Beyond HTML

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Introduction

This course is designed for Web Designers who have acquired intermediate-level skills in web page creation and are looking for tools to take their pages to the next level--interactivity. We will examine the capabilities of several tools which can help you create interactive and sophisticated elements for your web pages. Once we've examined the tools available, you will know what steps to take to learn the tool(s) that are most appropriate for your web development needs.

As with all of our courses, we hope you will be encouraged to learn and explore more about the topic. At the end of this manual, we have listed additional resources including text and web resources that may help you as you continue to learn more about Dreamweaver.

ITC Training Services

Types of Tools

Before we examine specific tools, it is important to define the categories into which these tools fall.

Scripting vs. Programming

Most of the tools examined in this class are either "scripts" or "programming languages." Scripting languages generally provide less functionality than programming languages, but can have quicker development times and slower runtimes.

Program: A complex block of programming code assembled to perform functions. Programs are usually "compiled" into code once and can then run multiple times. Compiling programs means that the written programming language is translated into a binary file (or set of files) that your computer can understand natively as zeroes and ones. Programs are utilized in web development in one of two ways: as server side programs, or in the case of Java, as client-side "applets." (See section on Java for explanation of applets.) The web page ("client side" or "browser-based") just becomes the user interface for a fulltime program, which is run from the server ("server side" or "web server-based.").

Script: Programming shorthand with less functionality than a full programming language. As opposed to a programming language, scripts are interpreted by your browser each time a web page comes up, so scripts function mostly through the client side. The web page is the container of the script and the vehicle for displaying the script that is embedded in HTML.

Client side	Server Side
JavaScript, DHTML, VBScript, Perl, Java (Applets)	Java (Servlets), C, C++, Cold Fusion, Active Server Pages, Perl
Advantage: Does not give access to the web server (better protection from hackers)	**Advantage**: Does not depend on power of user's machine to work effectively
Disadvantages: Depends on the available power of the user's machine. Capabilities are more limited, but effects are more immediate.	**Disadvantages**: Server security—server side applications can provide entry to your web server to unauthorized persons (hackers). Performance can be slower because of calls to the server. The complexity of coding makes learning more difficult.

Tool #1: JavaScript

JavaScript is a scripting language for the Internet. It was first known as LiveScript, until Sun Microsystems came out with Java. After the introduction of Java, Netscape and Sun Microsystems got together and renamed LiveScript as JavaScript.

JavaScript is interpreted on the client side. It utilizes elements that already exist in a web page, like links, images, and forms. The user interacts with these elements and JavaScript provides a reaction to the user's input or action, resulting in meaningful interaction between a web page and a user. JavaScript definitions are embedded within the <head></head> tags in an HTML document. It is comparatively easy to script, even easier to borrow from other web pages, and simple to invoke in a web editor.

Alternative Tool

A competing product with essentially the same functionality that is designed for the Microsoft environment is VBScript. We'll discuss JavaScript here, but keep in mind that people who use FrontPage and design for Internet Explorer use VBScript. VBScript browser support is designed for IE 4.0 and higher.

Browser Support

Limited support in Navigator 3.0 and IE 3.0, better support in Navigator 4.0 and IE 4.0 and higher.

What can JavaScript do?

JavaScript offers a way to add interactivity to Web pages.

1. Use forms for dynamic navigation
2. Add interactivity to graphics, such as rollovers
3. Provide client-side form validation

Pitfalls

Issues with browser compatibility such as case sensitive variable names in IE 4x (meaning all tags and functions need to be either lower case or upper case), or different object models in Navigator and IE mean a script could work in Netscape, but not in IE 4x. However, there is a core set of functionality that will work across browsers.

Some users choose to disable the JavaScript function on their browsers, which allows them to keep control of browser actions such as keeping extra windows from opening, but means your JavaScript enhancements will not appear to these users.

Effect on Users' System Performance

Negligible effect—load time of pages should not be impacted noticeably.

JavaScript Resources

1. Learn to create Rollovers and other simple to complex JavaScript actions in Dreamweaver and Fireworks, no knowledge of scripting required. Search the Offered Courses at the Division of Training site for ITC's Dreamweaver Advanced Course and ITC's Fireworks Advanced Course.
2. Get an introduction to JavaScript with EchoEcho.com's tutorial and complete reference at **http://www.echoecho.com/javascript.htm**.

Tool #2: DHTML

Dynamic HTML is simply HTML that can change even after a page has been loaded into a browser. Anything that can be done in HTML can be redone after the page loads.

Dynamic HTML is enabled by a number of other tools, including JavaScript, VBScript, and the Document Object Model (DOM). The DOM defines all items on a Web page, such as headlines, graphics, and images, as objects that can be manipulated, and thus provides much more flexibility than HTML alone.

Browser Support

Navigator 4.x and higher; IE 4.0 and higher.

What can DHTML do?

You can achieve greater control over the appearance, layout, and behavior of your web pages with:

1. Style sheets
2. Page elements can be positioned without the use of tables through DHTML layers. If you've ever used My Yahoo or other personal web pages, you've seen DHTML layers in action.
3. Downloadable fonts solve the designer's frustration over using default fonts on web pages.

Pitfalls

The biggest drawback to DHTML is that there are "two flavors" of DHTML. Pages built following Microsoft's DHTML model (which uses VBScript) probably won't work in Navigator (which requires JavaScript) and pages built using Netscape's DHMTL model don't work well in Internet Explorer.

DHTML does not always degrade gracefully in older browsers—it is better to create alternate pages for 3.0 browsers.

Effect on System Performance

Negligible effect—load time of pages should not be impacted noticeably.

DHTML Resources

Create Cascading Style Sheets and Layers in Dreamweaver, no scripting required. Search the Offered Courses at the Division of Training site for ITC's Dreamweaver Advanced Course.

Take a look at cross-browser issues and other hints for creating your own DHTML at builder.com.com's DHTML Pages, **http://builder.com.com/1200-31-5087750.html**. An example and how-to on DHTML positioning can be found at **http://www.quirksmode.org/js/cross_dhtml.html**, and an article on downloadable fonts can be found at **http://525.fims.uwo.ca/~craven/525fon.htm**.

Tool #3: CGI/Perl

PERL (Practical Extraction and Report Language) has become the scripting language of the Web, as most CGI (see below) programs are written in Perl. However, Perl is widely used as a rapid prototyping language and a "glue" language that makes it possible for different systems to work well together. Perl is also popular with system administrators who use it for an infinite number of automation tasks.

CGI (Common Gateway Interface) standard lays down the rules for running external programs in a Web server. External programs are called gateways because they open up an outside world of information to the server. CGI is the method by which a web server can obtain data from (or send data to) databases, documents, and other programs, and present that data to viewers via the web. CGI can be written in any programming language like C, C++, or Java, but Perl is the most popular.

Browser Support

Perl's browser interaction is "standardized" so Perl should work with each and every browser. Perl was developed to run on best on UNIX, but it operates well on Macintosh, and PC systems.

What can Perl do?

Perl lets you interact with your users in many different ways.

1. Through guestbooks and feedback forms, you can get a sense of who your users are and what they think about your web page.
2. Perl provides stability to your web page that JavaScript might not (Perl is less likely to crash your use users' browsers because it runs on the server instead of inside the browser).
3. Search tools allow users to search your site efficiently and quickly. If you have ever used Amazon or Yahoo, you have encountered Perl.

Pitfalls

Coding includes many shortcuts, so can be difficult to modify and debug.

Effect on System Performance

Server processing can be slowed down, so it is important to optimize scripts for best performance.

Perl Resources

ITC Guestbook, Easyform, and LSearch scripts are ready to be installed on your site, no additional Perl scripting required:

Guestbook: **http://www.itc.virginia.edu/desktop/web/guestdoc.html**

Easyform/Easymail: **http://www.itc.virginia.edu/desktop/web/efdoc.html**

LSearch: **http://www.itc.virginia.edu/desktop/web/lsdoc.html**

Tool #4: Cold Fusion, ASP and PHP

Allaire's Cold Fusion is a server-side solution for creating interactive, database-driven Web sites, as well as simpler built-in support for database queries. Cold Fusion is an application server, meaning it works in conjunction with a Web server to deliver Web applications, not just plain Web pages. You build Web pages that include special tags, which must be hosted on an application server that supports Cold Fusion. When a Web browser requests one of those pages, the application server first interprets the special tags, replaces those tags with the results of whatever calculations or database queries are specified, and then sends the completed page to the Web server, which finally sends it to the browser.

Cold Fusion uses a tag-based language—you mingle normal HTML tags with those of Cold Fusion Markup Language (CFML). CFML includes tags for querying databases and outputting text, and interacting with other Web services such as email. Instead of ending your filenames with .htm or .html, you use the .cfm extension instead.

Microsoft's Active Server Pages (ASP), is a popular competing Microsoft product with similar functionality. Like Cold Fusion, ASP involves writing Web pages with mixed HTML and scripts. In ASP, those scripts can be written either in Microsoft's variation of JavaScript, called JScript, or in VBScript. ASP requires Netscape 4.x or above or IE 4.0, and works best with IE 4.0 and above.

PHP is a popular open-source tool with similar functionality, based on scripts embedded within HTML docouments. PHP distinguishes itself from both Cold Fusion and ASP in that it is entirely free.

Browser Support

Cold Fusion and PHP do not have any browser limitations, unless you combine them with JavaScript.

If ASP is run on the server side (most common), it is browser independent. If it is tied in with VBScript for client side applications, it is dependent on users viewing pages in IE.

What can these tools do?

1. Create dynamic data-driven web sites that allow you to use the web to interact with databases.
2. Create guest books, shopping carts, and order entry systems, including credit card processing.
3. Interact with a combination of Database and LDAP directory service (ASP - Access Db - LDAP).

Pitfalls

Creating Cold Fusion or requires a strong understanding of both relational database design principles and HTML coding—a big leap for either database designers who haven't done much web work or web designers who haven't built many databases

Cold Fusion and ASP require hosting on special servers that have application server support—these are available at UVa, but require special accounts and in some cases, fees for hosting.

Cold Fusion, ASP and PHP all require creating a relational database in another product— these products serve as the front-end of a web database, not as the database itself. All interact with a number of database formats, including Access, Sybase, Oracle, SQL Server and MySQL.

ASP is currently a PC-only solutions. PHP is commonly used on the UNIX platform, and Filemaker Pro is an option for Mac web database support.

Effect on System Performance

Complex queries can slow response time.

Cold Fusion Resources

1. ITC provides a Windows 2000-based Cold Fusion Application Server for instructional content delivery, research, and departmental projects at **http://www.web.virginia.edu**.
2. The introductory book favored by Cold Fusion professionals is The Coldfusion 4.0 Web Application Construction Kit, by Ben Forta.
3. Macromedia has an extensive site, with help from experts, tutorials, and free downloads at **http://www.macromedia.com/software/coldfusion**.

ASP Resources

1. ITC provides a Windows 2000-based ASP Application Server for instructional content delivery, research, and departmental projects at **http://www.web.virginia.edu**.
2. ITC offers an Introduction to ASP course. For more information see **http://www.hrs.virginia.edu/career/dot/itcslist.cfm**.
3. There is a whole cottage industry of ASP books on the market. For more information see **http://www.aspobjects.com/ASP_Books_Media/**.
4. Microsoft has an extensive site, with help from experts, tutorials, and free downloads at **http://msdn.microsoft.com/library/default.asp?url=/library/en-us/dnanchor/html/activeservpages.asp**.

PHP Resources

1. ITC offers PHP Application Support on many of it's UNIX servers, including www.people.virginia.edu. For more information see **http://www.itc.virginia.edu/desktop/web/php.html**.
2. There are a wide range of PHP books available on the market. For more information see **http://www.php.net/books.php**.
3. Extensive PHP support on the web is available at **http://www.php.net**.

Additional Web Database Resources

ITC's Desktop Computing Support group maintains documentation on various Web database tools, including Cold Fusion, ASP, and PHP at **http://www.itc.virginia.edu/desktop/web/database/**. You can see code examples of coding the exact same functional page in each of these three tools.

Tool #5: Java

Sun Microsystem's Java platform is actually much more than a programming language. It allows you to use the same application from any kind of machine—PCs, Macs, handheld "palmtops," even the increasingly popular Internet phones. Two of the most visible examples of Java technology-based software today are on enterprise networks, and on the Internet. One of these examples are the interactive programs are called "applets," which run right on your local browser (client side) as nearly independent applications. The second example of Java is the server-side Java technology of servlets, which can be as simple as embedded code in HTML pages (called JSP pages, which function similarly to Cold Fusion, ASP and PHP) to full-scale Java Enterprise software, based on their J2EE (Java 2 Enterprise Edition) standards, which can interconnect all facets of a business to the web.

Browser Support

Most popular browsers incorporate support for Java applets, and for those that do not, a free, universal Java plug-in is available from Sun.

Server-side Java is fully independent of any browser limitations.

What can Java do?

1. Java applets can provide any interactivity you can do with CGI/Perl scripting, JavaScript, Cold Fusion, and then some! Results are limited only by the creativity and programming knowledge of the applet's developer. Applets can provide more sophisticated interactive graphics and other interactive elements than possible with any of the other tools.
   - An example of a sophisticated interactive 3d graphics applet can be found at **http://www.frontiernet.net/~imaging/java3dviewer.html**.
   - From the UVa Alumni page, a Java applet running a Lawn webcam is at **http://www.virginia.edu/cgi-local/rcamcgi**.
   - Break yourself of your lottery habit with the Java lottery calculator at **http://www.cadenhead.org/book/java2412/lottomad.shtml**.
2. Server-side Java is behind many of the large enterprise sites on the web such as Delta, which integrate multiple systems, applications and databases into a seamless web "portal". Delta.com is powered by the BEA WebLogic J2EE (Java 2 Enterprise Edition) software, and incorporates multiple internal and external databases and applications within it's deceptively simple web interface at **http://www.delta.com/home/index.jsp**.

Pitfalls

Java is not for beginners. Previous experience programming or scripting is helpful for picking up Java programming concepts from the web or from a book or manual. A better strategy is to enroll in a course in Java (see Java Resources below). Although Java has a higher learning curve than some of these other technologies, it is also more powerful and ultimately more flexible.

Effect on System Performance

Applets can take time to load into client's browser.

Java Resources

1. Everything from a very approachable article on "What is Java" to advanced tips from the experts is available at Sun Microsystem's flagship Java site at **http://java.sun.com**.
2. Another resource to begin "from the ground up" is at **http://webdeveloper.internet.com/java/java_programming_grounds_up.html**.