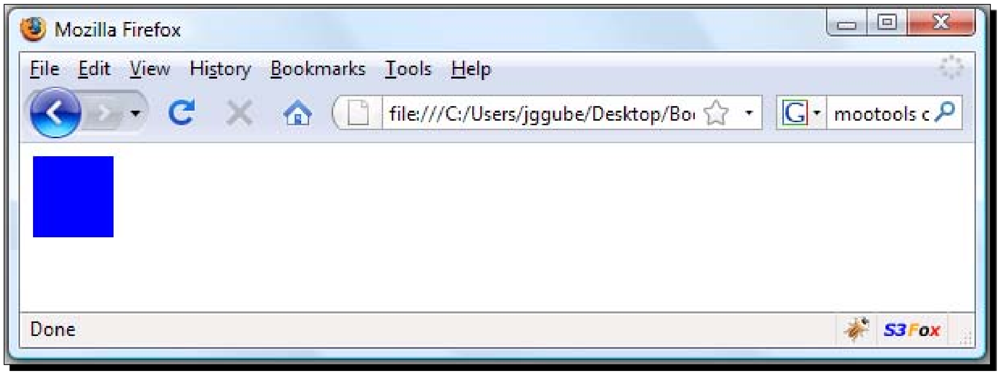
6. You can save and test your work if you wish. If you execute our script, you'll see two consecutive animation effects move to the right and then increase width. This should be what you end up with:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

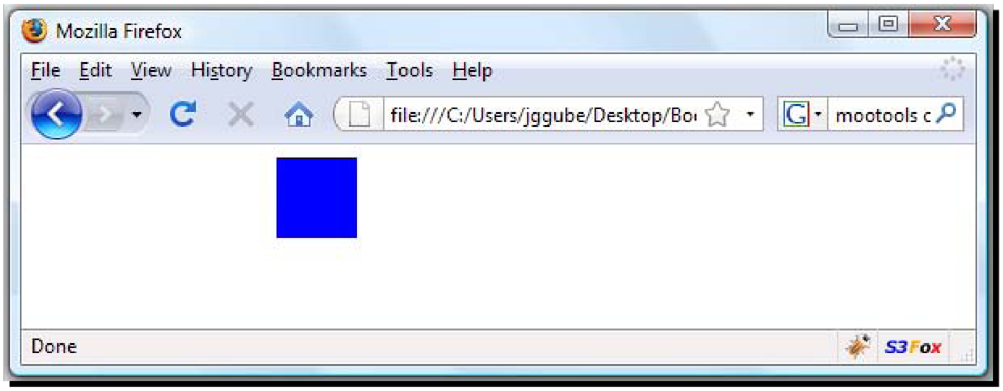
7. Let's add the rest of our chain methods, and this is what we should end up with:

```
  .chain(function()
  {
   boxAnimation.start( 'width', 100 );
  })
 .chain(function()
 {
   boxAnimation.start('opacity', 0);
 })
 .chain(function()
 {
   boxAnimation.start('opacity', 100);
 })
 .chain(function()
 {
   boxAnimation.start('margin-left', 0);
 });
```

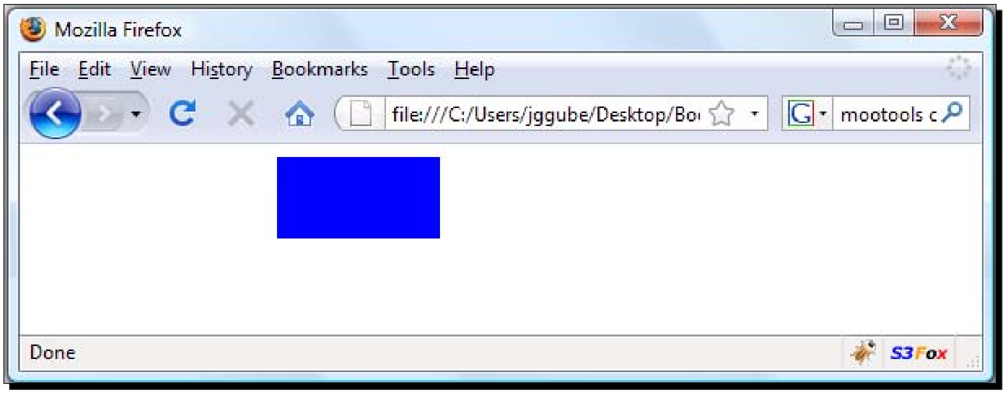
Here's the full sequence of the animation:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

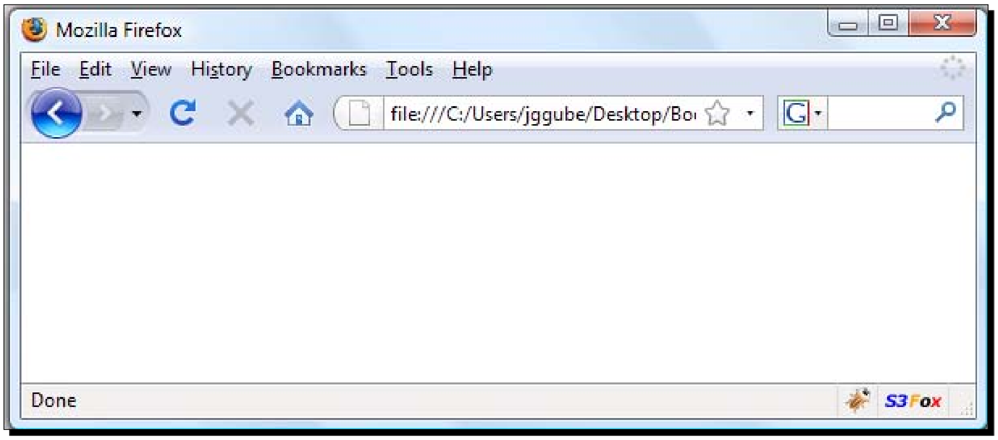
The next goes like this:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

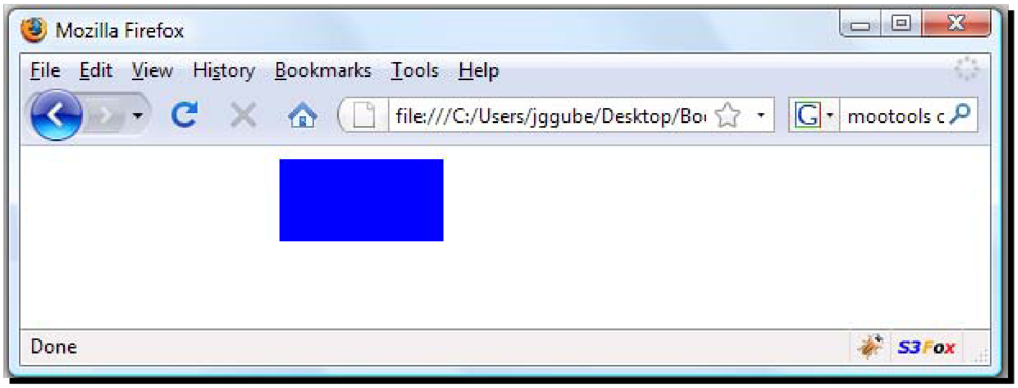
Then comes the following:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

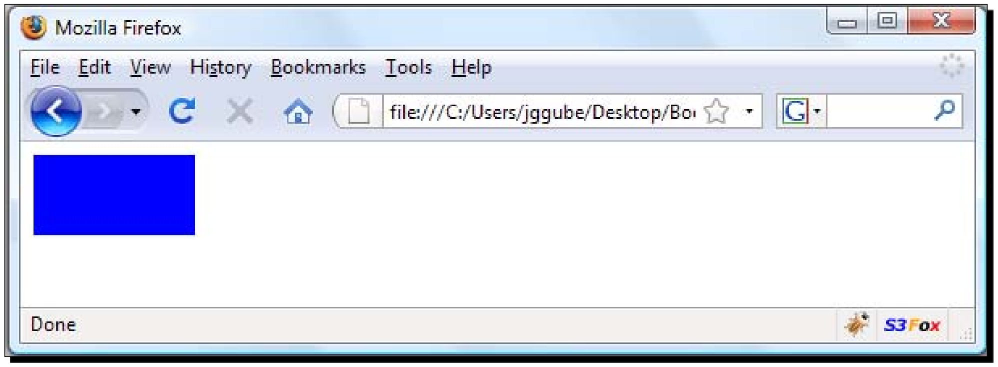
The next in the slide happens to be like the following:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Done
S3Fox

The next slide looks like the following:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
mootools c
Done
S3Fox

Lastly, the one aligned to the left:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggube/Desktop/Bo
Done
S3Fox

What just happened?

Here, we just learned about how to create and instantiate an object of a MooTools class (`Fx.Tween`), and learned how to use a method provided to us by another MooTools class (`Chain`) using the `.chain()` method.

Isn't MooTools classy?

By working through an example of how to chain methods in `Fx.Tween` together (we chained the `.start()` method which is actually in the `Fx` class and is available to classes that extend `Fx`, such as `Fx.Morph`), we're able to see the fundamental structure of MooTools. Its design is very class-based, and we work with objects by creating a blueprint, a template, and so on—oh here I go again!

Chainability

We saw the concept of chaining in this example, and how we can trigger methods one after the other on the same object (in our example, `boxAnimation`).

It doesn't seem so special now, especially since we're just moving and resizing a box, but once we get into the thick of things, like making asynchronous server-side calls where we need to fire off functions in a sequence based on the state returned by our server, you'll see just exactly how great chaining is.

Have a go hero – doing more with chaining Fx.Tween methods

You can try to add or remove chained methods and experiment with different CSS properties. Perhaps you'll want to transition the background color to red (#F00) or adjust the height to double its size (to 100px).

Summary

In this chapter we learned about:

- The concept of unobtrusive JavaScript. We did this by creating an "obtrusive" example and then reworked into an unobtrusive and more elegant solution.
- The concept of classes. We created our own class, explored it, and even extended it with another class. This gives us the basis of the structure and design of the MooTools framework.
- We learned the basics of using a class in MooTools. We used the `Fx.Tween` and `Chain` class to animate a blue box.
- Chainability: We discovered how we can chain methods one after another and execute them in sequence.

Though we covered a lot of theories in this chapter, it was necessary to give us a solid foundation for the next chapters and to give us a full understanding of how to write good MooTools code. Anyone can hack and dice with MooTools, but you now possess the knowledge of writing MooTools code that you can be proud of.

Now that we have some understanding of how to write JavaScript with MooTools, we are going to move right along with the thing you'll be doing the most of with MooTools, selecting and manipulating things in the Document Object Model.

3
Selecting DOM Elements

In the last chapter, we learned about the MooTools syntax as well as JavaScript best practices. More specifically, we discussed unobtrusive JavaScript and how we should separate our structure (HTML) from our website's behaviors (JavaScript).

In order to successfully and effortlessly write unobtrusive JavaScript, we must have a way to point to the `Document Object Model` *(*`DOM`*) elements that we want to manipulate. The DOM is a representation of objects in our HTML and a way to access and manipulate them. In traditional JavaScript, this involves a lot (like, seriously a lot) of code authoring, and in many instances, a lot of head-banging-against-wall-and-pulling-out-hair as you discover a browser quirk that you must solve.*

Let me save you some bumps, bruises, and hair by showing you how to select DOM elements the MooTools way. This chapter will cover how you can utilize MooTools to select/match simple elements (like, "All div elements") up to the most complex and specific elements (like, "All links that are children of a span that has a class of `awesomeLink` *and points to* `http://superAwesomeSite.com`*").*

In this chapter we will look at:

- The `$()` and `$$()` functions
- Selecting HTML elements with pseudo-class selectors
- Selecting HTML elements based on their attributes

So let's get on with it!

MooTools and CSS selectors

MooTools selects an element (or a set of elements) in the DOM using CSS selectors syntax.

Just a quick refresher on CSS terminology; a CSS style rule consists of:

```
selector {
  property: property value;
}
```

- `selector`—indicates what elements will be affected by the style rule
- `property`—refers to the CSS property (also referred to as attribute). For example, `color` is a CSS property, so is `font-style`. You can have multiple property declarations in one style rule.
- `property value`—the value you want assigned to the property. For example, `bold` is a possible CSS property value of the `font-weight` CSS property.

For example, if you wanted to select a paragraph element with an ID of `awesomeParagraph` to give it a red color (in hexadecimal, this is `#ff0`), in CSS syntax you'd write:

```
#awesomeParagraph {
  color: #ff0;
}
```

Also, if I wanted to increase its specificity and make sure that only paragraph elements having an ID of `awesomeParagraph` are selected:

```
p#awesomeParagraph {
  color: #ff0;
}
```

You'll be happy to know that this same syntax ports over to MooTools. What's more is that you'll be able to take advantage of all of CSS3's more complex selection syntax because even though CSS3 isn't supported by all browsers yet, MooTools supports them already. So you don't have to learn another syntax for writing selectors; you can use your existing knowledge of CSS. Awesome, isn't it?

Working with the $() and $$() functions

The `$()` and `$$()` functions are the bread and butter of MooTools. When you're working with unobtrusive JavaScript, you need to specify which elements you want to operate on.

The dollar and dollars functions help you do just that, they will allow you to specify what elements you want to work on.

Notice, the dollar sign **$** is shaped like an S, which we can interpret to mean 'select'.

The $() dollar function

The dollar function is used for getting an element by its ID, which returns a single element that is extended with MooTools Element methods or null if nothing matches. Let's go back to `awesomeParagraph` in the earlier example. If I wanted to select `awesomeParagraph`, this is what I would write:

```
$('awesomeParagraph')
```

By doing so, we can now operate on it by passing methods to the selection. For example, if you wanted to change its style to have a color of red, you can use the `.setStyle()` method which allows you to specify a CSS property and its matching property value, like:

```
$('awesomeParagraph').setStyle('color', '#ff0');
```

The $$() dollars function

The `$$()`function is the big brother of `$()` (that's why it gets an extra dollar sign). The `$$()` function can do more robust and complex selections, can select a group, or groups of elements and always returns an array object, with or without selected elements in it.

Likewise, it can be interchanged with the dollar function. If we wanted to select `awesomeParagraph` using the dollars function, we would write:

```
$$('#awesomeParagraph')
```

Note that you have to use the hash sign (**#**) in this case as if you were using CSS selectors.

When to use which

If you need to select just one element that has an ID, you should use the `$()` function because it performs better in terms of speed than the `$$()` function.

Use the `$$()` function to select multiple elements. In fact, when in doubt, use the `$$()` function because it can do what the `$()` function can do (and more).

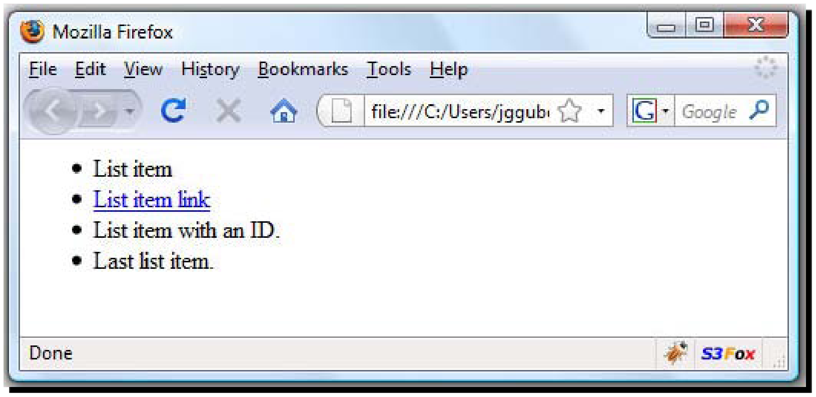
A note on single quotes (') versus double quotes (")

The example above would work even if we used double quotes such as `$("awesomeParagraph")` or `$$("#awesomeParagraph")`, but many MooTools developers prefer single quotes so they don't have to escape characters as much (since the double quote is often used in HTML, you'll have to do `\"` in order not to prematurely end your strings). It's highly recommended that you use single quotes, but hey, it's your life!

Now, let's see these functions in action. Let's start with the HTML markup first. Put the following block of code in an HTML document:

```
<body>
  <ul id="superList">
    <li>List item</li>
    <li><a href="#">List item link</a></li>
    <li id="listItem">List item with an ID.</li>
    <li class="lastItem">Last list item.</li>
  </ul>
</body>
```

What we have here is an unordered list. We'll use it to explore the dollar and dollars function. If you view this in your web browser, you should see something like this:



- List item
- List item link
- List item with an ID.
- Last list item.

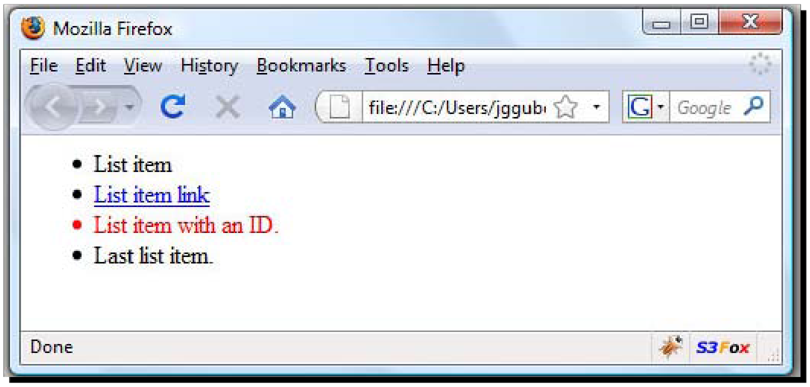
Time for action – selecting an element with the dollar function

Let's select the list item with an ID of `listItem` and then give it a red color using the `.setStyle()` MooTools method.

1. Inside your `window.addEvent('domready')` method, use the following code:

   ```
   $('listItem').setStyle('color', 'red');
   ```

2. Save the HTML document and view it on your web browser.
   You should see the third list item in red.

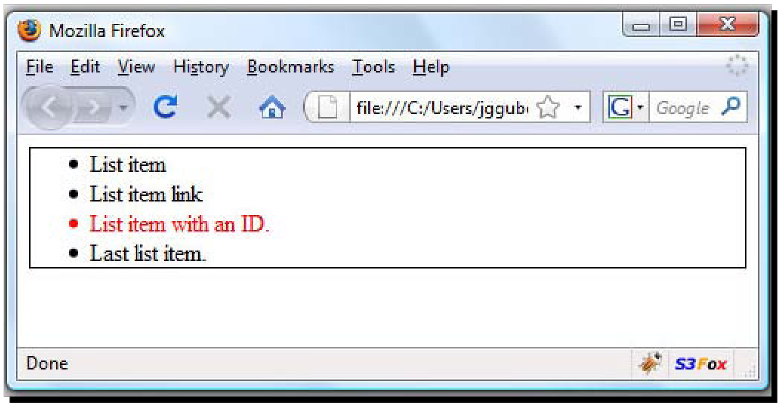


- List item
- List item link
- List item with an ID.
- Last list item.

3. Now let's select the entire unordered list (it has an ID of `superList`), then give it a black border (in hexadecimal, this is **#000000**). Place the following code, right below the line we wrote in step 1:

   ```
   $('superList').setStyle('border', '1px solid #000000');
   ```

4. If you didn't close your HTML document, hit your browser's refresh button. You should now see something like this:



- List item
- List item link
- List item with an ID.
- Last list item.

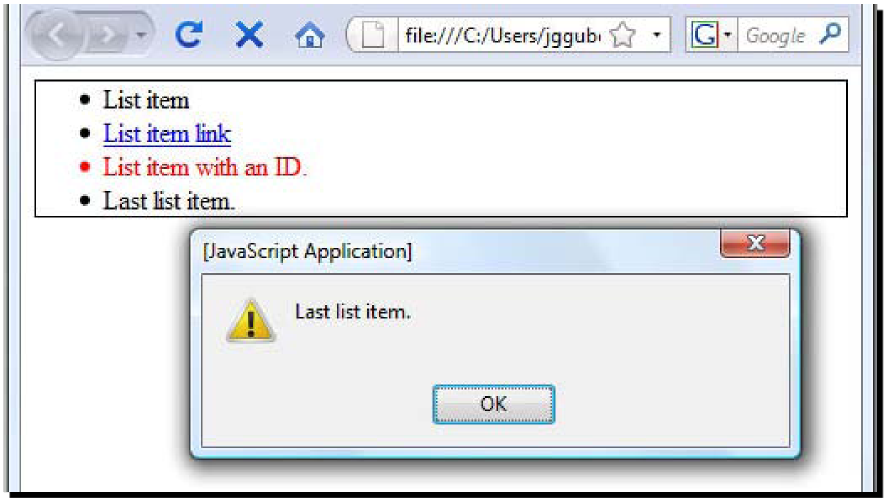
Time for action – selecting elements with the dollars function

We'll be using the same HTML document, but this time, let's explore the dollars function:

1. We're going to select the last list item (it has a class of `lastItem`). Using the `.getFirst()`, we select the first element from the array `$$()` returned. Then, we're going to use the `.get()` method to get its text. To show us what it is, we'll pass it to the `alert()` function. The code to write to accomplish this is:

   ```
   alert( $$('.lastItem').getFirst().get('text') );
   ```

2. Save the HTML document and view it in your web browser (or just hit your browser's refresh button if you still have the HTML document from the preview **Time for action** open). You should now see the following:



- List item
- List item link
- List item with an ID.
- Last list item.

[JavaScript Application]

Last list item.

OK

Time for action – selecting multiple sets of elements with the dollars function

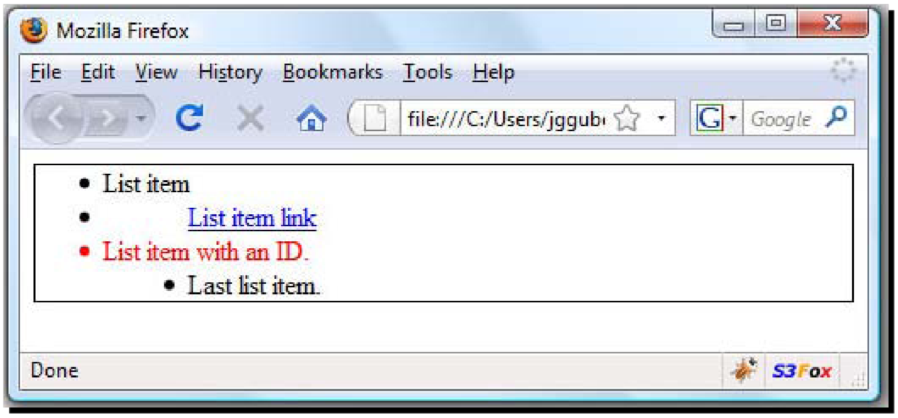
What if we wanted to select multiple sets of elements and run the same method (or methods) on them? Let's do that now.

1. Let's select the list item that has an <a> element inside it and the last list item (`class="lastItem"`), and then animate them to the right by transitioning their `margin-left` CSS property using the `.tween()` method.

2. Right below the line we wrote previously, place the following line:

   ```
   $$('li a, .lastItem').tween('margin-left', '50px');
   ```

3. View your work in your web browser. You should see the second and last list item move to the right by 50 pixels.



- List item
- List item link
- List item with an ID.
- Last list item.

What just happened?

We explored the dollar and dollars functions to see how to select different elements and apply methods to them. You just learned to select:

- An element with an ID (`#listItem` and `#superList`) using the dollar `$()` function
- An element with a class (`.lastItem`) using the dollars `$$()` function
- Multiple elements by separating them with commas (`li`, `a`, and `.lastItem`)
- You also saw how you can execute methods on your selected elements. In the example, we used the `.setStyle()`, `.getFirst()`, `.get()`, and `.tween()` MooTools methods.

Because DOM selection is imperative to writing MooTools code, before we go any further, let's talk about some important points to note about what we just did.

$() versus document.getElementById()

When we used the `$()` dollar function, it's equivalent to using the `.getElementById()` native JavaScript method. The difference is that using `.getElementById()` ends up with longer code and, in Internet Explorer, elements returned by `.getElementById()` are not extended with MooTools Element methods.

If we wanted to perform the same operation using JavaScript's `.getElementById()`, instead of:

```
$('listItem').setStyle('color', 'red');
```

We would first have to declare an object that will contain our desired DOM element, like:

```
var listItem = document.getElementById('listItem');
```

But we have to extend the element with MooTools Element methods, or else `setStyle` will not be available. So we'll change the code a tiny bit:

```
var listItem = $(document.getElementById);
```

Then we'd pass the `.setStyle()` method on our object:

```
listItem.setStyle('color', 'red');
```

Can we all agree that we just saved a lot of typing and that we can worry less about browser issues that may occur using the `.getElementById()` method? I think we can!

Selecting multiple sets of elements

In step 2 of **Time for action – selecting multiple sets of elements with the dollars function**, we selected two sets of elements using one `$$()` function; we matched all <a> tags inside a list item <`li`> and all elements with the class of `lastItem`.

What we did in step 2 is the same as writing:

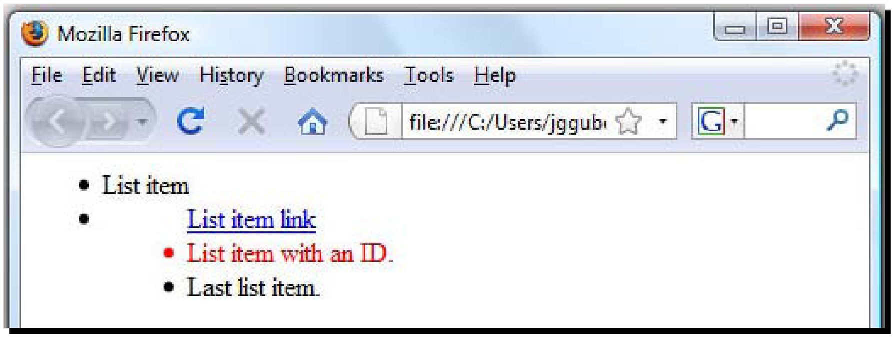
```
$$('li a').tween('margin-left', '50px');
$$('.lastItem').tween('margin-left', '50px');
```

Because one of MooTools' key design principles is to avoid repeating yourself (remember "DRY" in Chapter 2), you use the `$$()` function if you will be performing the same operations on the sets of elements, by separating your selection strings with a comma (`,`).

You can have as many sets of elements as you want.

Have a go hero – tween the list item element

Here's a good point to modify the example we wrote together. Try adding the list item with an ID of `lastItem` to the set of elements that used the `.tween()` method to transition to the left. If you did it correctly, the third list item should also move to the left when you test the script.



- List item
- List item link
  - List item with an ID.
  - Last list item.

Common errors with the dollar and dollars functions

When selecting elements using the `$$()` function, the syntax is exactly like CSS selectors. For example, if we wanted to select all instances of `<a>` that are inside a list item `<li>` tag and give them a color of `red`, in CSS, we'd write:

```
li a {
  color: red;
}
```

The same thing can be done in MooTools using the following line of code:

```
$$('li a').setStyle('color', 'red');
```

The dollar function doesn't work with CSS selectors!

Note the use of an exclamation point here - and you should pause here for a moment, close your eyes, and imagine me shouting this at the top of my lungs to make sure everyone hears it.

The `$()` function doesn't work with CSS selectors like the `$$()` function does because it only takes the ID name, and nothing else. CSS selectors can look like `#awesomeParagraph`, `p#awesomeParagraph`, or `.lastItem`.

A common mistake that MooTools beginners make is trying to do this:

```
$('li a')
```

MooTools interprets the above line as:

"Select the element with the ID of '`li a`'"

and not:

"Select all `<a>` *elements that are inside a list item* `<li>`"

like we intended it to.

So what happens when you do this? If you don't have an element in your web page with the ID of `li a` (which you shouldn't, because spaces are not allowed for IDs as part of HTML standard spec), then `$()` will return null since an element with the id "li a" does not exist.

Drop the pound # sign when using the $() function

If you're going to use the `$$()` function to select an element with an ID of `superList`, you have to write:

```
$$('#superList')
```

Again, imagine you're writing CSS code; you wouldn't write:

```
superList {
  border: 1px solid #000000;
}
```

Instead, you'd write:

```
#superList {
  border: 1px solid #000000;
}
```

But when you're selecting an element by its ID using the `$()` function, always remember to leave out the hash (#) sign because, like I said earlier, the `$()` function doesn't work with CSS selectors.

For example, you'll be disappointed by a JavaScript error if you write this code:

```
$('#superList').setStyle('border', '1px solid #000000');
```

It won't work because you would be selecting an element with an ID name of `#superList` and not `superList` like you intended.

Pop quiz – find the bad apple in the bunch

Which of the following selection operations won't work?

1. $$('ul li a span')
2. **$$('.myClass', 'p.indentedText', 'myID')**
3. $('myID')
4. $("thisID")

Selection using pseudo-classes

MooTools' selection awesomeness is further awesome'ized in its ability to utilize pseudo-classes. Pseudo-class selectors are special selectors that allow you to find items from the DOM using properties that can't be easily deduced using ordinary ID, class, tag, or attribute selectors. Psuedo-class selection will allow you to write complex selection strings; ones that would involve a ton of code if you were to write them in native JavaScript syntax.

A pseudo-class, in CSS3 specifications, allows you to select DOM elements that are difficult to select using normal selectors. The `pseudo-class` concept was introduced as part of CSS3 specifications by the W3C organization (the people in charge of establishing web standards).

Using a pseudo-class is simple, and follows the format:

```
:pseudo-classname
```

Or

```
:(pseudo-classname)
```

[You can read more about the concept of pseudo-classes from the W3C CSS3 Selectors Level 3 Working Draft at
`http://www.w3.org/TR/css3-selectors/#pseudo-classes`]

MooTools has a plethora of pseudo-class selectors that you can readily use, such as `:contains()` pseudo-class which searches for elements containing a certain string of text. For example, to find all paragraphs that have the text **MooTools is l33t**, you would write:

```
$$('p:contains(MooTools is l33t)')
```

If you've ever tried writing a similar piece of code using native JavaScript, you'll know exactly how much pseudo-classes will help you save some time and keep your sanity.

Pseudo-class example: Zebra striping a table

Let's see what pseudo-class selection can do with an example. In the following section, we're going to "zebra stripe" an HTML table, which basically means we're going to make the rows of our table alternate between two colors. Zebra striping a table is usually done to make HTML tables with a lot of data more readable.

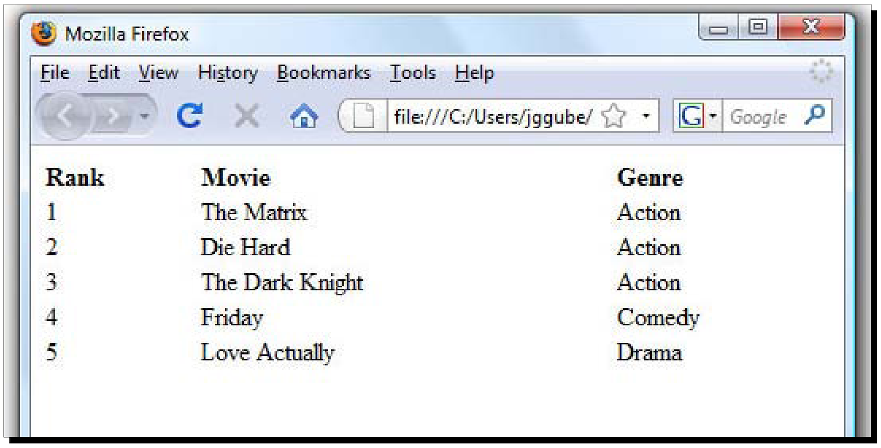
Time for action – using pseudo-classes to zebra stripe a table

Let's set up the markup for our HTML table. It'll have three columns and six rows listing my favorite movies in order.

Pseudo-class example HTML table markup:

```
<body>
<table width="100%" cellpadding="1" cellspacing="0">
  <!-- column headings -->
  <tr>
    <th>Rank</th>
    <th>Movie</th>
    <th>Genre</th>
  </tr>
  <tr>
    <td>1</td>
    <td>The Matrix</td>
    <td>Action</td>
  </tr>
  <tr>
    <td>2</td>
    <td>Die Hard</td>
    <td>Action</td>
  </tr>
  <tr>
    <td>3</td>
    <td>The Dark Knight</td>
    <td>Action</td>
  </tr>
  <tr>
    <td>4</td>
    <td>Friday</td>
    <td>Comedy</td>
  </tr>
  <tr>
    <td>5</td>
    <td>Love Actually</td>
    <td>Drama</td>
  </tr>
</table>
</body>
```

Our HTML table should look like this:

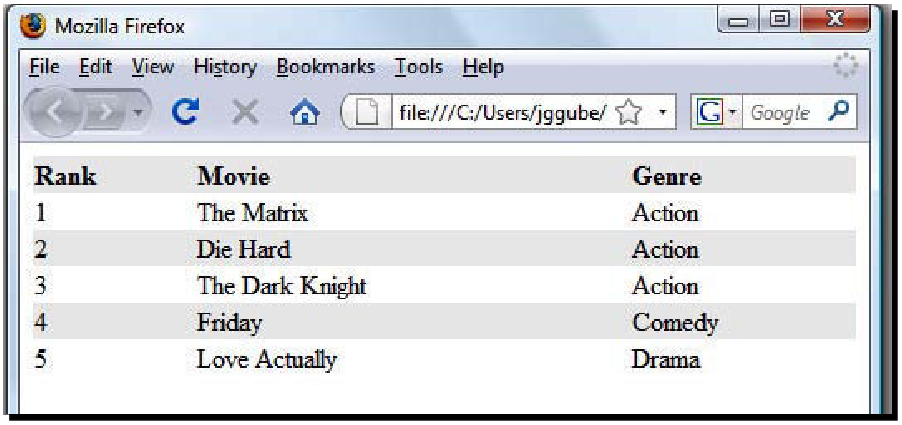


Rank	Movie	Genre
1	The Matrix	Action
2	Die Hard	Action
3	The Dark Knight	Action
4	Friday	Comedy
5	Love Actually	Drama

1. To color even rows with a light gray color, write this line of code (again, we use the `.setStyle()` method):

```
$$('table tr:even').setStyle( 'background-color', '#ebebeb' );
```

2. Save your work. View your document in a web browser. You should see something like this:

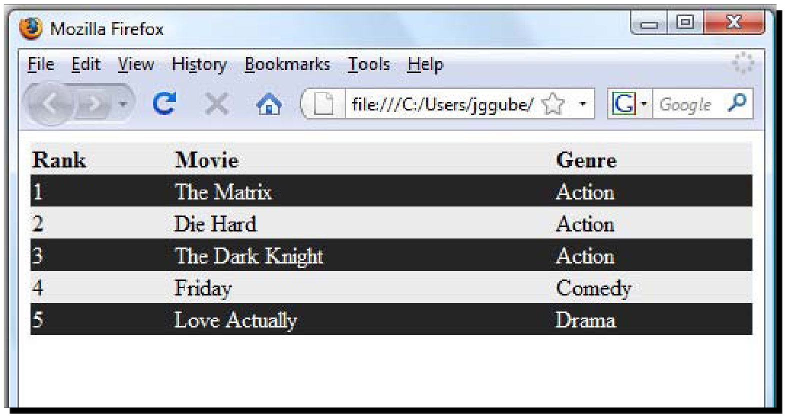


Rank	Movie	Genre
1	The Matrix	Action
2	Die Hard	Action
3	The Dark Knight	Action
4	Friday	Comedy
5	Love Actually	Drama

3. Now we're going to style the odd rows. This time, instead of `.setStyle()`, we're going to use the `.setStyles()` method so that we can supply more than one CSS property/CSS property value pair to be implemented. Here's the code to accomplish what we set out to do (which you can place right below the code in step 1):

   ```
   $$('table tr:odd').setStyles( {
     'background-color' : '#252525',
     'color' : '#ffffff'
   } );
   ```

4. Save and view your work in a web browser. Your HTML table that contains my favorite movies of all time should now look like this:



Rank	Movie	Genre
1	The Matrix	Action
2	Die Hard	Action
3	The Dark Knight	Action
4	Friday	Comedy
5	Love Actually	Drama

What just happened?

We learned one of the many ways in which pseudo-class selectors are helpful. In this case, we took a regular HTML table and zebra striped it so that we have different styles at alternating rows.

To zebra stripe our HTML table, we used the `:even` and `:odd` pseudo-class selectors to change the background color of even rows with a light gray color (#ebebeb in hexadecimal) and all odd rows of our tables with a dark gray background (#252525) with a white foreground color (`#ffffff`).

A couple of notes on the :odd and :even pseudo-class selectors

The `:odd` and `:even` pseudo-classes aren't available in W3C specifications; although the concept of using them is the same, they are custom MooTools pseudo-class selectors.

Secondly, the index of each one starts at 0. Because of this, using `:even` would select the first element (index 0) and third child elements because their index is actually 0 and 2, respectively. So they're kind of switched around in the conventional sense of odd and even.

Other pseudo-class selectors

There are nine MooTools pseudo-class selectors as of version 1.2:

Pseudo-class selector	Description
`:contains`	Matches elements that contain a particular text string. For example, matching all `<div>`'s with the text **I love MooTools** is `$$('div:contains(I love MooTools)')`.
`:empty`	Matches elements that don't contain anything. For example, `$$(div:empty)` would match this: `<div></div>`.
`:enabled`	Matches elements that are enabled. Usually used in `<input>` tags.
`:even`	Matches all child elements that have an even index. For example, if there are four paragraphs, using `$$('p:even')` would select the first and third paragraphs (remember that the index starts at 0).
`:first-child`	Matches the first child element (that is, the child with an index of 0). For example, if there are four paragraphs in a `<div>` element, using `$$('div p:first-child')` would select the first paragraph inside the `<div>` element.
`:last-child`	Matches the last child element (that is, the child with the highest index). For example, if there are four paragraphs in a `<div>` element, `using $$('div p:last-child')` will select the fourth paragraph inside the `<div>` element.
`:not`	Matches elements that do not match a particular selector. For example, matching all `paragraphs` that do not have the class `.intro` would be `$$('p:not(.intro)')`.

Pseudo-class selector	Description
`:nth-child`	Matches the nth expression child element. You can use mathematical expressions. For example, `$$('div:nth-child(3n+1)')` would select the first div (3(0)+1 = index 0 position), 4th div (3(1)+1 = index 4 position)… 3(n)+1 index position. You can also use, as an argument: `even`, `odd`, `first`, and `last` as in `div:nth-child(even)` which is exactly like the `:even` pseudo-class selector.
`:odd`	Matches all child elements with an odd index. For example, if there are four paragraphs, using `$$('p:odd')` would select the second paragraph and fourth paragraph (index 1 position and index 3 position).
`:only-child`	Matches all elements that are the only children of the only child element. For example, `$$(p:only-child)` would match the paragraph `<div><p>only child></p></div>`, but will not match these paragraphs `<div>><p>not an only child></p>><p>not only child></p></div>` because it has a sibling paragraph.

Working with attribute selectors

If you thought MooTools can't get any cooler with element selection, well, it gets much better. MooTools also implements CSS3's **attribute selectors**. An attribute selector allows you to select elements based on their CSS attributes, also commonly referred to as "properties" in MooTools.

For example, an `<input>` tag's `type` is considered one of its attributes (or properties), so is its `class`.

```
<input type="text" name="query" value="" />
```

In MooTools (as well as CSS3), the syntax for an attribute selector is as follows:

```
element[attribute=attribute value]
```

For example, if we wanted to select all `<input>` elements with a type of `text`, we would write:

```
$$('input[type=text]');
```

Attribute selector operators

Attribute selectors can match attribute values in various ways using attribute selector operators. The following table depicts a list and description of each attribute selector operator.

Operator	Description
`=`	Matches attribute value exactly and literally. For example, `$$('a[class=`**`myLinkClass`**`]')` will match all `<a>` elements with the class of `myLinkClass`.
`!=`	Matches all elements with the attribute value that is not the value given. For example, `$$('a[class!=`**`myLinkClass`**`]')` will select all `<a>` elements that don't have the class of `myLinkClass`.
`^=`	Matches all elements with the attribute value that starts with the value given. For example, `$$('img[src^=`**`big`**`]')` will match all images with the `src` attribute value that begin with the word big, such as **big-picture.png** or **biggiesmalls.jpg**.
`$=`	Matches all elements with the attribute value that ends with the value given. For example, `$$('img[src$=`**`.jpg`**`]')` will select all images that end with **.jpg**. Useful in selecting particular file extensions.

Attribute selector example: Styling different types of links

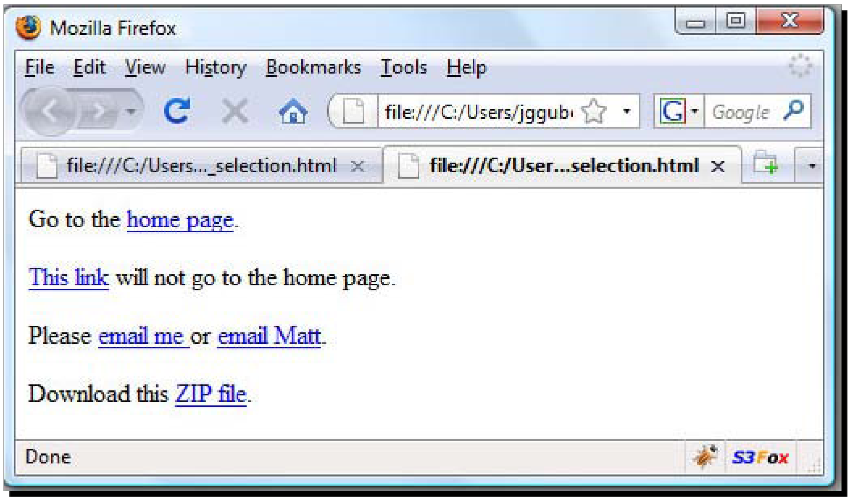
Often, you want to indicate to a user what a particular type of link is. For example, you may want to indicate to the user that a particular link goes to another website or that a link is a `mailto:` link that will open up their default email client. Perhaps, you want to highlight all links that point to a particular domain name like `sixrevisions.com`.

Time for action – using = attribute selector

Let's see exactly what attribute selectors can do. In the following HTML markup, you'll see a variety of links. Just pop this into an HTML document and we'll be good to go:

```
<body>
  <p>Go to the <a href="http://mywebsite.com">home page</a>.</p>
  <p><a href="http://mywebsite.com/about">This link</a> will not go to
    the home page.</p>
  <p>Please <a href="mailto:jacob@mywebsite.com">email me </a>or
  <a href="mailto:matt@mywebsite..com">email Matt</a>.</p>
  <p>Download this <a href="foo.zip">ZIP file</a>.</p>
</body>
```

You should have something like this:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggub
Google
file:///C:/Users..._selection.html
file:///C:/User...selection.html
Done
S3Fox

Go to the home page.

This link will not go to the home page.

Please email me or email Matt.

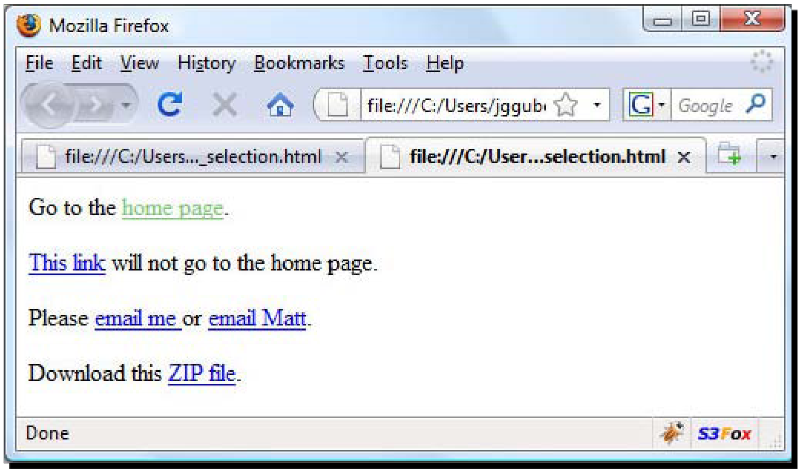
Download this ZIP file.

Let's style the first link with MooTools. Its `href` attribute goes to `http://mywebsite.com`. Let's say that we want all links in our web page to point to the site's home page, and they will be a green color. We'll use the `.setStyle()` method to apply the style.

1. To select all links in a web page that have the `href` attribute of `http://mywebsite.com`, we write:

```
$$('a[href="http://mywebsite.com"]').setStyle('color', '#7cc576');
```

2. Open up your HTML document in a web browser. You should see that the first link is now green:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Users/jggub
Google
file:///C:/Users..._selection.html
file:///C:/User...selection.html
Done
S3Fox

Go to the home page.

This link will not go to the home page.

Please email me or email Matt.

Download this ZIP file.

3. Your JavaScript should look like this at this point:

```
<script type="text/javascript">
window.addEvent('domready', function(){
$$('a[href="http://mywebsite.com"]').setStyle('color', '#7cc576');
});
</script>
```

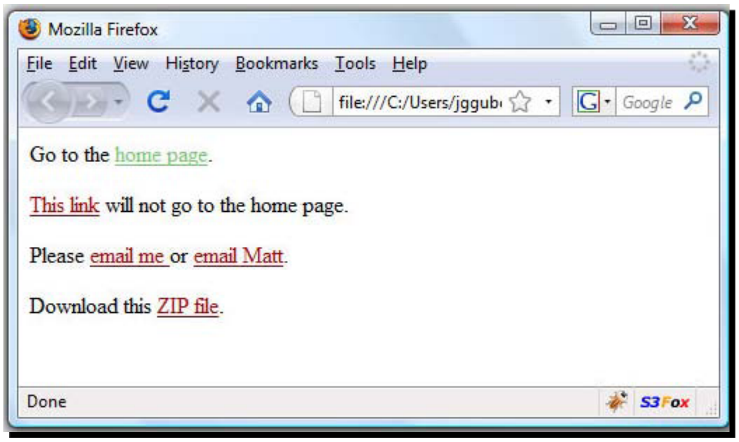
Time for action – using != attribute selector

Now, continuing with our example, we should try out the NOT (`!=`) attribute selector. We're going to color all of the links in the web page that don't point to the home page in red (`#9e0b0f`).

1. To color all links that don't go to `http://mywebsite.com`, we write this after our previous line of JavaScript:

```
$$('a[href!="http://mywebsite.com"]').setStyle('color',
'#9e0b0f');
```

2. Save your work and open or refresh your web browser to view what our HTML document looks like now. You should see something like this:



Go to the home page.

This link will not go to the home page.

Please email me or email Matt.

Download this ZIP file.

3. Your JavaScript should look like this at this point:

```
<script type="text/javascript">
window.addEvent('domready', function(){
$$('a[href="http://mywebsite.com"]').setStyle('color', '#7cc576');
$$('a[href!="http://mywebsite.com"]').setStyle('color',
'#9e0b0f');


});
</script>
```

Time for action – using ^= attribute selector

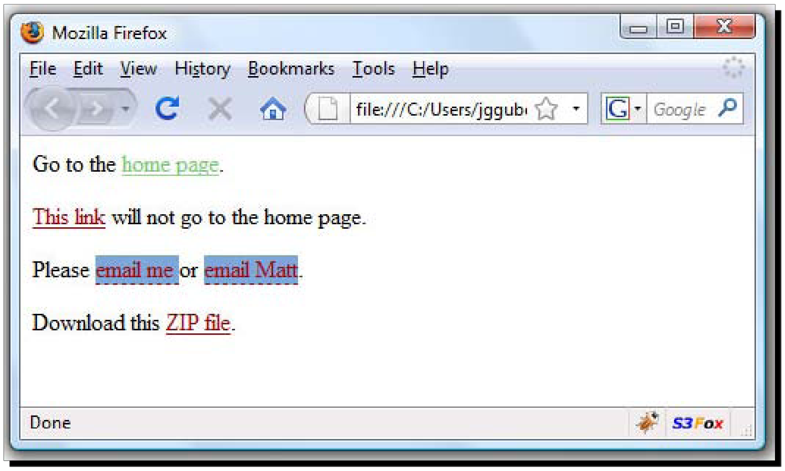
For all hyperlinks that have the `mailto:` attribute value inside its `href` attribute, let's make their underline dashed, and then give them a light blue color. This can give users a visual clue that the link they're going to be clicking on will open up their default email client.

Since we have to set multiple CSS properties, we'll use the `.setStyles()` method.

1. To select all links that start with the `mailto:` value in its `href` attribute, we write the following after our previous line of JavaScript:

```
$$('a[href^=mailto:]').setStyles({
   // Remove link  underline first
   'text-decoration' : 'none',
   // Add a dashed bottom border
   'border-bottom' : '1px dashed #9e0b0f',
   // Set background color
   'background-color' : '#7da7d9'
 });
```

2. Open or refresh your HTML document. If all went according to plan, you should see the two links with the `mailto:` attribute styled in a similar fashion, as the screenshot below:



Go to the home page.

This link will not go to the home page.

Please email me or email Matt.

Download this ZIP file.

3. Your JavaScript should look like this at this point:

```
<script type="text/javascript">
window.addEvent('domready', function(){
$$('a[href="http://mywebsite.com"]').setStyle('color', '#7cc576');

$$('a[href!="http://mywebsite.com"]').setStyle('color',
'#9e0b0f');

$$('a[href^=mailto:]').setStyles({
   // Remove link  underline first
   'text-decoration' : 'none',
   // Add a dashed bottom border
   'border-bottom' : '1px dashed #9e0b0f',
   // Set background color
   'background-color' : '#7da7d9'
 });

});
</script>
```

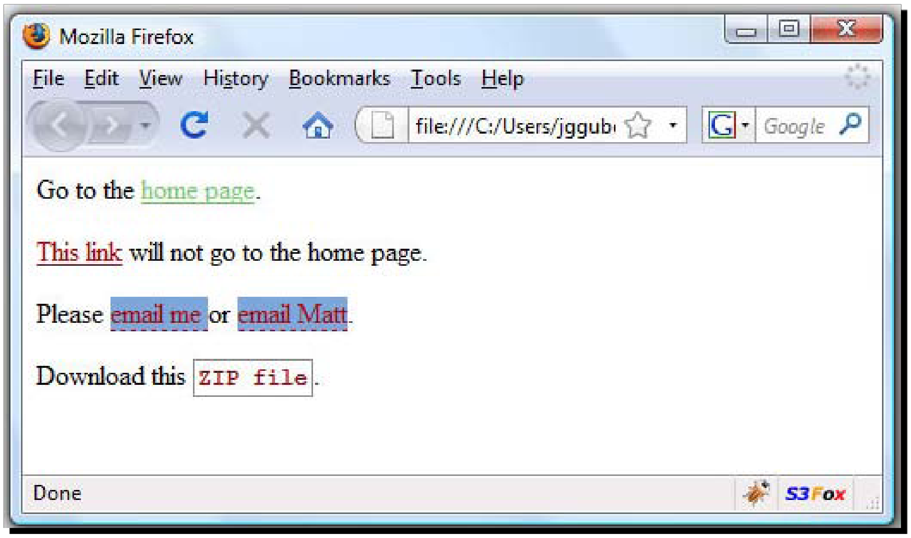
Time for action – using $= attribute selector

Let's give the link that points to a ZIP file a different font style and a gray border by utilizing the $= attribute selector. This can be helpful in distinguishing links that will prompt the user to download a file from a web page.

1. In order to give links that point to a ZIP file a different style, use the $= as follows, after the previously entered JavaScript code:

```
$$('a[href$=.zip]').setStyles({
   // Remove link underline first
   'text-decoration' : 'none',
   // Assign a different font style
   'font' : 'bold 14px "Courier New"',
   // Give them some padding
   'padding' : 2,
   //Add a solid gray border around the link
   'border' : '1px solid #898989',

 });
```

2. Open or refresh your web browser and you should see something like this:



Go to the home page.

This link will not go to the home page.

Please email me or email Matt.

Download this ZIP file.

3. Your JavaScript should look like this at this point:

```
<script type="text/javascript">
window.addEvent('domready', function(){
$$('a[href="http://mywebsite.com"]').setStyle('color', '#7cc576');

$$('a[href!="http://mywebsite.com"]').setStyle('color',
'#9e0b0f');

$$('a[href^=mailto:]').setStyles({
   // Remove link  underline first
   'text-decoration' : 'none',
   // Add a dashed bottom border
   'border-bottom' : '1px dashed #9e0b0f',
   // Set background color
   'background-color' : '#7da7d9'
 });

$$('a[href$=.zip]').setStyles({
   // Remove link underline first
   'text-decoration' : 'none',
   // Assign a different font style
   'font' : 'bold 14px "Courier New"',
   // Give them some padding
   'padding' : 2,
   //Add a solid gray border around the link
   'border' : '1px solid #898989',

 });

});
</script>
```

What just happened?

We experienced how attribute selectors can help us write complex DOM selections. More specifically, we:

- Used the = attribute selector to select all links that point to `http://mywebsite.com` and assigned them a green color
- Used the `!=` attribute selector to select all links that don't point to `http://mywebsite.com` and gave them a red color
- Used the ^= attribute selector to select all links that have an `href` attribute value that begins with `mailto:` to give users a visual clue that when the link is clicked, it will open up their default mail client; we gave these links a dashed underline and light blue background.
- Used the $= attribute selector to select all links that have an `href` attribute value the end in `.zip` to distinguish links that point to ZIP files; we gave these links a different font style and a gray border.

Attribute selector case sensitivity

When using attribute selectors, the criteria values you give them are case-sensitive. For example, in the example that uses `http://mywebsite.com` as the criteria for the = attribute selector, writing:

```
$$('a[href!="http://MyWebsite.Com"]').setStyle('color', '#9e0b0f');
```

This will not work! It's important to make sure you have the exact cases for the values you're trying to match. You'll have to extend your selector if you want to match different strings.

A common problem is in file extensions. Many people will write `.ZIP` as well as `.zip`, so your selector should look like this:

```
$$('a[href$=.zip], a[href$=.ZIP"]').setStyles({
...
 });
```

Note that we just added another selector string that matches all links with an `href` attribute value that ends in `.ZIP`.

DOM selection makes unobtrusive JavaScript do-able

Throughout this chapter, we've just seen how to create very narrow and refined DOM element selections. This will enable us to pinpoint exactly the elements we need to operate on.

What this means is that we're able to write JavaScript without touching our HTML markup. We simply have to hone into the elements we want to work on using the selection techniques we learned in this chapter.

Summary

In this chapter we learned about:

- The `$()` and `$$()` functions: how to use them to select DOM elements
- Pseudo-class selectors: how to use them to select otherwise difficult sets of DOM elements such as "all even rows of a table"
- Attribute selectors: how to further refine our selections by matching attribute (otherwise known as properties) values of elements in the DOM

We also discussed how the `$$()`function uses a similar syntax to CSS selectors, common mistakes to avoid in using the dollar and dollars functions, as well as the case sensitivity of attribute selector criteria.

Now that we've learned about selecting DOM elements, we'll learn other things we can do to manipulate the DOM to our will (cue evil 'muhahaha' laughter), and that's in the next chapter.

4
The Core's Useful Utility Functions

In this chapter, we'll be investigating the MooTools Core component which contains a collection of useful utility/helper functions and properties that we can use to write less code and obtain information about the browser client.

In this chapter we shall:

- Learn about browser properties that MooTools makes available to us, and how to use them to gain more data about our users
- Explore the Core's utility functions in order to discover functions that will make writing JavaScript easier

So let's get on with it!

What is the Core?

The Core is a MooTools component (`Core.js`) that contains a plethora of useful functions that deal with common JavaScript tasks, such as checking if the objects are defined, and merging the objects into one.

The Core is split into two sub-components: **Browser**, which gives you a set of tools for acquiring information about the client accessing your scripts, and **Core**, which contains a mixture of helpful functions for dealing with everyday JavaScript-related processes.

Browser: Getting information about the client

There are plenty of reasons why you would want to gain insight about the people viewing your web pages. For example, if you'd like to determine what the most popular web browser accessing your website/web application is, or what operating system people use, then you can use MooTools in conjunction with a server-side scripting language (like PHP), and a database (like MySQL), to mine this information.

The Browser component can do three things:

1. Determine whether a browser has a specific feature (`Browser.Features`)
2. What rendering engine (`Browser.Engine`) it uses
3. What operating system (`Browser.Platform`) the client is running on

Determining if the client has a specific feature

MooTools can help you find out whether or not **XPath** (a querying language for XML documents) or the `XMLHTTP` object (used for Ajax) are available in the client browser by using `Browser.Features`.

Browser.Features.xpath

`Browser.Features.xpath` returns a Boolean value (true or false).

By writing:

```
alert(Browser.Features.xpath)
```

You will be alerted whether or not the browser being used to view the web page supports xPath.

Browser.Features.xhr

`Browser.Features.xhr` works the same way as `Browser.Features.xpath` by evaluating `true` if the browser supports the XMLHTTP object.

Getting information about the client's rendering engine

A browser **rendering engine**, also known as a **layout engine**, is what the browser uses to interpret markup (HTML) and formatting/styles (CSS). For example, Microsoft's Internet Explorer browser uses the Trident rendering engine and Mozilla Firefox uses the Gecko rendering engine.

Knowing the client's rendering engine will enable you to deal with browser quirks more effectively using JavaScript-based techniques.

Let's go over some of the things `Browser.Engine` can do for us.

Determining the client's rendering engine and version

`Browser.Engine.name` returns a string value of the name of the rendering engine. `Browser.Engine.version` returns a string value of the version of the rendering engine. Let's see these two in action.

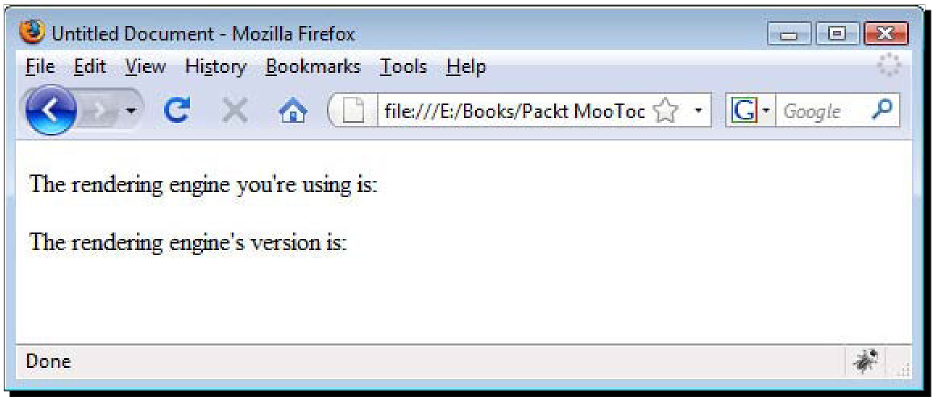
Time for action – determining the client's rendering engine and version

We're going to check what rendering engine you're using. If you have several browsers installed in your work station, try the same script in all of them:

1. For the markup, you can use the following:

```
<body>
<div id="browser-info">
    <p>The rendering engine you're using is: </p>
    <p>The rendering engine's version is: </p>
</div>
</body>
```

2. Open your HTML document in a browser to preview your work. You should see the following figure (it shouldn't have the rendering engine information yet):


Untitled Document - Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///E:/Books/Packt MooToc
Google
Done

The rendering engine you're using is:

The rendering engine's version is:

3. We'll get information about the browser engine name and version using `Browser.Engine.name` and `Browser.Engine.version`, and then assign them to the variables `browserEngine` and `browserEngineVersion`. If for some reason we can't determine the values, we assign them values "Unknown" by using `||` (which means "or"). To do this write:

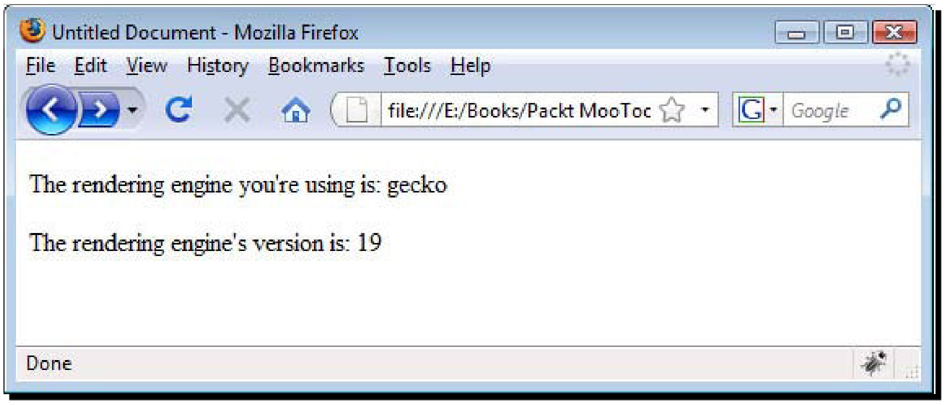
```
var browserEngine = Browser.Engine.name || "Unknown";
var browserEngineVersion = Browser.Engine.version || "Unknown";
```

4. Now we'll use the `.appendText()` method to add to the `browserEngine` and `browserEngineVersion` at the end of their respective paragraphs. Right below the code in step 3, do the following:

```
//Selects the first paragraph
$$('#browser-info p:first-child').appendText(browserEngine);
// Selects the last paragraph
$$('#browser-info p:last-child')
                            .appendText(browserEngineVersion);
```

5. Now refresh your browser. Depending on your web browser, you should see something similar to one of the following:

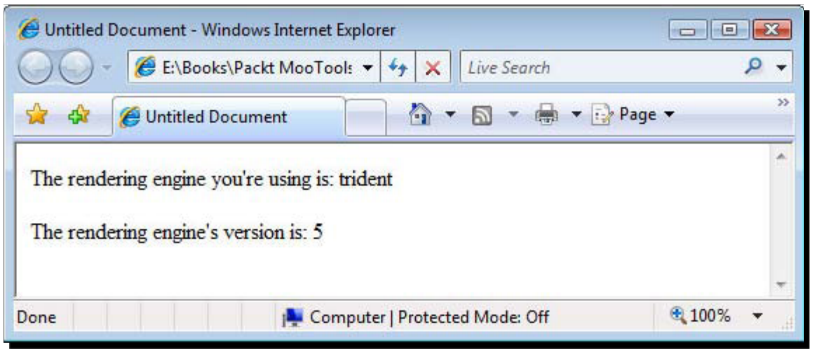
- Mozilla Firefox 3.0


Untitled Document - Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///E:/Books/Packt MooToc
Google
Done

The rendering engine you're using is: gecko

The rendering engine's version is: 19

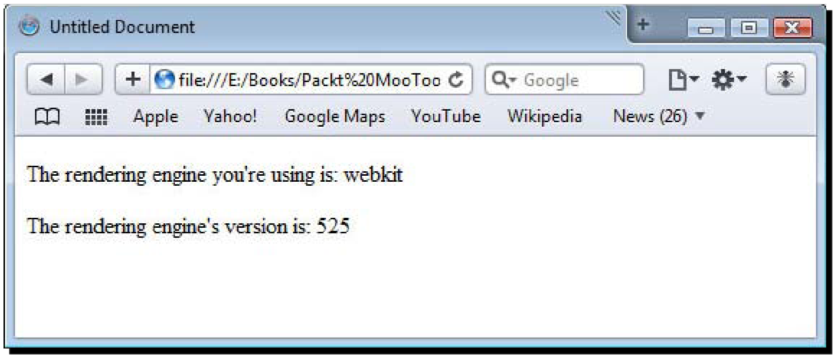
- Internet Explorer 7.0


Untitled Document - Windows Internet Explorer
E:\Books\Packt MooTools
Live Search
Untitled Document
Page
Done
Computer | Protected Mode: Off
100%

The rendering engine you're using is: trident

The rendering engine's version is: 5

- Safari 4.0 beta



The rendering engine you're using is: webkit

The rendering engine's version is: 525

6. Your JavaScript should look like the following:

```
<script type="text/javascript">
window.addEvent('domready', function(){
var browserEngine = Browser.Engine.name || 'Unknown';
var browserEngineVersion = Browser.Engine.version || 'Unknown';

//Selects the first paragraph
$$('#browser-info p:first-child').appendText(browserEngine);

// Selects the last paragraph
$$('#browser-info p:last-child').appendText(browserEngineVersion);
}
</script>
```

Checking if the client is using a particular web browser

`Browser.Engine` can check what particular rendering engine the client is using. This is especially helpful if you want to do something specifically for a particular browser, such as serving a script to fix a browser rendering quirk for certain browsers.

The following block of code (for example), would display "You're using Internet Explorer" if your MooTools detects the Trident layout engine.

```
if(Browser.Engine.trident){
   alert('You\'re using Internet Explorer');
} else{
   alert('You\'re not using Internet Explorer');
}
```

In the following table, you will see the `Browser.Engine` properties for common rendering engines and some of the browsers that use them. They return a Boolean value of either true or false.

Property	Rendering Engine	Some browsers that use it
`Browser.Engine.gecko`	Gecko	Mozilla Firefox, Flock, SeaMonkey, K-Meleon, Netscape 9
`Browser.Engine.presto`	Presto	Opera
`Browser.Engine.trident`	Trident	Internet Explorer
`Browser.Engine.webkit`	WebKit	Safari

Have a go hero – checking to see if your browser uses Gecko

Why don't you try out the previous example to check for Gecko, which Mozilla-based browsers (Firefox and SeaMonkey) use. Just change `Browser.Engine.trident` in the `if` statement to the appropriate browser property.

Determining if the client has Adobe Flash installed

If you work with Flash, it's often beneficial to check whether the client has the Flash plugin installed, so that if they don't, you can perform an alternative action, such as displaying a message with instructions on how to obtain the Flash plugin.

You can use `Browser.Plugins.Flash.version` to determine what version of Flash the user has. If the property returns a null value, then the client doesn't have Flash installed.

In the following example, if the client has the Flash plugin installed, it will output: "Flash plugin detected and the version is: #versionnumber" if MooTools can detect it.

```
if(Browser.Plugins.Flash.version){
   alert('Flash plugin detected and the version is: '+Browser.Plugins.
Flash.version);
} else{
   alert('Flash plugin not detected');
}
});
```

Alternatively, you can use `Browser.Plugins.Flash.build` to find out what the Flash plugin build is.

Finding out information about the client's operating system

Often, it's valuable to find out what operating system (Windows, Linux, Mac OS) the client uses. The `Browser.Platform` property will allow us to do just that.

The following table showcases all the properties available for `Browser.Platform`:

Property	**Platform**	**What it will tell you**
`Browser.Platform.mac`	Mac OS	Boolean. Will return true if the client uses the Mac OS platform.
`Browser.Platform.linux`	Linux-based	Boolean. Will return true if the client uses the Linux operating system.
`Browser.Platform.ipod`	iPhone or iPod touch	Boolean. Will return true if the client uses an iPhone or iPod touch to access the web page.
`Browser.Platform.other`	Other platforms	Boolean. It will return true if the client's platform is not any of the above platforms.
`Browser.Platform.name`	N/A	String. Will return the name of the client's platform.

Potential uses of this property

You can gain information about your site's visitors by using this property in conjunction with server-side scripting and a database.

Perhaps though, a common usage of "platform-sniffing" is when you're offering downloads on your site and want to tailor the download page specifically to the client platform. Wouldn't it be cool if you could change the page on-the-fly and customize the user experience based on the operating system they're using?

Example scenario: Offering the correct download based on the client's platform

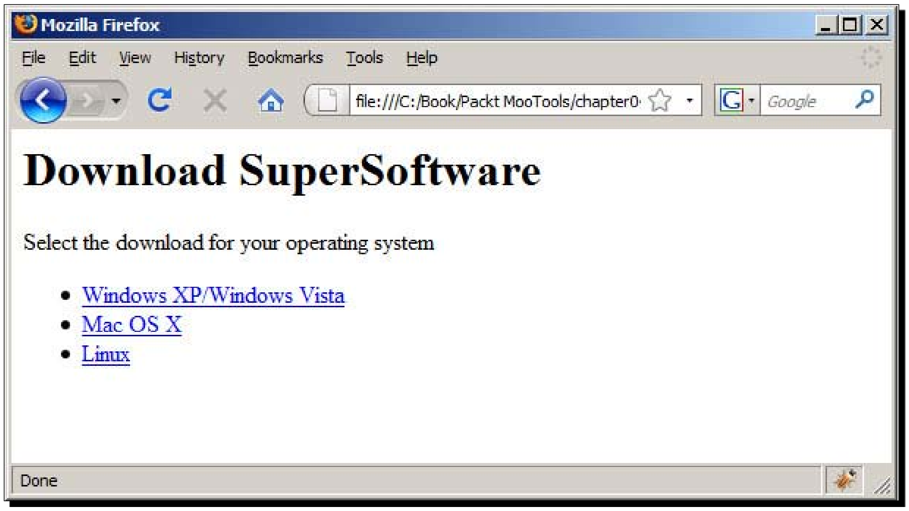
Let's pretend that you're a software application developer and that you just created an awesome application called SuperSoftware. There are multiple versions of it so that people with the Windows, Mac OS, and Linux machines can use SuperSoftware.

Let's set up the markup first.

SuperSoftware HTML

The HTML is simple; just a level 1 heading tag for the web page, a paragraph with instructions (`p class="instructions"`), and an unordered list with download options (`ul class="download-options"`).

```
<body>
   <h1>Download SuperSoftware</h1>
    <p id="instructions">Select the download for your operating
         system</p>
    <ul class="download-options">
        <li><a href='win.zip'>Windows XP/Windows Vista</a></li>
        <li><a href='mac.zip'>Mac OS X</a></li>
        <li><a href='linux.zip'>Linux</a></li>
    </ul>
</body>
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter0
Google
Done

Download SuperSoftware

Select the download for your operating system

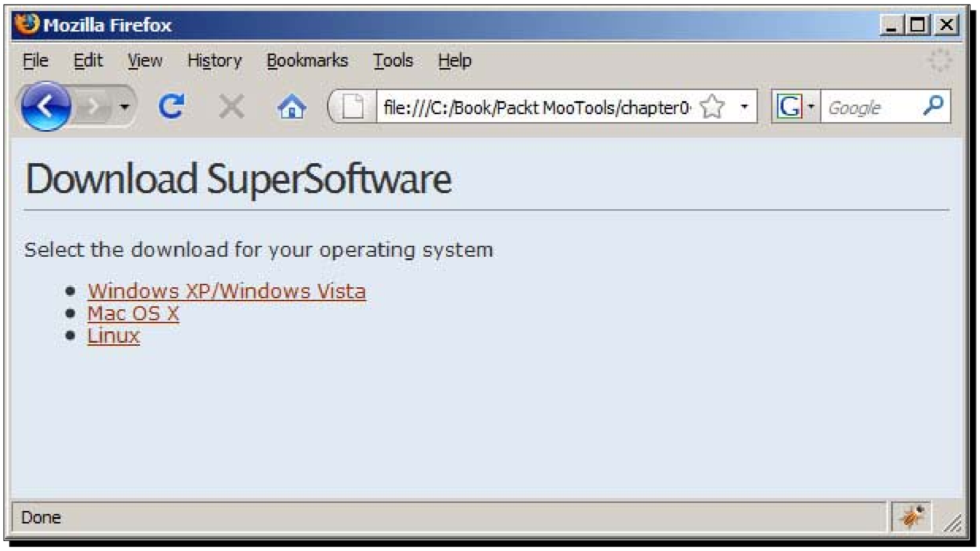
- Windows XP/Windows Vista
- Mac OS X
- Linux

Now we have our markup set up and the above figure is what our download page will look like without CSS or JavaScript. People will still be able to access the download links without JavaScript or CSS, but we should probably make it prettier with some CSS.

SuperSoftware CSS

For styles, we just change the body background color, the default font family and colors, and place a border at the bottom of our <h1> tag to separate it from the page content.

```
body {
   background-color: #e0e9f3;
   font:normal 12px/14px Verdana, Geneva, sans-serif;
   color:#333;
}
h1 {
   font:normal 26px "Lucida Sans Unicode", "Lucida Grande",
     sans-serif;
   padding-bottom:5px;
   letter-spacing:-2px;
   border-bottom:1px solid #999;
}
a {
   color:#930;
}
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter0
Google
Done

Download SuperSoftware

Select the download for your operating system

- Windows XP/Windows Vista
- Mac OS X
- Linux

With just a few CSS style rules, our download page looks a bit better. Now it's time to supercharge SuperSoftware's download page with MooTools!

Time for action – using Browser.Platform to customize SuperSoftware's download page

We'll use the `Browser.Platform` property to detect what platform the client uses so that we can tailor the page based on the user's operating system.

1. Let's figure out what the user's operating system is and put it in a variable called `userPlatform`. The values will be of a string data type and will be of the following values: `win` (for Windows), `mac` (for Mac OS), `linux` (for Linux machines), `ipod` (Apple iPhone and Apple iPod touch), and `other` (platform can't be detected or is unrecognized).

```
window.addEvent('domready', function(){
   var userPlatform = Browser.Platform.name;
});
```

2. Next, we build a function called `pageCustomizer` that will customize our page. We'll pass `userPlatform` (later on) to it so that it knows what platform it'll be working with. Let's set that up now:

```
window.addEvent('domready', function(){
   var userPlatform = Browser.Platform.name;

// Customizes download page depending on client's platform
   var pageCustomizer = function(platform) {
      // ...code goes here...
}
});
```

3. `pageCustomizer` will have three local variables: `platformNameFull` which will contain the full name of the platform, `instructions`, which will be assigned instructions that are specific to a particular platform, and `downloadURL`, which is the location of the file for the particular platform.

   We'll display all of these in the download page. Let's declare them now so that they're ready to be used.

```
   var pageCustomizer = function (platform) {
      var platformNameFull = '';
      var instructions = '';
      var downloadURL = '';
   }
```

4. Next, we need a control structure. We'll use `if/else` statements to give `platformNameFull` and `instructions` the appropriate values.

```
        // Control structure
        if(platform == 'win') {

        } else if(platform == 'mac') {

        } else if(platform == 'linux') {

        } else {
           // If the platform is iPod or other
        }
```

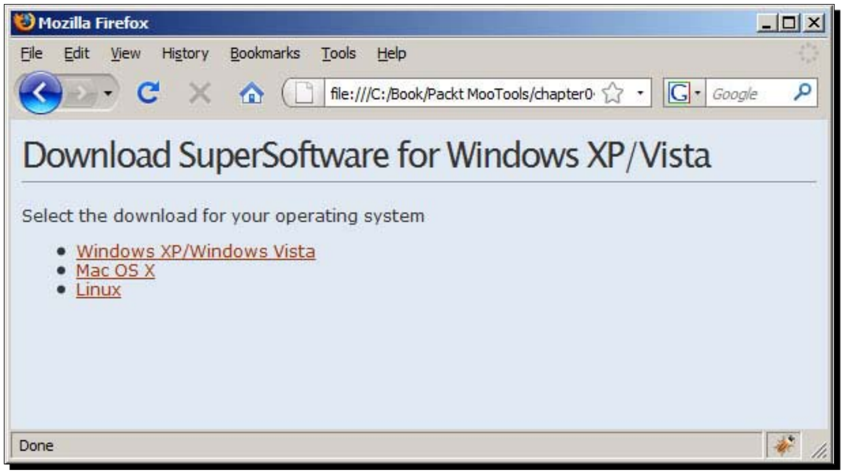
5. Let's assign values for `platformNameFull` and instructions. You can assign them any string values, but this is what I used:

```
              // Control stucture
        if(platform == 'win') {
           platformNameFull = ' for Windows XP/Vista';
           instructions = 'We recommend installing SuperSoftware in
                           C:\\Program Files';
           downloadURL = 'win.zip';
        } else if(platform == 'mac') {
           platformNameFull = 'for Mac OS X';
           instructions = ' Mac OS X users should be aware of a
             minor bug in SuperSoftware. <a href="mac-bug.html">
             See this page for details.</a>';
           downloadURL = 'mac.zip';
        } else if(platform == 'linux') {
           platformNameFull = 'for Linux';
           instructions = ' Ubuntu users may experience some
                           sluggishness with SuperSoftware.';
           downloadURL = 'linux.zip';
        } else {
           instructions = 'We couldn\'t detect your operating
            system. Please select a compatible download link below';
        }
```

6. Let's manipulate the <h1> tag to display the operating system we detected.

```
     // Display full name of platform.
     $$('h1').appendText(platformNameFull);
```

Our first page customization is done! Here's what our page looks like now in a Windows platform (notice the title page has changed to display the full name of the platform).


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter0
Google
Done

Download SuperSoftware for Windows XP/Vista

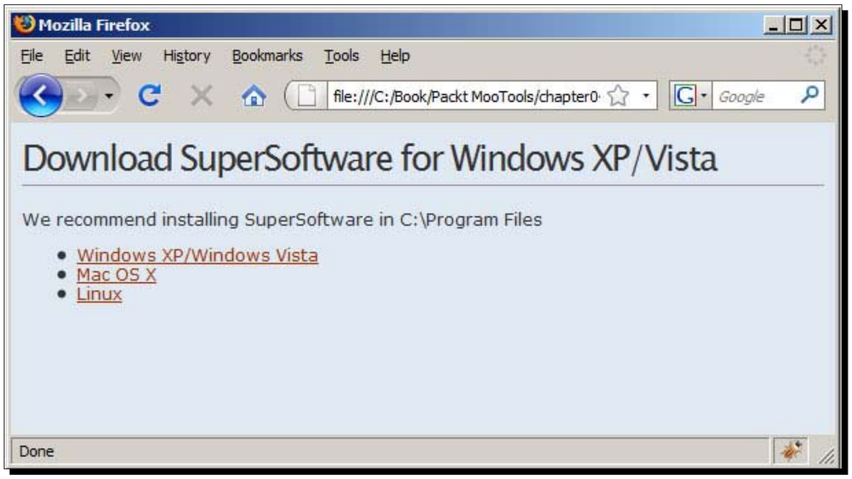
Select the download for your operating system

- Windows XP/Windows Vista
- Mac OS X
- Linux

7. Next, we need to display the custom instructions. We'll replace the text inside `<p id="instructions">` with the value inside the `instructions` variable. We use the `.set()` method for this, which takes two arguments: the property you want to target, and the value you want to set it to. We want to the target `#instructions` HTML property and set it equal to the contents on our instructions variable. Here's what we do:

```
$('instructions').set('html', instructions);
```

This is what our page looks like in Windows:


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter0
Google
Done

Download SuperSoftware for Windows XP/Vista

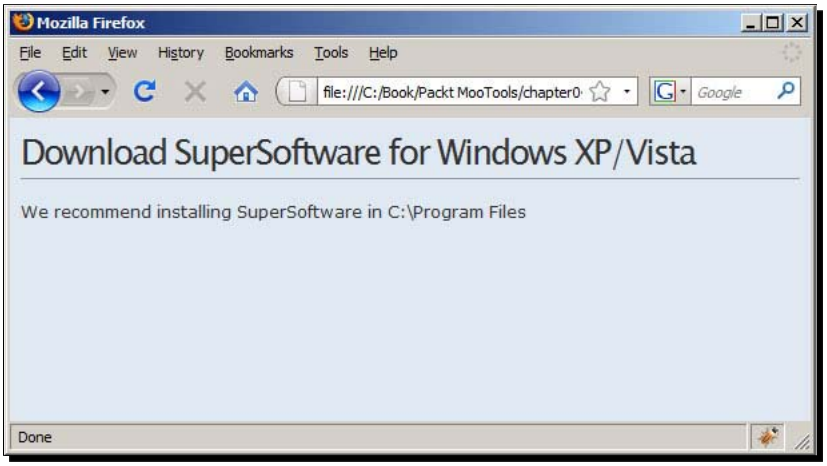
We recommend installing SuperSoftware in C:\Program Files

- Windows XP/Windows Vista
- Mac OS X
- Linux

8. If `userPlatform` is not `other` or `ipod`, we want to get rid of the unordered list with the class of `download-options`, since we don't need it anymore. We will use the `.destroy()` method which removes selected objects from the DOM. We'll also use a control structure to check whether or not `userPlatform` isn't `other` or `ipod` so that we still display the download options if we can't detect the operating system.

We'll select `download-options` and run the destroy method on it, just like so:

```
if(userPlatform!='other' || userPlatform!='ipod' ) {
      $$('.download-options').destroy();
}
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter0
Google
Done

Download SuperSoftware for Windows XP/Vista

We recommend installing SuperSoftware in C:\Program Files

Just like magic, our unordered list is gone.

9. We should now present the user with their download option. We'll create a new `div` element (just like in Chapter 2) and give it some styles.

```
// New div element
var downloadBox = new Element('div', {
   'styles' : {
      'border': '2px solid #555555',
      'padding' : 10,
      'background-color' : '#a0c1e9'
   }
});
```

10. We should customize the content of `downloadBox` with the `downloadURL` value. We'll set its HTML property like so:

```
'html' : 'Download location: <a href="'+downloadURL+'">'+
  downloadURL+'</a></p>'
```

11. Next, we inject the `downloadBox` element right after the `#instructions` paragraph using the `.inject()` method.

```
downloadBox.inject($('instructions'), 'after');
```

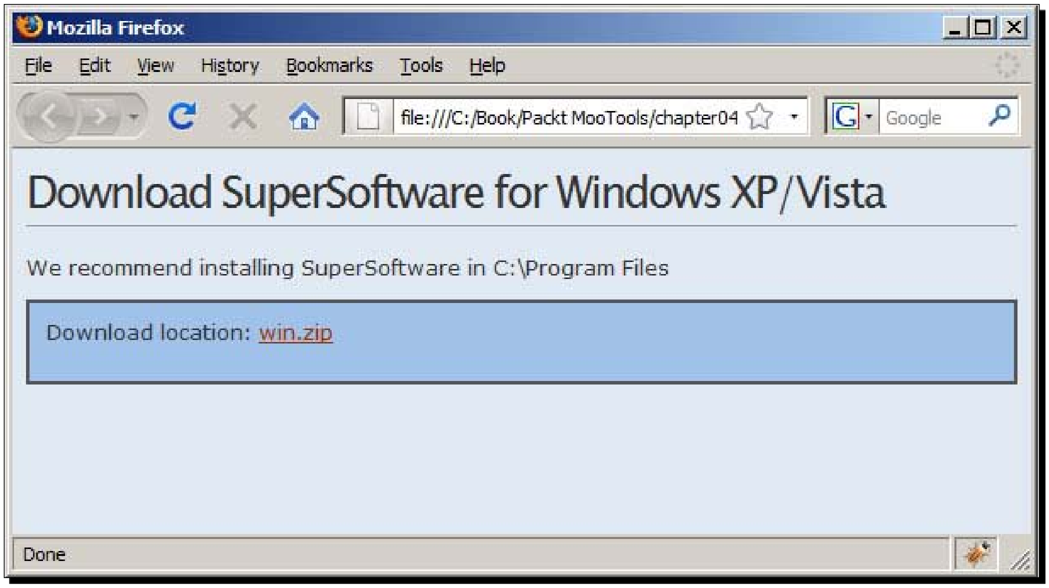
12. Lastly, we need to call our `pageCustomizer()` function:

```
pageCustomizer(userPlatform);
```

We're done! We just supercharged an ordinary download page into a tailored web page that acts according to what the user's operating system is. Let's pull the entire script in one big go:

```
<script type="text/javascript">
window.addEvent('domready', function() {
   var userPlatform = Browser.Platform.name;
//Customizes download page depending on client's platform
   var pageCustomizer = function (platform) {
      var platformNameFull = '';
      var instructions = '';
      var downloadFilePath = '';
// Control stucture
      if(platform == 'win') {
         platformNameFull = ' for Windows XP/Vista';
         instructions = 'We recommend installing SuperSoftware in
                         C:\\Program Files';
         downloadURL = 'win.zip';
      } else if(platform == 'mac') {
         platformNameFull = 'for Mac OS X';
         instructions = ' Mac OS X users should be aware of a minor
           bug in SuperSoftware. <a href="mac-bug.html">See this page
           for details.</a>';
         downloadURL = 'mac.zip';
      } else if(platform == 'linux') {
         platformNameFull = 'for Linux';
         instructions = ' Ubuntu users may experience some
                         sluggishness with SuperSoftware.';
         downloadURL = 'linux.zip';
      } else {
         instructions = 'We couldn\'t detect your operating system.
                    Please select a compatible download link below';
      }
// Display full name of platform.
      $$('h1').appendText(platformNameFull);
// Display instructions
      $('instructions').set('html', instructions);
// Dispose download-options
      if(userPlatform!='other' && userPlatform!='ipod') {
         $$('.download-options').destroy();
// New div element
         var downloadBox = new Element('div', {
            'styles' : {
               'border': '2px solid #555555',
               'padding' : 10,
               'background-color' : '#a0c1e9'
            },
            'html' : 'Download location: <a href="'+downloadURL+'">
            '+downloadURL+'</a></p>'
         });
downloadBox.inject($('instructions'), 'after');
      }
   }
   // Call pagecustomizer
   pageCustomizer(userPlatform);
});
</script>
```

Here's the final result of SuperSoftware's download page and what it looks like in a Windows system (and yours should be different if you're using another operating system):


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
Done

Download SuperSoftware for Windows XP/Vista

We recommend installing SuperSoftware in C:\Program Files

Download location: win.zip

What just happened?

We explored the `Browser.Platform` property provided to us by MooTools by way of an example scenario—SuperSoftware's download page. We customize the page depending on what the user's operating system was. More specifically, this is what we did together:

- Determined the user's operating system using `Browser.Platform.name`
- Constructed a function called `pageCustomizer()`, that contains a control structure (`if/else` statements) to assign three local variables (`platformNameFull`, `Instructions`, `downloadFilePath`) appropriate values depending on the client's platform name
- Got rid of the unordered list using the `.dispose()` method (if the platform name was either `win`, `linux`, or `mac`)
- Created a new element called `downloadBox`, that we injected into the DOM using the `.inject()` method

You learned a lot in this section, so let's cap it off with a little pop quiz.

Pop quiz – finding out information about the client's operating system

If a user uses an Apple iPhone to navigate to SuperDownload page, which of the following choices would return `true`?

1. Browser.Platform.mac
2. Browser.Platform.iPhone
3. Browser.Platform.other
4. **Browser.Platform.ipod**

Exploring the Core utility functions

Now that we've investigated the Browser component of MooTools, let's check out the Core component.

The Core component contains a plethora of useful functions (15 of them to be exact) that many JavaScript developers believe should have been in native JavaScript. You'll find functions that will check if an object is defined, functions that work with date and time, and a hodgepodge of miscellaneous functions that will save you a lot of code-writing.

Let's delve into the Core by exploring all of its functions.

Checking to see if objects are defined

You can often run into trouble when an object you're trying to access in your script is null or undefined. Because JavaScript allows you to create empty objects and create them on-the-fly without declaring them first, you'll often need to check if an object you're trying to use contains something.

This leads to a lot of `if/else` statements and `try/catch` methods. Let MooTools do all the hard work by leveraging some of the useful utility functions it makes available to us, namely: `$chk`, `$defined`, `$pick`, `$try`.

Seeing if an object has a value with $chk

You can use the `$chk` function to see if an object is a true value or if it's false. This is especially useful for ascertaining that an object contains something.

For example:

```
window.addEvent('domready', function() {
   var myObject;
   if($chk(myObject)) {
      alert('Object has a value');
   } else {
      alert('Object does not have a value');
   }
});
```

In the above example, the alert box will display the second condition **Object does not have a value** because even though we declared `myObject`, we didn't assign it a value.

Compare it with the following code block:

```
window.addEvent('domready', function() {
   var myObject;
   myObject = 0;
   if(myObject) {
      alert('Object exists');
   } else {
      alert('Object does not exist');
   }
});
```

We've assigned a value to `myObject`, but it will still alert us that the **object does not exist**. It's because JavaScript uses a **falsy/truthy** system where "0" is considered "false" and "1" is considered "true".

If you need `myObject` to evaluate true even when it's given a value of 0 (or vice versa, you want it to evaluate false when it's given a value of 1), then you should use `$chk()`.

`$chk` also checks to see if the value is not `''`, which is used to initiate variables that will hold string literals, such as:

```
var myString = '';
```

In the following example, we'll be alerted that the object does not exist because it doesn't contain a value:

```
window.addEvent('domready', function() {
   var myObject;
   myObject = '';
   if($chk(myObject)) {
      alert('Object exists');
   } else {
      alert('Object does not exist');
   }
});
```

Checking if an object is defined with $defined

`$defined` is very similar to `$chk` but it only evaluates whether an object is defined or not.

For example:

```
window.addEvent('domready', function() {
   var myObject;
   if($defined(myObject)) {
      alert('Object is defined');
   } else {
      alert('Object is not defined');
   }
});
```

Will alert us that the **Object is not defined** because we haven't assigned it a value.

Comparing it to `$chk`, the following block is considered as defined (evaluates `true`) even if the string literally contains nothing.

```
window.addEvent('domready', function() {
   var myObject;
   myObject = '';
   if($defined(myObject)) {
      alert('Object is defined');
   } else {
      alert('Object is not defined');
   }
});
```

Selecting the first defined object using $pick

`$pick` allows you to pass several objects into it, and it will select the first object that is defined.

In the following example, `definedFruit` will be assigned the value of **oranges have vitamin C** because it is the first object passed into `$pick` that is defined.

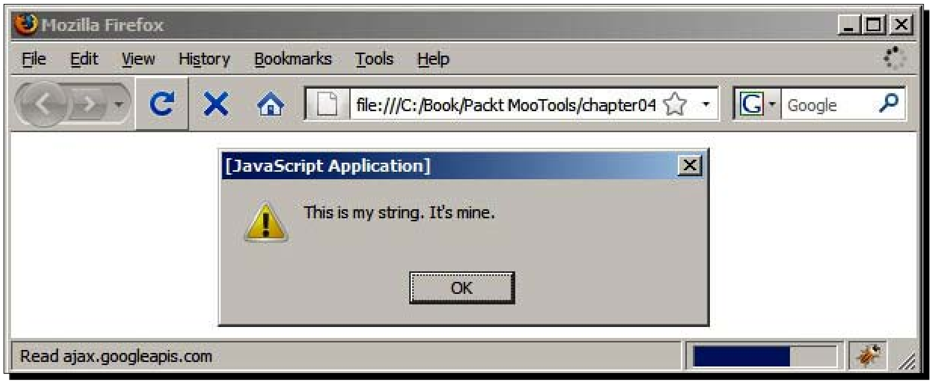
```
window.addEvent('domready', function() {
   var apples;
   var oranges = 'oranges have vitamin C';
   var grapes = 'grapes are purple';

   var definedFruit = $pick(apples, oranges, grapes);
});
```

Getting the return of first working function with $try

`$try` accepts multiple functions, and it will attempt to execute each one. It will return the first function that does not fail without executing consecutive functions. `$try` is really useful because this avoids having to write several `try/catch` blocks that "try" whether some code will fail or work properly.

Here's an example that sets the value of `myObject` to *This is my String. It's mine.*:

```
window.addEvent('domready', function() {
   var myObject = $try(
   function myFailedFunction() {
      myCounter++;
      //myCounter is not defined so it skips it
      return myCounter;
   },
   function myWorkingFunction() {
      var myString="This is my string. It's mine.";
      return myString;
   });
   alert(myObject);
});
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
[JavaScript Application]
OK
Read ajax.googleapis.com

This is my string. It's mine.

Dealing with time and intervals

The core utility functions include two awesome functions that deal with time and intervals: `$time()` and `$clear()`.

The $time() function

The `$time()` function simply returns the current system time of the client, in the number of milliseconds that's elapsed since January 01, 1970.

Instead of figuring dates (which can be hard with leap years and such), the function can be used to determine how fast or slow certain processes are.

Let's explore a simple example, seeing how fast you can click on a button.

Time for action – the $time() function

We're going to see how fast (or slow) you click a button:

1. First, we'll grab the start time and place it in an object called `startTime`. Right below it, we'll call the `alert` function to print out a message soliciting the user to click on the **OK** button. Right after that, we'll get the ending time and place it into an object called `endTime`.

```
   var startTime = $time();
   alert('Click on the OK button.');
   // The $time() function will be called again as soon as the
user presses 'OK' to get the endTime.
var endTime = $time();
```

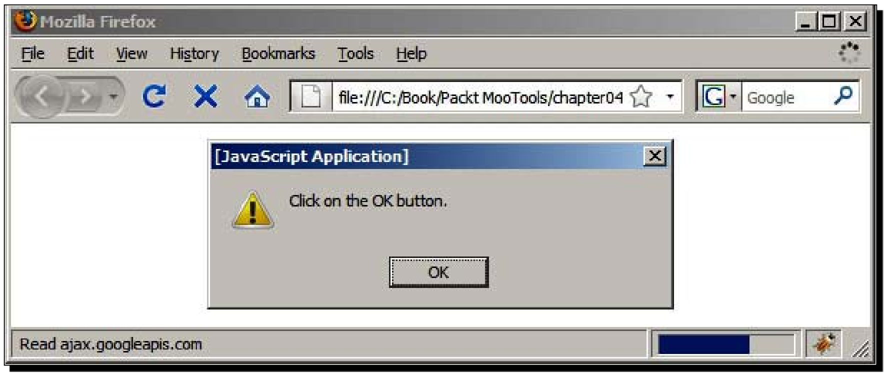
2. Next, we need to calculate the difference between `endTime` and `startTime`. Let's place that value inside an object called `totalTime`.

```
var startTime = $time();
alert('Click on the OK button.');
// The $time() function will be called again as soon as the user
//presses "OK" to get the endTime.
var endTime = $time();
var totalTime = endTime - startTime;
```

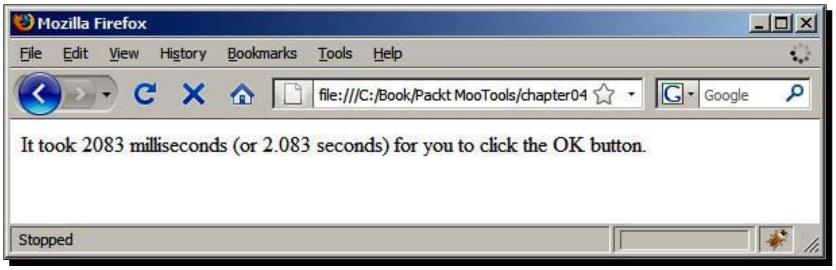
3. Finally, we want to print out the results. We'll use the `.write()` JavaScript method to write the results into our document. We'll print out the time in milliseconds, and also the time in seconds for readability (we just divide `totalTime` by 1000).

```
document.write('It took '+totalTime+' milliseconds (or
'+totalTime/1000+' seconds) for you to click the OK button.');
```

4. Open the HTML in your web browser. The first thing you'll see should be the alert dialog box, asking you to click on the **OK** button.



Once you click on the **OK** button of the dialog box, you'll see the total time it took for you to click the **OK** button (in units of milliseconds and seconds).


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
Stopped

It took 2083 milliseconds (or 2.083 seconds) for you to click the OK button.

What just happened?

You discovered a way to use the `$time()` function to monitor the time it takes in between two processes. This has many uses, including profiling your scripts to see how long certain tasks take to execute. If you find a really slow function, it's time to rewrite (called **refactor**) it!

The $clear() function

The `$clear()` function simply removes delays and timeouts you may have set. It's often used with the `.delay()` method (which delays an execution of a function by the time, in milliseconds, that you pass to it) and the `periodical()` function, which executes a function in set intervals.

Let's explore the `$clear()` function with an example. We'll execute a function that transitions a blue box (a `div` element) to the right repeatedly using the `periodical()` function, then stop it from executing any further after the third execution.

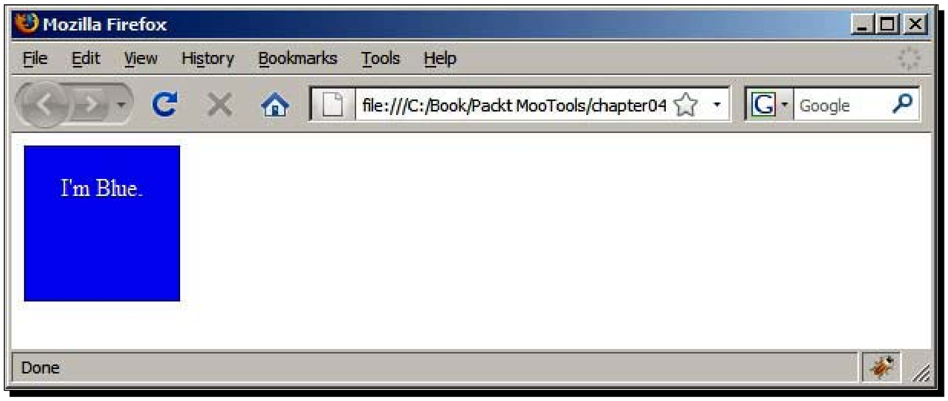
Here's the HTML structure we'll be using (there's nothing fancy about it):

```
<div id="bluebox">
   <p>I'm Blue.</p>
</div>
```

To make our blue box easier to see, you can use this CSS style rule:

```
#bluebox {
   width:100px;
   height:100px;
   background-color:#00f;
   border:1px solid #006;
   text-align:center;
   color:#fff;
}
```

With everything set up, this is what you should see when previewing your HTML document.


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
I'm Blue.
Done

Let's look at making this box move using MooTools.

Time for action – exploring the $clear() function with periodical()

To showcase the use of `$clear()`, we'll use one of its complimentary functions, `periodical()`. We'll create a function that will transition `#bluebox` to the left in increments of 50 pixels, five times. Then we're going to stop executing the function further (or else it will keep moving to the left infinitely).

1. First, we'll create an integer object that will hold the number of times our function has executed.

```
var counter = 0;
```

2. Next, let's create our function, we'll called it `moveLeft()`.

```
var moveLeft = function() {
   // our function code goes here.
}
```

3. Inside `moveLeft`, we'll write use the `tween()` method to move `#bluebox` to the left.

```
$('bluebox').tween('margin-left', (counter+1)*50);
```

4. Now, we need to increment the counter every time the function is called. We'll use the following line of code, which will execute as soon as our box has finished the animation to the left:

```
counter++;
```

5. Let's now use `periodical()` to execute the `moveLeft()` at intervals of 1 second (or 1000 milliseconds).

   ```
   var moving = moveLeft.periodical(1000);
   ```

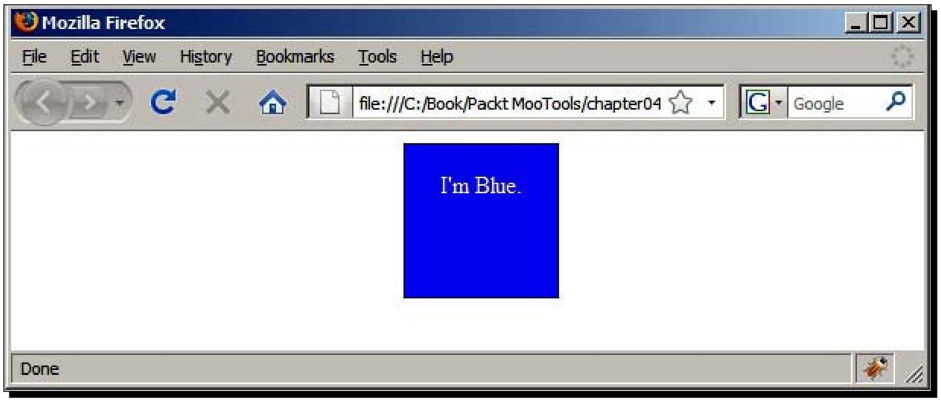
6. The problem with this is that it will keep on moving to the left. So we'll have to stop `moving`.

7. Inside the `moveLeft` function, we'll add an `if` conditional statement that checks whether the counter is equal to 5 or not. If it's equal to 5, then we know our function has been called five times, and therefore it's time to use `$clear()` on our `periodical()` function (which we call `moving`). Add the following `if` statement inside the `moveLeft()` function:

   ```
   if(counter == 5) {
      $clear(moving);
   }
   ```

8. We're done! Our `#bluebox` should now move left five times in set intervals of 1 second. Then when it's moved 5 times, it will stop moving. Here's the final script that we wrote together:

   ```
   window.addEvent('domready', function() {
           var counter = 0;
           var moveLeft = function() {
                   $('bluebox').tween('margin-left', (counter+1)*50);
                   counter++;
                   if(counter == 5) {
                           $clear(moving);
                   }
           }
           var moving = moveLeft.periodical(1000);
   });
   ```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
I'm Blue.
Done

What just happened?

We explored one of the ways to use the `$clear` function, stopping/clearing periodical after a certain amount of time.

Besides that, you got a chance to discover another handy MooTools function—the `periodical()` function, which is helpful when you want to execute another function at set intervals.

Utility functions for working with objects

There are several utility functions that will come in handy for working with objects and saving a few more lines of code. Namely, they are:

- `$extend()`
- `$merge()`
- `$each()`

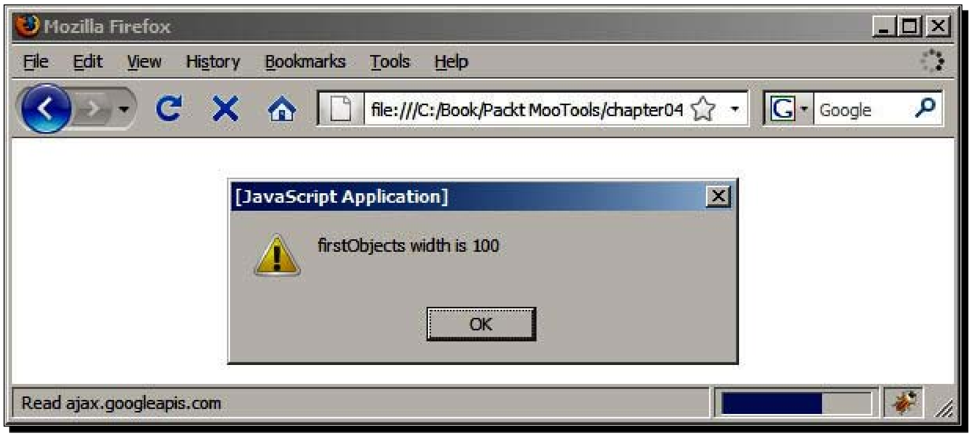
Extending objects with $extend()

`$extends()` accepts two arguments: the first one is the target object that will be extended, and the second argument is the object whose properties will be copied to the target object.

Here's an example script that uses the `$extend` function to extend the first object (called `firstObject`):

```
window.addEvent('domready', function() {
   //firstObject object
   var firstObject = {
      'color' : 'blue',
      'length' : 50
   };
   //secondObject object
   var secondObject = {
      'width' : 100,
      'depth' : 200
   }
   $extend(firstObject, secondObject);
   alert('firstObjects width is ' + firstObject.width);
});
```

Even though we didn't declare a 'width' index for `firstObject`, you can see that it took on the value of 'width' from `secondObject`.


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
[JavaScript Application]
OK
Read ajax.googleapis.com

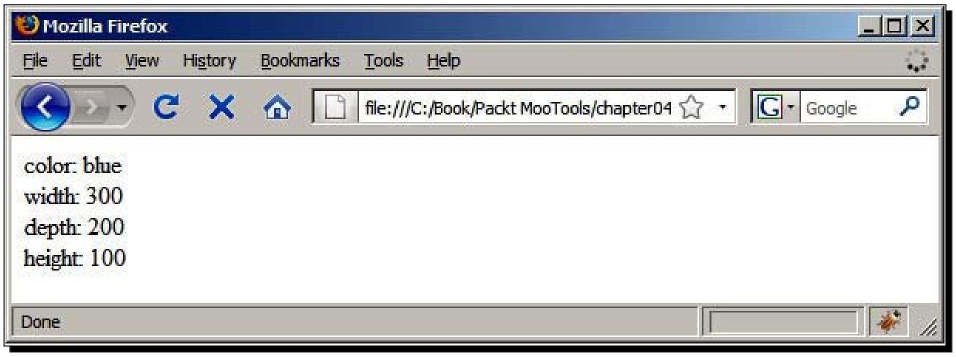
firstObjects width is 100

Merging objects with $merge()

`$merge` works similarly to `$extend`, but it can take more than two objects as arguments and "deep-copies" objects, which means objects within objects will also be merged. If there is a conflict in properties (two objects have the same property), then the last object supplied into the `$merge()` function takes precedence.

In the following example, three arrays are merged into an array called `combinedObject`. Then we use the `.write()` method on our document to print out the values of inside `combinedObject`.

```
window.addEvent('domready', function() {
   //firstObject array
   var firstObject = {
      'color' : 'blue',
      'length' : 50
   };
   //secondObject array
   var secondObject = {
      'width' : 100,
      'depth' : 200
   }
   var thirdObject = {
      'width' : 300,
      'height' : 100
   }
   var combinedObject = $merge(firstObject, secondObject,
                                thirdObject);
   document.write('color: '+ combinedObject.color + "<br>");
   // This should be 300 because thirdObject comes later than
   //secondObject
   document.write('width: '+ combinedObject.width + "<br>");
   document.write('depth: '+ combinedObject.depth + "<br>");
   document.write('height: '+ combinedObject.height + "<br>");
});
```


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
Done

```
color: blue
width: 300
depth: 200
height: 100
```

Iterating through objects using $each

$each is a helpful function to save you some time in having to write loops (like `for`, `while`, and so on). It takes two arguments: an object or array to be iterated upon, and the function to run on each item inside the object. The basic format of an $each function call is:

```
   $each(targetObject, function(){});
```

The second argument, the function to run, can take in three arguments: the current item (or value), the index (or key), and the object that's being iterated upon. You can then use these arguments as references inside the function. The basic format of the `function()` argument for $each is:

```
   function(currentItem, indexOrKey, targetObject)
```

Let's examine the `$each()` function in action. Let's say we have an object that contains the cars I'll be buying with the massive profits I make from the sales of this book (thank you by the way, I'll be thinking of you as I cruise around town with one of these bad boys):

```
      var myCars = {
         'Ferrari 612 Scaglietti' : 'first',
         'Bugatti EB 16.4 Veyron' : 'second',
         'Masarati Quattroporte' : 'third'
      }
```

Let's write a script that uses $each to print out my cars.

Time for action – exploring the $each function

Let's see how the $each function helps us to list down our dream cars:

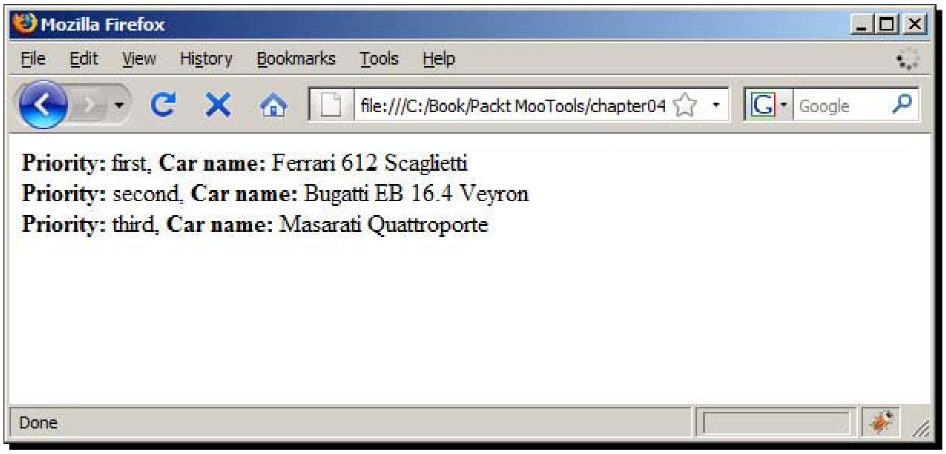
1. Let's set up the structure of the $each function. As our target object, we pass the argument of `myCars`. `priority` a the current item value, and `car` the current object's key.

   ```
   $each(myCars, function(priority, car){
      // Code to print out each car goes here.
   });
   ```

2. We'll use the `.write()` method to display the contents of `myCars`.

   ```
   $each(myCars, function(priority, car){
      document.write('<strong>Priority:</strong> '+priority+',
        <strong>Car name:</strong> '+car+'<br />');
   });
   ```

3. Preview the script in your browser, and voila, you've got a list of my dream cars.


Mozilla Firefox
File Edit View History Bookmarks Tools Help
file:///C:/Book/Packt MooTools/chapter04
Google
Done

Priority: first, **Car name:** Ferrari 612 Scaglietti
Priority: second, **Car name:** Bugatti EB 16.4 Veyron
Priority: third, **Car name:** Masarati Quattroporte

What just happened?

We explored a quicker way of iterating through objects using the $each function. $each can be used on any objects that are iterable, including arrays and class objects. The $each function saves you time in having to write complex, nested `for` and `while` loops.

Other utility functions in the Core

Here are hodgepodges of miscellaneous functions that are included in the Core.

Generating a random number with $random

`$random` is a helpful function and a shortcut for executing a numerical value between two ranges.

The basic format is:

```
$random(minValue, maxValue)
```

Using `$random` in the following way will assign `myDiceRoll` a numerical value between 1 and 6.

```
var myDiceRoll = $random(1,6);
```

Converting objects to arrays with $splat

`$splat` will take one argument and convert it into an array, if it isn't already one and if it's defined.

In the following example, `$splat` will create an empty array with a single value called `newArray`.

```
$splat(' newArray ');
```

If we pass an array as an argument, `$splat` won't do anything to it. In the following example, the alert dialog box will display 1, because we passed an array into `$splat`.

```
var myArray = $splat([1,2,3]);
alert(myArray[0]);
```

Determining the data type using $type

JavaScript is a liberal and lenient language. It doesn't require you to declare a data type before creating an object, and you can switch data types at any time.

`$type` allows you to check what your object's data type is. In the following example, `switchy` is an integer first, then changed to a string literal datatype, and lastly changed to a Boolean (true or false).

```
window.addEvent('domready', function() {
   // First it's Number
   switchy = 0;
   alert($type(switchy));
   // Switcheroo, now it's a String
```

```
        switchy = '';
        alert($type(switchy));
        // Another Switcheroo, now it's a Boolean
        switchy = true;
        alert($type(switchy));
    });
```

Typically, in other languages, assigning a variable that's previously declared as a certain data type will issue an error and break your scripts. With JavaScript, it'll just go along with it and convert your variable's data type to the appropriate one. This is convenient when you're fully aware of the conversion happening, but if you're not, this can lead to logical errors which are very hard to catch since they may not break your scripts or alert you to an error. `$type` will check to make sure your variable is the data type that you need it to be.

Limited use functions

Here are a few functions that are included in the Core, but have a very limited and specific use. These functions are typically used for MooTools' internal functions (but are readily available to you anyway).

Creating a function placeholder with $empty

`$empty` simply creates an empty function. You typically use this inside class and events functions to avoid logical errors in your scripts while developing.

To create an empty function, simply write:

```
    var myPlaceholderFunction = $empty;
```

Returning arguments using $lambda

`$lambda` just returns the value you pass to it. In the following example, `$lambda` just assigns `myObject` a value of false.

```
    $myObject = $lambda(false);
```

`$lambda` is very obscure and is of limited use, so don't expect to be using it too much.

Creating a function that returns the specified value using $arguments

`$arguments` creates a function that returns the argument that you point to. In the following example, `$mySimpleFunction` will return a value of banana because `$arguments` points to the second argument of `mySimpleFunction`.

```
    mySimpleFunction = $arguments(1);
    alert(mySimpleFunction('apple', banana', 'grapes'));
```

Summary

In this chapter, we covered the Core component of MooTools, which is split up into two sub-components: Core->Browser and Core->Core.

Specifically, we:

- Learned how to obtain information about the client using browser properties, such as what browser they're using and what operating system they're using
- Explored the Core->Core's useful (and not so useful) helper/utility functions

Now that we've learned about the Core component, we're ready to animate objects in the DOM, which is the topic of the next chapter.

5
Working with Events

In this chapter, we'll be exploring browser events. We'll also see how MooTools can help us watch out for events such as mouse clicks, mouse movements, keyboard presses, and all the events that make our web pages more responsive to user actions.

In this chapter, we shall:

- Define what events are in web development terms
- Learn how to add event listeners to web page elements
- Find out how to create custom events to extend MooTools' event object
- Learn how to remove, clone, and fire off events
- Investigate MooTools events methods and properties

We have a lot of things to cover in this chapter, so hold on to your seats and enjoy the ride!

What are events exactly?

Events are simply things that happen in our web pages. MooTools supports all HTML 4.01 event attributes like `onclick` and `onmouseout`, but the framework refers to them without the "on" prefix (`click` instead of `onclick`, `mouseout` instead of `onmouseout`).

What's neat about MooTools is that it not only extends HTML 4.01 event attributes with a few of its own, but also ensures that methods and functions that deal with web page events work across all web browsers by providing us with a solid, built-in object called **events**. Event is part of the native component of MooTools, and is also referred to as the "event hash".

You can read the official W3C specifications on events in the HTML 4.01 Specification, section 18.2.3, under **Intrinsic events**: `http://www.w3.org/TR/html401/interact/scripts.html#h-18.2.3`

We'll go over all of the available event attributes in MooTools so that you can learn what stuff we can listen to. There are several events that we can detect or "listen to". We can, for the sake of discussion, divide them into five groups: window events, form events, keyboard events, mouse events, and MooTools custom events.

Window events

Window events refer to activities that occur in the background. There are only two window events.

HTML event attribute / MooTools event name	What is it?
`onload` / `load`	This event occurs when the window and images on the page have fully loaded, and/or when all of the `iFrames` in the page have loaded. It can be used for monitoring when the web page has fully loaded (such as when you want to know if all images have been downloaded).
`onunload` / `unload`	This even happens when a window or an `iFrame` is removed from the web page. It has limited use.

Form events

There are events that occur within form elements (such as `<input>` elements), and we'll refer to these as form events.

For example, the `onfocus` event is triggered when the user clicks on an input field (you'll see this in action in this chapter), effectively focusing on that particular input field. Some of these events apply even to non-form elements.

HTML event attribute / MooTools event name	What is it?
`onblur` / `blur`	This event occurs when an element loses focus, either because the user has clicked out of it, or because the user used the *Tab* key to move away from it. This is helpful for monitoring the instant when the user loses focus on a particular element.
`onchange` / `change`	This event happens when the element loses focus or when its original value has changed. This is helpful for knowing when the user starts typing in the input text field or text area, or when a user selects different option in a select drop-down element.
`onfocus` / `focus`	This event is the opposite of the blur event; it is triggered when the user focuses on an element. This is useful for watching when the user highlights a form field or when they have navigated to it using the *Tab* key.
`onreset` / `reset`	This event only applies to form elements. This event is triggered when the form has been reset to its default values.
`onselect` / `select`	This event happens when the user highlights (selects) text in a text field.
`onsubmit` / `submit`	This event is only for form elements. This event occurs when the user submits a web form.

Keyboard events

There are events that happen when a user presses on a keyboard input device; let's call these the keyboard events.

For example, the `onkeypress` event is triggered when you press any key on your keyboard.

HTML event attribute / MooTools event name	What is it?
`onkeydown` / `keydown`	This event occurs when the user holds down a keyboard key.
`onkeypress` / `keypress`	This event is triggered whenever the user presses a keyboard key.
`onkeyup` / `keyup`	This event happens when the user releases a key.

Mouse events

There are several HTML event properties that allow you to deal with activities related to the mouse. Clicking, moving, double-clicking, and hovering are all mouse events.

HTML event attribute / MooTools event name	**What is it?**
`onclick` / `click`	This event occurs whenever the user uses the mouse button to click on an element.
`ondblclick` / `dblclick`	This event occurs whenever the user double-clicks on an element.
`onmousedown` / `mousedown`	This event occurs when the mouse button is held down.
`onmouseup` / `mouseup`	This event occurs when the mouse button is released.
`onmousemove` / `mousemove`	This event occurs when the mouse is moved.
`onmouseout` / `mouseout`	This event occurs when the mouse pointer is removed from the target element.
`onmouseover` / `mouseover`	This event occurs when the mouse pointer enters the target element.

MooTools custom mouse events

MooTools supplies us with three custom events that extend the standard mouse events.

MooTools event name	**What is it?**
`mouseenter`	This event is triggered when the user's mouse pointer enters an element, but does not fire again when the mouse goes over a child element (unlike `mouseover`). This is useful for detecting the `mouseover` event once in nested element structures, such as `<li><a>item</a></li>`. If we were to use the `mouseover` event, it would be triggered twice, once for `<li>` and once again for `<a>`.
`mouseleave`	This event works similarly to `mouseenter` in that it is triggered only once when the mouse pointer exits the target element, unlike the `mouseout` event that gets triggered more than once for nested element structures.
`mousewheel`	This even is triggered when the scroller on a mouse is used (available in most modern mouse input devices, usually situated in between the left and right buttons).

Adding event listeners

We can attach event listeners to elements on a web page using the addEvent and addEvents methods. By doing so, we're able to find out whenever that event happens, as well as execute a function to react to them.

Adding event listeners is the basis for interactivity, and is where JavaScript and (subsequently) MooTools has gained its popularity. Imagine being able to perform an operation whenever a user hovers over an image, or clicks on a link, or whenever the user submits a form; the possibilities are endless.

Adding a single event listener

The addEvent method allows you to add one event listener to an element method, and follows the format:

```
$(yourelement).addEvent(event, function(){})
```

For example, in the following code block, we attach a click event listener for all <a> elements. When the user clicks on any hyperlink on our web page, it runs a function that opens up an alert dialog box that says, **You clicked on a hyperlink**.

```
$$('a').addEvent('click', function(){
   alert('You clicked on a hyperlink');
});
```

In a moment, we'll create a simple web form highlighting the input field that the user is focused on.

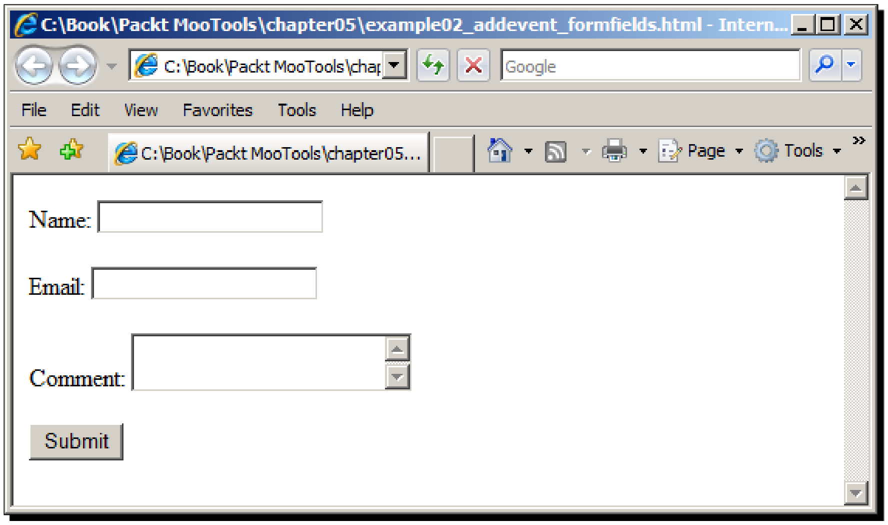
Time for action – highlighting focused fields of web forms

Let's start with our web form's HTML.

1. We'll use <input> and <textarea> tags that will hold our user's information as well as provide them a means to submit the web form (input type="button"). We use the <label> tag to indicate to the user what information to put inside each form field.

```
<form action="" method="get">
   <p><label for="Name">Name: </label>
     <input name="Name" type="text"></p>
   <p><label for="Email">Email: </label>
     <input name="Email" type="text"></p>
   <p><label for="Comment">Comment: </label>
     <textarea name="Comment" cols="" rows=""></textarea></p>
   <p><input name="Submit" type="button" value="Submit"></p>
</form>
```

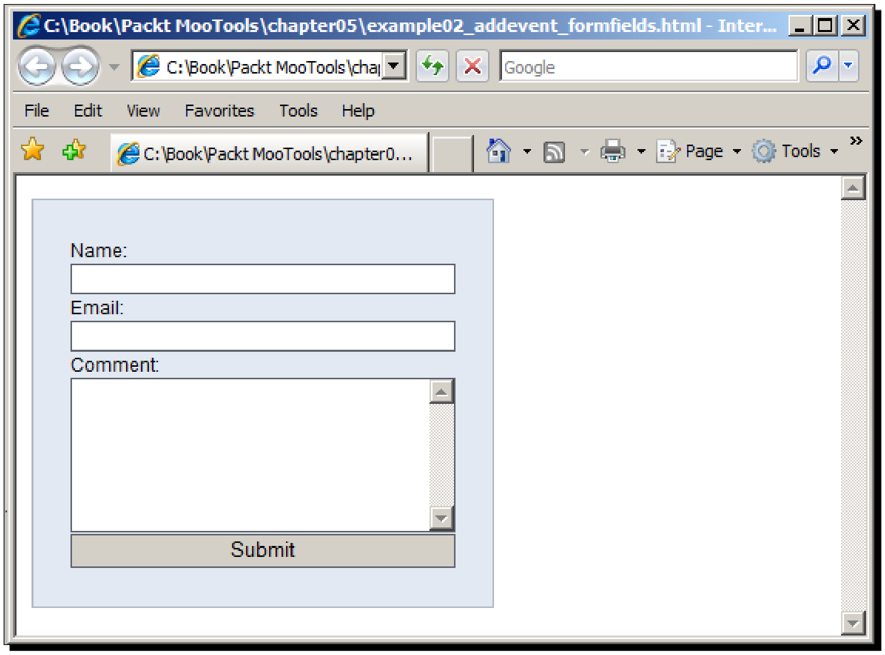
With the above markup, this is how our form looks:


C:\Book\Packt MooTools\chapter05\example02_addevent_formfields.html - Intern...
C:\Book\Packt MooTools\chap
Google
File
Edit
View
Favorites
Tools
Help
C:\Book\Packt MooTools\chapter05...
Page
Tools
Name:
Email:
Comment:
Submit

2. Our web form is a bit dull, so how about we spruce it up a bit with some CSS? Read the comments to gain insight on some of the more important CSS properties to take a note off.

```
/* Center the fields using text-align:center */
form {
   width:300px;
   border:1px solid #b1b8c2;
   background-color:#e3e9f2;
   text-align:center;
   padding:25px 0;
}
label {
   display:block;
   font:12px normal Verdana, Geneva, sans-serif;
}
/* Give  the input and textarea fields a 1px border */
input, textarea {
   width:250px;
   border:1px solid #5c616a;
}
textarea {
   height:100px;
}
p {
   text-align:left;
   display:block;
   width:250px;
   overflow:auto;
   padding:0;
   margin:5px 0;
}
/* We will give fields that are currently focused on the .focus
class which will give them a distinct thicker border and
background color compared to the other input fields */

.focused {
   border:3px solid #b1b8c2;
   background-color: #e8e3e3;
}
```

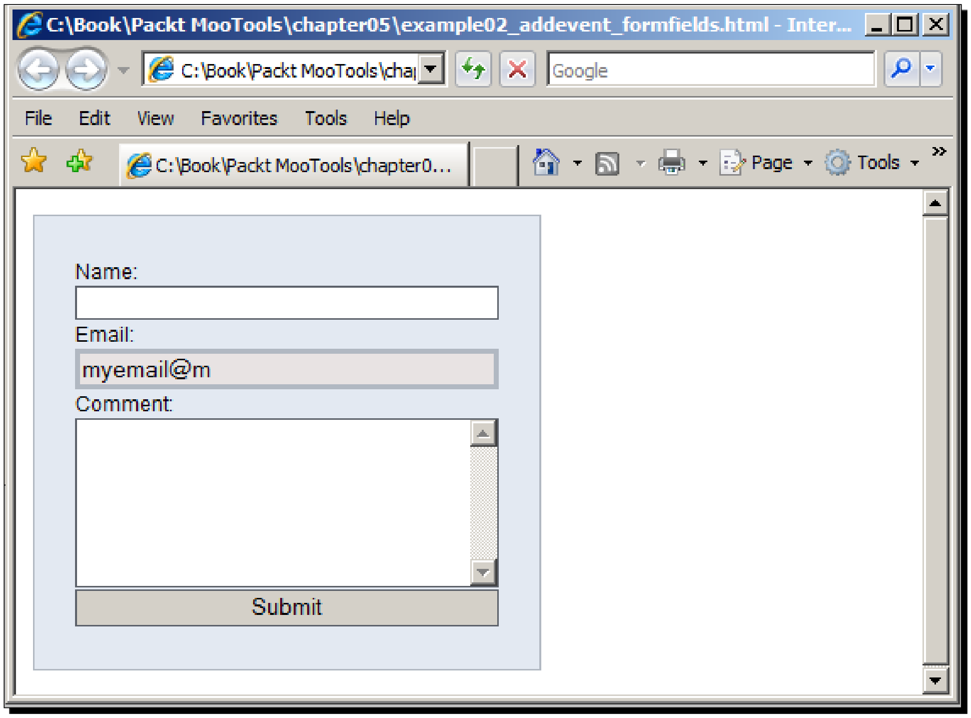
With just a few styles, our simple web form has transformed to a more attractive form field.


C:\Book\Packt MooTools\chapter05\example02_addevent_formfields.html - Inter...
C:\Book\Packt MooTools\cha
Google
File
Edit
View
Favorites
Tools
Help
C:\Book\Packt MooTools\chapter0...
Page
Tools
Name:
Email:
Comment:
Submit

3. Let us move onto the JavaScript. We use the `addEvent` method to add an event listener for the form event, `onfocus`. When the user focuses on a particular field, we run a function that adds the `.focus` CSS class on that field which we declared as a style rule in step 2. We'll also remove `.focus` class on other fields on the web page.

```
window.addEvent('domready', function(){
  var els = $$('input, textarea')
  els.addEvent('focus', function(){
   els.removeClass('focused');
   this.addClass('focused');
  })
});
```

Now, when you focus on a form field, it will be highlighted with a thick blue border and with a lighter blue background. Users who use the *Tab* key to navigate in between form fields will appreciate this feature since they'll clearly see which field is active.


C:\Book\Packt MooTools\chapter05\example02_addevent_formfields.html - Inter...
C:\Book\Packt MooTools\cha
Google
File
Edit
View
Favorites
Tools
Help
C:\Book\Packt MooTools\chapter0...
Page
Tools

Name:

Email:

myemail@m

Comment:

Submit

What just happened?

In the previous example, we created a simple and interactive web form that highlights the current field (the user has active). We did this by using the `addEvent` method, adding an event listener for the `focus` form event. When the user focuses on a particular input field, we executed a function that adds the `.focus` CSS class, which highlights the focused field `<input>` or `<textarea>` with a thick blue border with a light blue background.

By highlighting active fields in a web form, we have just improved our form's usability by providing visual feedback about which field the user is currently on.

Adding multiple event listeners

The `addEvents` method allows you to add more than one event listener to an element (or set of elements). This is the format for running the `addEvents` method on an element.

```
$(yourelement).addEvents({
   'event1' : function {},
'event2' : function {}
})
```

Let's explore the `addEvents` method using the previous web form example.

Time for action – adding tooltips to the web form

We'll use the same web form as before, but we'll modify it to provide a hover over tooltip for users. This can be used to provide more explanation for a particular field. Although the example we're using is pretty straightforward, there are some web forms that have labels that could use a little tooltip help to clarify to the users what they need to enter.

1. First, we have to modify our HTML. We'll add <span> tags with the text **(?)**, which when the user hovers over them, will display a relevant tooltip/information box beside our web form. We give each of these span tags a unique ID so that we can tell MooTools which help text to display. The tooltip/information box is a div with the ID of `feedback`.

```
<form action="" method="get">
  <p><label for="Name">Name: <span class="help" id="hName">(?)
    </span></label><input name="Name" type="text" /></p>
  <p><label for="Email">Email: <span class="help" id="hEmail">(?)
    </span></label><input name="Email" type="text" />
   </p>
  <p><label for="Comment">Comment: <span class="help"
    id="hComment">(?)</span></label><textarea name="Comment"
    cols="" rows=""></textarea></p>
   <p><input name="Submit" type="button" value="Submit" /></p>
```

```
</form>
<!-- holds user feedback -->
<div id="feedback">&nbsp;</div>
```

2. Let's give our new elements some CSS styles.

```
#feedback {
   width:200px;
   border:1px solid #f90;
   background-color:#ffc;
   padding:5px;
   font:bold 12px Verdana, Geneva, sans-serif;
   /* Displays the div to the right of our web form */
   position:absolute;
   top:15px;
   left:315px;
}
.help {
   color:#009;
   font:bold 12px Arial, Helvetica, sans-serif;
/* Changes mouse cursor to pointer when mouse hovers on .help */
   cursor:pointer;
}
```

3. It's time for some MooTools code. First, we should hide the `#feedback` div.

```
  $('feedback').setStyle('opacity', 0);
```

4. Let's create an array object called `helptext` that will hold our help text which we will display. For the index, we use the ID of the `.help` span tag for each input field, so that we easily reference the array position later on.

```
   // Initialize helptext array, will store help text
   var helptext = {};

   // Put help text inside array
   Helptext.hName = 'Enter your first and last name';
   Helptext.hEmail = 'Enter a valid email address';
   Helptext.hComment = 'Leave your feedback';
```

5. Next we'll add two event listeners using the `.addEvents()` method. The first event listener is for `mouseover`: when the user puts their mouse cursor over a `.help` span element, we show tween the `#feedback` div in, and give it the associated text.

```
    'mouseover' : function() {

       // Get the span's ID
       var spanID = $(this).get('id');

       // Set the text inside feedback div, reference
       // array index using spanID
       $('feedback').set('html', helptext[spanID]);

$('feedback').tween('opacity', 1);

    }
```

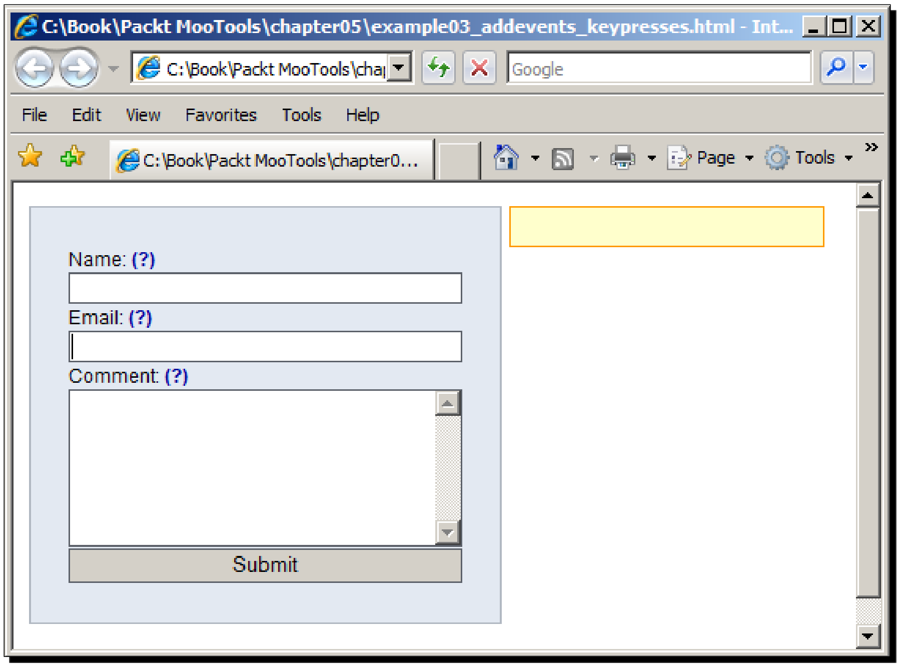
6. The second event listener that we add to our span elements is `mouseout`; when the user removes their mouse cursor from a span tag, it will hide the `#feedback` div.

```
    'mouseout' : function() {
       $('feedback').tween('opacity', 0);
    }
```

7. Our `addEvent()` code block now looks like this:

```
  $$('.help').addEvents({
    'mouseover' : function() {
       $('feedback').tween('opacity', 1);
       // Get the span's ID
       spanID = $(this).get('id');
       // Set the text inside feedback div, reference
       // array index using spanID
       $('feedback').set('html', helptext[spanID]);
    },
    'mouseout' : function() {
       $('feedback').tween('opacity', 0);
    }
  });
```

Our form should now look like this:

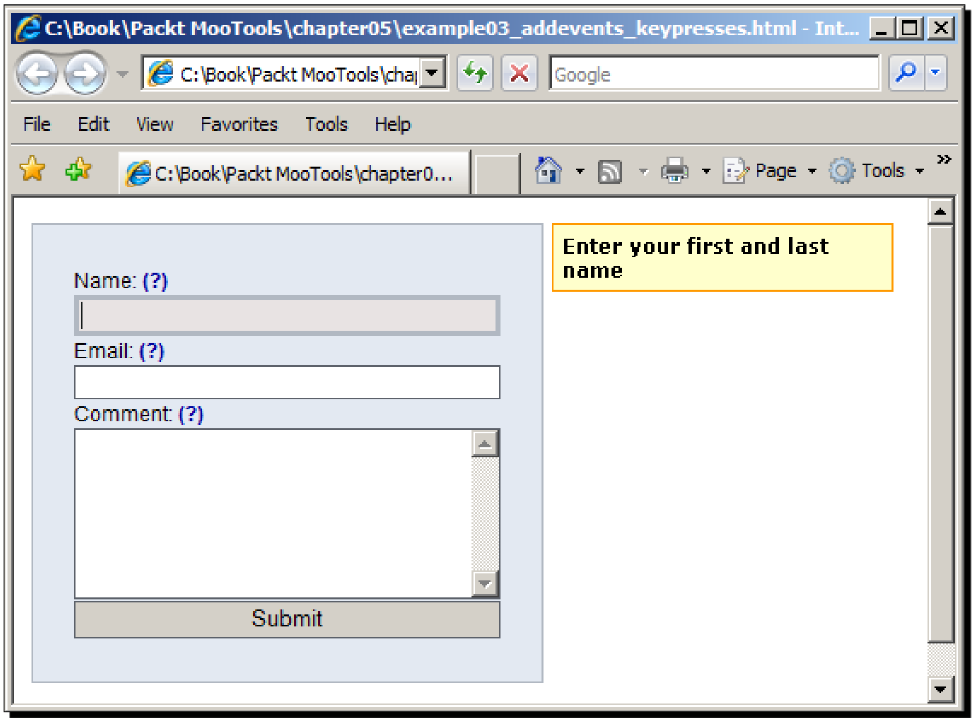

C:\Book\Packt MooTools\chapter05\example03_addevents_keypresses.html - Int...
File Edit View Favorites Tools Help
Page Tools
Name: (?)
Email: (?)
Comment: (?)
Submit

8. Here is the entire MooTools script:

```
window.addEvent('domready', function(){
  $('feedback').setStyle('opacity', 0);
  $$('input, textarea').addEvent('focus', function(){
      $$('input, textarea').removeClass('focused');
      $(this).addClass('focused');
  });
   // Initialize helptext array, will store help text
   var helptext = [];
   // Put help text inside array
   helptext['hName'] = 'Enter your first and last name';
   helptext['hEmail'] = 'Enter a valid email address';
   helptext['hComment'] = 'Leave your feedback';
  // Add events to span.help
  $$('.help').addEvents({
   'mouseover' : function() {
      $('feedback').tween('opacity', 1);
      // Get the span's ID
      spanID = $(this).get('id');
```

```
            // Set the text inside feedback div, reference
            // array index using spanID
            $('feedback').set('html', helptext[spanID]);
         },
         'mouseout' : function() {
            $('feedback').tween('opacity', 0);
         }
      });
   });
```

9. When you hover over a **(?)**, you should see something similar to the following image:


C:\Book\Packt MooTools\chapter05\example03_addevents_keypresses.html - Int...
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Google
File
Edit
View
Favorites
Tools
Help
C:\Book\Packt MooTools\chapter0...
Page
Tools

Name: (?)

Email: (?)

Comment: (?)

Submit

Enter your first and last name

What just happened?

In the previous example, we discovered how to add more than one event listener to an element using the `.addEvents()` method.

Creating custom events

Besides the standard HTML events that you saw earlier in this chapter, you can also create custom events of your own. For example, you may want to create a custom event for a user pressing the *Caps Lock* key; you can do this by adding (extending) properties to the `Element.Events` object in MooTools. Here is the format for adding event properties to the `Element.Events` MooTools object:

```
Element.Events.eventname = {
   'base' : 'click', // A base event such as click, keypress,
     keydown, onload, etc.
   'condition' : function() {
      // conditions that need to be met to trigger event
   },
   'onAdd' : function() {
      // Functions to trigger when you bind/add the event to elements
   },
   'onRemove' : function() {
      // Functions to execute when you unbind/remove elements
   }
};
```

There are five things to take a note off in the above code sample.

- `eventname`: This is the name of your custom event.
- `base`: This is an optional string value which gives our custom event a standard event to listen to. If you have condition set, which is also an optional property, then you must also have base set.
- `condition`: This is a function that must be met to trigger the event; in other words, the function must return a boolean value of `true` in order for the event to fire. This is an optional property to set, but if you have `condition` set, you must also have `base` set.
- onAdd: This is an optional function property; it fires off the function that you assign to it whenever the custom event is added or bound to elements.
- onRemove: This is an optional function property, and it does the opposite of onAdd; if the custom event is removed or un-bound from elements, then it will trigger the function.

There's really no better way to learn about creating custom events than by creating one. That's what we'll do next!

Time for action – creating a custom event for showing help tips

Imagine that you created a web application that supports keyboard shortcuts. Keyboard shortcuts allow users to use web applications more efficiently. For this example, let us say that one of your keyboard shortcuts is *Shft + H*, which displays a box with help tips in it.

1. First step, let's set up the HTML for our help tip box. Our help tip box will be a `<div>` with an ID of `help`.

```
<body>
   <h1>myWebApp</h1>
   <p>Use <strong>Shift + H</strong> to view Help tips on how to
      use this web application.</p>
   <div id="help">
      <h1>Help Tips</h1>
      <p>This is the help tip box. It will display helpful tips on
         how to use this web application.</p>
      <p>Press <strong>Shift + H</strong> on the keyboard to
         toggle this box.</p>
   </div>
</body>
```

2. Let's give the help tip box some styles, as well as change the default font style of the HTML web page with some CSS. Let us give the help tip box a gray background with a dotted border to make it easy to distinguish. This step is optional.

```
body {
   font:12px solid Verdana, Geneva, sans-serif;
}
#help {
   width:200px;
   background:#ccc;
   padding:5px;
   border: 1px dotted #00f;
}
```

3. It's time for MooTools to step in. The first thing we'll do is hide the help tip box. We'll do this using the `.setStyle()` MooTools method, setting the opacity property to `0`.

```
$('help’).setStyle('opacity', 0);
```

4. Next, we'll create our custom event. This custom event will be called `shiftH`. We'll use the base event `keypress` so that whenever you press something on the keyboard, the event will check to see if the appropriate keys are pressed (*Shift* and *H* keys at the same time).

   ```
   // Add custom event to MooTools Events object
   Element.Events.shiftH = {
       // Set our base event to 'keypress'
      base: 'keypress'
   };
   ```

5. We should set the condition for this custom event. We want this event to be triggered whenever we have pressed *Shift* and *H* keys at the same time. We can use the MooTools event property called `.shift`, which returns a boolean value of `true` when the *Shift* key is pressed.

   We will also use the `.key` event property, which returns a string that has the value of the key that was pressed in lowercase. In our instance the `.key` property should be equal to 'h'.

   Both *Shift* and *H* keys must be pressed at the same time. In other words, our custom event (`shiftH`) will not be triggered when you press the *H* key without also pressing the *Shift* key (and vice versa). Therefore, the condition will return the `true` value only when `customEvent.shift` is `true` and `customEvent.key=='h'` is `true`.

   ```
   // Add custom event to MooTools Events object
   Element.Events.shiftH = {
       // Set our base event to 'keypress'
      base: 'keypress',
      // Condition that must be met
       condition: function(customEvent){
           if(customEvent.shift && customEvent.key=='h'){
return true;
         else{
            return false;
}
       }
   };
   ```

6. The only thing that is left is adding an event listener for `shiftH`. We'll use the `addEvent` method, that will run a function that toggles the `#help` div.

   ```
   // Add custom event on document object
   window.addEvent('shiftH', function(){
      // execute the stuff in here
   });
   ```

7. The code we want to execute when the `shiftH` event is triggered is showing the `#help` div when it's hidden, and vice versa; in other words, we want to toggle the opacity of `#help` div. We'll transition the opacity using the `.tween()` method.

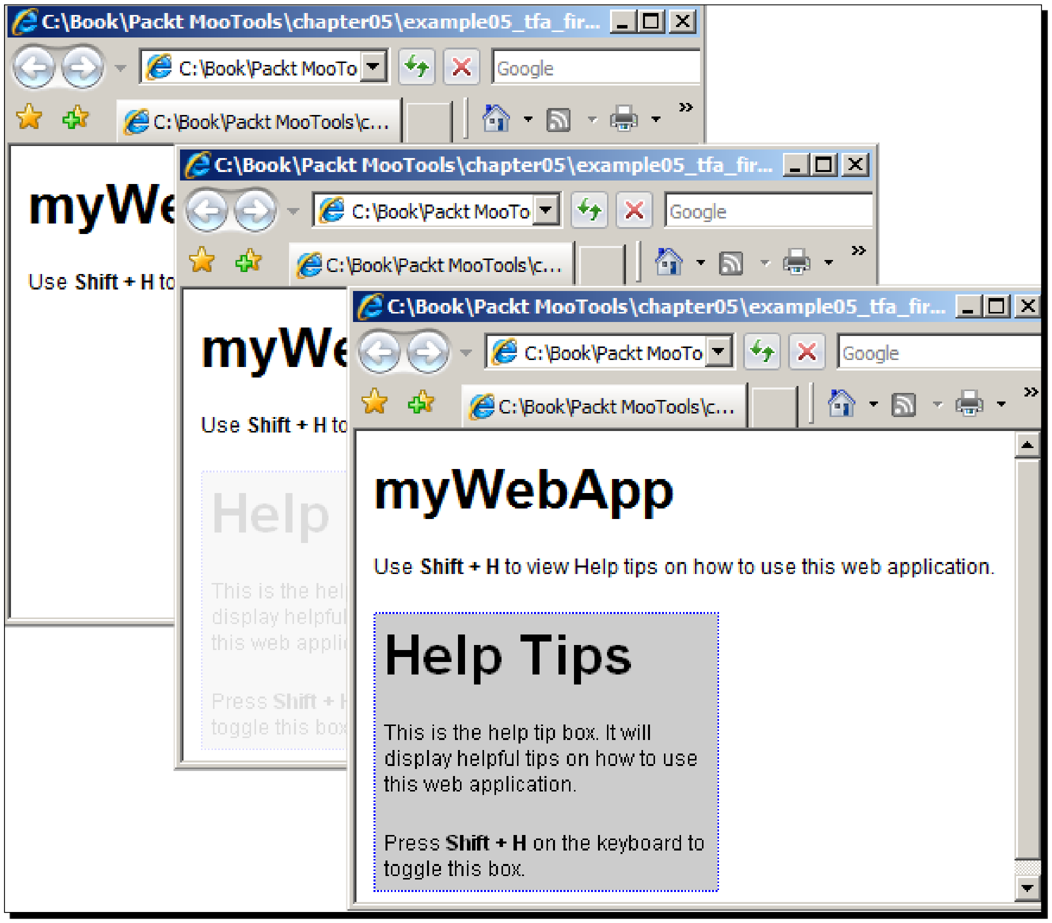
   We'll create a variable for the opacity value we want to assign to the `#help` div; `opacityValue`. If the current opacity is `0`, then `opacityValue` will be `1`. If the current opacity is `1`, then `opacityValue` will be `0`. Then, we tween the `#help` div opacity property to `opacityValue`.

```
// If opacity is 0 then we tween to 1, and vice versa
var opacityValue = ($('help').get('opacity')) == 0 ? 1 : 0;
$('help').tween('opacity', opacityValue);
```

8. All together, our MooTools script looks like:

```
window.addEvent('domready', function(){
   $('help').setStyle('opacity', 0);
   // Add custom event to MooTools Events object
   Element.Events.shiftH = {
       // Set our base event to 'keypress'
      base: 'keypress',
      // Event condition
       condition: function(customEvent){
        if(customEvent.shift && customEvent.key=='h') return true;
       }
   };
   // Add custom event on document object
   window.addEvent('shiftH', function(e){
      // If opacity is 0 then we tween to 1, and vice versa
      var opacityValue = ($('help').get('opacity')) == 0 ? 1 : 0;
      $('help').tween('opacity', opacityValue);
   });
});
```

9. Test your web page in your favorite web browser. Then toggle the help tip box by pressing *Ctrl + H* keys.


C:\Book\Packt MooTools\chapter05\example05_tfa_fir...
C:\Book\Packt MooTo
Google
C:\Book\Packt MooTools\c...

myWebApp

Use **Shift + H** to view Help tips on how to use this web application.

Help Tips

This is the help tip box. It will display helpful tips on how to use this web application.

Press **Shift + H** on the keyboard to toggle this box.

What just happened?

You've discovered how to create a custom event by extending the MooTools event object. We created a custom event called `shiftH` which had a base event of `keypress`. The condition that must be met for `shiftH` to be triggered is that both the *Shift* key and the *H* key are pressed at the same time.

Additionally, we were able to explore two MooTools methods included inside events: `.shift` which returns `true` if the *Shift* key is pressed, and `.key` which returns a lowercase string value of the key that is pressed.

Have a go hero – create your own custom event

Why don't you try to create your own custom event? How about modifying `shiftH` to `ctrlH`, and so that `#help` div is toggled when your users press *Ctrl + H* keys.

You can see what other event methods are available to you in the official MooTools documentation: `http://mootools.net/docs/core/Native/Event#Event`. In this instance, you'll have to replace the `.shift` event method to `.control` event method.

Removing, cloning, and firing off events

Besides adding event listeners, other operations you may want to do are removing events from an element, cloning events from other elements, and firing off events for elements manually. We'll go through each one of these operations.

Removing events from elements

There are instances when you want to remove an event listener that you've added to an element. One reason would be that you only want an element to be triggered once, and after that event has been triggered, you no longer want to trigger it again. To ensure it only fires once, you should remove the event once certain conditions have been met.

Removing a single event from elements

There are two methods available to you for removing events from elements. The first is `removeEvent()`, which removes a single specified event.

Time for action – removing an event

Let's say you have some hyperlinks on a page, which when clicked, will alert the user that they have clicked a hyperlink, but you only want to do it once. To ensure that the warning message appears only once, we'll have to remove the event after it has been fired.

This type of thing may be utilized for instructional tips: when the user sees an unfamiliar interface element, you can display a help tip for them, but only once, because you don't want the tip to keep showing up every single time they perform an action.

1. First, let's put some links on a web page.

```
<a href="#">Hyperlink 1</a> <a href="#">Hyperlink 2</a>
```

2. Next, let's create a function object which we will call whenever a click event happens
on any of the links on our page. When the function fires, it will open up an alert box with a message, and then it will remove the click event from all <a> elements on the web page.

```
// Create an function object
var warning = function() {
   alert('You have clicked a link. This is your only warning');
   // After warning has executed, remove it
   $$('a').removeEvent('click', warning);
};
```

3. Now we add a click event listener that will fire off the warning function object.

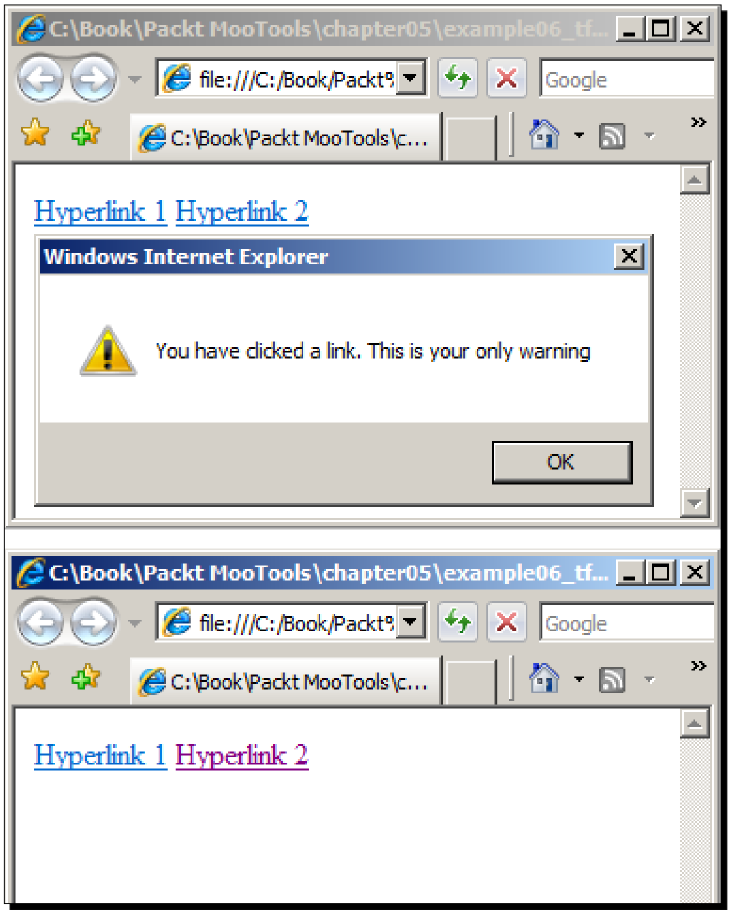
```
// Add a click event listener which when triggered, executes the
//warning function
$$('a').addEvent('click', warning);
```

4. Our script should look like the following:

```
window.addEvent('domready', function(){
    // Create an function object that will be executed when a
    //click happens
   var warning = function() {
      alert('You have clicked a link. This is your only warning');
      // After warning has executed, remove it from all <a>
      //elements on the web page
      $$('a').removeEvent('click', warning);
   };

   // Add a click event listener which when triggered, executes
   //the warning function
   $$('a').addEvent('click', warning);
});
```

5. Test in your web browser by clicking on any of the hyperlinks on the page. The first time you click, you'll see an alert dialog box with our message. The second (or third, fourth, fifth, you get the picture) time you click on any hyperlink, the alert
dialog box will no longer show up.


C:\Book\Packt MooTools\chapter05\example06_tf...
file:///C:/Book/Packt%
Google
C:\Book\Packt MooTools\c...
Hyperlink 1 Hyperlink 2
Windows Internet Explorer
OK
C:\Book\Packt MooTools\chapter05\example06_tf...
file:///C:/Book/Packt%
Google
C:\Book\Packt MooTools\c...
Hyperlink 1 Hyperlink 2

You have clicked a link. This is your only warning

Removing a type of event, or all events, from elements

If you want to remove a type of event on an element (or set of elements), or if you want to remove all events regardless of their type from an element, you have to use the `removeEvents` method.

To remove a type of event from an element, you pass the type of event you want to remove as a parameter of the `removeEvents` method. For example, if you wanted to remove all click events that were added using the MooTools `addEvent` method from an element called `myElement`, you would do the following:

```
$('myElement').removeEvents('click');
```

If instead, you wanted to remove all events that `myElement` has, regardless of the type of event it has, then you would simply run `removeEvents` as follows:

```
$('myElement').removeEvents();
```

Cloning events from another element

What if you wanted to copy all event listeners from another element? This could be useful in situations where you clone an element using the `clone` MooTools element method. Cloning an element doesn't copy the event listeners attached to it, so you also have to run the `cloneEvents` method on the element being cloned if you wanted to also port the event listeners to the copy.

To clone the events of an element, follow the format:

```
// clone the element
var original = $('originalElement');
var myClone = original.clone();

// clone the events from the original
myClone.cloneEvents(original);
```

Firing off events

Sometimes you want to fire off events manually. This is helpful in many situations, such as manually firing off an event listener function that is triggered by another event. For example, to fire off a `click` event on `myElement`, without having the user actually clicking on `myElement`, you would do the following:

```
$('myElement').fireEvent('click');
```

Time for action – firing off a click event

Imagine that you have a hyperlink with a `click` event listener attached to it, that when triggered, alerts the user with a message. But you also want to fire off this alert message when the user presses the *Ctrl* key. Here's how you'd do this:

1. First, let us place a hyperlink in an HTML document. We'll put it inside a <p> element and tell the users that clicking on the hyperlink or pressing the *Ctrl* key will open up an alert dialog box.

```
<body>
   <p>Show a warning by clicking on this link: <a href="#">Click
me</a>. Alternatively, you can show the warning by pressing the
<strong>Ctrl</strong> key on your keyboard.</p>
</body>
```

2. Next, let's add an event to <a> elements. We'll use the `addEvent` method to do this.

```
// Add a click event
$$('a').addEvent('click', function(){
   alert('You either clicked a link or pressed the Ctrl key.');
});
```

3. Now we have to add another event listener onto our HTML document that watches out for a `keydown` event. The function that the event listener executes will check if the key pressed is the *Ctrl* key by using the `control` event method, which returns a Boolean value of true if the *Ctrl* key is pressed.

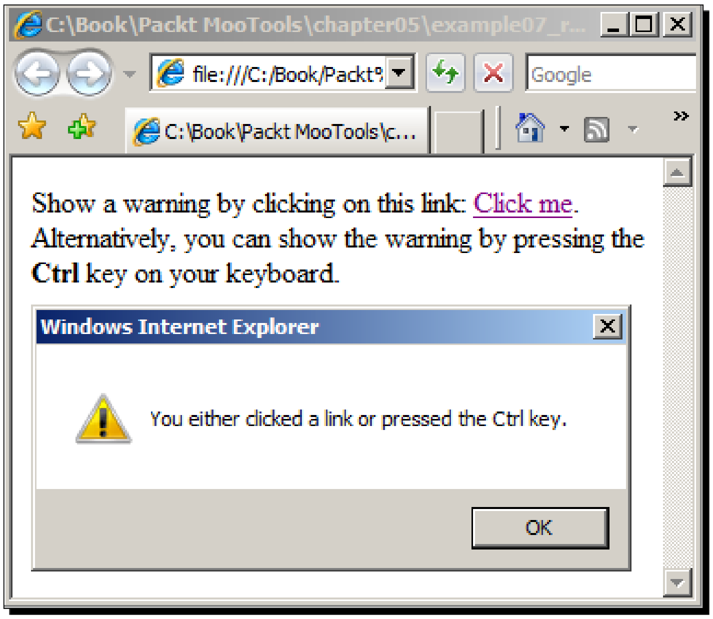
   If the key that was pressed is the *Ctrl* key, we ask it to fire the click event function that we set in all our a elements by using the `fireEvent` method with click as its parameter.

```
// Add a keydown event on our web page
window.addEvent('keydown', function(e){
// If the keypress is the Ctrl key
   // manually fire off the click event
   if(e.control) {
      $$('a').fireEvent('click');
   }
});
```

4. All together, our MooTools script should look like this:

```
window.addEvent('domready', function(){
   // Add a click event
   $$('a').addEvent('click', function(){
      alert('You either clicked a link or pressed the Ctrl key.');
   });
   // Add a keydown event on our web page
   window.addEvent('keydown', function(e){
   // If the keypress is the Ctrl key
   // manually fire off the click event
   if(e.control) {
      $$('a').fireEvent('click');
   }
   });
});
```

5. Test your HTML document in the web browser. Click on the **Click me** link. It should show you the alert message we created. Press the *Ctrl* key as well. It should also open up the same alert message we created.


C:\Book\Packt MooTools\chapter05\example07_r...
file:///C:/Book/Packt
Google
C:\Book\Packt MooTools\c...

Show a warning by clicking on this link: Click me. Alternatively, you can show the warning by pressing the **Ctrl** key on your keyboard.

Windows Internet Explorer

You either clicked a link or pressed the Ctrl key.

OK

The MooTools event object

The MooTools event object, which is part of the native component, is what allows us to create and work with events. It's therefore worth it to take a bit of time to explore the events object.

Using event object methods

There are three event methods: `preventDefault`, `stopPropagation`, and `stop`.

Preventing the default behavior

An event usually has a default behavior; that is, it has a predefined reaction in the instance that the event is triggered. For example, clicking on a hyperlink will direct you to the URL that `href` property is assigned to. Clicking on a **Submit** input field will submit the form to the value that the `action` property of the form element is assigned to.

Perhaps you want to open the page in a new window, but instead of using the non-standard target property on an <a> element, you can use JavaScript to open the page in a new window. Or maybe you need to validate a form before submitting it. You will want to prevent the default behaviors of an event doing either one of these things. You can use the `preventDefault` method to do so.

Time for action – preventing the default behavior of a hyperlink

Imagine that you have a list of hyperlinks that go to popular sites. The thing is, you don't want your website visitors to ever get to see them (at least coming from your site). You can prevent the default behavior of your hyperlinks using the `preventDefault` method.

1. Here is the HTML markup for a list of <a> elements that go to popular websites. Place it inside an HTML document.

```
<h1>A list of links you can’t go to.</h1>
<ul>
    <li><a href="http://www.google.com/">Google</a></li>
    <li><a href="http://www.yahoo.com/">Yahoo!</a></li>
    <li><a href="http://digg.com/">Digg</a></li>
</ul>
```

2. We will warn the user with an alert dialog box that tells them they can't access the links, even when they click on it. We'll fire this alert dialog box when a user clicks on it. Notice the e argument in the function? That is the event object that is passed into the function, allowing us to access events' methods and properties.

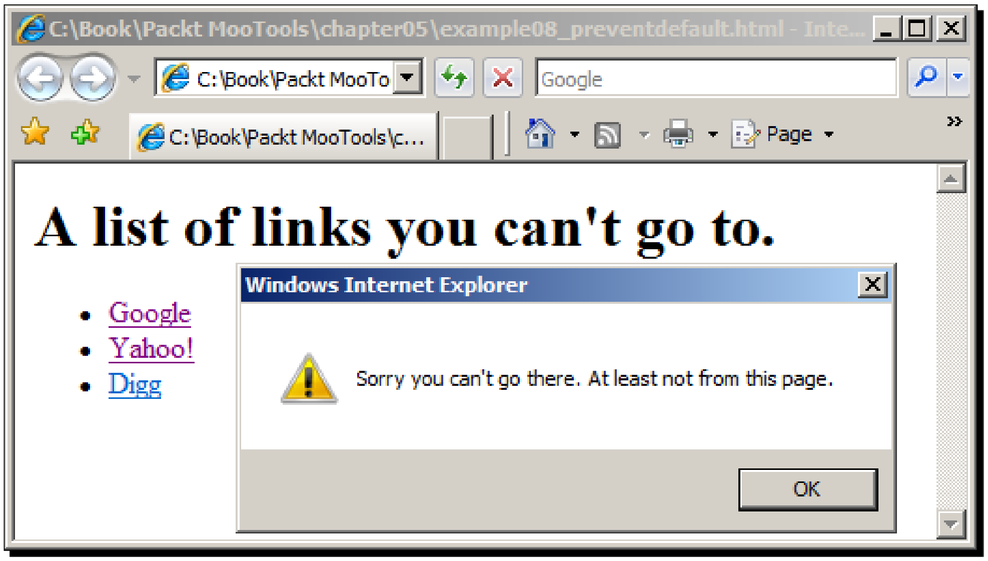
```
  $$('a').addEvent('click', function(e){
alert('Sorry you can\'t go there. At least not from this page.');
  });
```

3. Open your HTML document in a web browser and verify that the links still open their destination, since we haven't prevented the default yet. You will, however, see the alert dialog box we set up in step 2, showing you that, indeed, the click event listener function fires off.

4. Now we will prevent the links from opening by using the `preventDefault` method. We'll just add the following line above the `alert();` line:

```
e.preventDefault();
```

5. Test the document again in your web browser. Clicking on any hyperlink opens the alert dialog box, but doesn't open the hyperlink.


C:\Book\Packt MooTools\chapter05\example08_preventdefault.html - Inte...
C:\Book\Packt MooTo
Google
C:\Book\Packt MooTools\c...
Page
Windows Internet Explorer
OK

A list of links you can't go to.

- Google
- Yahoo!
- Digg

Sorry you can't go there. At least not from this page.

Preventing event bubbling

Event bubbling occurs when you have an element inside another element. When an event is triggered from the child element, the same event is triggered for the parent element, with the child element taking precedence by being triggered first.

You can prevent event bubbling using the `stopPropagation` method. Let's explore the concept of event bubbling and how to prevent it from occurring (if you want to), using the `stopPropagation` event method.

Time for action – preventing event bubbling

Let's say you have two divs, one inside another. When a div is clicked, it will open up the alert box that displays the div's ID property value.

1. Let's start with the HTML. In the following HTML markup, we have two div elements. The parent div has an ID of `#parent` and the child div has an ID of `#child`.

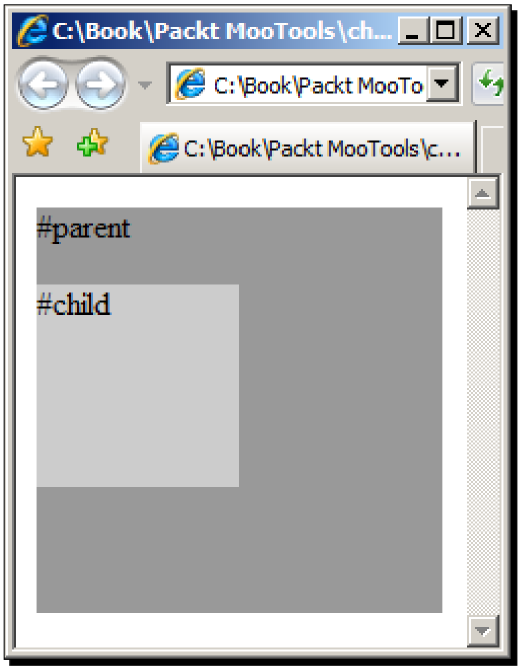
```
<body>
<div id="parent">
   <p>#parent</p>
   <div id="child">
       <p>#child</p>
```

```
    </div>
</div>
</body>
```

2. We'll style them with different background colors, widths, and heights so we can see each div better.

```
#parent {
   width:200px;
   height:200px;
   background-color: #999;
}
#child {
   width:100px;
   height:100px;
   background-color:#ccc;
}
```

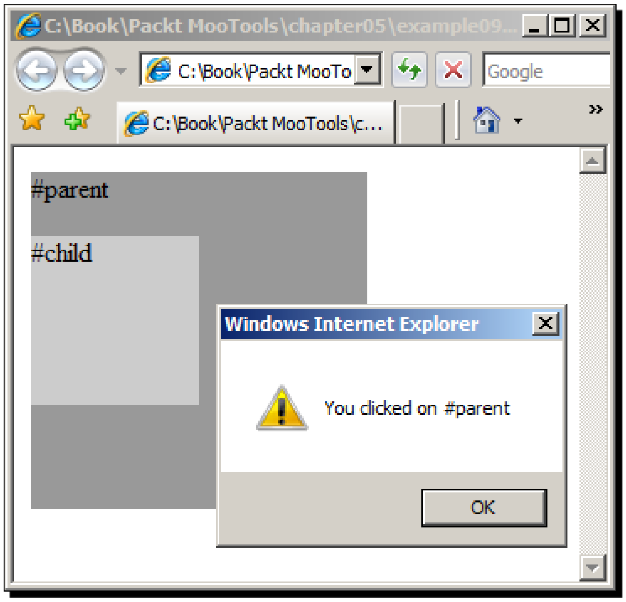
3. Open the HTML browser. You should see the following:



4. Let's explore the concept of event bubbling by adding a `click` event on all divs in the web page. When the `click` event is triggered, we will display an alert dialog box with the ID of the div that triggered the event.

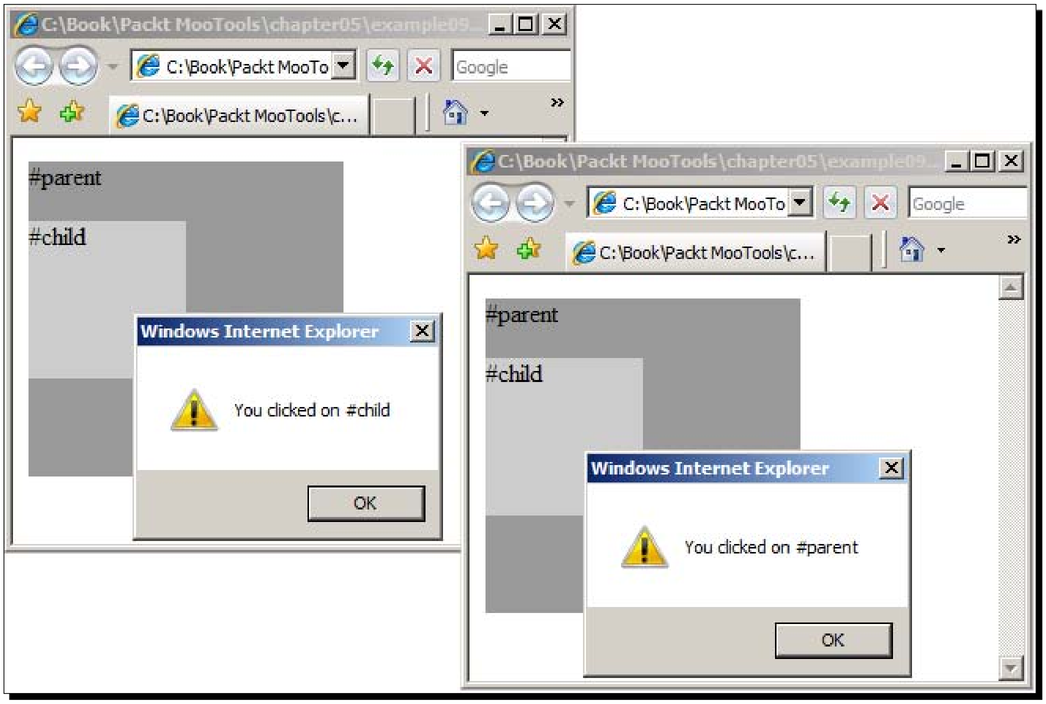
```
$$('div').addEvent('click', function(e){
   alert('You clicked on #' + this.get('id'));
});
```

5. Open or refresh your work in your web browser. Click on the `#parent` div. You should see one alert dialog box that displays the ID of the parent div.


C:\Book\Packt MooTools\chapter05\example09...
C:\Book\Packt MooTo
Google
C:\Book\Packt MooTools\c...
#parent
#child
Windows Internet Explorer
OK

You clicked on #parent

6. This step is where you'll see event bubbling in action. Click on the **#child** div. You should see two alert boxes, one right after the other. The first one will display an alert that you clicked on **#child** div, and the second one will alert you that you clicked on **#parent** div, effectively running the same function twice in one click.


C:\Book\Packt MooTools\chapter05\example09...
C:\Book\Packt MooTo
Google
C:\Book\Packt MooTools\c...
#parent
#child
Windows Internet Explorer
OK

You clicked on #child

You clicked on #parent

7. Let's prevent event bubbling from occurring. All we have to do is add this one line of code above the `alert()` line in step 4.

   ```
   alert('You clicked on #' + this.get('id'));
   ```

8. Refresh your HTML document. Click on the child element. You should only see one alert dialog box this time. In effect, we've prevented event bubbling, which is helpful when you only want to run the event's function once, not multiple times.

What just happened?

You've learned the concept of event bubbling, which is a useful thing to know because event bubbling can yield unexpected results if you don't keep it in mind. Sometimes you want to run a function only once, so you have to prevent the propagation of the event listener to the parent elements.

We did this by using the `stopPropagation` MooTools event method.

Stopping default behavior and event propagation

If you want to stop the default behavior of an element (`preventDefault`) as well as prevent event propagation (`stopPropagation`), you should use the "stop the event" method. This is a combination of both methods and it's a great way to save lines of code if you want to perform both operations.

If you had a link inside a <p> element, like so:

```
<p><a href="http://digg.com">link</a></p>
```

By default, clicking on this link will take you to the `Digg.com` website as well as trigger the click event on the <a> element and the <p> element. To prevent this from happening, which in essence means limiting the operation performed only to triggering the click event on the <a> element and nothing else, you can do the following:

```
$$('a').addEvent('click', function(e){
   e.stop();
});
```

Using event properties

MooTools event objects also contain a variety of properties (similar to the Browser Properties in Chapter 4). With these properties, you can find out many things about an event. We've already used several of these properties in this chapter, such as the `shift`, `control`, and `key` properties.

Here are all the properties of event objects. You can find a similar summary in the MooTools official documentation In the Event section: `http://mootools.net/docs/core/Native/Event#Event:constructor`.

Event property	**Data type**	**What it does**
`code`	Number	This property returns the key code that was pressed. You can see a list of JavaScript Key Codes for standard keyboard keys in Mozilla Developer Center, under KeyEvent: `https://developer.mozilla.org/en/DOM/Event/UIEvent/KeyEvent`. For example, if the user presses the *Enter* key, the key code number is 14, and thus `event.code` will return a number value of 14.

Event property	**Data type**	**What it does**
`key`	String	Returns the lowercase value of the key pressed. For example, it will return q if the *Q* key is pressed, and enter when the *Enter* key is pressed. Possible values of the `key` property are: letters a - z numbers 0 - 9 'enter', 'up', 'down', 'left', 'right', 'space', 'backspace', 'delete', and 'esc'.
`shift`	Boolean	This property will return true if the `Shift` key was pressed.
`control`	Boolean	This property will return true if the `Ctrl` key was pressed.
`alt`	Boolean	This property will return true if the `Alt` key was pressed.
`meta`	Boolean	This property will return true if the `Meta` key was pressed.
`wheel`	Number	How many times the scoller button on a mouse was used.
`page.x`	Number	Returns the x coordinate position of the mouse relative to the entire browser window.
`page.y`	Number	Returns the y coordinate position of the mouse relative to the entire browser window.
`client.x`	Number	Returns the x coordinate position of the mouse relative to the browser's viewport.
`client.y`	Number	Returns the y coordinate position of the mouse relative to the browser's viewport.
`target`	Element	Returns the element or elements that are targeted by the event.
`relatedTarget`	Element	Returns the related element or elements that are targeted by the event (useful for seeing what elements can be affected by event bubbling).

Summary

We learned a lot in this chapter. We learned about web browser events and how they can help us watch for, and react to, user actions. We saw events in action in web forms and in a mythical web application that allows users to toggle a help tip box with a shortcut key.

Specifically, we covered:

- Adding event listeners to elements: We learned how to add a single event listener, as well as multiple event listeners, using the `addEvent` and `addEvents` methods. You'll find a lot of use for these as you get into the more advanced facets of MooTools.
- Removing, cloning, and firing off events: We saw how to remove events from elements using the `removeEvent` and `removeEvents` methods, cloning events with the clone method, and systematically firing off events, even when they are not triggered by users, using the `fireEvent` method.
- Creating custom events: We found out how to create custom events to extend MooTools' event object.
- Event properties and methods: We saw the available methods and properties that will help us work with events.

Your newfound understanding of events will tremendously help us in the chapter, when we deal with the fun stuff: JavaScript effects and animation, which, you'll be glad to know, is the topic of the next chapter.

6
Bringing Web Pages to Life with Animation

Users expect a highly-interactive experience when interfacing with websites and web applications. With MooTools, you can create stunning animation within your web pages with MooTools' smooth and slick JavaScript effects.

In this chapter we shall:

- Learn about the MooTools `Fx` class
- Learn how to animate a CSS property of an element
- Discover how to animate multiple CSS properties of an element
- Investigate some of Fx's useful methods for working with MooTools effects

So let's get on with it!

MooTools' Fx class

The MooTools `Fx` class is where the magic happens (or at least, one of the places where it happens). It contains the framework's animation effects logic that will help you transform CSS properties in a smooth and slick fashion. Before we get started with the fun stuff, let's go over the basics.

Basic syntax

Declaring a new Fx object follows the same syntax as declaring any other object in MooTools (like a new Event in Chapter 5). You create a new Fx object using the following format:

```
var nameOfFxObject = new Fx([options]);
```

However, it's unlikely that you will use the Fx class in the above manner, but rather, you'll use one of its extensions (`Fx.Tween` or `Fx.Morph`).

Let's go over the options and properties you can use to define your animation effect.

Fx options

You have a myriad of options that you can take advantage of inside the Fx class, giving you unprecedented control over your JavaScript animation effects. In the following table, you'll find the option name, the data type it accepts, its default value (if you don't declare a value for the option), and what the option is for.

It's important to note that when constructing your Fx object, you do not need to include any of these options because they're optional.

Option Name (Data Type)	**Default Value**	**What it's for**
`fps` (number)	50	Allows you to specify the number of frames per second of the effect.
`unit` (string)	'false'	The unit used for the effect transition (px, em, or %).
`link` (string)	'ignore'	What to do when the effect starts. The values you can use are: 'ignore': will ignore the other effects currently running when this effect starts. 'cancel': will cancel other effects currently running when this effect starts. 'chain': the effect will start as soon as currently running effects end.
`duration` (number or string)	500	How long the effect will last in milliseconds (that is the value of 500 is half a second); the longer it is, the slower the transition. You can use numbers or one of the three preset duration values: short (250 ms), normal (500 ms), and long (1000 ms).

Option Name (Data Type)	Default Value	What it's for
`transition`	sine:in:out	The mathematical formula used for the effect transition. There's a big list of values you can use to learn about all the different types of transitions at the official MooTools Docs: `http://mootools.net/docs/core/Fx/Fx.Transitions`

Now that you know the basics of the `Fx` class, it's time to get "Mooving" and shaking, and that's what we'll do in the next part of the chapter.

Animating a CSS property with Fx.Tween

JavaScript animation effects have come a long way with the help of frameworks like MooTools that allow you to perform very fine-tuned, slick animations that rival the likes of Adobe Flash.

MooTools allows you to smoothly transition a CSS property from one value to another. For example, if you would like to transition the width of an element from 100px to 200px, or the color from #ffffff to #000000, you can.

The term "tween" comes from the animation industry; it is when the animator fades a frame into the picture while fading out the existing frame, giving the appearance of a smooth and seamless transition between the two frames.

`Fx.Tween` is a class extension of `Fx` that deals with animating one CSS property value into another. We'll explore just how cool `Fx.Tween` is with an example.

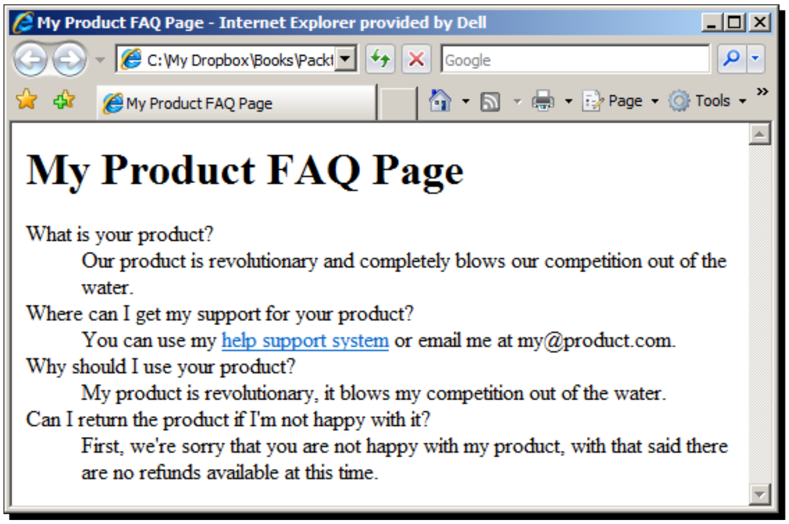
Time for action - creating a hide/show FAQ page

Let's say that you have a boring FAQ page on your website, and you'd like to add a bit of interactivity to it, as well as shorten the page so that users can quickly find the questions they're looking for. One of the ways we can achieve these two goals is by hiding the answers to the questions, and then showing them when the user clicks on the question.

To help us achieve our goals, we will use `Fx.Tween` to let users click on a frequently-asked question, which would reveal their corresponding answers.

1. We will start with the `HTML.definition` list `<dl>` element so that we can pair up the questions with their respective answers (dd). Here is the HTML code we're going to use (place your questions inside the `<dt>` element, and their corresponding answers in the following `<dd>` element).

```
<body>
<h1>My Product FAQ Page</h1>
<dl>
   <dt>...Question 1...<dt>
   <dd>...Answer 1...<dd>
   <dt>...Question 2...<dt>
   <dd>...Answer 2...<dd>
   <dt>...Question 3...<dt>
   <dd>...Answer 3...<dd>
   <dt>...Question 4...<dt>
   <dd>...Answer 4...<dd>
</body>
```

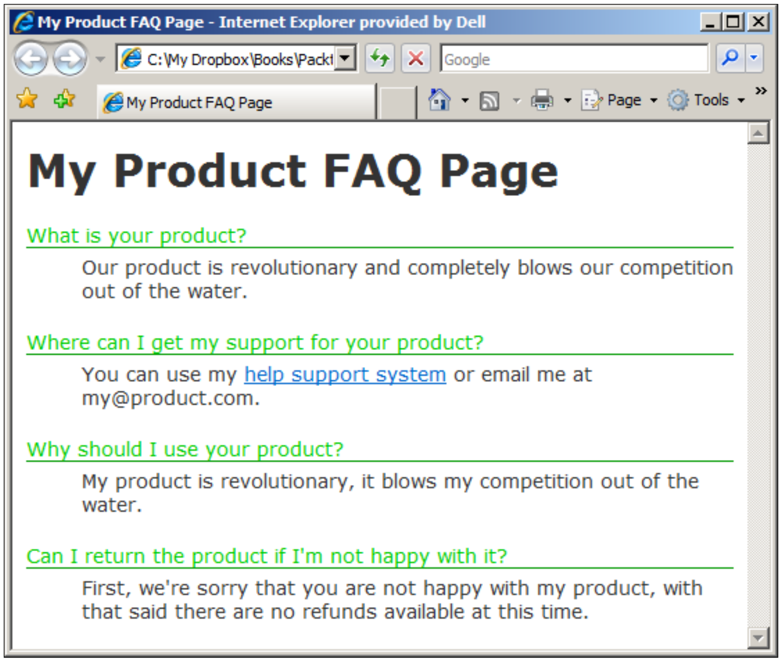

My Product FAQ Page - Internet Explorer provided by Dell
C:\My Dropbox\Books\Packt
Google
My Product FAQ Page
Page
Tools

My Product FAQ Page

What is your product?
    Our product is revolutionary and completely blows our competition out of the water.
Where can I get my support for your product?
    You can use my help support system or email me at my@product.com.
Why should I use your product?
    My product is revolutionary, it blows my competition out of the water.
Can I return the product if I'm not happy with it?
    First, we're sorry that you are not happy with my product, with that said there are no refunds available at this time.

2. Let's make the FAQ page a bit prettier. We'll change the default font style to Verdana. For the questions (`dt`), we'll give them green color, a green bottom border, a bit of space in between each other, and change the `cursor` property to `pointer` to indicate to the users that they are clickable. For the answers (dd), we'll simply give them a bit of space from the questions.

```
body {
   font:normal 14px Verdana, Geneva, sans-serif;
   color:#333;
}
dt {
   color:#030;
   border-bottom:1px solid #090;
   margin-top:20px;
   cursor: pointer;
}
dd {
   margin-top:5px;
}
```


My Product FAQ Page - Internet Explorer provided by Dell
C:\My Dropbox\Books\Packt
Google
My Product FAQ Page
Page
Tools

My Product FAQ Page

What is your product?

Our product is revolutionary and completely blows our competition out of the water.

Where can I get my support for your product?

You can use my help support system or email me at my@product.com.

Why should I use your product?

My product is revolutionary, it blows my competition out of the water.

Can I return the product if I'm not happy with it?

First, we're sorry that you are not happy with my product, with that said there are no refunds available at this time.

3. It's MooTools time! First, let's create some objects, namely two arrays that will hold all of the questions (called `questions`), and one that will hold the answers (called `answers`). This will make our code a bit cleaner and easier to read, as well as make the sets easier to reference later down the script.

```
window.addEvent('domready', function(){
// Define some objects to make code cleaner
// and easier to reference
```

```
var questions = $$('dt');
var answers = $$('dd');
```

4. When the page first loads, we have to hide all of the answers. We do this by using the `.setStyle()` method to immediately set the opacity CSS property of all the answer elements (dd) to 0%.

```
// On first load, hide the answers
answers.setStyle('opacity', 0);
```

5. We will need an event listener for the event that a user clicks on a question, so we'll use what we learned in Chapter 5 and utilize the `addEvent()` method to add a click event listener to the questions.

   When the user clicks on a question, we want to get the index position of the question so that we know which answer to show or hide. We do this using the `indexOf()` method on the definition term set (`dt`) and then storing this numerical value into a variable called `questionIndex`. If the user clicks on the first question: `questionIndex` will be 0, second question: `questionIndex` is 1, and so forth. Then we will pass `questionIndex` as an argument to a function called `toggleAnswer` which we will create in the next step. Note that you do not have to put the index position inside a variable like `questionIndex`, but doing so makes the code a bit more readable.

```
// Add click event listener to questions
// (all dt elements)
questions.addEvent('click', function(){
   // Get the index position of the question
   var questionIndex = questions.indexOf(this);
   // Call toggleAnswer function with the index
   // of this question as the argument
   toggleAnswer(questionIndex);
});
```

6. We're going to create a function that will deal with the hiding and showing (toggling) of the answers; we shall call this function `toggleAnswer` which accepts an argument that points to the index position of the answer to show (or hide). The argument will be `questionIndex` from the previous step.

```
// The toggleAnswer function
function toggleAnswer(index){

}
```

7. Inside `toggleAnswer`, we will declare a new `Fx.Tween` object called `toggleEffect`. It will transition the opacity CSS property of the element we pass to it, and the effect will have a short duration. The element we will pass to it as an argument is the answer whose index matches the question that was clicked (`answers[index]`).

```
var toggleEffect = new Fx.Tween(answers[index], {
   property : 'opacity',
   duration : 'short'
});
```

8. Next, we create a control structure for determining whether we will be transitioning to 100% opacity (the question is hidden) or 0% opacity (the question is currently showing). We use the `get()` method to see if the target element has a `0` opacity, and if it does, we'll start the effect at 0% opacity, and then end at 100% opacity, otherwise, we do the opposite. To start the `toggleEffect` animation, we use the `start()` method and pass the starting value and ending value of the opacity. We'll talk about the `start()` method in greater detail later on in the chapter.

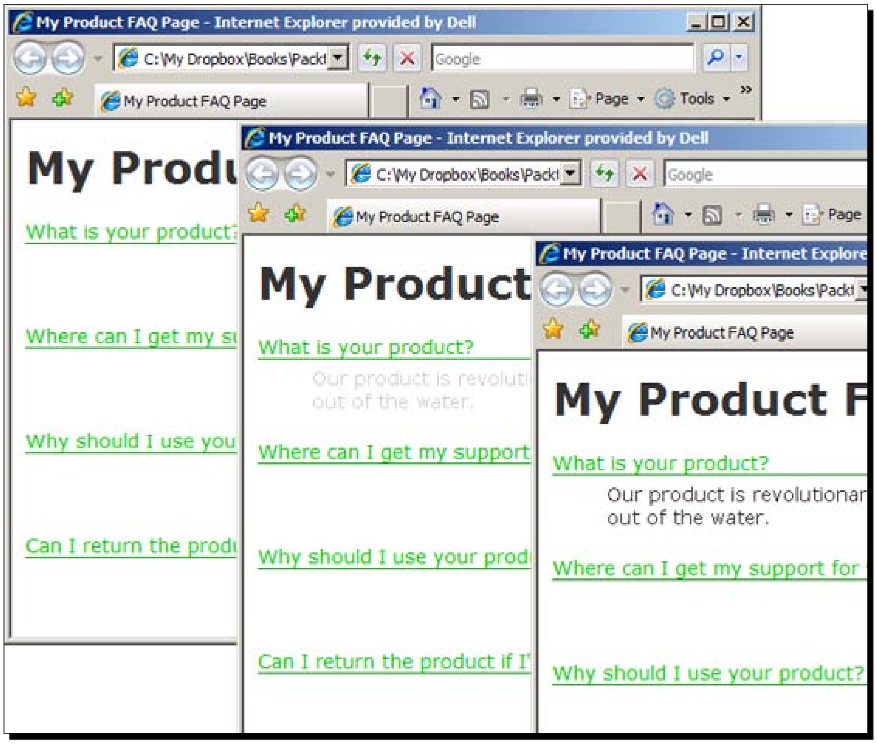
```
if(answers[index].getStyle('opacity')==0){
   // If answer is hidden, transition to 100%
   toggleEffect.start(0, 1);
} else {
   // Else if answer is shown, hide it
   // and transistion to 0%
   toggleEffect.start(1, 0);
}
```

9. Review the entire MooTools script that we wrote together. Here it is without the comments.

```
window.addEvent('domready', function(){
var questions = $$('dt');
var answers = $$('dd');

answers.setStyle('opacity', 0);

questions.addEvent('click', function(){
   var questionIndex = questions.indexOf(this);
   toggleAnswer(questionIndex);
});
function toggleAnswer(index){
   var toggleEffect = new Fx.Tween(answers[index], {
      property : 'opacity',
      duration : 'short'
   });
   if(answers[index].getStyle('opacity')==0){
      toggleEffect.start(0, 1);
   } else {
      toggleEffect.start(1, 0);
   }
}
});
```


My Product FAQ Page - Internet Explorer provided by Dell
C:\My Dropbox\Books\Packt
Google
My Product FAQ Page
Page
Tools

My Product F

What is your product?

Our product is revolutionar
out of the water.

Where can I get my support for

Why should I use your product?

What just happened?

In the previous example, we used `Fx.Tween` to hide and show elements, namely dd elements which contain the answers to a hypothetical set of frequently asked questions (`dt`).

We did this by getting the index position of the question, then sending it to a function called `toggleAnswer`, which determines whether the corresponding answer is already showing or not; if it's hidden, it fades the question in, if it is shown, then it fades it out.

Have a go hero – modifying the hide/show transition effect

Try to see what happens when you modify the duration option (give it a slower or faster value). You should notice that the effect becomes more pronounced and noticeable as you increase the duration option of the `Fx.Tween` class instance.

Tweening a single CSS property using the tween() method

`Fx.Tween` comes packed with a few helpful methods for quickly transitioning a CSS property of an element. `tween()` is one such method that allows you to transition one CSS property value to another with fewer keystrokes than declaring a new `Fx.Tween` instance.

Using `.set('tween', options)` before starting the effect allows you to change the options before using `tween()`. You should use `tween()` on an element (or set of elements) instead of creating a new instance of `Fx.Tween` to save some lines of code. We've used the `tween()` method in a previous chapter, but let's talk about it in a bit more detail here.

Using `tween()` is simple, and follows the format:

```
$(yourelement).tween(property, [startvalue, endvalue]);
```

If you want to start the tween at the current value, then just providing an end value will transition the element from the current value to the end value, that is:

```
$(yourelement).tween(property, endvalue);
```

`tween()` is a deceptively simple method that provides you a quick way of creating highly-interactive and appealing user interaction.

Time for action – toggling the visibility of a div

Imagine you have a div that you would like to hide or show. The `tween()` method will allow you to do this very easily and with very few lines of code. Let's just jump right to it.

1. First, we set up the HTML. We use an <a> tag as the trigger. When clicked it will either hide or show the `#panel` div depending on its visibility.

```
<a href="#">Toggle div</a>
<div id="panel">
  <!-- Div content -->
</div>
```

2. We give the `#panel` div some simple styles by changing its background color to gray and giving it a black border. This step is optional but it makes it easier to see the transition.

```
#panel {
   background-color:#ccc;
   border:1px solid #000;
}
```

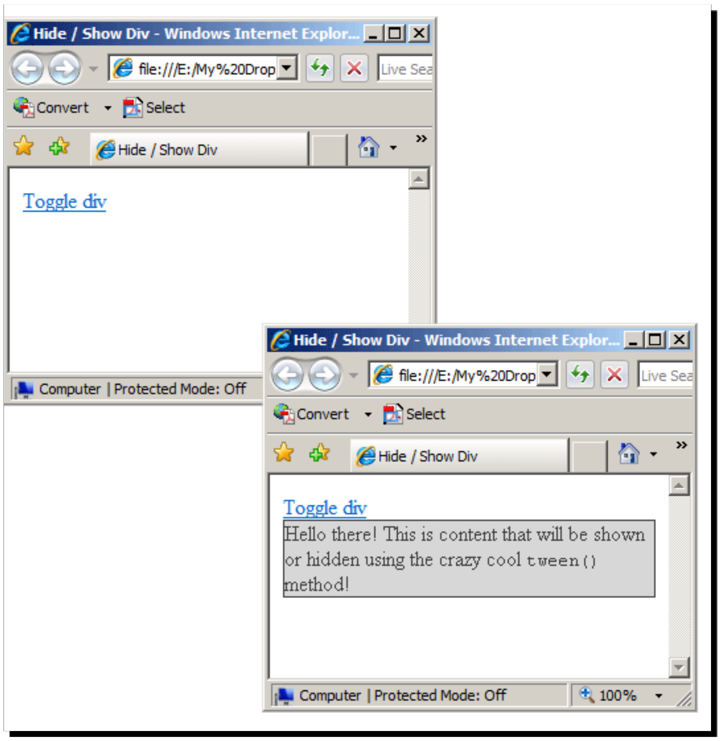
3. Moving on to MooTools. First, we declare a variable that holds the <a> element. This makes it easier to reference in our code. We also immediately set the opacity of the `#panel` div to `0`.

```
   // target is the div we hide or show
   var target = $('panel');
   // Hide div immediately
   target.setStyle('opacity',0);
```

4. Finally, we add a click event for the <a> element. When the click event is triggered, we tween the opacity CSS property of the `#panel` div. If the opacity is currently `0`, we set the end value to `1`, and if the opacity is `1`, we set the end value to `0`.

```
   // Click event
   $$('a').addEvent('click', function(){
      // Tween opacity to 1 if currently 0, tween to 0 if
     //currently 1
      target.tween('opacity', target.getStyle('opacity')==0 ? 1 :
       0);
   });
```

5. Test your work in a browser. At first, the `#panel` div should be hidden when the page loads. When you click on the <a> element, it will animate the visibility of the `#panel` div. Clicking on the <a> element when the `#panel` div is shown should animate the div to be hidden again.


Hide / Show Div - Windows Internet Explor...
file:///E:/My%20Drop
Convert
Select
Hide / Show Div
Toggle div
Computer | Protected Mode: Off
100%

Hello there! This is content that will be shown or hidden using the crazy cool tween() method!

What just happened?

We learned how to use the `tween()` method by hiding and showing a web page element. More specifically, we animated the opacity CSS property of a div using the `tween()` method.

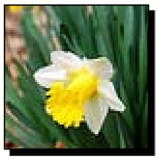
Fading elements

There is another shortcut method for animating elements within the `Fx.Tween` class, called `fade()`, that simply fades an element in and out. Rather than talking about it in length, let's just jump right into it with an example.

Time for action - fading an image in and out

Imagine that you have an element (or a set of elements) that you'd like to fade in and out from a web page. We can use the `fade()` method, in conjunction with event listeners, to make this happen with very few lines of code. This can be used for simple hide and show interactions, much like in the earlier example in this chapter with FAQ's.

1. We'll be fading an image in and out of a web page. We use a click event on a link to trigger the animation. For the image, we'll use an image from my Flickr account: `http://www.flickr.com/photos/31288116@N02/3380520852/in/set-72157615731243219/`.
2. We'll use two sizes of the images, one small and one big. The small one, when clicked, will fade in the bigger image, much like in thumbnail galleries. To download the small image, visit this link: `http://farm4.static.flickr.com/3636/3380520852_5494538698_s_d.jpg`



3. Download the large image using this link: `http://farm4.static.flickr.com/3636/3380520852_5494538698_d.jpg`

4. Store both images in the same directory with your HTML document that you will use for this example, so that we can easily reference them. Rename them to a shorter file name. How about `flower_small.jpg` for the small one and `flower_large.jpg` for the larger one?

5. Let's start with the HTML code. We'll simply put the images inside paragraph elements. The smaller image (the thumbnail) will have a class of `.small`, and the larger version will have a class of `.large`.

```
<body>
<p><img class="small" src="flower_small.jpg" width="75"
        height="75" /></p>
<p><img class="large" src="flower_large.jpg" width="404"
        height="500" /></p>
</body>
```

6. First, we need to hide the larger image immediately when the first page loads; we do so with the `.setStyle` method with opacity as the property argument, and `0` as the property value to set it to.

```
// Set opacity immediately to 0
$$('.large').setStyle('opacity', 0);
```

7. Next we need a click event listener on the thumbnail; we'll target the `.small` class and add a click event listener to it.

```
$$('.small').addEvent('click', function(){
  // Code to execute
});
```

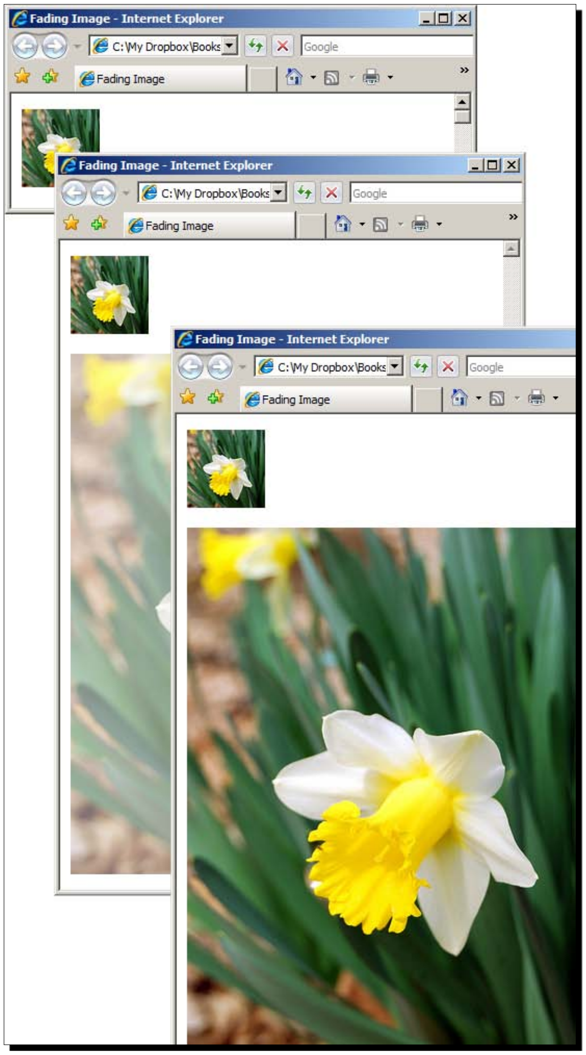
8. It's time to utilize the `.fade` method. First, we create an object called large, just to make our code a bit cleaner. Then we run the fade method on large. We feed fade either a `1` or `0` using a ternary control structure; if the opacity of large is `0`, then we fade to `1` (showing it), otherwise, we fade to `0` opacity.

```
$$('.small').addEvent('click', function(){
   // Make code cleaner
   var large = $$('.large');
   // Run fade on method on .large
   //   If opacity of .large is 0 fade to 1
   //   Otherwise, fade to 0
   large.fade((large.get('opacity') == 0) ? 1 : 0);
});
```

9. Review the script we wrote together. Here it is without comments.

```
window.addEvent('domready', function(){
$$('.large').setStyle('opacity', 0);
$$('.small').addEvent('click', function(){
      var large = $$('.large');
      large.fade((large.get('opacity') == 0) ? 1 : 0);
});
});
```

Now, test the web page in a web browser.



What just happened?

We learned how to use one of the `Fx.Tween` shortcuts, the fade method. We applied it to an image to create a gallery style effect where you click on a thumbnail (`flower_small.jpg`) and it shows the full scale version of itself (`flower_large.jpg`).

Now we're ready to move on to another awesome `Fx.Tween` shortcut.

Highlighting elements

The other `Fx.Tween` shortcut that is helpful is the highlight method. You can use the highlight method to draw attention to elements by momentarily transitioning its background color, creating a "flashing" or "blinking" effect.

If you use the highlight method without any options, it uses a light yellow color (`#ff8`) as the "highlighting" color and makes the background of the element flash for a split second to draw the user's attention to it.

Time for action - indicating blank form fields that are required

Let's see what the highlight method can do for us. We're going to use it on a web form.

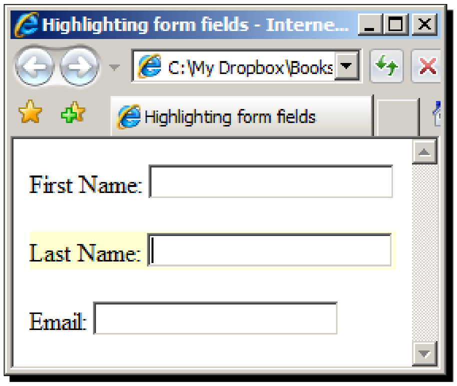
1. First we'll set up the form's HTML.

```
<form action="" method="">
<p>
  <label for="firstName">First Name:</label> <input
name="firstName" type="text" />
</p>
<p>
  <label for="lastName">Last Name:</label> <input name="lastName"
type="text" />
</p>
<p>
  <label for="email">Email:</label> <input name="email"
type="text" />
</p>
</form>
```

2. Then we target all the input elements and add a focus event listener to them. When an input field is focused on, we grab its parent (p) element and then run the highlight method on that element to animate its background color.

```
$$('input').addEvent('focus', function(){
   this.getParent('p').highlight();
});
```

On testing the above script in a web browser, you should see that the background color momentarily flashes to a light yellow color, and then fades back to the original background color (which defaults to transparent or no color in most web browsers).



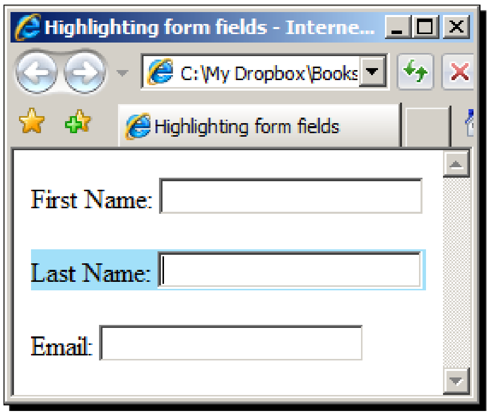
First Name:

Last Name:

Email:

3. Let's see what happens when we pass one color value to the method as an argument. This effectively functions as the starting color of the highlight. We'll use a blue color (`#6dcff6`).

```
$$('input').addEvent('focus', function(){
   this.getParent('p').highlight('#6dcff6');
});
```



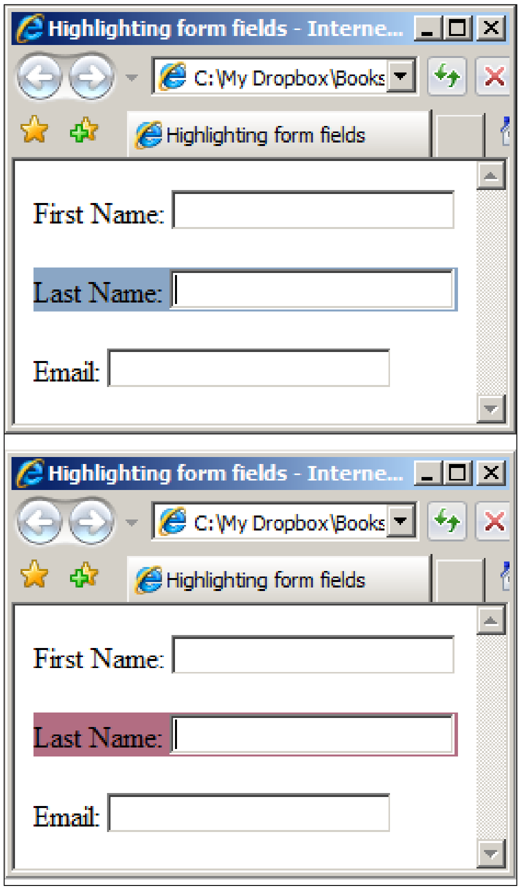
First Name:

Last Name:

Email:

4. Now let's modify it so that we pass both a starting and ending value for the color options. You should see the blue color transitioning to the red color, then the red color transitioning to the element's default background color (transparent).

```
$$('input').addEvent('focus', function(){
   this.getParent('p').highlight('#6dcff6', '#ff0000');
});
```



What just happened?

We explored the highlight method and how we can use it to draw attention to the focused input fields on a web form. By passing no color options to the method, it uses a light yellow color that acts as a "blinking" or "flashing" animation effect. With one option, it replaces the default light yellow color to the one we've specified, and with two options, it uses the first color passed as the starting value, the second color as the ending value, before transitioning back to its original background color (which is transparent or 0% opacity).

Now that we've fully seen what `Fx.Tween` can do for us, let's see how we can use more than one CSS property to animate elements.

Animating multiple CSS properties with Fx.Morph

When you want to transition more than one CSS property at the same time, you'll have to use another `Fx` class extension, `Fx.Morph`. The biggest difference between `Fx.Morph` and `Fx.Tween` is that the former is able to transition more than one CSS property simultaneously (imagine transitioning the color, width, and height of an element at the same time).

Let's learn about `Fx.Morph` through an example!

Time for action - enlarging an image

Say you have an image that you'd like to scale up or down when the user clicks on it. This type of interaction is common in thumbnail galleries where images are displayed in thumbnails so that the web page can display many images at once. When the user clicks on an image that they find interesting, it enlarges so they can see the full size.

We'll do this for one image, but I'm sure that once you're done with the chapter, you can figure out how to apply it to multiple images on a web page (if you wish).

1. Let's grab an image to use for the example. You can download an image from one of my Flickr sets of a blue flower and save on your local machine as `blueflower.jpg`: `http://farm4.static.flickr.com/3429/3379703917_835a79555f_d.jpg`

Place the image in an HTML document with an ID of "image".

```
<body>
<img id="image" src="blueflower.jpg" width="500" height="301"
alt="blue flower" />
</body>
```

2. First, we'll declare a bunch of variables for helping us easily reference them.

```
// Create variable for easier referencing
var image = $('image');
// Get the current width, height, opacity as numbers
var width = image.getProperty('width').toInt();
var height = image.getProperty('height').toInt();
var opacity = image.getStyle('opacity').toInt();
```

3. Next, we immediately set the width and height of the image to 25% of its original value, and its opacity to 50% of its value by using division operations.

```
// On page load, reduce width and height to 25%
// reduce opacity to 50%
image.setStyles({
   'width' : width / 4,
   'height' : height / 4,
   'opacity' : opacity / 2
});
```

4. We add an event listener to our image to listen for mouse clicks on itself.

```
// Click event listener
image.addEvent('click', function(){
   // code to execute
});
```

5. Inside the click event listener, the first thing we will do is add a class property of "enlarged". We use the `toggleClass` method, which adds the specified class if it's not there, or remove the class if isn't there. This is how we'll know if the image is thumbnail size or full size (enlarged).

```
   // Toggle enlarge class value
   this.toggleClass('enlarged');
```

6. Next we set up the `Morph` object. Instead of the default transition type, we'll use one of my favorite transition types: `Fx.Transitions.Bounce.easeOut` which does a bouncy type of animation.

```
      // Declare Fx.Morph object
      var scaleEffect = new Fx.Morph(this, {
         'duration' : 550,
         'transition' : Fx.Transitions.Bounce.easeOut
      });
```

7. Next we start the effect. We use the `hasClass()` method to determine whether or not the image is thumbnail class or if it is already enlarged, so that we know what values to transition to.

```
      // Start the effect
      var enlarged = this.hasClass('enlarged');

      scaleEffect.start({
         // If the element has a class of enlarged
         // Then we scale all properties to 100%,
         // Otherwise we scale it down to 25% width/height
         // and 50% opacity
         'width' : enlarged ? width : width / 4,
         'height' : enlarged ? height : height / 4,
         'opacity' : enlarged ? opacity : opacity / 2
      });
```

8. Review the script we wrote together, here it is all together without comments.

```
window.addEvent('domready', function(){
   var image = $('image');
   var width = image.getProperty('width').toInt();
   var height = image.getProperty('height').toInt();
   var opacity = image.getStyle('opacity').toInt();

   image.setStyles({
      'width' : width / 4,
      'height' : height / 4,
      'opacity' : opacity / 2
   });

   image.addEvent('click', function(){
```

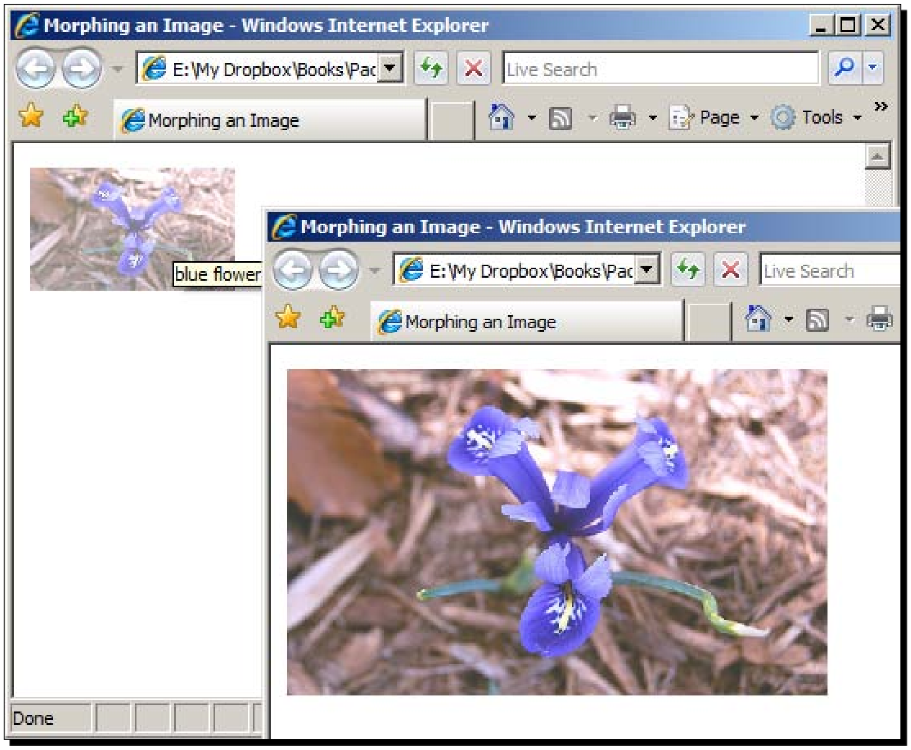
```
            this.toggleClass('enlarged');

            var scaleEffect = new Fx.Morph(this, {
               'duration' : 550,
               'transition' : Fx.Transitions.Bounce.easeOut
            });

            var enlarged = this.hasClass(‘enlarged’);

            scaleEffect.start({
               'width' : enlarged ? width : width / 4,
               'height' : enlarged ? height : height / 4,
               'opacity' : enlarged ? opacity : opacity / 2
            });
         });
      });
```

9. Test your work. If done correctly, when you click on the image it should enlarge. If you click on it again, it should shrink back to the smaller, thumbnail size.



What just happened?

In the previous example, we witnessed how fun `Fx.Morph` can be. We used an image that we shrunk down to thumbnail size, and then we added a click event listener to it. When the image is clicked, we use `Fx.Morph` transition, configuring the width, height, and opacity properties of the image, all at the same time.

Have a go hero – modify the transition type

In the above example, I used my favorite transition type. There are a lot more types of transitions and the best way to find about all the different types of transitions is heading over to the MooTools Official Docs site, `Fx.Transitions`.

`http://mootools.net/docs/core/Fx/Fx.Transitions`

Modify the example by changing the transition option value to ones that you find interesting.

Using the morph() shortcut method

`Fx.Morph` comes with a useful method called `morph()` that you can use on elements to transition their CSS properties with very few lines of code. What's cool about `morph()` is that it can also use a class name as an argument, so if you have a class in your stylesheet with style properties, you can use it. Like the `tween()` method in `Fx.Tween`, you can use `.set('morph' options)` on the element to change the options before calling `morph()`.

Enough of chit-chat! Let's just jump right into it to see how exactly the morph method works.

Time for action - experimenting with morph

To explore the morph method, we will use a div with text inside it to morph several of its properties.

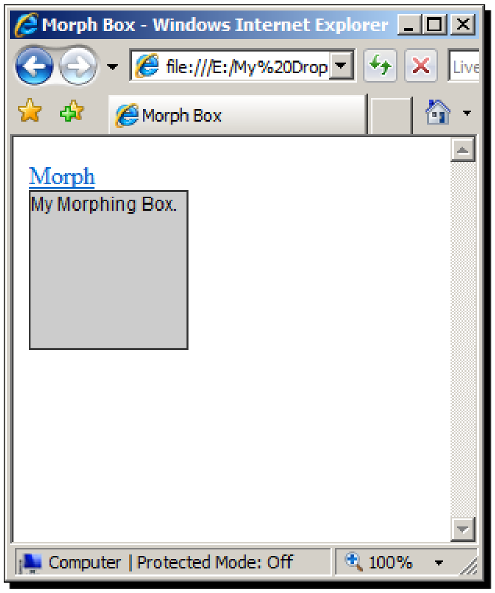
1. We will use an element to trigger the animation effect. We will run the animation on a div element with an ID of `morphDiv`.

   ```
   <a href="#null">Morph</a>
   <div id="morphDiv">
      <p>My Morphing Box.</p>
   </div>
   ```

2. We will give `morphDiv` some CSS styles to modify its default styles.

   ```
   #morphDiv {
      width:100px;
      height:100px;
      border:1px solid #333;
   ```

```
    background:#ccc;
    font:normal 12px Arial, Helvetica, sans-serif;
}
```


Morph Box - Windows Internet Explorer
file:///E:/My%20Drop
Live
Morph Box
Computer | Protected Mode: Off
100%

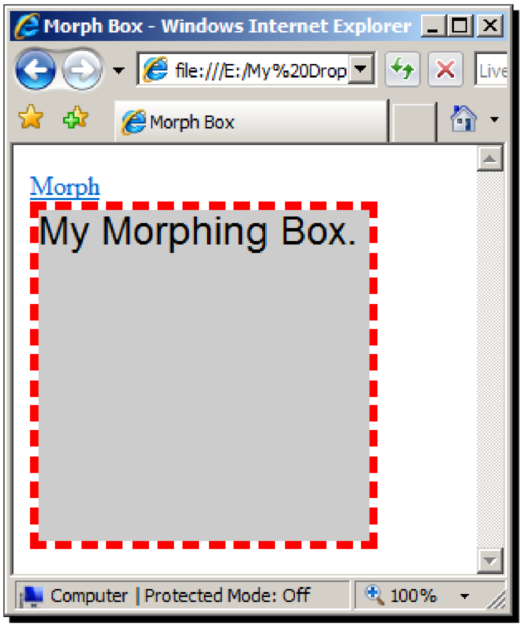
Morph

My Morphing Box.

3. We add a click event listener to the <a> element so that when it's clicked, it executes the `morph` method on `morphDiv`. We transition several properties.

```
$$('a').addEvent('click', function(){
    $('morphDiv').morph({
        'width' : 200,
        'height' : 200,
        'border' : '5px dashed #ff0000',
        'font-size' : '24px'
    });
});
```

4. When you click on the <a> element, it should transition all of the CSS properties of `morphDiv` to the values we've specified in step 3.


Morph Box - Windows Internet Explorer
file:///E:/My%20Drop
Live
Morph Box
Morph
My Morphing Box.
Computer | Protected Mode: Off
100%

5. Let's declare a style rule for a class called `morphed`, with the exact values we used in the morph method arguments in step 3.

```
.morphed {
   width:200px;
   height:200px;
   border:5px dashed #ff0000;
   font-size:24px;
}
```

6. Let's modify the code in step 3 to instead use `morphed` as the argument.

```
$$('a').addEvent('click', function(){
   $('morphDiv').morph('.morphed');
});
```

7. Test your work again. It should still perform the exact same transition.

What just happened?

We saw how we could save a few lines of code using the `morph()` method. First, we used CSS properties as arguments to specify the end value of our transition effect. Then we used a class argument to perform the same transition effect.

Other Fx methods

There are several `Fx` methods that are useful for working with animation `Fx`. You've already seen one of them, the `start()` method, which simply starts an animation effect. In this section, we shall go over methods available to you when working with MooTools animation.

Starting an effect

The `start()` method allows you to start an effect. It takes in the properties you'd like to transition, and their end value. Here are a few examples of using the start method format on instances of `Fx.Tween` and `Fx.Morph`.

```
// In Fx.Tween this transitions the width from the current value
//to 100px
myTween.start('width', 100);
// In Fx.Tween this transitions the width from 50px to 100px
myTween.start('width', 50, 100);

// In Fx.Morph this transitions the height to 100 and the color
//to #ff0000
myMorph.start({
   'height' : 100,
   'color' : #ff0000
});
// In Fx.Morph this transitions the height from 50px to 100px
myMorph.start({
   'height' : [50px, 100px]
});
```

Setting properties immediately

If you want to set CSS properties immediately without a transition, you should use the `set()` method. This method is useful for quickly setting CSS properties and can be a great way to 'reset' properties to their original values without a transition.

Here's an example which sets the opacity to 0%.

```
var effect = new Fx.Tween('myElement', {'duration' : 'short'});
// myElement is set to 0 opacity immediately
effect.set('opacity', 0);
```

Cancelling a transition

There may be instances when you want to cancel a transition immediately while it is still running. If so, you can use the `cancel()` method which stops the specified transition. Used with event listeners, you can cancel an effect when certain events occur.

Here's an example format:

```
myEffect.cancel();
```

Pausing effect

Instead of cancelling an effect, maybe you'd just like to pause it. If so, you can use the `pause()` method. It uses the following format:

```
myEffect.pause();
```

Resuming a paused effect

If you'd like to resume an effect that you paused, you can use the `resume()` method. The format is similar to the `pause()`, and `cancel()`, methods:

```
myEffect.resume();
```

Summary

In this chapter we learned about JavaScript animation effects:

- We covered the basic `Fx` syntax and options available to you, so that you can have utmost control over your animation effects
- We learned how to animate one CSS property with the `Fx.Tween`
- We covered some useful effects methods in the `Fx.Tween` class: `tween()`, `fade()`, and `highlight()`
- We then learned how to animate multiple CSS properties with `Fx.Morph`, as well as learned a shortcut method called `morph()` that allows us to quickly transition several CSS properties at once
- Finally, we briefly covered other `Fx` methods for starting, cancelling, pausing, and resuming effect transitions

Now that we know about animation effects, it's time to move onto even more interactivity in our web pages, and next chapter, we're going to super-charge our web pages with Ajax!

7
Going 2.0 with Ajax

Prior to the conceptualization and widespread adoption of Ajax techniques, web pages used to reload the entire page whenever data was sent or requested from the server.

With Ajax, websites and web applications become highly-responsive, no longer needing to request an entire page's content when new data is available. You have the ability to request certain types of data as well as only update parts that you need to update.

What this ultimately means is that websites that leverage Ajax techniques are able to provide the user a much fuller and seamless experience that provides them with instantaneous server-side data. There is less waiting for requested information on the user's behalf and our web servers save bandwidth by not having to reacquire an entire web page's content.

JavaScript is at the forefront of this evolution of websites and web applications.

MooTools helps us write our Ajax scripts quicker, faster, and better.

This chapter shows you how to deal with Ajax requests and responses. By the end, you will have enough expertise on the subject to be able to implement Ajax functionalities into your web applications. In this chapter, we shall:

- Learn about MooTools' Request class
- Discover how to create Ajax Request objects
- Find out how to get data from the server and other files asynchronously
- Figure out how to send data to the server without a page refresh
- Learn about HTTP headers and the methods available to us in working with them

Let's get started, shall we?

What you'll need

Before you begin your Ajax adventure, you should be aware that—because of the JavaScript security model—most of the examples in this chapter require a web server or a local host web server installed on your computer for you to get the examples to work.

If you have a remote web hosting account, you should upload your files through FTP in a location where you can test it.

If you don't have a web server available, it's quite easy to install one on your computer. Some notable web server packages include WAMP and XAMPP.

On my site, you can find a step-by-step tutorial on installing XAMPP which you can read and review to get you up and running in no time. What's great about XAMPP is that it is one of the few tools you can use that is compatible with Windows, Mac OS, and Linux operating systems.

`http://sixrevisions.com/tutorials/web-development-tutorials/using-xampp-for-local-wordpress-theme-development/`

Creating a Request object

In order to start utilizing the Ajax features of MooTools, let's take a few moments to discuss the Request class.

The Request class is MooTools' class for creating Request objects for dealing with Ajax-based HTTP server-side/client-side communication. With this class, you'll be able to easily send and retrieve data, as well as perform useful operations on these data.

To create a Request object, use the following format:

```
var requestObject = new Request(options);
```

The Request class is feature-packed; it has oodles of options for making your life as an Ajax developer much easier. Let's look at the options available to you.

Request object options

In the following table, you will see the Request class options. You will see the option name, the data type that it accepts, its default value, and what it's for. We will use several of these throughout the chapter, so it would be ideal if you reviewed them now.

Request option	Data type / Default value	What it does
`url`	String / `null`	The url option points to the location of the file where data is to be sent. Example, 'http://example.com/scripts/ajax.php' or '/scripts/ajax.php'
`method`	String / '`post`'	The HTTP method used to send data. Possible values: '`post`' or '`get`'.
`data`	String / `''`	The data to be sent. When no data is explicitly mentioned, it sends an empty string.
`link`	String / '`ignore`'	What to do when another request is created while this request is running. '`ignore`' will not run the new request. '`cancel`' will stop the current request. '`chain`' will perform the request after the current request has been made.
`async`	Boolean / `true`	If set to `false`, only the current request can run, making the request "synchronous". Possible values: `true` or `false`.
`encoding`	String / '`utf-8`'	The character set type of the data to be set.
`headers`	Object / `null`	An object for HTTP request headers.
`isSuccess`	function	Function to execute when request is successful.
`evalScripts`	Boolean / `true`	Evaluates code inside `<script>` tags in HTML document.
`evalResponse`	Boolean / `false`	If true, evaluates the entire response data set.
`emulation`	Boolean / `true`	If set to true, other HTTP request methods other than '`post`' and '`get`' are allowed where the method is sent as post-data named `'_method'`.
`urlEncoded`	Boolean / `true`	If true, URL encodes data set.
`noCache`	Boolean / `false`	Prevents caching, specifically to remedy Internet Explorer cache settings that are troublesome for refreshed data.

Request events options

The Request class has its own event listeners. They're used for performing operations during certain situations of an Ajax request. Let's take a few moments to discuss them here.

Running a function immediately when a request is made

If you want to run a function just when a request is made, you can do so with `onRequest`. Here is an example that alerts users when a request is sent to a file on the server called `myscript.php`.

```
var makeRequest = new Request ({
   url: 'myScript.php',
   onRequest: function(){
      alert('You just sent a request!');
   }
});
```

Running a function when the request is completed

If you want to run a function after the request has been completed, you can do so with `onComplete`. You should only use this option when you want to run a function when the request is finished, regardless if it was a success or not. Here is an example:

```
var makeRequest = new Request ({
   url: 'myScript.php',
   onComplete: function(response){
      $('#log-box').inject(response);
   }
});
```

Running a function when the request is cancelled

Sometimes you want to cancel an ongoing request. A situation might be that a new request is triggered by the user and it conflicts with the current request. If you want to run a function when the request has been cancelled, you can do so with the `onCancel` option. Here is an example:

```
var makeRequest = new Request ({
   url: 'myScript.php',
   onCancel: function(){
      alert('You cancelled the previous Ajax request!');
   }
});
```

Other Request events

Sometimes, things don't work out and your request is terminated. At that event you only want to run a certain function if the request is successful; use the `onSuccess` option.

On the same token, if you only want to run a function when the request fails, use `onFailure`.

When you want to run a function when an exception in the HTTP header occurs, check out `onException`.

Now that we know the Request class inside out, it's time to see it in action. We'll start by learning how to request data from remote files.

Requesting data

One of the most basic tasks involved in Ajax/RIA development is requesting data from server files. We will learn about a method for requesting static data.

Time for action – requesting remote data

Imagine that you have a file on the server that contains data that you'd like to use on a web page. We will devise a way to get that data, and then display it on our web page without requiring a page refresh.

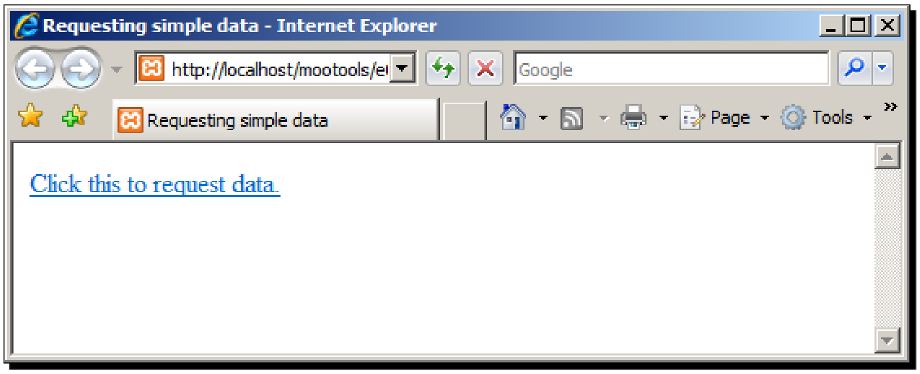
1. Create an HTML document that will hold our remote data, and save it with the file name of `mydata.html`.
2. In `mydata.html`, put in some HTML content. This is what I used, but feel free to put your own valid HTML markup:

   ```
   <p>This is some <strong>remote</strong> data that I requested.</p>
   ```

3. Next we need an HTML document that will be our web page that requests the data from `mydata.html`. Create this HTML document and place it in the same location as `mydata.html`.

4. In our web page HTML document, we place an <a> element that will serve as the trigger for making our Ajax request. This document also has a div where we will place the data we get from `mydata.html`; give this div an ID of `content-holder`. In the HTML document, we use the following markup:

```
<a href="#">Click this to request data.</a>
<div id="content-holder">&nbsp;</div>
```


Requesting simple data - Internet Explorer
http://localhost/mootools/e
Google
Requesting simple data
Page
Tools

Click this to request data.

5. The first thing we should do is write an event listener for the <a> element. Here, we utilize the `addEvent` method with an event argument of `click`.

```
window.addEvent('domready', function(){
$$('a').addEvent('click', function(){
      // Code to execute goes here
   });
});
```

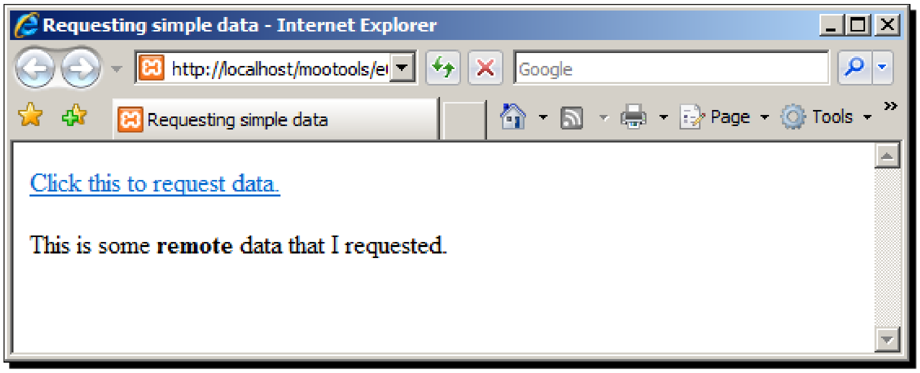
6. Next, we build our Request object; we're going to call it `requestData`. We point to the location of our remote data (`mydata.html`) via the `url` option. Then, when our request has been completed, we update the `#content-holder` div's content with the response that we get from the request; we do this with our trusty `set()` method.

```
window.addEvent('domready', function(){
   $$('a').addEvent('click', function(){
      var requestData = new Request ({
         url: 'mydata.html',
         onComplete: function(response){
            $('content-holder').set('html', response);
         }
      });
   });
});
```

7. Now the only thing left is to send the request; we do so with the `send()` method included in the Request class.

```
requestData.send();
```

8. Test your work in a web browser. When you click on the <a> element, the page should display the HTML data we got from `mydata.html`, without a page refresh.


Requesting simple data - Internet Explorer
http://localhost/mootools/e
Google
Requesting simple data
Page
Tools

Click this to request data.

This is some **remote** data that I requested.

What just happened?

In the above example, we learned the very basics of how Ajax works; we can request data from a file and then load that data in using JavaScript. Imagine if we had sent the request to a server-side script, that, when passed a value gives us a result (all in the background). The possibilities are endless!

Note that the example we just did will not work if you're not running your web page in a web server. The above example, and subsequent examples in this chapter, must run in a web server. If you have a web host account, upload your files in a testing directory. If you don't have one, install a web server package on your local machine, and use a web server deployment package such as XAMPP to make this easier.

Requesting HTML and JSON data

You can use the general Request class to get all sorts of data, but if you know that you'll be working with HTML or JSON data, there is the `Request.HTML` and `Request.JSON` classes that extend the Request class with useful features specifically for those formats.

Working with HTML data

In the previous example, we requested an entire HTML document. By using `Request.HTML`, we can work more easily with data returned as HTML. We'll learn about this subclass by way of an example.

Time for action – updating a web page with HTML

We'll use the `Request.HTML` to update a web page with HTML data. This can be useful when you are receiving data as HTML markup.

1. First, we create a text file that holds our HTML data. Save this text file in the same location as the HTML document that will contain your MooTools code. For the text file, I used the following markup (and again, feel free to customize your HTML document):

```
<html>
<head>
</head>
<body>
   <ul>
      <li>List item #1</li>
      <li>List item #2</li>
      <li>List item #3</li>
   </ul>
</body>
</html>
```

2. Create a new HTML document that will serve as our web page; it will contain our MooTools code and the following HTML markup:

```
<body>
<a href="#">Click to make the request!</a>
   <div id="holder"></div>
</body>
```

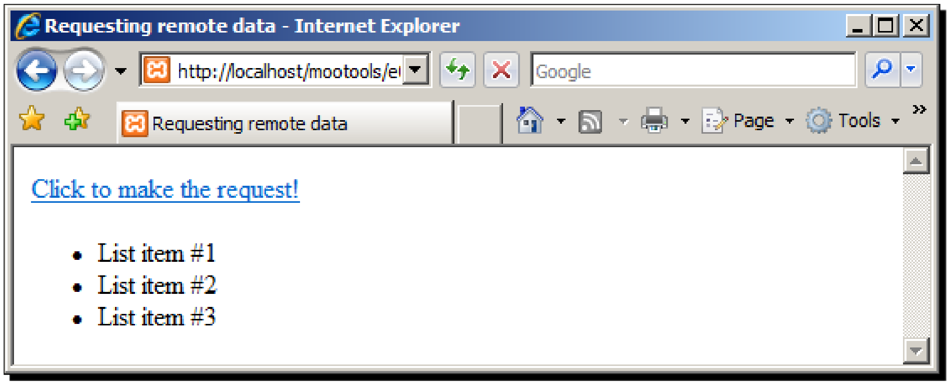
3. Create an event handler for the <a> element being clicked (which triggers the request).

```
<script type="text/javascript">
window.addEvent('domready', function(){
   $$('a').addEvent('click', function(){
   // code goes in here.
   });
});
</script>
```

4. Let's build our `Request.HTML` object. We use the `url` option to point to our `myhtmldata.txt` file. We use the `update` option to specify what element we want to update with the requested data. We chain the `send()` method as a shortcut.

```
$$('a').addEvent('click', function(){
   var requestHTMLData = new Request.HTML ({
      url: 'myhtmldata.txt',
      update: $('holder')
   }).send();
});
```

5. Test your work in the web browser. When you click on the link, it should update the `#holder` div with the unordered list we placed in `myhtmldata.txt`.


Requesting remote data - Internet Explorer
http://localhost/mootools/e
Google
Requesting remote data
Page
Tools

Click to make the request!

- List item #1
- List item #2
- List item #3

What just happened?

We learned how to load remote data from a text file into our HTML document using the `Request.HTML` class.

In the process, we encountered a nifty class option that can be used throughout the `Request.HTML` class called `update` that will update an HTML element in the web page with the received data. Additionally, we learned that we can chain the `send()` right after declaring the Request object to immediately send the request as soon as it is created.

Loading HTML documents remotely

If you have HTML documents that you would like to load into a web page, you can easily do so with the `load()` method for `Request.HTML`. Let's explore this useful method by way of an example.

Time for action – loading HTML data

We're going to give the user the option to load data from other HTML files. This gives us the ability to provide them with requested data on demand.

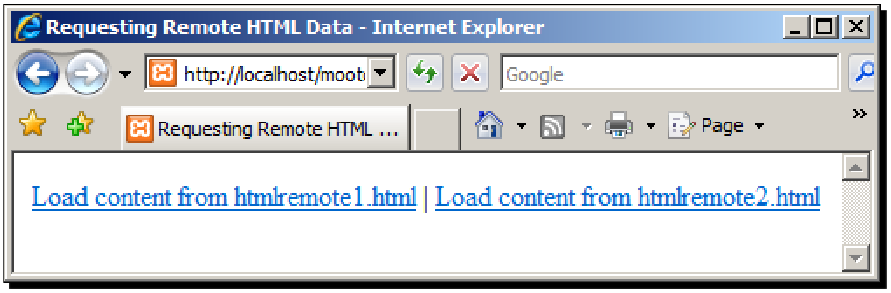
1. Start by creating two HTML documents that will serve as our remote HTML data. Save them as `htmlremote1.html` and `htmlremote2.html`. Place some sample HTML markup to help you determine which file is being loaded. Here is what I used for `htmlremote1.html`:

```
<p>This is data from <strong>htmlremote1.html</strong></p>
```

2. Next, create a new HTML document that will be our web page that loads the two HTML documents. Name it anything you like, but save it in the same location as the two other HTML files.

3. In our HTML document, we will add two <a> elements that will serve as means for the user to request the data they want. We also create a div element with an ID of `load-area` that will contain the HTML that we retrieve.

```
<a id="load-htmlremote1" href="#">Load content from htmlremote1.
html</a>
|
<a id="loadhtmlremote2" href="#">Load content from htmlremote2.
html</a>
<div id="load-area"></div>
```


Requesting Remote HTML Data - Internet Explorer
http://localhost/moot
Google
Requesting Remote HTML ...
Page

Load content from htmlremote1.html | Load content from htmlremote2.html

4. We will create an event listener for the event that an <a> element is clicked, using the `addEvent()` method.

```
<script type="text/javascript">
window.addEvent('domready', function(){
   $$('a').addEvent('click', function(){
      // Code goes in here
   });
});
</script>
```

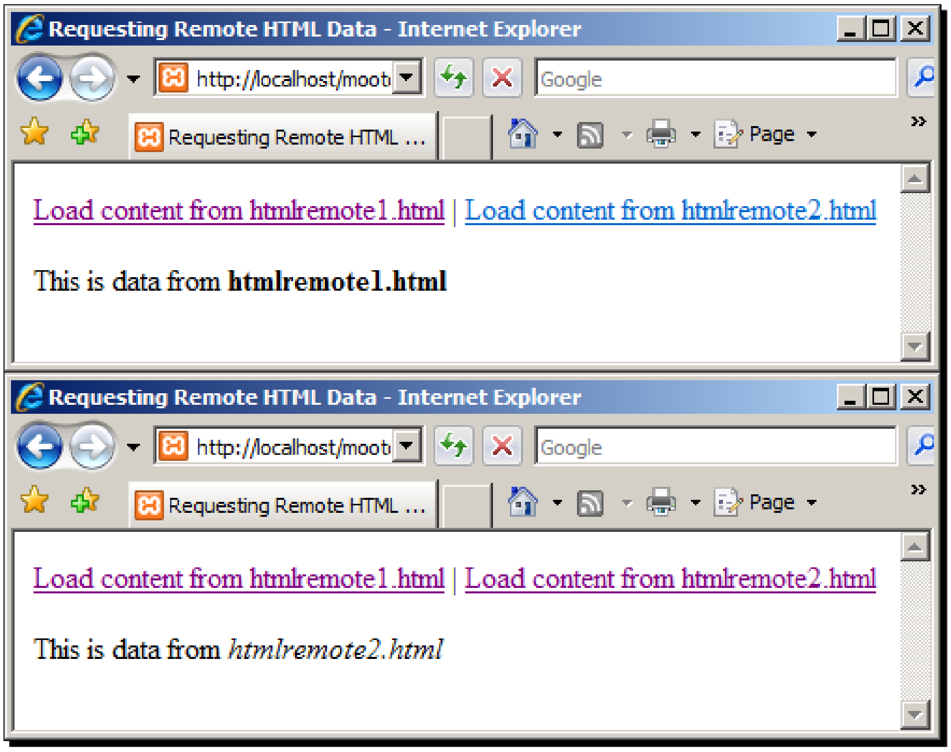
5. Before we work on the code logic for loading in the remote HTML files, we should first determine the ID of the link that was clicked so that we know which file to load; we conveniently place it in a variable named `linkID` for later use.

   ```
   var linkID = this.get('id');
   ```

6. Then we run the `load()` method on the `#load-area` element so that the retrieved data is placed inside it. To indicate which HTML files to load, we use a ternary operator with the logic: "if `linkID` is equal to `load-htmlremote1` then the value is `htmlremote1.html`, otherwise the value is `htmlremote2.html`".

   ```
   // Load the appropriate html document based on linkID value
   $('load-area').load((linkID=='load-htmlremote1') ?
   'htmlremote1.html' : 'htmlremote2.html');
   ```

7. Test your work in a web browser. When you click on one of the links, it should load the appropriate external HTML file.


Requesting Remote HTML Data - Internet Explorer
http://localhost/moot
Google
Requesting Remote HTML ...
Page

Load content from htmlremote1.html | Load content from htmlremote2.html

This is data from **htmlremote1.html**

Load content from htmlremote1.html | Load content from htmlremote2.html

This is data from *htmlremote2.html*

Working with JSON data

JSON, which stands for JavaScript Object Notation, is a standard data format written in JavaScript syntax. It is a great way to interchange complex data sets because it's lightweight and universal. For more information about JSON, visit `http://www.json.org`.

Just as you would expect, MooTools has a class for working with JSON data: `Request.JSON`. This subclass extends the Request class with tools and options specifically for working with JSON objects.

This class works well alongside MooTools' JSON object which is MooTools' JSON parser and encoder.

Time for action – working with Ajax and JSON

In this example, we will use a JSON object from a remote server file to update a web page when the user requests it.

1. First, we need some sample JSON data to work with. In the following code block you can see an example of a JSON object that you can use as your sample data. Save this file as `myjsondata.json`.

```
{
   "name": "Jacob Gube",
   "age": 26,
   "hairStyle": "Short",
   "location": "Bloomington"
}
```

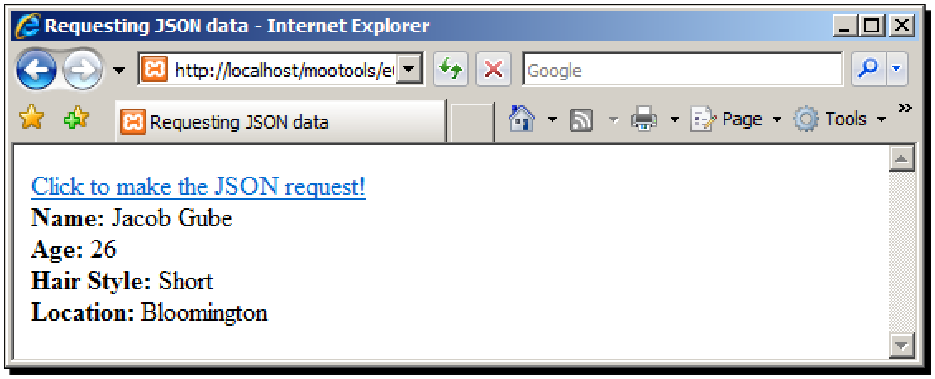
2. Next, create an HTML document that will serve as the web page requesting JSON data. This document contains the <a> element that triggers the request, and a div called `holder` that will be updated with the JSON data.

```
<a href="#">Click to make the JSON request!</a>
   <div id="holder"></div>
```

3. The final step is building our `Request.JSON` object (named `jsonRequest`). In this object, we point our request to our JSON file using the `url` option. By using the `onSuccess` method, we can run a function that sets #`holder` div's HTML to the data inside the JSON object when the server's response is successful.

```
   $$('a').addEvent('click', function(){
      var jsonRequest = new Request.JSON({
         url: 'myjsondata.json',
         onSuccess: function(personData){
            $('holder').set('html',
            '<strong>Name:</strong> ' + personData.name +
            '<br /><strong>Age:</strong> ' + personData.age +
            '<br /><strong>Hair Style:</strong> ' +
               personData.hairStyle +
            '<br /><strong>Location:</strong> ' +
               personData.location);
         }
   }).send();
   });
```

4. Test your work in a web browser. When you click the <a> element, you should see something like the following figure:


Requesting JSON data - Internet Explorer
http://localhost/mootools/e
Google
Requesting JSON data
Page
Tools

Click to make the JSON request!
Name: Jacob Gube
Age: 26
Hair Style: Short
Location: Bloomington

What just happened?

In the previous example, we saw how the `Request.JSON` class works to our advantage. JSON is a great way to exchange data because it's lightweight and standardized; it's ideal for interoperable systems development.

Cancelling a Request

If you would like to immediately cancel an ongoing Ajax request, you may do so using the `cancel()` method. This can be helpful in terminating a specific Request object when a certain event occurs. One reason you would cancel an Ajax request is if it conflicts with a certain process.

The format of cancelling a request is:

```
requestObject.cancel()
```

Now that we've learned about requesting data, we will now discuss how to pass data to other files so that they can perform their own operations on that data.

Sending data

In the previous section, we dealt with getting data from web server files; however, usually we would also like to send data out of our web page.

Time for action – sending data to PHP

We're going to demonstrate how powerful Ajax is via a simple example; we're going to send a PHP script a string, and it will reverse the string as we type. We do this by asynchronously updating the web page as the user presses on their keyboard.

This involves server-side scripting, and we'll use one of the most widely-available languages out there—PHP. Chances are, your web server has the capability to run PHP files (and if you followed my advice on installing XAMPP, you're all set). Don't worry, we won't be working with complex PHP and if you know any language, even just JavaScript, you'll understand what's going on.

This simulates more complex examples, such as sending in a user string, which PHP, or your preferred server-side scripting language, processes to query the database and check if that user string exists. Depending on the query's result, it will respond to MooTools accordingly.

1. We'll start by creating our web page. The structure of our document will have a `textarea` element that will house the text that the user types. Additionally, we create an empty `div` element called `response` that will print out the response we get from PHP. We use a label to display the instructions for the `textarea`.

```
<body>
  <label for="user-input">Enter stuff:</label>
  <textarea name="user-input" type="text" ></textarea>
  <div id="response"></div>
</body>
```

2. We start the JavaScript by creating a request instance first. We shall call it `ajaxRequest`. This way we can reuse the request instead of having to create a new one whenever the user types. For the `url` option, we use the value to PHP script's file name (which we will create in the subsequent steps). Upon a successful Ajax request and response, we update the HTML content of our `#response` div with the value that PHP sends back using the `set()` method.

```
<script type="text/javascript">
window.addEvent('domready', function(){}
      var ajaxRequest = new Request({
         url: 'php-script.php',
         onSuccess: function(response){
            $('response').set('html', response);
        }
    });

    // Additional lines of code here
});
</script>
```

3. We need to construct an event handler for the `user-input` text area. First, we need to select it from the DOM, and to do so, we use the name= operator in the `Selectors` class to match the text area. We want to send our Ajax request whenever the user presses and then releases a keyboard key, so we listen to the keyup event.

```
$$('textarea[name=user-input]').addEvent('keyup', function(){
    // Next lines of code will go here
});
```

4. Next, we create a variable that takes the current value inside the text area. Every time the user types something in the text area, this variable will be updated and sent into our PHP script for processing.

```
var value = this.get('value');
```

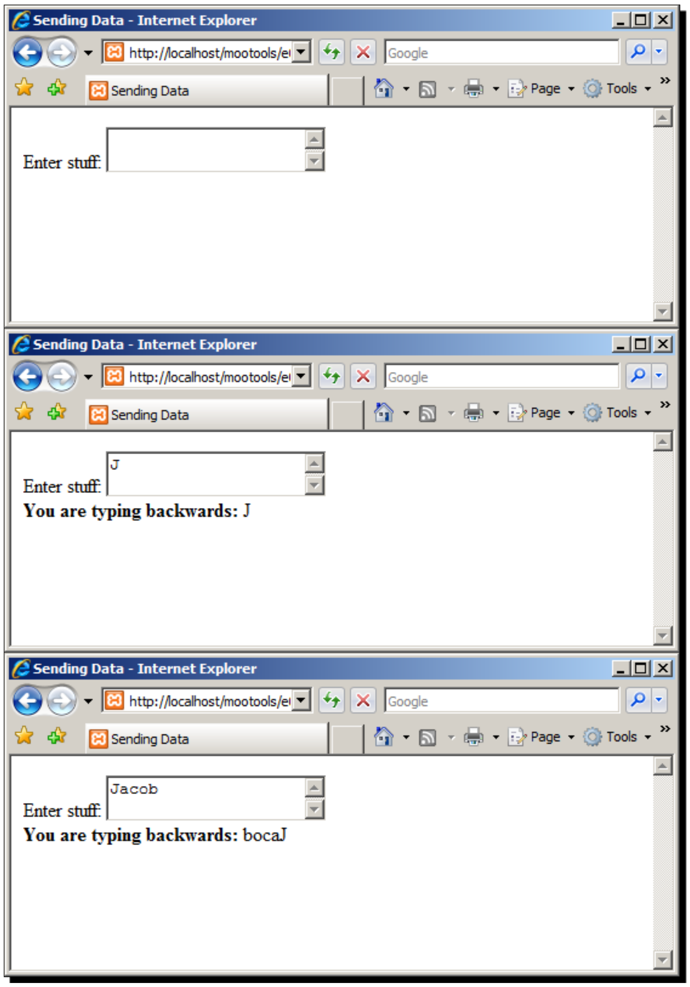
5. Now there are two more things we will have to do to send the Ajax request. First we will have to use the `.cancel()` method to overcome stalled requests. If a previous request takes longer to finish, it will complete later and update the text content with old data. Then we will make the request with the `.send()` method by sending the `data` option. We assign it an HTTP URL variable called `userInput` with the value of what is currently in the text area.

```
ajaxRequest.cancel().send({
    data: {'userInput': value}
});
```

6. Finally, we create the PHP script. To start, place the following code block inside a new document in your source code/text editor. Then save it in the same location as your HTML document using the file name `php-script.php`. The script is very simple; it puts the data that we sent (`userInput`) into a holder variable called `$dataSent`. Then we pass that variable into a PHP function called `strrev()`, which simply reverses the string. We put the output of that function into a variable called `$dataToSendBack`. The last task is printing out the PHP response, which is what gets sent back to our client-side script. The last line that starts with echo is what the `response` argument in the onSuccess method in our MooTools script will contain.

```
<?php
// Put the data that is sent into a variable
$dataSent = $_POST['userInput'];
// Pass the current input to a function called strrev which
// reverses the string and place into dataToSendBack
$dataToSendBack = strrev($dataSent);
// Send back back the new variable
echo '<strong>You are typing backwards:
</strong>'.$dataToSendBack;
?>
```

7. Test your work on a web browser. Type in some text. You should see the `#response` div updated every time there is a keystroke.



Enter stuff:

Enter stuff: J
You are typing backwards: J

Enter stuff: Jacob
You are typing backwards: bocaJ

What just happened?

In the preceding example, we saw how to talk to the server using MooTools. Specifically, we used the MooTools Request class to create an Ajax Request object that sent the user input to a PHP script. That PHP script took the user input and operated upon it; it ran the data into a PHP function called `strrev()` that reversed the string. After the PHP process was done, it sent back the processed data to our client-side script, we then took the response and performed a DOM manipulation to insert the data into a div called `#response`.

Through this simple example, we witnessed Ajax in action. We saw how we could communicate with the server, sending and receiving data from a script, without needing a web page reload. This created a seamless experience, one that would be valuable in web applications that mimic functionalities and instant feedback that desktop applications have.

Setting and getting HTTP headers

HTTP headers are meta information about an HTTP response; they define a lot of information about the data that you are sending and receiving. For example, with the **Cache-Control** HTTP response header, you can determine whether your data will be cached on the user's browser, and the **Date** HTTP request header gets a timestamp of the request.

This information is contained in the documents that you request, but is not shown explicitly in the HTML document's source code. But you can easily attain and set HTTP request and response headers by using JavaScript.

> For a full list of HTTP headers, please view the Wikipedia page entitled *List of HTTP headers* via the following HTTP address: `http://en.wikipedia.org/wiki/List_of_HTTP_headers`.

Setting an HTTP header for an Ajax Request object

When you create a MooTools Request object, you can choose to set HTTP headers for it using the `setHeader()` method in the Request class. For example, let's say you created a Request object called `myRequest`; to set an HTTP header/value pair, follow the format:

```
myRequest.setHeader('headername', 'headervalue');
```

If you want to set `Cache-Control` to instruct the browser not to cache the information being requested, you would write:

```
myRequest.setHeader('Cache-Control', 'no-cache');
```

One instance where you would want to do this is when requesting sensitive data that you don't want to store in the user's computer, or if you want to avoid caching issues for constantly-updated data (such as Flash objects). Doing this will not guarantee that the browser will actually follow your command, but in most instances, it would work.

Alternatively, you can use the `headers` option when creating the prototype of your Request object to set HTTP headers.

Getting an HTTP header

Whenever you get a server response, it provides you contextual information about that particular response via HTTP headers. Think of it as meta information. Sometimes you want to obtain this information after a successful Ajax response. Perhaps, you want to know the date the response was sent to output to the user how long an Ajax request/response took, or how the data is encoded.

Use the `getHeader()` method in the MooTools Request class to obtain this information. The format of getting HTTP headers about a Request object is as follows:

```
myRequest.getHeader('headername');
```

If you want to see when the HTTP response was sent, you could write:

```
myRequest.getHeader('Date');
```

Let us explore the setting and getting of HTTP headers by way of example.

Time for action – getting the Last-Modified HTTP header

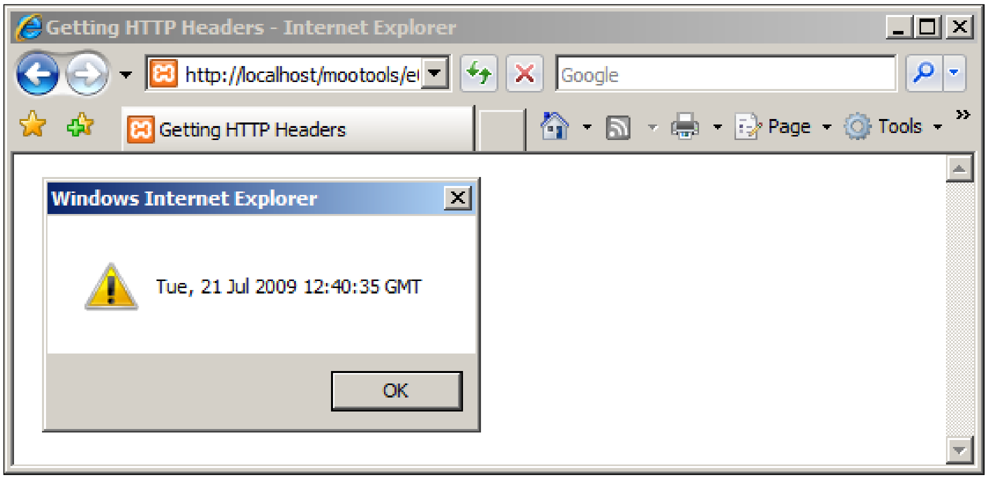
We are going to get HTTP headers from the server during our Ajax request. This can be helpful in displaying contextual information about the server that's sending us our response. In this particular instance, we're going to determine when the file that we requested was last modified.

1. The first thing we're going to do is get the time when our HTML document was last modified. Start by creating an HTML document and saving it onto your server with MooTools ready to go.

2. Next, set up our MooTools Request object. For the `url` value, set it to the name of the HTML document that you uploaded to your server. We will use the `onSuccess` Request class method to watch for the eventuality that our Ajax request was successful. Upon success, we alert the date that the HTML document was last modified by getting the value of the `Last-Modified` HTTP header using the `getHeader` method. Finally, we use the `send()` method to initiate the Ajax request.

```
<script type="text/javascript">
window.addEvent('domready', function(){
   var ajaxRequest = new Request({
      // Make the request to the same page
      url: 'e05_getting_headers.html',
      // When the server response is completed
      onSuccess: function(){
         // Display the last time the document was modified
         alert(this.getHeader('Last-Modified'));
      }
   }).send();
});
</script>
```

3. Test your work in a web browser. Upon the success of your Ajax Request, you should see the something like the following dialog box.


Getting HTTP Headers - Internet Explorer
http://localhost/mootools/e
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Tue, 21 Jul 2009 12:40:35 GMT

What just happened?

In the previous example, we learned how we can get information about a web page that we've requested. More specifically, we looked into an HTTP header called `Last-Modified` to see when the web page was last modified.

Have a go hero – get the content length of the requested page

Did you know that you can determine the content length of a requested document? To do so, you can see what the value of the `Content-Length` HTTP header is. This gives you the size in terms of 8-bit bytes.

Modify the previous example to alert the `Content-Length` value instead of the `Last-Modified` value, and see how big our HTML document is.

Summary

Congratulations, you're now a professional Ajax developer! We covered plenty of things in this chapter.

Specifically, we covered:

- Creating a Request object: We learned how to create an Ajax Request object in MooTools, as well as the options and methods available to us for working with Request objects.
- Requesting data: We discovered how to request data from the web server. In the process we explored the `Request.HTML` and `Request.JSON` classes, which make working with HTML and JSON data a breeze.
- Sending data: With the help of PHP, we witnessed just how powerful Ajax is by sending data to a server-side script that processed our data and sent it back to us, asynchronously. This allowed us to create an uninterrupted user experience that instantly updated the web page upon a user event.
- Setting and getting HTTP headers: We learned that HTTP requests and responses have attached meta information that tell us about the server and the data we're requesting. They're called HTTP headers and we used MooTools methods in the Request class to get and set this information.

Now that we've learned about the classes, methods, and functions we can use for working with Ajax, we're ready to extend MooTools' core functionalities with plugins; that's the topic of the next chapter.

8
Beefing Up MooTools: Using the MooTools More Plugins

The MooTools project offers highly useful additional classes that extend the MooTools Core library, officially called MooTools More. These classes are often referred to as **plugins** *because you can simply plug them into your web pages to extend the MooTools Core library.*

You'll find a diverse set of plugins that do a wide variety of tasks, from adding simple text hints on web form input fields, to permitting drag--and-drop functionality to be used in web games.

Plugins are, in essence, MooTools classes written by either MooTools core developers and/or members of the MooTools community. They utilize the MooTools API to either extend functionalities of existing Core classes, or create an entirely new class utilizing Core functions and methods.

Although there are many third-party plugins out there that are equally awesome when compared to the More plugins, we'll limit our discussion specifically to official MooTools plugins.

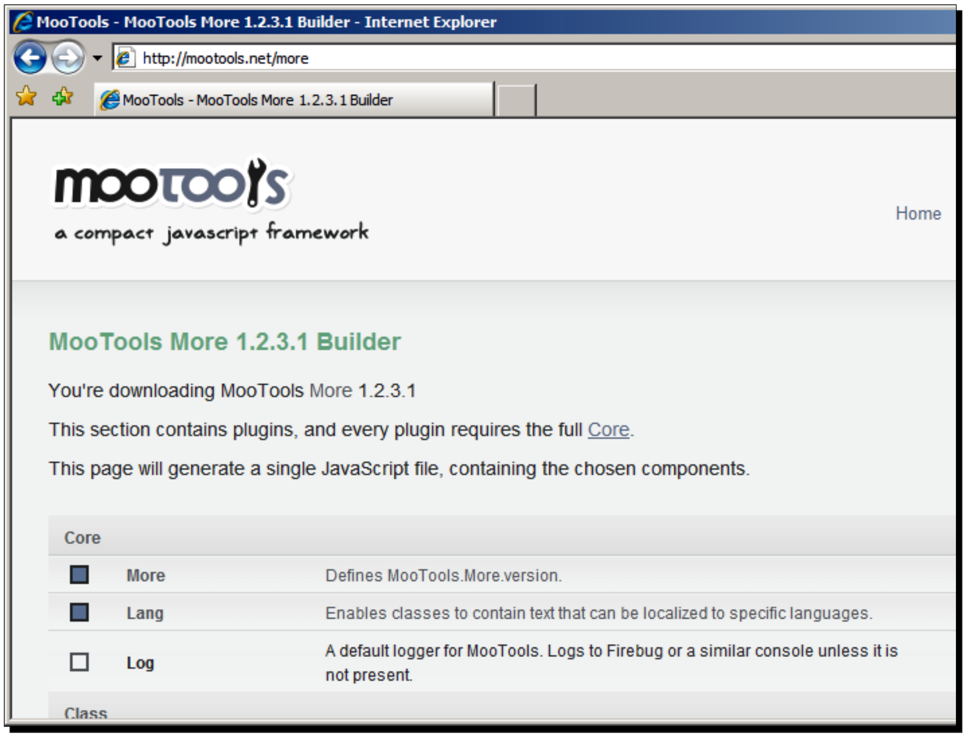
In this chapter we shall:

- Learn how to obtain and install MooTools More plugins
- Learn how to make a slick Accordion area to display content in an engaging and compact manner using the Fx.Accordion plugin
- Make more user-friendly forms using the OverText plugin
- Create a simple web game, to make things fun, using the Drag and Drag. Move plugin

Downloading MooTools More plugins

MooTools More plugins can be found on the official MooTools website. To see the available plugins, go to the More Builder section of the site, located at the following web address: `http://mootools.net/more`

The More Builder is a web tool for downloading a customized library containing your plugins of interest. You can select the plugins you'd like to acquire, and the More Builder will automatically include any other plugins and JavaScript libraries that are required (dependencies) in order for the selected plugins to work.


MooTools - MooTools More 1.2.3.1 Builder - Internet Explorer
http://mootools.net/more
MooTools - MooTools More 1.2.3.1 Builder
mootools
a compact javascript framework
Home

MooTools More 1.2.3.1 Builder

You're downloading MooTools More 1.2.3.1

This section contains plugins, and every plugin requires the full Core.

This page will generate a single JavaScript file, containing the chosen components.

Core

■	More	Defines MooTools.More.version.
■	Lang	Enables classes to contain text that can be localized to specific languages.
☐	Log	A default logger for MooTools. Logs to Firebug or a similar console unless it is not present.

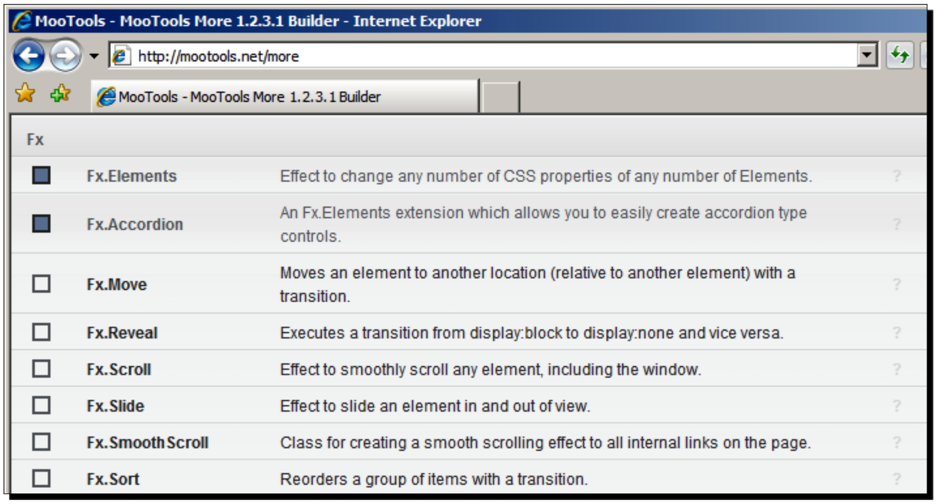
Class

Time for action – downloading the Fx.Accordion plugin

Let us see how the MooTools More Builder works by downloading an Fx plugin called Fx.Accordion.

1. In your web browser, navigate to the More section in the MooTools official site. The web address is: `http://mootools.net/more`.
2. Scroll down to the section called **Fx** and click on the box beside **Fx.Accordion**.

3. Click on the box beside **Fx.Accordion**. This will automatically include other components, namely: **Fx.Elements** and **More**. These components are required for Fx.Accordion to run, so they must be included in the download.



MooTools - MooTools More 1.2.3.1 Builder - Internet Explorer

http://mootools.net/more

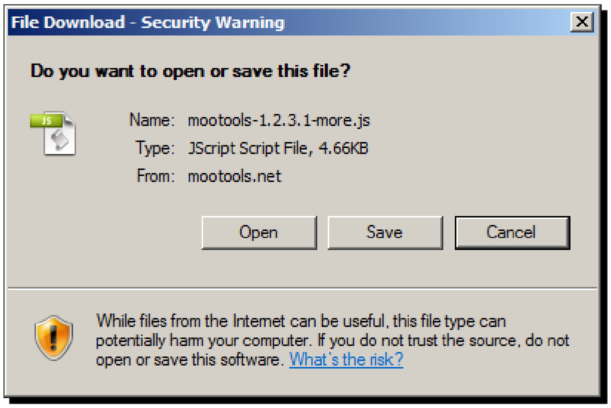
MooTools - MooTools More 1.2.3.1 Builder

Fx

■	Fx.Elements	Effect to change any number of CSS properties of any number of Elements.	?
■	Fx.Accordion	An Fx.Elements extension which allows you to easily create accordion type controls.	?
☐	Fx.Move	Moves an element to another location (relative to another element) with a transition.	?
☐	Fx.Reveal	Executes a transition from display:block to display:none and vice versa.	?
☐	Fx.Scroll	Effect to smoothly scroll any element, including the window.	?
☐	Fx.Slide	Effect to slide an element in and out of view.	?
☐	Fx.SmoothScroll	Class for creating a smooth scrolling effect to all internal links on the page.	?
☐	Fx.Sort	Reorders a group of items with a transition.	?

4. Scroll down the page towards the heading, **Download Options**. Choose the compression type that you want. If you are interested in studying the code of the plugins (which I suggest you do), choose **No Compression**. Otherwise, choose a compressed version to reduce the file size to minimum.

5. Click on the **Download** button to proceed with the download. Save this JavaScript file in a convenient location, because we will be using this later in the chapter.



File Download - Security Warning

Do you want to open or save this file?

Name: mootools-1.2.3.1-more.js
Type: JScript Script File, 4.66KB
From: mootools.net

Open | Save | Cancel

While files from the Internet can be useful, this file type can potentially harm your computer. If you do not trust the source, do not open or save this software. What's the risk?

What just happened?

We learned how to download a MooTools More plugin using the More Builder. You should have noted that when selecting a plugin to download, the other plugins are automatically checked for you; these are other plugins that are required in order for the selected plugins to work.

Installing MooTools plugins

Using a MooTools plugin is as simple as referencing it in the HTML document. However, important considerations must be made to make sure that they are included in the correct order in your HTML documents. More specifically, the order should be:

1. MooTools Core Library
2. MooTools More Library
3. Your MooTools script

Time for action – installing Fx.Accordion

Before we proceed any further in our exploration of MooTools plugins, we should first learn how to install them in our HTML documents.

1. To start, create an HTML document and reference the MooTools Core library's location in the <head> section. Make sure that the file path in the `src` attribute is pointing to the correct location.

```
<html>
<head>
<script type="text/javascript" src="/filelocationofscript"></
script>
</head>
<body>
…
</body>
</html>
```

2. Next, include the More library that you downloaded earlier, right beneath the Core library.

```
<html>
<head>
<script type="text/javascript" src="/filelocationofscript">
</script>
```

```
<script type="text/javascript" src="mootools-1.2.3.1-more.js">
</script>
</head>
<body>
…
</body>
</html>
```

3. Finally, create another `<script>` tag pair where you will insert your own MooTools code, right below the inclusion of the More library.

```
<html>
<head>
<script type="text/javascript" src="http://ajax.googleapis.com/
ajax/libs/mootools/1.2.2/mootools-yui-compressed.js"></script>
<script type="text/javascript" src="mootools-1.2.3.1-more.js">
</script>
<script type="text/javascript">
window.addEvent('domready', function(){
   // MooTools script goes in here
});
</script>
</head>
<body>

</body>
</html>
```

Now, we are ready to move on and utilize MooTools plugins.

What just happened?

You learned the correct way of installing a MooTools plugin in an HTML document. We learned that the order of `<script>` tags in our document is essential for the plugins to work properly.

Now that we know how to download and install MooTools plugins, it's time to see some plugins in action.

Discovering a handful of MooTools More plugins

There are—at the time of this writing—over 40 MooTools plugins available on the MooTools site, and there's no indication that this collection will stop growing as more and more developers contribute their own work to share to their fellow coders. Though we won't get to use all of the plugins in the More collection, we will certainly see a handful of them in action in this chapter.

By using a few plugins, I hope that you see just how great More plugins are, how they uphold the MooTools way of reducing the amount of code you have to write, and that I prompt you to explore other More plugins to enhance your JavaScripts.

To find full documentation of each MooTools More plugin, check out the official MooTools More docs pages at: `http://mootools.net/docs/more`

We'll start with a plugin we already have in hand, Fx. Accordion.

Creating engaging content using Fx.Accordion

Fx.Accordion is a class for making a group of elements, whose visibility is toggled, by clicking on a trigger. Clicking on a trigger expands or collapses the target element in a smooth and animated manner.

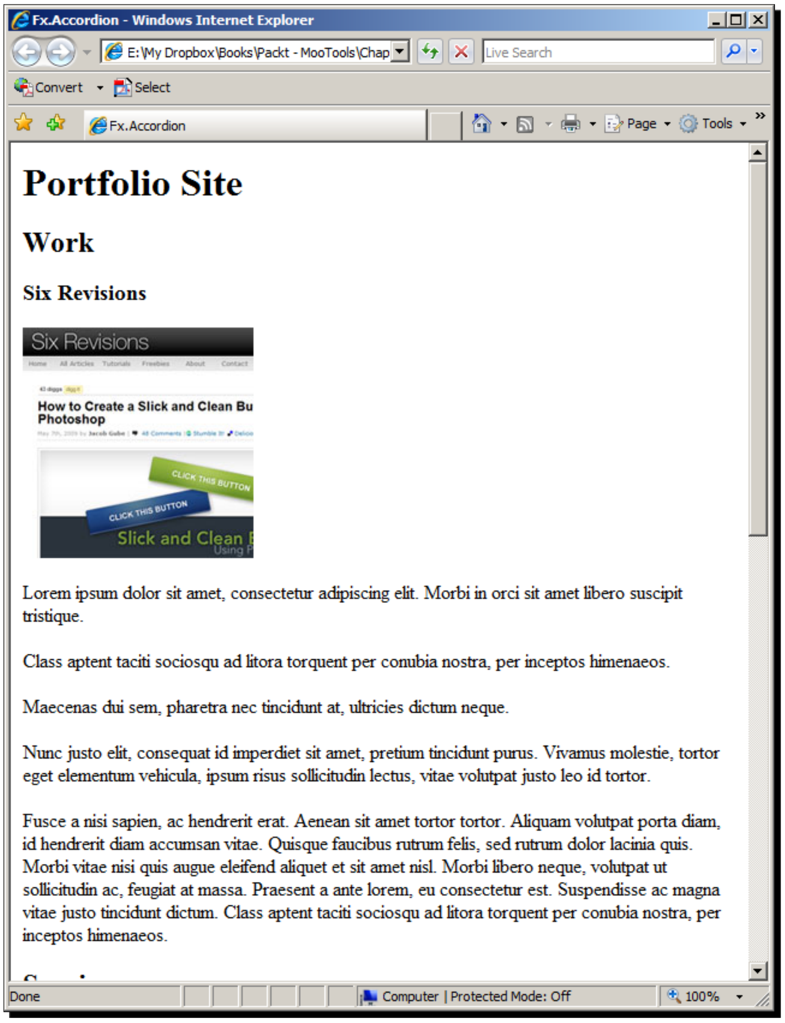
Time for action – creating an accordion

Accordions are great for displaying a large amount of content in a compact manner, as well as establishing an engaging experience by allowing users to interact with your content. In this example, we're going to create an accordion area that displays information about a hypothetical development firm. We'll have accordion sections for work, services, clients, and contact.

1. First things first: solid HTML. We have to make sure that our accordion has good markup so that when JavaScript and CSS are disabled, users can still access content. We contain our accordion inside a div that's intuitively called `accordion`. Then we have h2/`div` pairs for each section. The h2s will serve as the trigger for expanding a section later on; we give then a class of `trigger`. The content of each section is inside `div`s with a class of `section`.

```
<body>
<h1>Portfolio Site</h1>
<div id="accordion">
  <h2 class="trigger">Work</h2>
  <div class="section">
    <!-- Work section content -->
  </div>
```

```
    <h2 class="trigger">Services</h2>
    <div class="section">
      <!-- Work section content -->
    </div>
    <h2 class="trigger">Clients</h2>
    <div class="section">
      <!-- Work section content -->
    </div>
    <h2 class="trigger">Contact</h2>
    <div class="section">
      <!-- Work section content -->
    </div>
  </div>
  </body>
```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Work

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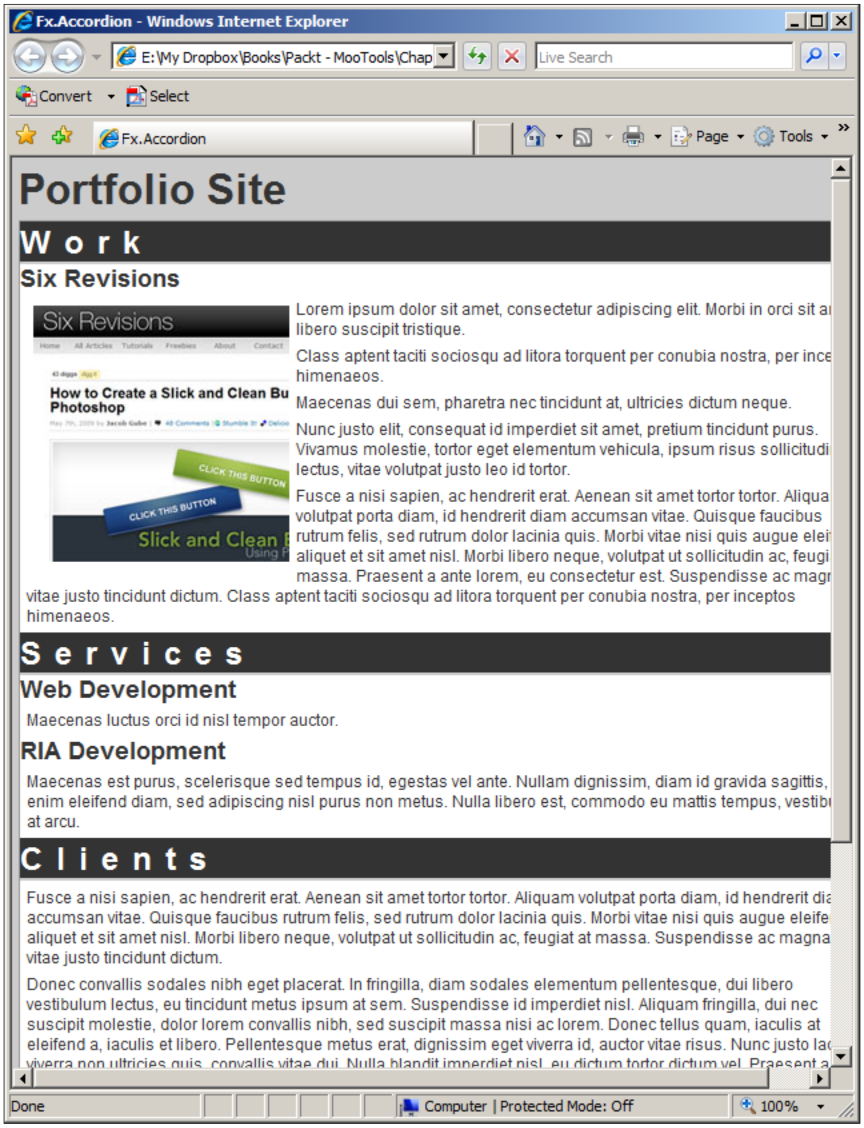
2. Next, we'll use some CSS to make our accordion a bit more pleasing to the eye. Read the comments in the following CSS code block to take note of some style rules.

```
<style type="text/css">
/* Reset margin and padding of all elements to 0 */
* {
 margin:0;
 padding:0;
}
body {
 background:#ccc;
 font:12px Arial, Helvetica, sans-serif;
 color:#333;
}
#accordion {
 background:#fff;
 border:1px solid #999;
 width:640px;
 margin-left:5px;
}
/* Change mouse pointer to pointer when hovering over trigger */
.trigger {
 height:30px;
 line-height:30px;
 display:block;
 letter-spacing:10px;
 background: #333;
 border-bottom:2px solid #ccc;
 color:#fff;
 margin:0;
 cursor:pointer;
}
h1, p, img { margin:5px; }
img { float:left; }
</style>
```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S e r v i c e s

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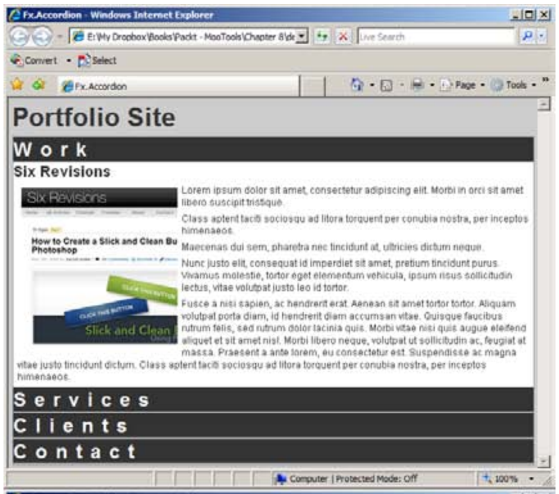
3. Next, we'll include the Fx.Accordion library that we downloaded earlier in the chapter. Remember the importance of the order of including our libraries and scripts: MooTools Core library first, then MooTools More, and finally, our own scripts.

```
<script type="text/javascript" src="mootools-core.js"></script>
<script type="text/javascript" src="mootools-more.js"></script>
<script type="text/javascript">
window.addEvent('domready', function(){
  // Script goes here
});
</script>
```

4. Finally, we instantiate our accordion. We create a new object called `accordion`. We feed it with three arguments: the elements that will trigger the expanding and collapsing of the sections (`.trigger`), the sections that will be hidden and shown (`.section`), and finally, the container of our accordion (`#accordion`). Then we set a few option values: `alwaysHide` is set to `true` to permit us to collapse all sections (by default, the plugin forces at least one section to be shown), and `trigger` set to `'mouseover'` which lets us expand and collapse each section when the user mouses over the `.trigger` elements (by default, the value is `'click'`).

```
window.addEvent('domready', function(){
   var accordion = new Accordion('.trigger', '.section',
                                 $('accordion'), {
      alwaysHide: true,
      trigger: 'mouseover'
   });
});
```

5. Test your work in a web browser. On initial page load, you should see an animated transition as the first section is displayed. Then, when you hover over other section titles (like **Clients**, for example), the first section should collapse, and the new section should expand.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Portfolio Site

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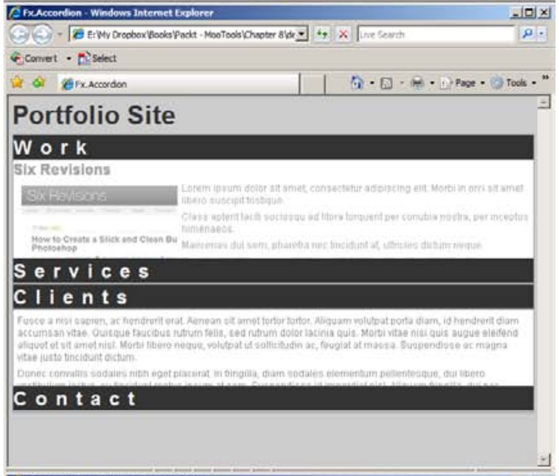
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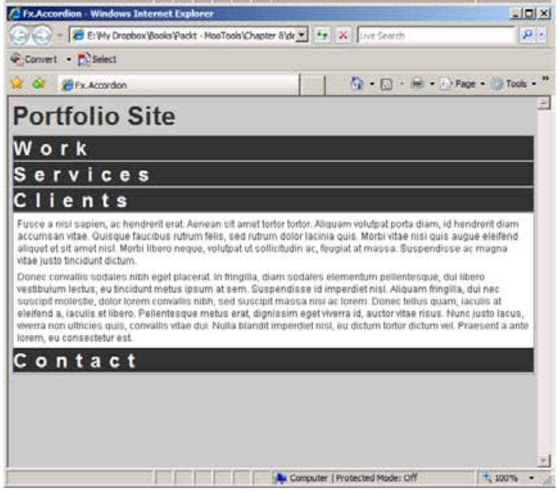
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W o r k

S e r v i c e s

C l i e n t s

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C o n t a c t

What just happened?

In the previous example, we created a simple accordion using the Fx.Accordion MooTools More plugin. We instantiated an object called accordion using the Accordion class and pointed to our accordion by feeding it the value of the trigger class (`'.trigger'`), the sections that will be expanded and collapsed (`'.section'`), and the container of our Accordion elements (`$('accordion')`).

Just like with most MooTools classes, the format for instantiating a MooTools Accordion object is as follows:

```
var objectName = new Accordion('trigger', 'sections', 'container');
```

Fx.Accordion options

Before moving onto another MooTools more plugin, let's go over some options available in the Fx.Accordion plugin. We've already used two: `alwaysHide` and `trigger` in the above example.

In the following table, you will see a list of Fx.Accordion options that you can set to customize your own accordions.

Option name	Data type	Default value	What it's for
`alwaysHide`	boolean	`false`	When set to `true`, users can collapse all sections. The plugin (by default) forces at least one section to be shown at all times.
`display`	integer	`0`	By default, it shows the first section (which has an index of 0). Set this to -1 to hide all sections.
`fixedHeight`	boolean	`false`	Sets a fixed height for all sections.
`fixedWidth`	boolean	`false`	Sets a fixed width for all sections.
`height`	boolean	`true`	By default, there is an animated transition when expanding and collapsing sections; set this to `false` if you don't want any animations.
`initialDisplayFx`	boolean	`true`	If you don't want an effect transition when the page first loads, set this to `false`.
`opacity`	boolean	`true`	If you don't want an opacity transition when hiding and collapsing sections, set this option to `false`.
`show`	integer	`0`	Makes the index of the element show first.

Option name	Data type	Default value	What it's for
`trigger`	string	`'click'`	The event type to be used on the trigger elements for expanding or collapsing section.
`width`	string	`false`	If set to `true`, there will be a width transition for expanding and collapsing sections.

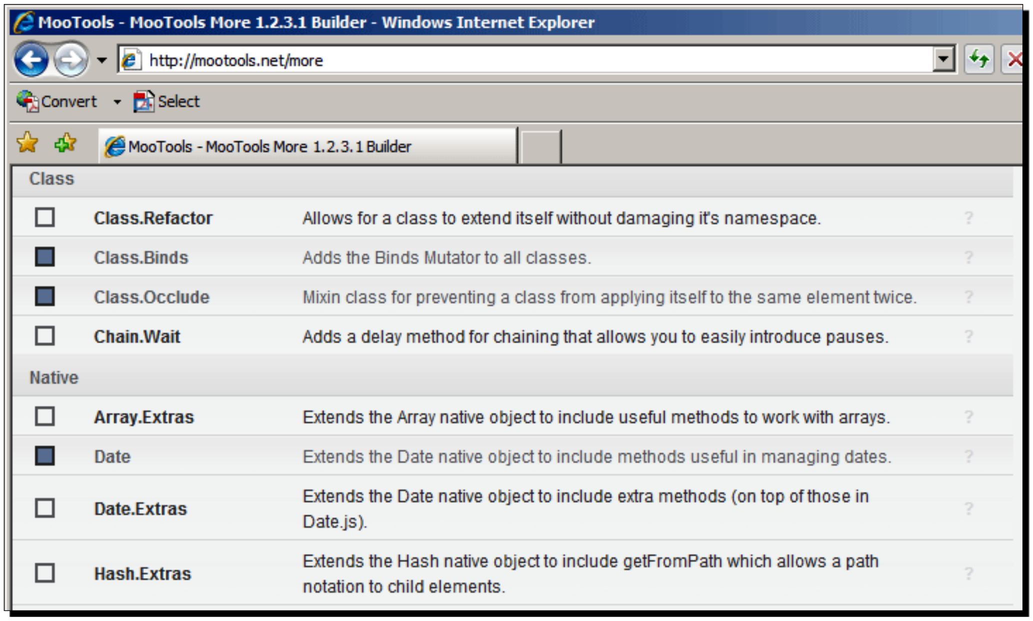
Downloading all the MooTools More plugins we need

Before we move onto exploring the other More plugins in this chapter, let's go ahead and download them in one go.

Time for action – downloading more Mootools More plugins

In the next part of this chapter, we're going to work with four more MooTools More plugins: **Date**, **OverText**, **Drag**, and **Drag.Move**.

1. Head over to the **More Builder** on the official MooTools site. As a reminder, the web address is `http://mootools.net/more`.
2. Click on the box beside the **Date** plugin. It should automatically check other plugins that are required for it to work.


MooTools - MooTools More 1.2.3.1 Builder - Windows Internet Explorer
http://mootools.net/more
Convert
Select
MooTools - MooTools More 1.2.3.1 Builder

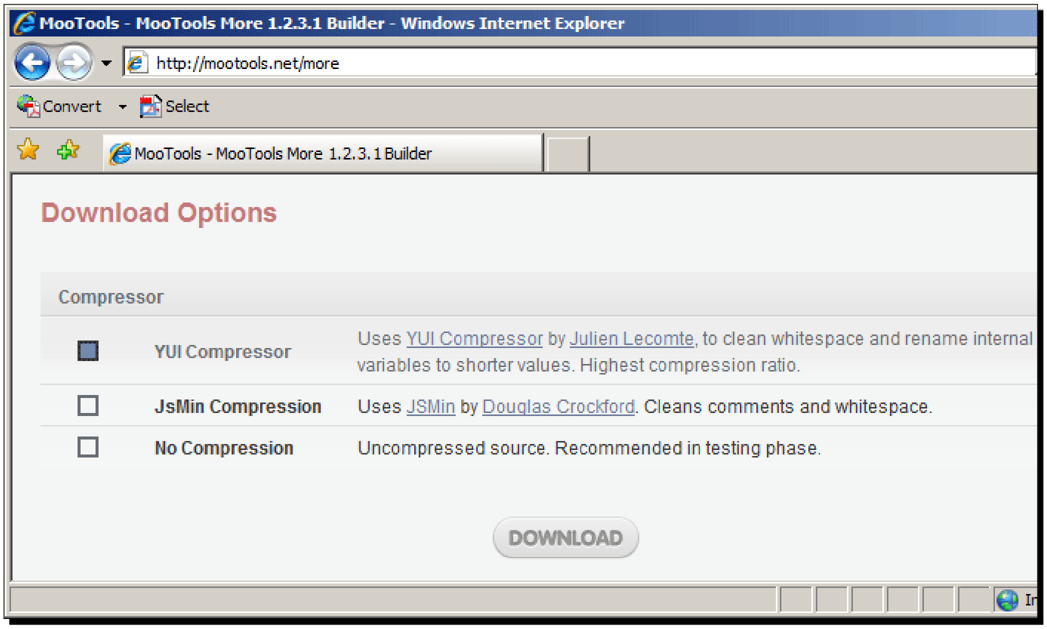
Class		
☐	Class.Refactor	Allows for a class to extend itself without damaging it's namespace.
■	Class.Binds	Adds the Binds Mutator to all classes.
■	Class.Occlude	Mixin class for preventing a class from applying itself to the same element twice.
☐	Chain.Wait	Adds a delay method for chaining that allows you to easily introduce pauses.
Native		
☐	Array.Extras	Extends the Array native object to include useful methods to work with arrays.
■	Date	Extends the Date native object to include methods useful in managing dates.
☐	Date.Extras	Extends the Date native object to include extra methods (on top of those in Date.js).
☐	Hash.Extras	Extends the Hash native object to include getFromPath which allows a path notation to child elements.

3. Click on the box beside **OverText**. It should automatically check other plugins that are required for it to work.

4. Click on the box beside **Drag**. It should automatically check other plugins that are required for it to work.

5. Finally, click on the box beside **Drag.Move**. It should automatically check other plugins that are required for it to work.

6. Scroll down the page to the **Download Options** section. Check the compression type you want (I chose **YUI Compressor**, which is the default) and then click the **Download** button.

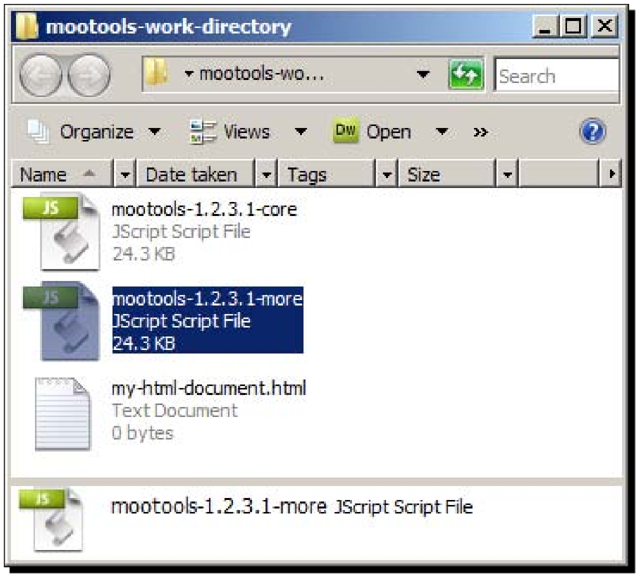

MooTools - MooTools More 1.2.3.1 Builder - Windows Internet Explorer
http://mootools.net/more
Convert
Select
MooTools - MooTools More 1.2.3.1 Builder
DOWNLOAD

Download Options

Compressor

■	YUI Compressor	Uses YUI Compressor by Julien Lecomte, to clean whitespace and rename internal variables to shorter values. Highest compression ratio.
☐	JsMin Compression	Uses JSMin by Douglas Crockford. Cleans comments and whitespace.
☐	No Compression	Uncompressed source. Recommended in testing phase.

7. Place the file in same location as your MooTools Core library and the HTML documents you will use.



mootools-1.2.3.1-core
JScript Script File
24.3 KB

mootools-1.2.3.1-more
JScript Script File
24.3 KB

my-html-document.html
Text Document
0 bytes

mootools-1.2.3.1-more JScript Script File

Extending JavaScript's native Date object

JavaScript's Date object is useful for working with date and time formats, but it lacks a lot of common utilities that web developers need. The Date plugin extends the native Date object with a host of useful functions and methods for dealing with date inputs.

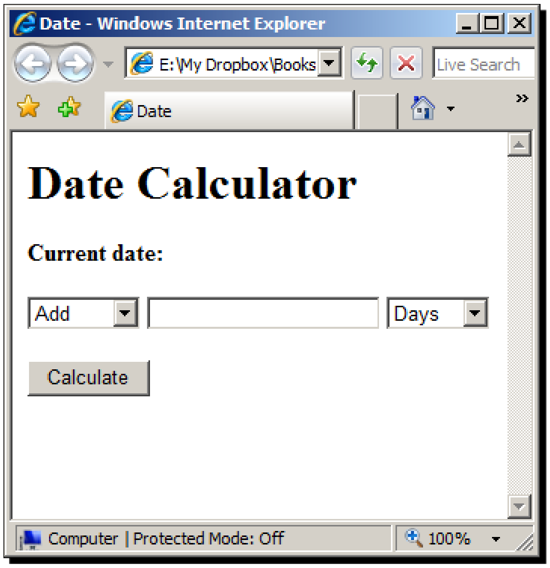
Let's explore some of these functions.

Time for action – building a Date calculator tool

Let's witness the power of the Date plugin by building a pure client-side web tool that adds or subtracts values based on the current date. The tool will allow users to enter how many days, months, or years to add or subtract to the current date. This can be helpful for getting the exact date of past events. Note that this calculator doesn't do input validation, and thus, if you were to use it, you would have to modify it so that it validates the user's input. In particular, if the user inputs an invalid value to add or subtract to the current date, such as 'apple' instead of a number, the script will break.

1. We'll start by setting up the HTML. The first key element is a paragraph that will show the current date. We will have three form fields to allow users to set the options for the calculation. The first form field is a `<select>` element (drop-down menu) that will determine what operation we will use: either Add or `Subtract`. The second form field is an input text element, which will take a numerical whole number as a valid value (if the user enters something else, our script will break). The third form field is another `<select>` element that will determine whether we're adding/subtracting days, months, or years. Lastly, we have a paragraph element called `#new-date` that will show the resultant date after we run our script.

```
<body>
<h1>Date Calculator</h1>
<!-- Today's date -->
<p id="current-date"><strong>Current date: </strong></p>
<!-- Input fields -->
<select id="operation" name="operation">
       <option value="add">Add</option>
    <option value="subtract">Subtract</option>
</select>
<input id="number" name="number" type="text" value="" />
<select id="interval" name="interval">
       <option value="day">Days</option>
       <option value="month">Months</option>
       <option value="year">Years</option>
</select>
<p><input id="calculate" name="calculate" type="button"
          value="Calculate" /></p>
<!-- Element to display calculated date -->
<p id="new-date">&nbsp;</p>
</body>
```


Date - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
Date
Computer | Protected Mode: Off
100%

Date Calculator

Current date:

Add | | Days

Calculate

2. Next, make sure that you have the MooTools libraries and your script set up correctly.

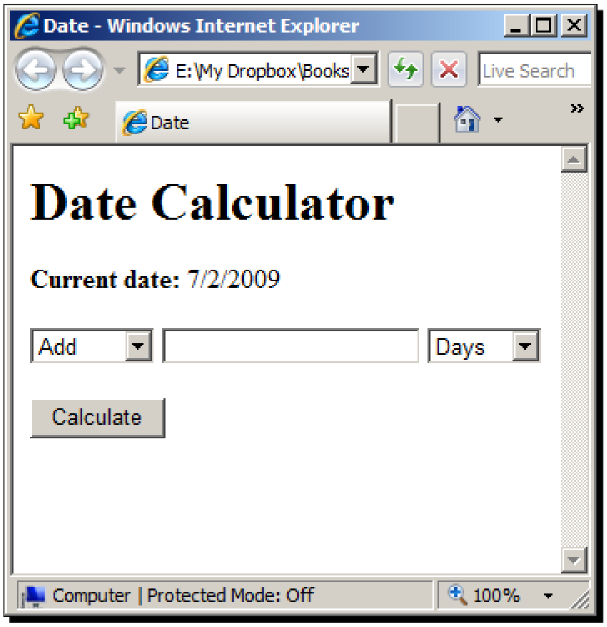
```
<script type="text/javascript" src="mootools-1.2.3.1-core.js">
</script>
<script type="text/javascript" src="mootools-1.2.3.1-more.js">
</script>
<script type="text/javascript">
window.addEvent('domready', function(){
   // Script goes here
});
</script>
```

3. First, we will initiate a date object—aptly named `date`—that will hold the current date (which it takes from the computer's date and time settings). Once this is done, we can run methods onto the object, such as `date.get('year')`.

```
   // Initiate date object
   var date = new Date();
```

4. Next, we will build a string that will hold today's date to output on the web page. The text format of the date is month/day/year (that is, February 18, 2009 is 2/18/2009); we put this string inside a variable called `currentDateDisplay`. The Date plugin extends the Core library in such a way that we can use the `get` method to determine the month (`.get('mo')`), day (`.get('date')`), and year (`.get('year')`) of a date instance. We then use the `appendText` method to append the `#current-date` paragraph element with the string value inside `currentDateDisplay`.

```
// Build current date as a string to display in web page
// Format: mm/dd/yyyy
var currentDateDisplay =
 date.get('mo')+'/'+date.get('date')+'/'+date.get('year');
// Append #current-date paragraph with currentDateDisplay
$('current-date').appendText(currentDateDisplay);
```


Date - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
Date
Computer | Protected Mode: Off
100%

Date Calculator

Current date: 7/2/2009

5. The next step is pretty straightforward; we add a click event listener on the Calculate button.

```
$('calculate').addEvent('click', function(){
   // Calculation happens in here
});
```

6. The first part of calculating the new date is to get the values from the form fields. To make our code cleaner and easier to maintain, we place these values into variables. To determine which option is selected in the `<select>` elements, we use a handy MooTools method called `getSelected()`. To get the text input field value, we can simply use the trusty `get` method with `'value'` as the argument.

```
// Get values and place in variables
var operationSelected = $('operation').getSelected();
var numberValue = $('number').get('value');
var intervalSelected = $('interval').getSelected();
```

7. The next chunk of code is the meat of our programming logic. We get the value of the selected option using the `getProperty` method with `'value'` as the argument. If the value is `'add'`, then we use the increment method, otherwise, we use the decrement method. Both methods are part of the Date plugin, which takes two arguments: the **interval** ('month, 'day', 'year', 'seconds') you would like to add (or subtract) and the **how many** (in integers) to add (or subtract). For the interval, we use the value of the option selected in the `<select id="interval">` element. And for the how many part, we get the value entered in the `#number` text input field (which we earlier placed inside a variable called `numberValue`). We place the calculated date inside a date object called `newDate`.

```
// If value of $('operation') is 'add', use increment method...
  if(operationSelected.getProperty('value')=='add'){
     var newDate =
       date.increment(intervalSelected.getProperty('value'),
       numberValue);
  // otherwise use decrement method
  } else{
     var newDate =
       date.decrement(intervalSelected.getProperty('value'),
       numberValue);
  }
```

8. The final process we need to perform is to produce the calculated date inside the `<p id="new-date">` element. First, we build the new date as a string, placing the value inside `newDateDisplay`. Then we use the set method to set the HTML inside the `<p>` element.

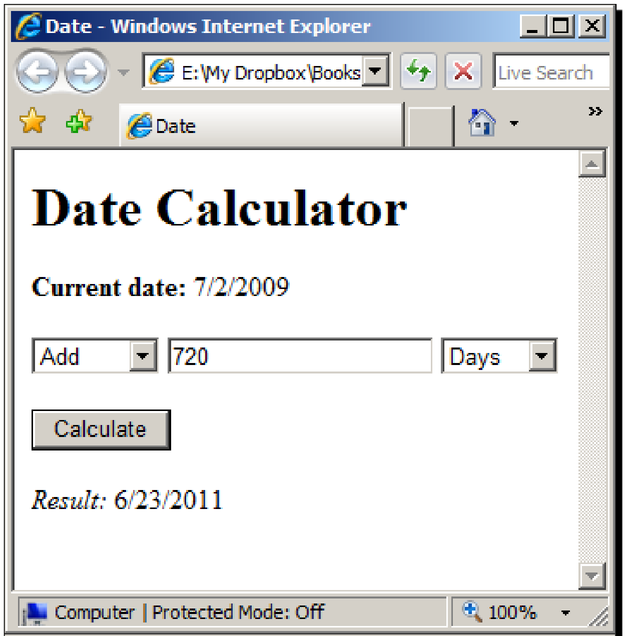
```
// Build new date as a strong to display in web page
var newDateDisplay =
  newDate.get('mo')+'/'+newDate.get('date')+'/'+
  newDate.get('year');
// Set #new-date paragraph's HTML with newDateDisplay
```

```
      $('new-date').set('html', '<em>Result:
        </em>'+newDateDisplay);
```

9. Here is the entire Date calculator script without comments. Study it to make sure you understand the code logic.

```
<script type="text/javascript">
window.addEvent('domready', function(){
   var date = new Date();
   var currentDateDisplay =
     date.get('mo')+'/'+date.get('date')+'/'+date.get('year');

   $('current-date').appendText(currentDateDisplay);

   $('calculate').addEvent('click', function(){

      var operationSelected = $('operation').getSelected();
      var numberValue = $('number').get('value');
      var intervalSelected = $('interval').getSelected();

      if(operationSelected.getProperty('value')=='add'){
         var newDate =
           date.increment(intervalSelected.getProperty('value'),
           numberValue);
      } else{
         var newDate =
           date.decrement(intervalSelected.getProperty('value'),
           numberValue);
      }

      var newDateDisplay =
        newDate.get('mo')+'/'+newDate.get('date')+'/'+
        newDate.get('year');
      $('new-date').set('html', '<em>Result:
        </em>'+newDateDisplay);
   });
});
</script>
```

10. Test your work in a web browser. Enter a numerical integer value, click on the **Calculate** button, and you should have the desired date.


Date - Windows Internet Explorer
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Live Search
Date
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100%

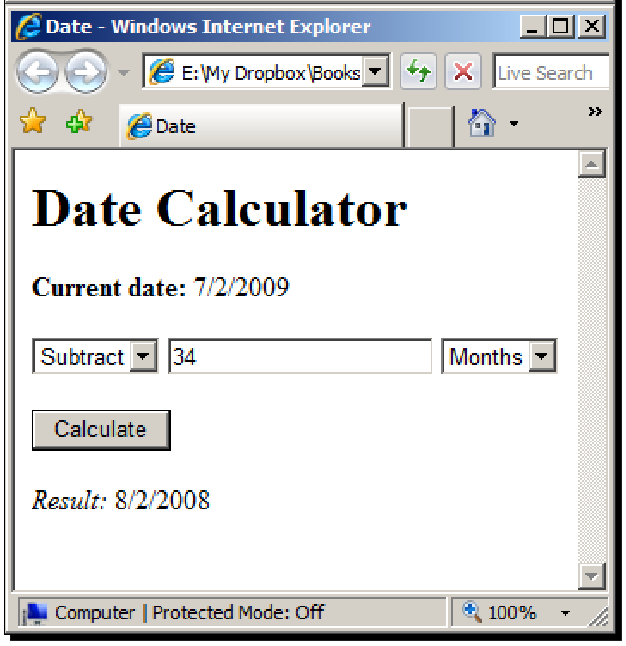
Date Calculator

Current date: 7/2/2009

Add | 720 | Days

Calculate

Result: 6/23/2011


Date - Windows Internet Explorer
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Live Search
Date
Computer | Protected Mode: Off
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Date Calculator

Current date: 7/2/2009

Subtract | 34 | Months

Calculate

Result: 8/2/2008

What just happened?

We created a simple web tool for calculating past and future dates, based on the current date. More specifically, we allow users to select whether they want to add or subtract from the current date, enter a numerical integer, and then also ask whether they'd like to add or subtract days, months, or years. The script we wrote used the Date plugin and some of its useful utility functions and methods to make this whole script possible in fewer than 20 lines of code.

To learn more about the Date plugin and other useful functions and methods it has, visit the official MooTools docs pages for it at `http://mootools.net/docs/more/Native/Date`.

Making web forms more user-friendly with the OverText plugin

MooTools More plugins range from very simple features to complicated features (such as input validation in web forms). Overtext is in the simple range. What it does is it shows text in an input field (which can be used to prompt the user on what to enter), and when they focus on the input field, the text disappears so that they can proceed with entering their text.

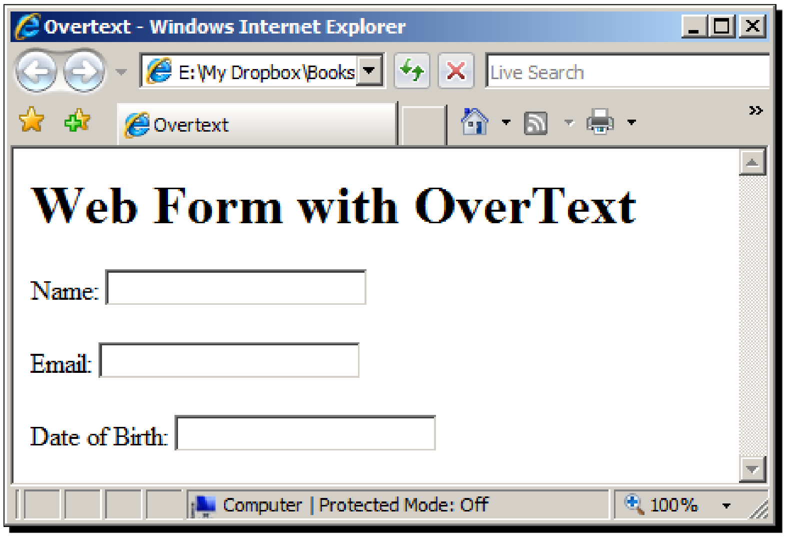
Let's explore this plugin by way of an example.

Time for action – creating a web form that uses OverText

OverText is great for providing contextual hints about an input field. For example, an input field that takes a birth date could suggest the proper date format, or a password text field could give the user a reminder to use a strong and memorable password. In some instances, you may even consider replacing input labels with OverText to save some space. In this simple web form example, we'll use OverText for input fields.

1. Let us create the HTML web form. We have three input fields with IDs of `name`, `email`, and `dateofbirth`. They also have corresponding labels for semantics and web accessibility. The most important thing to note is that our `input` elements have `alt` properties: the value of its `alt` property will be the text that will be shown as an over text.

```
<body>
<h1>Web Form with OverText</h1>
<form>
  <p>
    <label for="name">Name: </label>
    <input id="name" alt="Enter first and last name" type="text"/>
  </p>
  <p>
    <label for="name">Email: </label>
    <input id="email" alt="Format: email@email.com" type="text"/>
  </p>
  <p>
    <label for="name">Date of Birth: </label>
    <input id="dateofbirth" alt="Format: mm/dd/yyyy" type="text"/>
  </p>
</form>
</body>
```


Overtext - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
Overtext
Computer | Protected Mode: Off
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Web Form with OverText

Name:

Email:

Date of Birth:

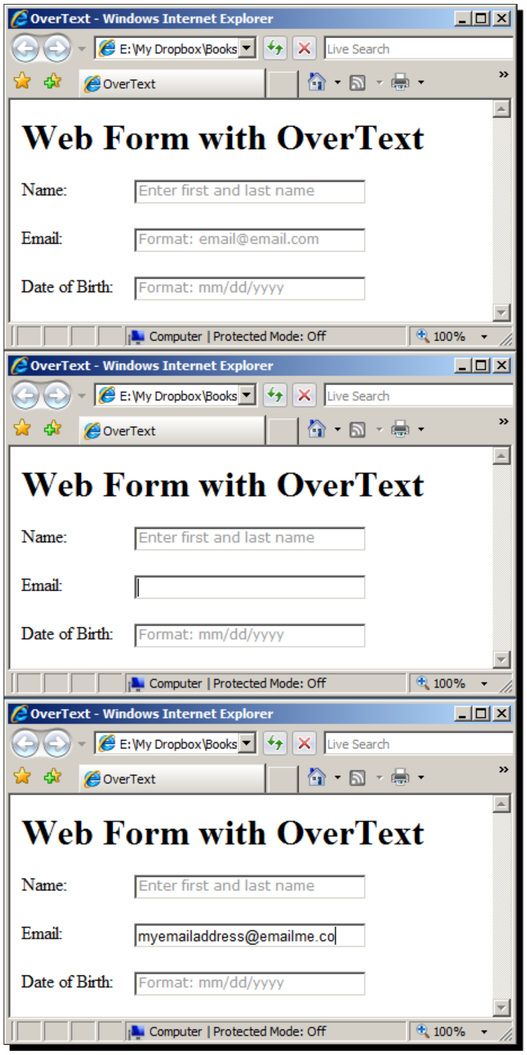
2. Let's give the form some basic styles. The most important style rule to note is the span: our over text will be span elements.

```
<style type="text/css">
label {
   width:100px;
   display:block;
   float:left;
}
input { width:200px; }
/* A few style rules for the OverText text*/
span {
   color:#999;
   width:300px;
   font:12px Verdana, Geneva, sans-serif;
}
</style>
```

3. Time to write our OverText script. We use the each method to cycle through each input field. For each iteration, we create a new `OverText` class instance with the first argument set to the ID of the input element (which we determine via the `get` method). We set the `element` option of the class instance to `span` (by default, they are `labels`).

```
<script type="text/javascript">
window.addEvent('domready', function(){
   $$('input').each(function(el){
      new OverText(el.get('id'), {
         element: 'span'
      });
   });
});
</script>
```

4. That's it! Now, test the script in a web browser. You should see the over text as gray text equal to the value of the `alt` properties of each `input` element. When you click on an `input` to start typing, the over text disappears.


OverText - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
OverText
Computer | Protected Mode: Off
100%

Web Form with OverText

Name: Enter first and last name

Email: Format: email@email.com

Date of Birth: Format: mm/dd/yyyy

Web Form with OverText

Name: Enter first and last name

Email:

Date of Birth: Format: mm/dd/yyyy

Web Form with OverText

Name: Enter first and last name

Email: myemailaddress@emailme.co

Date of Birth: Format: mm/dd/yyyy

What just happened?

In the previous example, we used the OverText plugin to make a web form more usable by giving contextual hints to users while filling out the form. For example, for the Date of Birth input field, we suggested the correct date format to enter.

Drag-and-drop with Drag and Drag.Move

The last two plugins we'll explore in this chapter are the Drag and Drag.Move plugins. The Drag plugin extends the MooTools Core library to enable **draggable** elements; elements that, when clicked on with the mouse, can be moved around the web page. The Drag.Move plugin is an extension of the Drag plugin and is a subclass that opens up even more functions and methods for working with drag and drop content.

Important note on web accessibility

Though the drag-and-drop interaction pattern is becoming more and more popular, you should ensure that web pages that use this type of interactivity degrade correctly. Specifically, you should make sure that users who have vision impairments—and thus cannot see where to click and drag to, and mobility impairments—and thus, cannot move conventional input devices such as a mouse—are still able to access important information and perform critical site tasks.

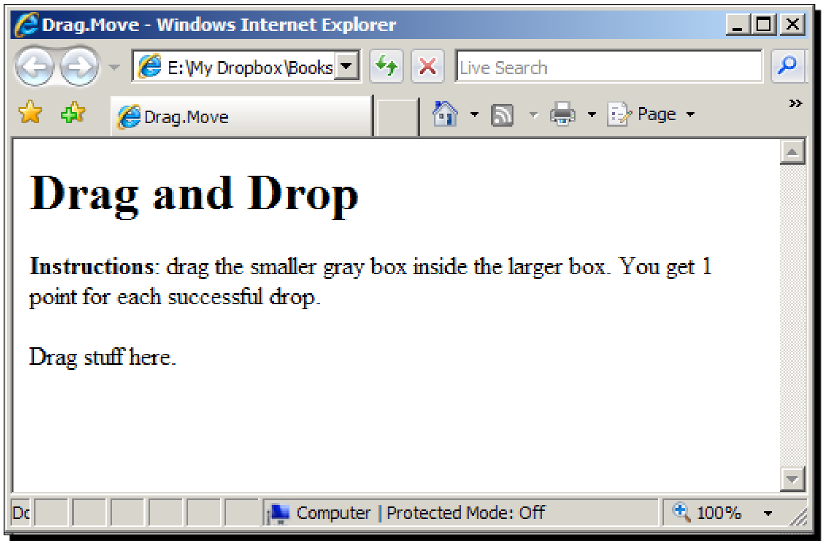
We will learn about these two plugins by creating a simple web game.

Time for action – creating a simple drag-and-drop game

We're going to create a web game that will utilize the Drag and Drag.Move plugins. There will be a small gray box that you can drag around the web page (called a draggable). There will also be a larger box to drag to (called a **droppable**). When the draggable is dropped inside the droppable, you get 1 point.

1. First, we will set up the HTML. We contain the draggable and droppable elements inside a div called `#drag-container`. The draggable element will have an ID of `#draggable` and the droppable element will have an ID of `#dropbox`. Finally, we have a section for placing the user's score called `#log`.

```
<body>
<h1>Drag and Drop</h1>
<p><strong>Instructions</strong>: drag the smaller gray box inside
the larger box. You get 1 point for each successful drop.</p>
<div id="drag-container">
  <div id="draggable">&nbsp;</div>
  <div id="dropbox">Drag stuff here.</div>
</div>
<div id="log">&nbsp;</div>
</body>
```


Drag.Move - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
Drag.Move
Page
Computer | Protected Mode: Off
100%

Drag and Drop

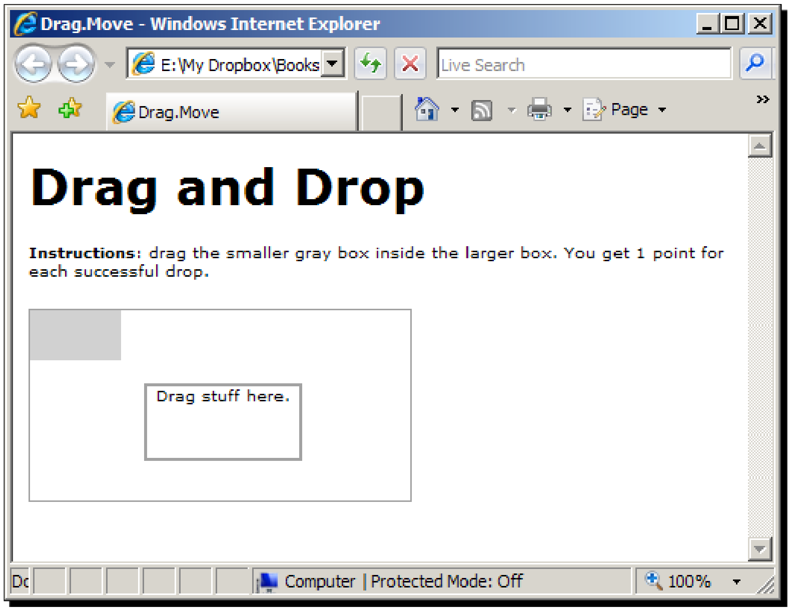
Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.

Drag stuff here.

2. As you can see in the previous figure, we need some CSS styles to make our web game visually relevant. Let's discuss the important styles. For `#drag-container`, we need to explicitly declare the `position` attribute as **relative**, or else dragging will not function in Internet Explorer. For the `#draggable` element, we need to explicitly declare a `position` property set to **absolute**, even though the plugin automatically does this for us via DOM manipulation (also for IE). We also set a `z-index` property to **1**—a higher value than `#dropbox`—so that it always appears on top of the latter. Finally, `.start-drag` is a class that we will apply via JavaScript to `#draggable` once the dragging has started; it will be a visual indication that shows when the element has been dragged, and when it has been dropped.

```
body { font:10px Verdana, Geneva, sans-serif; }
#drag-container {
   height:250px;
   width:250px;
   border:1px solid #999;
    /* Needed for Internet Explorer */
    position:relative;
}
#draggable {
   background-color:#ccc;
   width:60px;
   height:60px;
   text-align:center;
   /* Needed for Internet Explorer */
```

```
        position:absolute;
       top:0;
        left:0;
       /* Keep draggable on top of #dropbox */
       z-index:1;
    }
    #dropbox {
       border:2px solid #999;
       text-align:center;
       width:100px;
       height:100px;
       position:absolute;
       top:75px;
        left:75px;
       /* Keep #dropbox below #draggable */
        z-index:0;
    }
    /* Class to apply when dragging starts */
    .start-drag {
       background-color:#000;
       border:2px solid #000;
    }
    #log { font-size:18px; }
```


Drag.Move - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
Drag.Move
Page
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Drag and Drop

Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.

Drag stuff here.

3. In the previous screenshot, you can see our web game taking shape. The structure and styles are in; now all there is left to do is make it functional. To start, we will initiate a variable that will hold the user's score (called `successCount`).

```
<script type="text/javascript">
$(window).addEvent('domready', function(){
   // Counts successful drops
   var successCount = 0;
});
</script>
```

4. Next, we set up the structure of our Drag.Move instance. We call the instance `dragEl`, and pass as an argument `$('draggable')` to indicate the target element to make draggable.

```
   // Create Drag.Move class instance
   var dragEl = new Drag.Move($('draggable'),{
      // Options, methods, event listeners go here
   });
```

5. Next, we set the `droppables` option to `$('dropbox')`, to indicate that the `#dropbox` div is a droppable area.

```
   var dragEl = new Drag.Move($('draggable'),{
      // Indicates elements considered as drop areas
      droppables: $('dropbox'),
      // Rest of the stuff will go here...
   });
```

6. Drag has a special event option called `onStart` that watches out for the event that the dragging has started (that is, the user clicks and holds down the mouse button on the draggable element). We use the set method to DOM insert the text `Start drag...` inside it, and the `addClass` method to assign the element the `.start-drag` class.

```
   var dragEl = new Drag.Move($('draggable'),{
      // Indicates elements considered as drop areas
      droppables: $('dropbox'),
      // Event listener for when dragging starts
      onStart: function(el){
         el.set('html','<p>Start drag...</p>')
         .addClass('start-drag');
      },
      // Rest of the stuff goes here...
   });
```

7. There's an event option just for the Drag.Move class called `onEnter`, which can run a function when the draggable element comes in contact with the droppable element. When this event occurs, we use the `highlight` method (from Fx.Tween) to make `#dropbox` flash red (hexidecimal value of `#ff0000`), indicating that the element has entered the area.

```
// Create Drag.Move class instance
var dragEl = new Drag.Move($('draggable'),{
   // Indicates elements considered as drop areas
   droppables: $('dropbox'),
   // Event listener for when dragging starts
   onStart: function(el){
      el.set('html','<p>Start drag...</p>')
      .addClass('start-drag');
   },
   // Event listenter for when draggable object
   // enters a droppable area.
   onEnter: function(el, dropbox){
      // Highlight the droppable area entered
      dropbox.highlight('#ff0000');
   },
   // Rest of the stuff goes here...
});
```

8. The final option we will set for our Drag.Move instance (and the most verbose one) is the `onDrop` option, which runs a function when the draggable element is dropped inside the droppable element. The function after the `onDrop` option uses two arguments. The first argument (`el`) refers to the element being dragged. The second argument (`dropArea`) will contain the DOM element that the `el` has been dropped upon; if the value of this argument is **null**, it means it was not dropped in a droppable element. We set up a control structure (`if`/`else`) to check the value of `dropArea`. If it is not null, then we increment our score tracker (`successCount`) by `1` to indicate that the user successfully gained `1` point. We also update the `#log` div with the new score. And then we set the HTML inside `el` to say "Dropped in dropbox" to add a visual queue that the drop was a success, as well as remove the `.start-drag` class because we're no longer dragging. Otherwise, if `dropArea` is null, then we set the HTML of `el` to say "Not in dropbox." and still remove the `.start-drag` class.

```
var dragEl = new Drag.Move($('draggable'),{
   // Indicates elements considered as drop areas
   droppables: $('dropbox'),
   // Event listener for when dragging starts
   onStart: function(el){
```

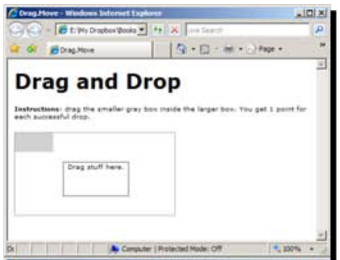
```
            el.set('html','<p>Start drag...</p>')
            .addClass('start-drag');
         },
         // Event listenter for when draggable object
         // enters a droppable area.
         onEnter: function(el, dropbox){
            // Highlight the droppable area entered
            dropbox.highlight('#ff0000');
         },
         // Event listener for when draggable is dropped
         onDrop: function(el, dropArea){
            // Second argument is null if
            // draggable is not dropped in a droppable
            if(dropArea!=null){
               // Increment variable by 1
               successCount++;
               // Update #log div with new successCount value
               $('log').set('html','<p>Successful drops: ' +
                successCount + '</p>');
               // Update #draggable HTML to indicate it was dropped
              //inside a droppable
              el.set('html','<p>Dropped in dropbox.</p>')
              .removeClass('start-drag');
            }
             else{
                // If not dropped in droppable area
                el.set('html','<p>Not in dropbox.</p>')
                .removeClass('start-drag');
            }
         }
      });
```

9. Here is the drag-and-drop script in its entirety (without code comments); study it to make sure you understand what we just accomplished.

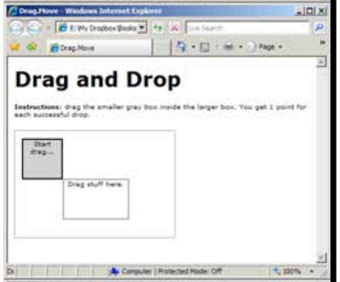
```
<script type="text/javascript">
$(window).addEvent('domready', function(){
   var successCount = 0;

   var dragEl = new Drag.Move($('draggable'),{
```

```
            droppables: $('dropbox'),
            onStart: function(el){
               el.set('html','<p>Start drag...</p>')
               .addClass('start-drag');
            },
            onEnter: function(el, dropbox){
               dropbox.highlight('#ff0000');
            },
            onDrop: function(el, dropArea){
               if(dropArea!=null){
                  successCount++;

                  $('log').set('html','<p>Successful drops: ' +
                    successCount + '</p>');

                  el.set('html','<p>Dropped in dropbox.</p>')
                  .removeClass('start-drag');
               }
               else{
                  el.set('html','<p>Not in dropbox.</p>')
                  .removeClass('start-drag');
               }
            }
         });
      });
      </script>
```

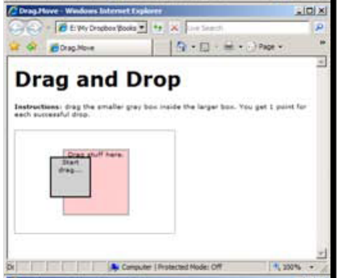
10. Test your work in a web browser and enjoy your newly created web game!


Drag.Move - Windows Internet Explorer
Drag and Drop
Drag stuff here.
Computer | Protected Mode: Off

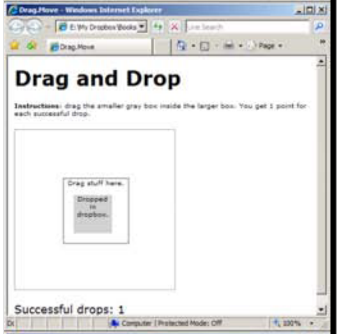
Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.



Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.

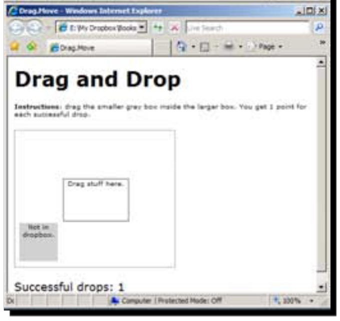


Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.



Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.

Successful drops: 1



Instructions: drag the smaller gray box inside the larger box. You get 1 point for each successful drop.

Successful drops: 1

What just happened?

We created a very simple web game that allows users to drag-and-drop an element into another element. When they successfully drop the draggable element inside the droppable element, they get a score of one. This was accomplished using the Drag and Drag.Move MooTools More plugin.

Summary

In this chapter we learned about MooTools More plugins:

- What MooTools More plugins are: We determined that they're useful classes that can be used to extend the MooTools Core library.
- Downloading and installing MooTools More plugins: We learned that the More Builder in the official MooTools site is where we obtain More plugins and that we can customize our download so that only the plugins we want will be included.
- Discovering some More plugins: We discovered four out of the 40+ More plugins to see just how useful More plugins are. We used Fx.Accordion to create a slick and interactive content area, OverText to make web forms more user-friendly, and Drag/Drag.Move to create a simple web game.

Now that we've learned about MooTools More plugins, how about we create our own MooTools plugins? That's the topic of the next chapter.

9
Creating Your Own Plugin

Authoring your own plugin is a great practice for creating flexible, extensible, and reusable scripts. Plugins are inline with the MooTools philosophy of writing reusable code that you can instantiate and customize. For example, if you build many websites and find that there are certain JavaScript functionalities that you reuse and tweak for each project, you can simply write a class for it and instantiate them with varying options in your projects.

You can also release plugins to the public, and, thus, participate and help your fellow MooTools developers. This can be an added advantage to your curriculum vitae; it can showcase your abilities in writing MooTools code, the right way.

In this chapter we shall:

- Design a plugin by making a design sheet
- Create a script that accomplishes the function of the plugin; it will serve as a pattern and as a lesson on converting your existing scripts into a reusable and flexible plugin
- Create documentation for the plugin and preparing it for public release

Let's get started, shall we?

Why create a plugin?

As I mentioned in the preceding chapter, plugins are flexible classes that you can reuse and share, whether you have an existing script that you want to reuse several times in multiple projects, or have an idea of a useful script that you'll know will be used over and over again. It's a good idea to write a class that you can instantiate and provide customizable options for.

In this chapter, we're going to create a simple auto image captioning plugin. We'll start from the design/conceptualization phase of the plugin, all the way up to documenting our code and preparing it for public release. We're going to follow MooTools coding standards (which you can learn about by simply downloading a MooTools More plugin and studying the code and comments).

Designing the plugin

With a little forethought, we can effectively build a flexible class. We have to think of what the plugin is meant to do (and what it isn't meant to do), what options will be helpful, and the basic logic of how the plugin will work.

Often, it is helpful to invest some time in writing down necessary information about a plugin you're about to write. Your notes can be the blueprint of what you're building, and also serve as a great way to conceptualize the code logic of the plugin. I call this document a **design sheet**.

This design sheet can also help greatly when we finalize our code's documentation, and for preparation of the plugin for public release. The design sheet can change; you may realize that there are more options that you need in order to make the plugin truly customizable, and there may be options that you thought would be good to have, but would just be overkill in the final product.

Before we begin any writing, we're going to design our plugin, so grab your favorite notebook or word-processing software and get ready to do some writing.

Time for action – creating a design sheet for our plugin

We are going to create a design sheet for the auto image captioning plugin that we're going to build. The format that you should use for this design sheet should be one that you and/or your team is comfortable with. In this example, I will show you how to create a design sheet arranged as a table: you can do this by depicting it in a notebook, or on a word-processing application (such as Microsoft Word or OpenOffice).

1. Create the headings of the design sheet: **Plugin name**, **What will it do**, **How will it do it**, and **Plugin Options**.

Plugin name	What will it do	How will it do it	Plugin Options

2. Write in the plugin name. The plugin name must be capitalized. MooTools best practices for naming a class is by **camelcasing** words of the class name, that is, where each elements initial letter is capitalized. When coming up with a class name, make sure that it's as intuitive as possible and outlines what it does. Since we're creating an image auto captioning plugin, the name is **ImageCaption**.

Plugin name	What will it do	How will it do it	Plugin Options
ImageCaption			

3. Next, we should define what the intent of the plugin is. This will help us conceptualize the code we will have to write and find options we might want to provide the user for customizing the class instance, as well as uncover some potential pitfalls when writing our script. In this case, the plugin will take the `alt` property of the image and place it as HTML text below it. If the `alt` property is not present, it will try to check if the `title` property is present. Now we can see the first potential pitfall of our script: what if both `alt` and `title` properties weren't available? We should have a backup plan for this situation. Our backup plan is that the caption text will equal to an empty string (`''`). We don't have to write all this down, we just want a basic one to two sentence definition of our plugin (which you'll see in action later in the chapter when we document our code).

Plugin name	What will it do	How will it do it	Plugin Options
ImageCaption	ImageCaption will take the `alt` property (or title property) of an image, and insert it as HTML text to serve as a photo caption (its description).		

4. The next step is to plot out the code logic. For this to work, we will iterate through all the images in a web page, take each image's `alt` property and store it in a variable, wrap the image in another element that will contain both the image and the caption, and then inject the caption text in it, right below the image, as a `<span>` element.

   By writing down the code logic, we've discovered a couple of things. First, what if the user doesn't want all images in a web page to be captioned? This means we should have a plugin option for specifying which images should be captioned. Second, what if the user wanted the image caption to be above instead of below the image? We should also have a plugin option for the position of the caption text. By writing this down, we're able to flesh out two options for the final column.

Plugin name	What will it do	How will it do it	Plugin Options
ImageCaption	ImageCaption will take the `alt` property (or title property) of an image, and insert it as HTML text to serve as a photo caption (its description).	We will take the `alt` (or title) property value of the target images in a web page, wrap that image in another element that will contain the image and the caption text, and then inject the caption text into the DOM, above or below the image, as a `<span>` element.	

5. In the last column, we should determine options we'd like to provide to the user. This list should be flexible: while writing the plugin, you might realize there are more options that we should provide, or that some options that you initially thought were great, aren't really that useful or can't be made available due to the way the script was written.

   We should allow the user to specify the class name to the wrapper of the image/caption pair so that they may be able to style these elements using CSS. Next, we should allow users to change the element type of the wrapper (by default, both will be `<span>` elements). Finally, users should be able to position the caption text above the image. To make this easier, we'll follow the format: **option name** - (**datatype**, defaults to **default value**) **description**. This format is consistent with MooTools docs and will help us later on when we document our plugin.

Plugin name	What will it do	How will it do it	Plugin Options
ImageCaption	ImageCaption will take the `alt` property (or title property) of an image, and insert it as HTML text to serve as a photo caption (its description).	We will take the `alt` (or title) property value of the target images in a web page, wrap that image in another element that will contain the image and the caption text, and then inject the caption text into the DOM, above or below the image, as a `<span>` element.	wrapperClass - (string, defaults to 'imgWrapper') the class name of the wrapper element. wrapperType - (string, defaults to 'span') the element type of the wrapper. captionType - (string, defaults to 'span') the element type of the caption text. captionPosition - (string, defaults to 'after') where the caption text element will be injected to the DOM relative to the image.

What just happened?

In the previous example, we constructed a design sheet for our plugin in order to give us a better understanding of what we will be coding. In addition, it will serve as a guide (or "blueprint") of our plugin while we write it, and later on, when we document our code, we can take parts of it.

Now that we've got a good understanding of what we'll be doing, it's time to start coding.

Creating the ImageCaption script

Oftentimes, you will already have a script lying around that you wish to convert to a plugin because you found yourself using it repeatedly in your projects. For beginner MooTools developers, it may be helpful to first get the functionality working, and then convert it to a flexible plugin, thus using the script as a pattern.

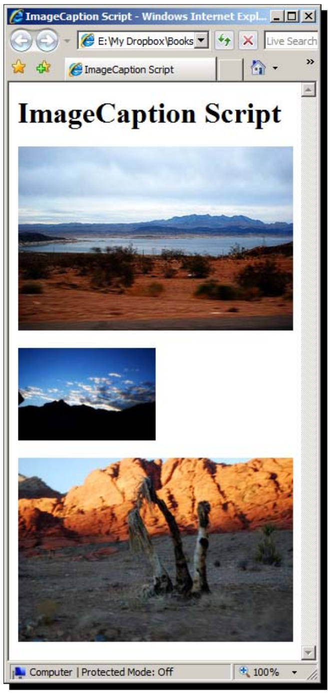
To begin, we'll focus on scripting the image caption function. This will also help you understand how the code works to make it easier to transition it into a MooTools plugin.

Time for action – writing the ImageCaption script

Before we start writing our MooTools plugin, we'll take an additional step; we're going to write a functional script that accomplishes the task we've set out to do, which is to automatically caption images in a web page using their `alt` (or `title`) property. Imagine auto-captioning 20 images (or more) in a web page without having to do much other work than assigning them an `alt` or `title` property? This reduces the amount of HTML we have to write, which in turn, reduces HTML clutter and file size.

1. Start with some HTML by putting images in a web page. In this web page, place three image elements (encapsulating these image elements inside a p tag is optional). For the first image, include an `alt` property/value pair. For the second image, do not provide any `alt` or `title` property/value pairs. This will serve as a test case on how our script will work without an image caption. The third one will have a title property instead of an alt property.

```
<h1>ImageCaption Script</h1>
<p><img src="lake_mead.jpg" width="300" height="201" alt="Lake
mead in a speeding car." /></p>
<p><img src="clouds.jpg" width="150" height="101" /></p>
<p><img src="red_rocks.jpg" width="300" height="201" title="A
photo of Red Rock Mountain near Las Vegas, Nevada." /></p>
</body>
```


ImageCaption Script - Windows Internet Expl...
E:\My Dropbox\Books
Live Search
ImageCaption Script
ImageCaption Script
Computer | Protected Mode: Off
100%

2. Next, we write our MooTools script. We will iterate through each `img` element, adding a caption for each of them. We do this by using the `each` method.

```
<script type="text/javascript">
window.addEvent('domready', function(){
$$('img').each(function(image){
  // code to execute goes here
});
});
</script>
```

3. The first action is to get the caption text value and the width of the image. We get the `alt` property value by using the `getProperty` method, and place it inside a variable called `captionText`. Since we have to take into account that the alt property may not be present because the user does not have it assigned to the image (and thus, using the `getProperty` method will return `null`), we use the `||` operator.

   Here's how it works: the value to the left of the `||` will take precedence over the value on its right. If the value on the left is `null`, then it will try the value on its right. You can have as many `||` operators as you would like and if the last value is still `null`, then the variable will be assigned a `null` value.

   Therefore, the last value should avoid returning `null` (unless you want it to) and is the "back up" plan.

   In this instance, if there are no `title` or `alt` properties, then we use an empty string (`''`) as our caption text; this will prevent our script from malfunctioning because `captionText` will never be equal to `null`.

```
$$('img').each(function(image){
   var captionText = image.getProperty('alt') || image.
getProperty('title') || '';
});
```

4. Next, we should get the width of the image so that we can set its wrapper element equal to it; this makes it so that our wrapper is not too wide, which will affect the position of the image caption. Again, we utilize the `getProperty` method to do this. Because the `getProperty` method returns a string value, we can use the `toInt()` method to convert it to an integer data type. Like with `captionText`, we want to avoid a `null` value (which will happen when the user does not include a width property on the `img` element). Therefore, we use the `||` operator to conditionally assign `width` a string value of `'auto'`.

```
$$('img').each(function(image){
   var captionText = image.getProperty('alt') || image.
getProperty('title') || '';
```

```
    var width = image.getProperty('width').toInt() || 'auto';
});
```

5. Now, it's time to construct the wrapper element. We use the `Element` constructor with an argument of string value of `span` to denote that our wrapper element will be a <span> element. We use the class option to define the value of the wrapper's CSS class—`imageCaption`. We use the styles option to set required CSS styles onto the wrapper element: it has to be a block element so that we can float the image/caption set if we choose to. We also need to set the width CSS property to either the width property of the image defined by the user, or to `auto,` this is where the `width` variable earlier on comes into play. We call this element `wrapper` and we will be referencing it later in the script.

```
$$('img').each(function(image){
    var captionText = image.getProperty('alt') || image.
getProperty('title') || '';
    var width = image.getProperty('width').toInt() || 'auto';

    var wrapper = new Element('span', {
        'class': 'imgCaption',
        'styles': {
            'display': 'block',
            'width': width
        }
    });
});
```

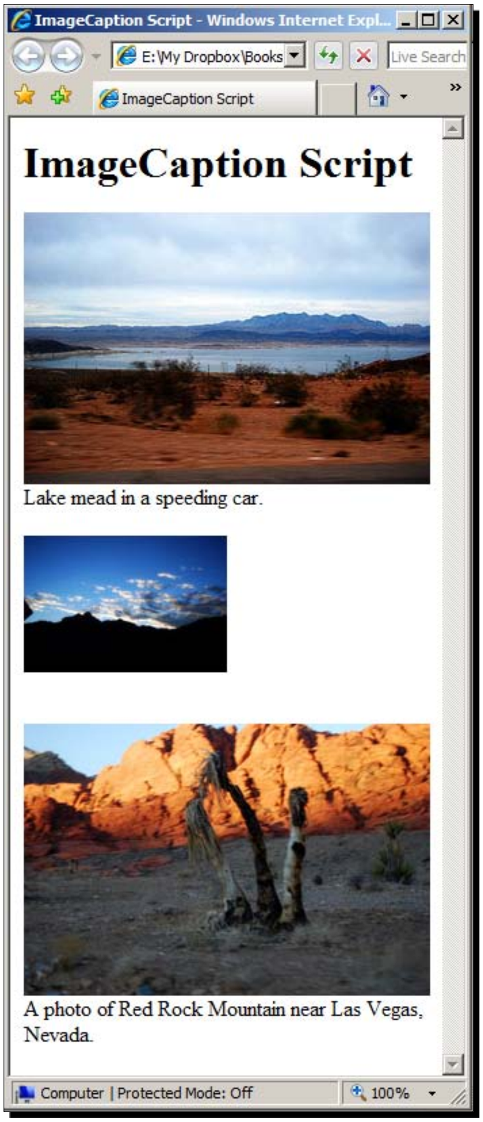
6. Next, we create the caption text element, again, using the `Element` constructor, named `caption`. `caption` will be a <span> element. To set the text inside the <span> , we use the html option with the value of `captionText` that we took earlier from the `alt` (or `title`) property. Finally, we use the styles option to set the basic CSS styles of the element; it has to be a block element so that it displays below the `img` element, and so that we may make adjustments to it easily.

```
$$('img').each(function(image){
    var captionText = image.getProperty('alt') || image.
getProperty('title') || '&nbsp;';
    var width = image.getProperty('width').toInt() || 'auto';

    var wrapper = new Element('span', {
        'class': 'imgwrapper',
        'styles': {
            'display': 'block',
          'width': width
       }
    });
    var caption = new Element('span', {
       'html': captionText,
       'styles': {
          'display': 'block',
          'width': width
       }
    });
});
```

7. Now we have to modify the DOM to wrap the `img` element with the wrapper element as well as inject the caption element after the image. This only takes up two lines of code. We use the `wraps` method to wrap the image with the wrapper. We then use the `inject` method to insert the `caption` element after image.

```
window.addEvent('domready'', function(){
$$('img').each(function(image){
    var captionText = image.getProperty('alt') ||
      image.getProperty('title') || '&nbsp;';
    var width = image.getProperty('width').toInt() || 'auto';
    var wrapper = new Element('span', {
       'class': 'imgwrapper',
       'styles': {
          'display': 'block',
          'width': width
       }
    });
    var caption = new Element('span', {
       'html': captionText,
       'styles': {
          'display': 'block',
          'width': width
       }
    });
    wrapper.wraps(image);
    caption.inject(image,'after');
});
});
</script>
```

8. Test your work in your web browser. You should see that our first and third images have text captions, but the second one will not (because we didn't set an `alt` or `title` property on that `img` element).


ImageCaption Script - Windows Internet Expl...
E:\My Dropbox\Books
Live Search
ImageCaption Script
Computer | Protected Mode: Off
100%

ImageCaption Script

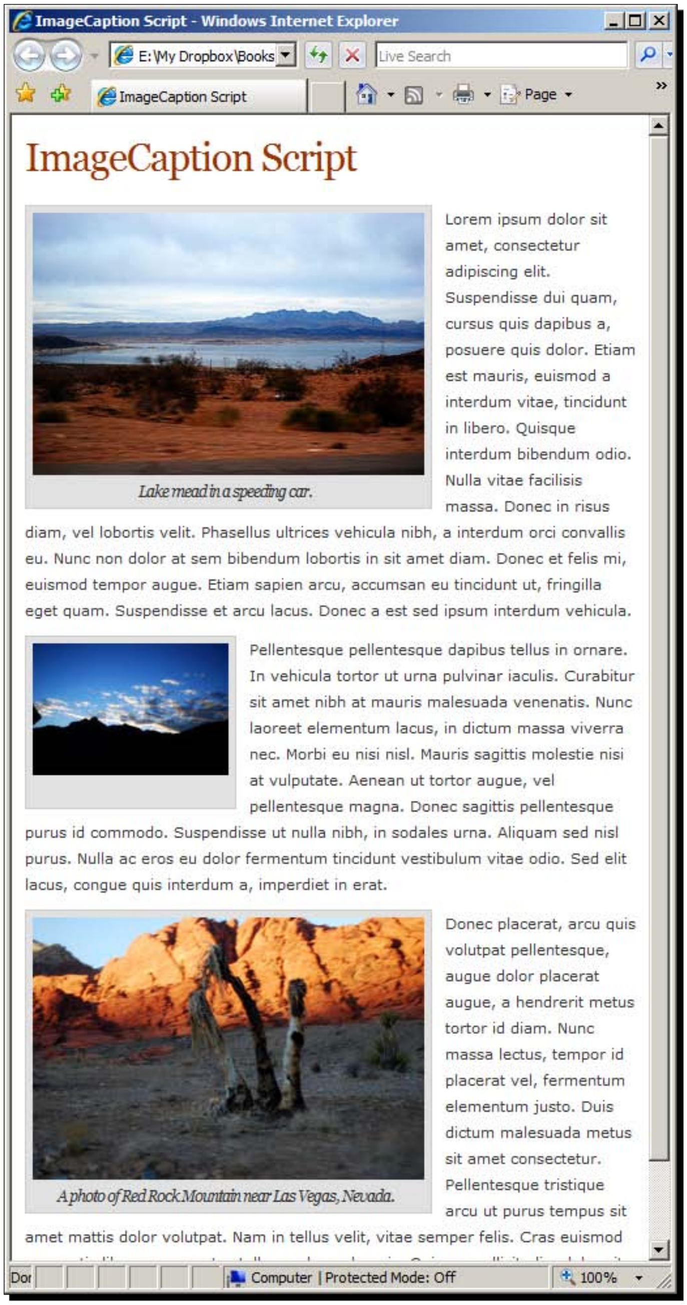
Lake mead in a speeding car.

A photo of Red Rock Mountain near Las Vegas, Nevada.

9. We can stop there and call it a day, but our image captions don't look very pleasing to the eyes. We'll use CSS to style our captions. Here, it is important to note a crucial concept: separating functionality from style. By not using JavaScript to limit our CSS styles, we give our script a lot more flexibility in its design. We only set the display CSS property and width property because they are necessary, the rest is in the hands of the developer/designer. The following are the CSS styles used here, but you should take the liberty to get the style and layout you wish your image captions to have.

```
/* Styles for the wrapper */
.imageCaption {
   background-color:#e1e1e1;
   border:1px solid #ccc;
   padding:5px;
   text-align:center;
   float:left;
   margin:0 10px 5px 0;
}
/* Styles for the image */
.imageCaption img {
   border:1px thin #fff;
}
/* Styles for caption text */
.imageCaption span {
   font:italic 12px Georgia, "Times New Roman", Times, serif;
   color:#333;
   letter-spacing:-1px;
   margin-top:5px;
}
/* Web page styles not related to image captions */
body {
   font:normal 11px/20px Verdana, Geneva, sans-serif;
   color:#363636;
}
h1 {
   font:30px Georgia, "Times New Roman", Times, serif;
   letter-spacing:-1px;
   color:#930;
}
p {
   margin:10px 0;
}
```

10. To get the full effect of how the image captions work, dummy text was also inserted. Testing your work in a web browser should show you something similar to the following screenshot:


ImageCaption Script - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
ImageCaption Script
Page
Computer | Protected Mode: Off
100%

ImageCaption Script

Lake mead in a speeding car.

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Suspendisse dui quam, cursus quis dapibus a, posuere quis dolor. Etiam est mauris, euismod a interdum vitae, tincidunt in libero. Quisque interdum bibendum odio. Nulla vitae facilisis massa. Donec in risus diam, vel lobortis velit. Phasellus ultrices vehicula nibh, a interdum orci convallis eu. Nunc non dolor at sem bibendum lobortis in sit amet diam. Donec et felis mi, euismod tempor augue. Etiam sapien arcu, accumsan eu tincidunt ut, fringilla eget quam. Suspendisse et arcu lacus. Donec a est sed ipsum interdum vehicula.

Pellentesque pellentesque dapibus tellus in ornare. In vehicula tortor ut urna pulvinar iaculis. Curabitur sit amet nibh at mauris malesuada venenatis. Nunc laoreet elementum lacus, in dictum massa viverra nec. Morbi eu nisi nisl. Mauris sagittis molestie nisi at vulputate. Aenean ut tortor augue, vel pellentesque magna. Donec sagittis pellentesque purus id commodo. Suspendisse ut nulla nibh, in sodales urna. Aliquam sed nisl purus. Nulla ac eros eu dolor fermentum tincidunt vestibulum vitae odio. Sed elit lacus, congue quis interdum a, imperdiet in erat.

A photo of Red Rock Mountain near Las Vegas, Nevada.

Donec placerat, arcu quis volutpat pellentesque, augue dolor placerat augue, a hendrerit metus tortor id diam. Nunc massa lectus, tempor id placerat vel, fermentum elementum justo. Duis dictum malesuada metus sit amet consectetur. Pellentesque tristique arcu ut purus tempus sit amet mattis dolor volutpat. Nam in tellus velit, vitae semper felis. Cras euismod

What just happened?

In the above example, we created a simple script that automatically captions the images in a web page. This is the pattern that we will use in constructing our ImageCaption plugin. One of the things we learned is that, in order to create flexible scripts, we must limit the amount of CSS styles we use in the script and let the user determine the styles they would like for their image caption.

Noting down pitfalls and places of improvement to the script

In preparation for writing our plugin, the next step we should take is review our script to find places where we can run into trouble, and places where we can improve flexibility and customizability.

In reviewing the ImageCaption script we wrote, we noticed that we use the `$$()` to select all the images on a web page. What if the user just wants a particular class of images to have captions? We will have to address that issue when writing our plugin.

On the same token, we noticed that we use the `<span>` element for the wrapper and caption text element, what if the user wanted to use a `<div>` element for the wrapper and `<p>` element for the caption text? That's another issue we'll resolve in our plugin.

Also, we can see that we're committed to using the `imageCaption` class for our figures, but what if the user is already using that class for something else, or they would like to name it something different to follow their coding conventions? We need our plugin to be able to allow the user the option to set their class name(s).

Finally, we can see that although the script works, we'd need to modify it heavily if we wanted two types of image captions in a web page. For example, if we wanted one image caption with a different background or floated to the left, we'd have to write a lot of duplicate code to get that instance. Writing this script into a plugin allows us to instantiate different variations of the plugin class that can have different classes.

Now that we know the places where we can improve our script and provide the user script's more customizability options, it's time to start writing our plugin.

Converting the script to a flexible plugin

In this section, we will take the previous script and convert it into a MooTools plugin. We'll be using, to the best of our abilities, MooTools More coding conventions and standards so that MooTools developers using your plugin can easily read it and modify it (if needed).

The best way to learn MooTools coding conventions is by reading the Core library's code. Perhaps a more pertinent method in this chapter is to read a MooTools More plugin's source code by downloading an uncompressed version of it.

Additionally, you can take a look at the following web page in GitHub, which is where the MooTools project is stored for Core developers:

Syntax and Coding Style Conventions on GitHub

`http://wiki.github.com/mootools/mootools-core/syntax-and-coding-style-conventions`

Time for action – creating the ImageCaption plugin

We'll now create our plugin.

1. A plugin should be in its own JavaScript file. The file name, for best practice, must be the same as the class name. Since our class name is `ImageCaption`, our JavaScript file should be named `ImageCaption.js`. To start, create a new JavaScript file and name it `ImageCaption.js`.

2. Next, let us set up the "template" for our class. A plugin will have three staples. The first is `Implements`, which handles the `Options`. Because a plugin is typically flexible and customizable , it will have an `options` option. Finally, it will have the `initialize` option, which, if you can remember, runs the code whenever our class is instantiated.

   ```
   var ImageCaption = new Class({
      Implements: [Options],
      options: {
         // Available options

      },
      initialize: function(){
         // Code to run whenever this class is instantiated.
      }
   });
   ```

3. We will start with the plugins options. Our plugin will have four options, as we've defined in our design sheet earlier. `wrapperClass` is the class of the wrapper element, `wrapperType` and `captionType` are the element types of the wrapper and the caption elements. Finally, `captionPosition` allows the user to specify where to insert the caption element relative to the `img` element. The values assigned to each option are the default values that we also mentioned down in our design sheet. They're all string data types. If the user specifies an option during class instantiation, then our default options are overwritten and their specifications take precedence over the default values.

```
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
   initialize: function(){

   }
});
```

4. Next, let us write the code which will be run when our plugin is instantiated. Our plugin requires one argument from the user, the target image elements to be captioned, which can use either the `$$()` or `$()` function to point to the elements. It also requires the `options` argument so that it can set the options of the class instance.

```
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
   initialize: function(images, options){
      // Code to run whenever this class is instantiated.
   }
});
```

5. First, we need to set the options of the instance so that we can reference it throughout our class. We use the `setOptions` method to do this, with the `options` object as the argument.

```
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
   initialize: function(images, options){
      this.setOptions(options);
   }
});
```

6. The next phase is creating the code for captioning the target images. We can do this in two ways: run it right in the `initialize` function or create a class method to compartmentalize our class. We'll choose the latter option by creating an `ImageCaption` method called `addCaption`. For each target image, we call the `addCaption` method to add a caption to it (we use the each method to iterate through each target `img` element).

```
   var ImageCaption = new Class({
      Implements: [Options],
      options: {
         wrapperClass: 'imageCaption',
         wrapperType: 'span',
         captionType: 'span',
         captionPosition: 'after'
      },
      initialize: function(images, options){
         this.setOptions(options);
         images.each(function(image){
            this.addCaption(image);
         }, this);
      },
      addCaption: function(image){
         // captioning code
      }
   });
```

7. Let's work on the `addCaption` method. Since we use the script we built earlier in the chapter, this part should be a piece of cake. First, we get the `captionText` and width value of the image, just like in the previous example.

```
      addCaption: function(image){
         var captionText = image.getProperty(captionProperty) ||
           image.getProperty('title') || '&nbsp;';
         var width = image.getProperty('width').toInt() || 'auto';
      }
```

8. Then let's create the `wrapper` and `caption` elements. Instead of explicitly declaring the values, we use the class options to set them; this way, we create a flexible class.

```
      var wrapper = new Element(this.options.wrapperType, {
         'class': this.options.wrapperClass,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
      var caption = new Element(this.options.captionType, {
         'html': captionText,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
```

9. Finally, we perform our DOM manipulation, just like before.

```
   addCaption: function(image){
      var captionText = image.getProperty(captionProperty) ||
image.getProperty('title') || '&nbsp;';
      var width = image.getProperty('width').toInt() || 'auto';
      var wrapper = new Element(this.options.wrapperType, {
         'class': this.options.wrapperClass,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
      var caption = new Element(this.options.captionType, {
         'html': captionText,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
      wrapper.wraps(image);
      caption.inject(image, this.options.captionPosition);
   }
```

10. Here is our entire plugin's code; review it to make sure you understand how we converted our script into a plugin.

```
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
   initialize: function(images, options){
      this.setOptions(options);
      images.each(function(image){
         this.addCaption(image);
      }, this);
   },
   addCaption: function(image){
      var captionText = image.getProperty(captionProperty) ||
image.getProperty('title') || '&nbsp;';
      var width = image.getProperty('width').toInt() || 'auto';
      var wrapper = new Element(this.options.wrapperType, {
         'class': this.options.wrapperClass,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
      var caption = new Element(this.options.captionType, {
         'html': captionText,
         'styles': {
            'display': 'block',
            'width': width
         }
      });
      wrapper.wraps(image);
      caption.inject(image, this.options.captionPosition);
   }
});
```

What just happened?

We converted the script that we built earlier into a flexible class (plugin) which we can reuse and share with other MooTools developers.

In the next section, we shall test our plugin by instantiating it.

Instantiating the plugin

Now that we have successfully converted our ImageCaption script into a plugin, it's time to give it a test run.

Time for action – basic instantiation of the ImageCaption plugin

We will see how our plugin works under various circumstances.

1. Create an HTML document (or modify the example we used earlier).

```
<body>
<h1>ImageCaption Script</h1>
<p><img src="lake_mead.jpg" width="300" height="201" alt="Lake
mead in a speeding car." /></p>
<p><img src="clouds.jpg" width="150" height="101" /></p>
<p><img src="red_rocks.jpg" width="300" height="201" title="A
photo of Red Rock Mountain near Las Vegas, Nevada." /></p>
</body>
```

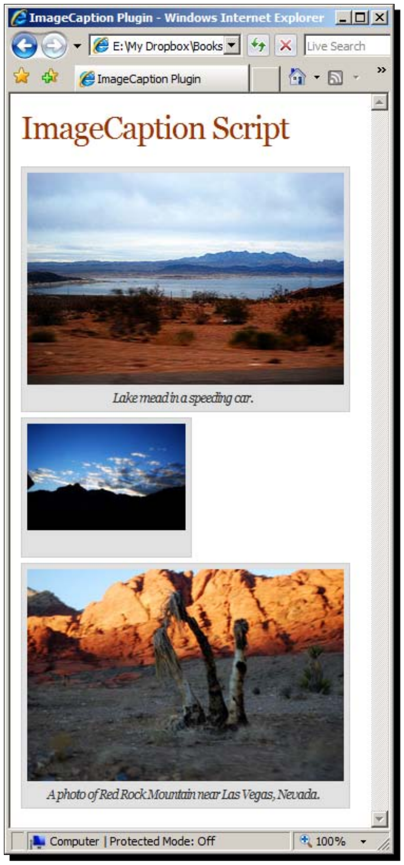
2. In the <head> section of your HTML document, reference the MooTools Core library and the ImageCaption plugin, and create a section where we will instantiate our Caption class.

```
<script type="text/javascript" src=”mootools.js"></script>
<script type="text/javascript" src="ImageCaption.js"></script>
<script type="text/javascript">
$(window).addEvent('domready',function(){
   // Instantiate here.
});
</script>
```

3. Finally, let's instantiate our ImageCaption plugin. We do this by creating a class object called `captionMyImages` (the name doesn't matter). We provide the class instance its one required argument, which is the target elements: in this instance `$$('img')`.

```
<script type="text/javascript" src="http://ajax.googleapis.com/
ajax/libs/mootools/1.2.2/mootools-yui-compressed.js"></script>
<script type="text/javascript" src="ImageCaption.js"></script>
<script type="text/javascript">
$(window).addEvent('domready',function(){
   var captionMyImages = new ImageCaption($$('img'));
});
</script>
```

4. Test your work in a web browser; you should see something like the following screenshot. As you can see, it's not at all different from our original script, which is a good thing.


ImageCaption Plugin - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
ImageCaption Plugin
ImageCaption Script
Lake mead in a speeding car.
A photo of Red Rock Mountain near Las Vegas, Nevada.
Computer | Protected Mode: Off
100%

What just happened?

We created a basic class instance of our ImageCaption plugin. Now that we know how to instantiate our plugin, we'll go into more advanced implementations of the plugin.

Creating a more complex instance of the plugin

It's time to see our plugin's capability. We'll start by creating multiple instances of it.

Time for action – creating new instances of the plugin

Imagine that you'd like several instances of the `ImageCaption` class. We'll create a situation where one of the images will have its caption at the top of the image instead of before.

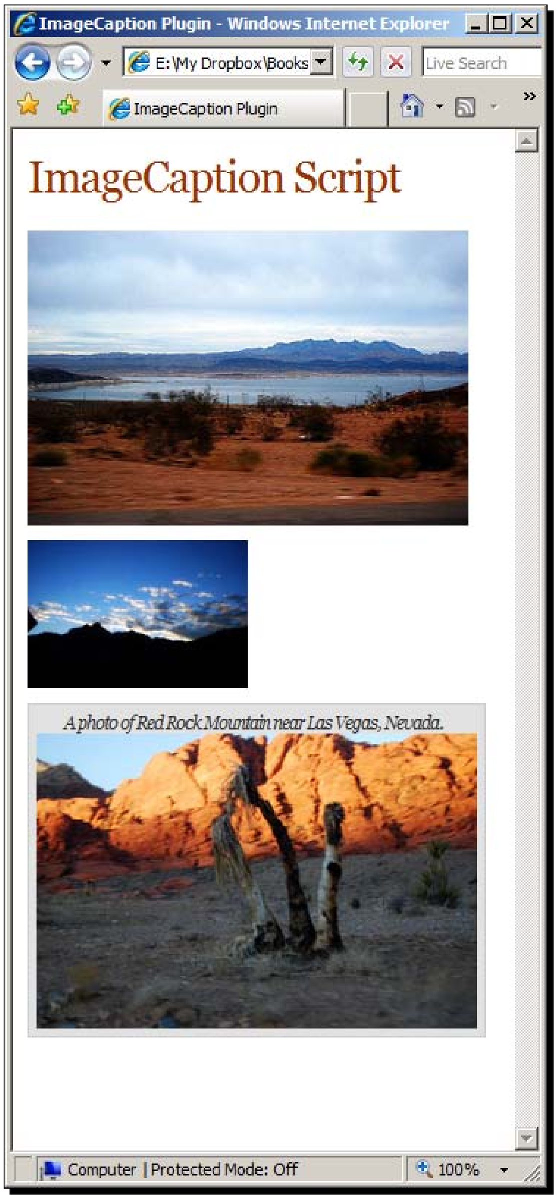
1. First, modify the HTML markup in such a way that the last image has an ID of `#caption-on-top`.

```
<body>
<h1>ImageCaption Script</h1>
<p><img src="lake_mead.jpg" width="300" height="201"
        alt="Lake mead in a speeding car." /></p>
<p><img src="clouds.jpg" width="150" height="101" /></p>
<p><img id="caption-on-top" src="red_rocks.jpg"
        width="300" height="201"
        title="A photo of Red Rock Mountain near Las Vegas,
         Nevada." /></p>
</body>
```

2. Next, let's create a class instance of the `ImageCaption` class. This time, we limit the image caption to only the image with the ID of `#caption-on-top`. Also, we use one of our options, `captionPosition`, to change the default value of `'after'` to `'before'`.

```
var captionOnTop = new ImageCaption($$('#caption-on-top'), {
   captionPosition: 'before'
});
```

3. Finally, test your work in a web browser. You should see something like the following screenshot. Note that only the last photo has an image caption because we limited the plugin implementation to the image with the ID of `#caption-on-top`.


ImageCaption Plugin - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
ImageCaption Plugin
ImageCaption Script
A photo of Red Rock Mountain near Las Vegas, Nevada.
Computer | Protected Mode: Off
100%

Creating multiple instances of the plugin

Another great thing about creating a plugin that is flexible is that it gives us the ability to create multiple instances of it in one web page without a lot of code and duplication. We'll now create two instances of the class.

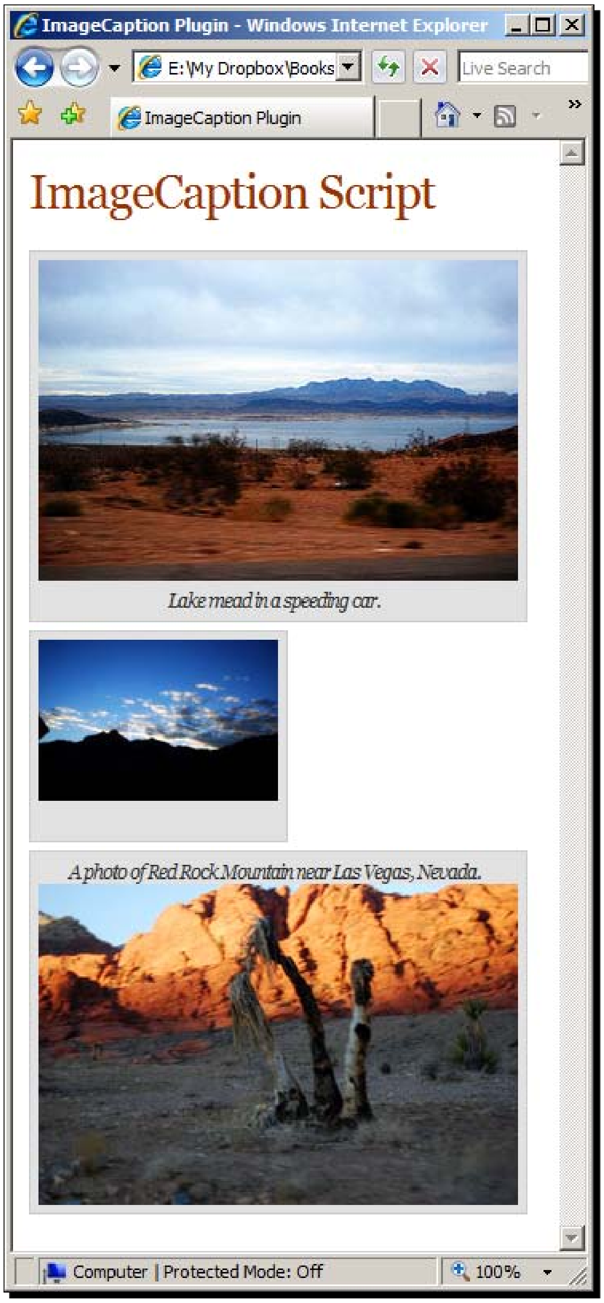
Time for action – multiple instances of the ImageCaption plugin

We are going to create two instances of our `ImageCaption` class on the same web page to outline just how powerful creating plugins can be.

1. We're still going to use the same HTML markup and just build on top of the code we already have from the preceding example. We create a new instance called `captionNormal`, and then use this instance for all other images that don't have the ID of `#caption-on-top`.

```
var captionOnTop = new ImageCaption($$('#caption-on-top'), {
   captionPosition: 'before'
});
var captionNormal =
    new ImageCaption($$('img[id!=caption-on-top]'), {
   captionPosition: 'after'
});
```

2. Test your work in a web browser. You should see that the other images will have their caption text after the `img` element.


ImageCaption Plugin - Windows Internet Explorer
E:\My Dropbox\Books
Live Search
ImageCaption Plugin
Computer | Protected Mode: Off
100%

ImageCaption Script

Lake mead in a speeding car.

A photo of Red Rock Mountain near Las Vegas, Nevada.

What just happened?

In the previous two examples, we learned how to create a more complex instance of our ImageCaption plugin, as well as how to create multiple instances of it in the same web page. By doing so, we can see the advantages of using plugins, in terms of reducing code duplication and the ability to customize easily.

Now that we have our plugin finished and we know how it works, it's time to document our code and prepare it for sharing with the public.

Preparing your plugin for the public

If you'd like to make your plugin available to the public for use in their own projects, there are a few tips and guidelines you can follow. In the following section, we will obey, as much as we can, MooTools standard documentation. Though there isn't an official standard method for documentation yet, we can use the official MooTools docs and coding styles in MooTools More plugin so that our documentation will be familiar to MooTools developers, making it easy for them to understand and learn how to implement our work.

Documenting your plugin with comments

At the top of `ImageCaption.js`, we should put some meta information about our plugin so that people studying its working can know a little bit more about it. In MooTools More plugin, here is the format of this comment block.

```
Script: Plugin file name
   Brief description of the plugin

   License:
      Licensing type and copyright information

   Authors:
      FirstName-1 LastName-1 - Website URL
      FirstName-2 LastName-2 - Website URL
      ...
      FirstName-n LastName-n - Website URL
*/
```

Let's modify `ImageCaption.js` with the above information.

Time for action – documenting the ImageCaption plugin

Let's document the ImageCaption plugin with the standard MooTools More plugin documentation block comment (sometimes abbreviated as **docblock** comments).

1. Open `ImageCaption.js` in your source code editor.
2. At the very top of the file, insert the following docblock comment.

```
Script:
…
…

   License:


   Authors:

*/
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
...
```

3. Finally, fill in the information. This is where our design sheet comes in handy for the description of the script; we can simply take what we wrote down in the "What it will do" column of the design sheet we developed, and modify it as necessary. Use tab spaces to indent the docblock comment items.

```
Script: ImageCaption.js
   Takes the alt property (or title property) of an image, 
and insert it as HTML text to serve as a photo caption (its 
description).


   License:
      MIT-style license

   Authors:
        Jacob Gube - http://sixrevisions.com

*/
var ImageCaption = new Class({
   Implements: [Options],
   options: {
      wrapperClass: 'imageCaption',
      wrapperType: 'span',
      captionType: 'span',
      captionPosition: 'after'
   },
...
```

What just happened?

We documented our plugin with the standard docblock comment that MooTools More plugin uses. This enables others to better understand our code.

To provide greater context, you might consider also leaving comments on your code to help others better understand what's going on in the plugin. This will also serve as a reminder for you when you modify the plugin.

External documentation

When you offer a plugin for download, it's a good idea to give people context on what it does and how to implement it into their work. For this, we can use the Official MooTools More structure for documenting MooTools More plugins.

Let's create a simple download page template for our plugin. Here's the information we'll need if we were to follow the official MooTools docs style of external documentation.

- PluginName—name of the plugin
- Description
- Notes—any special requirements or things the user needs to know up-front
- Extends—any MooTools Core or More classes that our plugin extends
- Syntax—basic structure of instantiating the class
- Arguments—required parameters that the class instance needs in order to work, listed down in an ordered list to denote the parameter order
- Options—all the available options
- Examples—example usage
- Returns—after the class has been instantiated, what will the instance object get back?

Besides the above items, we should also have download information and a section where we document any changes and updates we make to the plugin (called **changelog**).

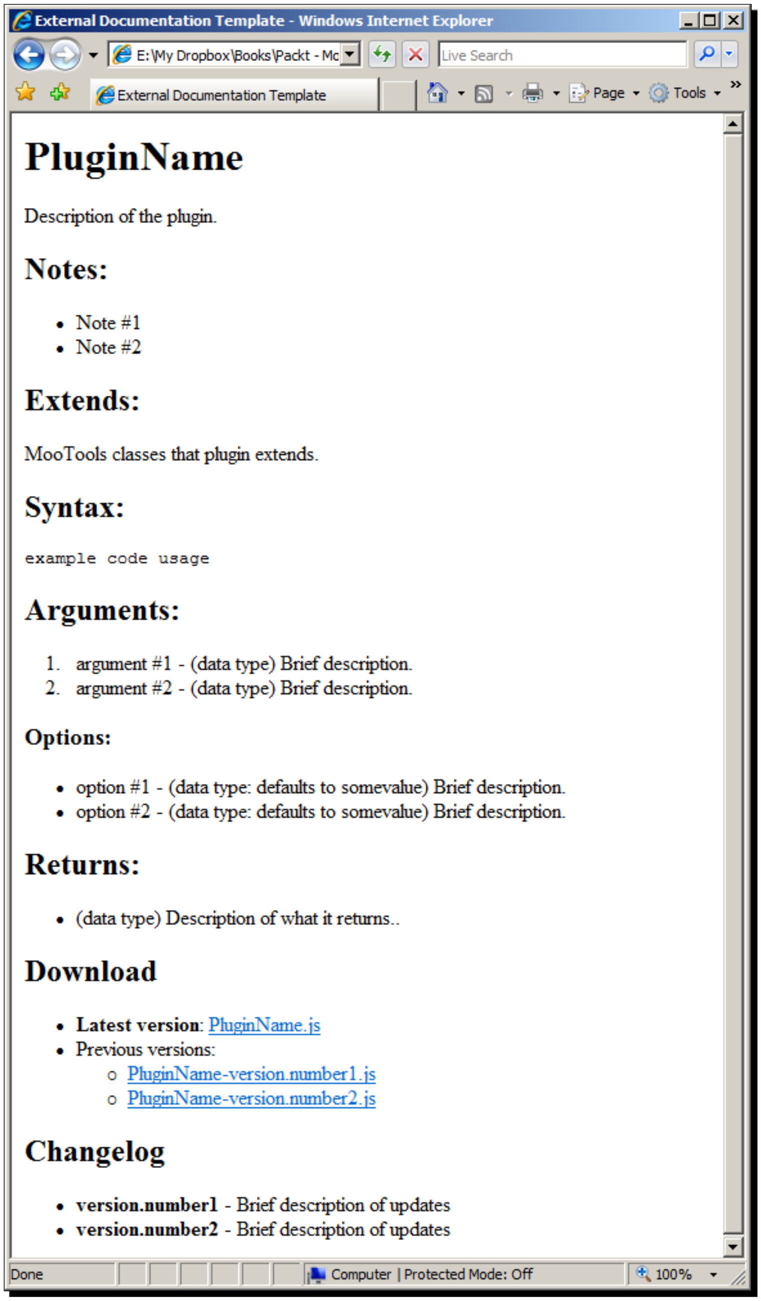
Time for action – creating a basic download page for the ImageCaption plugin

We're going to create a simple HTML web page where we can offer the ImageCaption plugin for download. We will borrow the content structure from the Official MooTools docs, so that MooTools users will be familiar with the documentation we're about to write.

1. Create a new HTML document. You can use the following markup as an HTML template of your plugin's download page.

```
<body>
<h1>PluginName</h1>
<p>Description of the plugin.</p>
<h2>Notes: </h2>
<ul>
  <li>Note #1</li>
  <li>Note #2</li>
</ul>
<h2>Extends: </h2>
<p>MooTools classes that plugin extends.</p>
<h2>Syntax: </h2>
<pre>example code usage
</pre>
<h2>Arguments:</h2>
<ol>
  <li>argument #1 - (data type) Brief description.</li>
  <li>argument #2 - (data type) Brief description.</li>
</ol>
<h3>Options:</h3>
<ul>
  <li>option #1 - (data type: defaults to somevalue) Brief
description.</li>
  <li>option #2 - (data type: defaults to somevalue) Brief
description.</li>
```

```
</ul>
<h2>Examples: </h2>
<pre>example usage
</pre>
<h2>Returns:</h2>
<ul>
  <li>(data type) Description of what it returns..</li>
</ul>
<h2>Download</h2>
<ul>
  <li><strong>Latest version</strong>: <a href="#download-
link">PluginName.js</a></li>
  <li>Previous versions:
    <ul>
      <li><a href="#download-link">PluginName-version.number1.js</
a></li>
      <li><a href="#downloadlink">PluginName-version.number2.js</
a></li>
    </ul>
  </li>
</ul>
<h2>Changelog</h2>
<ul>
  <li><strong>version.number1</strong> - Brief description of
updates</li>
  <li><strong>version.number2</strong> - Brief description of
updates</li>
</ul>
</body>
```


External Documentation Template - Windows Internet Explorer
E:\My Dropbox\Books\Packt - Mo
Live Search
External Documentation Template
Page
Tools
Done
Computer | Protected Mode: Off
100%

PluginName

Description of the plugin.

Notes:

- Note #1
- Note #2

Extends:

MooTools classes that plugin extends.

Syntax:

```
example code usage
```

Arguments:

1. argument #1 - (data type) Brief description.
2. argument #2 - (data type) Brief description.

Options:

- option #1 - (data type: defaults to somevalue) Brief description.
- option #2 - (data type: defaults to somevalue) Brief description.

Returns:

- (data type) Description of what it returns..

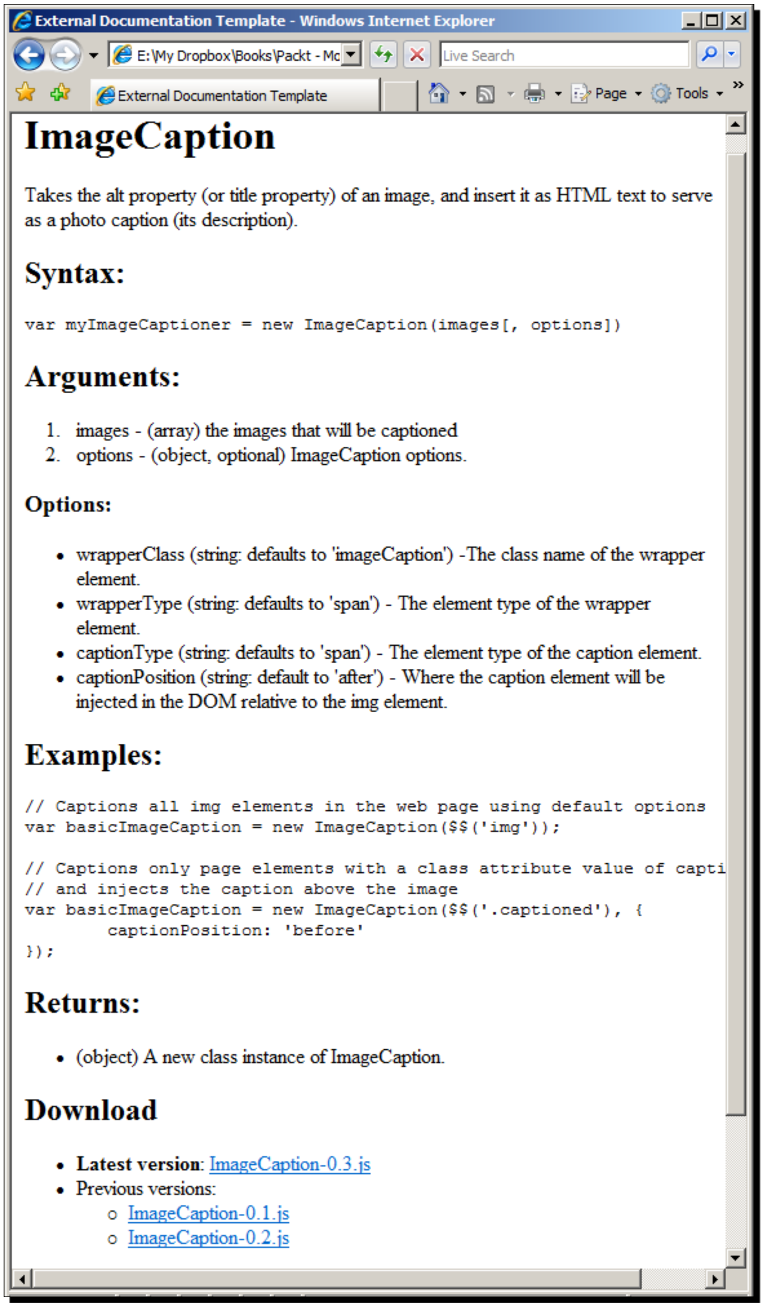
Download

- **Latest version**: PluginName.js
- Previous versions:
  - PluginName-version.number1.js
  - PluginName-version.number2.js

Changelog

- **version.number1** - Brief description of updates
- **version.number2** - Brief description of updates

2. Now, modify the template with the **ImageCaption** information. Remove any sections that aren't pertinent. In the following screenshot, I've written the information regarding the ImageCaption plugin.


External Documentation Template - Windows Internet Explorer
E:\My Dropbox\Books\Packt - Mc
Live Search
External Documentation Template
Page
Tools

ImageCaption

Takes the alt property (or title property) of an image, and insert it as HTML text to serve as a photo caption (its description).

Syntax:

```
var myImageCaptioner = new ImageCaption(images[, options])
```

Arguments:

1. images - (array) the images that will be captioned
2. options - (object, optional) ImageCaption options.

Options:

- wrapperClass (string: defaults to 'imageCaption') -The class name of the wrapper element.
- wrapperType (string: defaults to 'span') - The element type of the wrapper element.
- captionType (string: defaults to 'span') - The element type of the caption element.
- captionPosition (string: default to 'after') - Where the caption element will be injected in the DOM relative to the img element.

Examples:

```
// Captions all img elements in the web page using default options
var basicImageCaption = new ImageCaption($$('img'));

// Captions only page elements with a class attribute value of capti
// and injects the caption above the image
var basicImageCaption = new ImageCaption($$('.captioned'), {
        captionPosition: 'before'
});
```

Returns:

- (object) A new class instance of ImageCaption.

Download

- **Latest version**: ImageCaption-0.3.js
- Previous versions:
    - ImageCaption-0.1.js
    - ImageCaption-0.2.js

What just happened?

In the above example, we constructed a download page for our plugin so that we can easily share it with other developers in an easy-to-understand fashion, giving them the information that they need in order to understand how to implement the plugin.

Summary

In this chapter, we learned how to build a plugin; a plugin that automatically captions images in a web page with their respective `alt` (or `title`) property.

This is what we covered in this chapter:

- Designing a plugin: We created a design sheet that we can easily reference as we build our plugin, and when we document it for public use.
- How to convert a script to a flexible MooTools class: We converted an image captioning script that we wrote into a class (plugin) with various options that allow its class instance to be customized.
- Instantiating our plugin: We learned how useful plugins can be in allowing us to customize instances to reduce the amount of code we have to write (and re-write).
- How to properly document our plugin: We followed documentation and used the MooTools coding style and plugin documentation to let other MooTools developers quickly learn how to implement our plugin into their own projects.

At this point, you're now officially a MooTools rockstar!

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