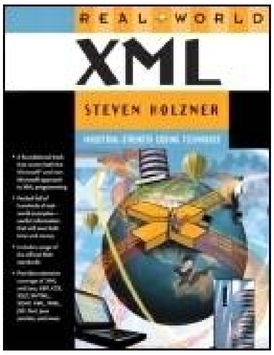


&"87%" class="t2" height="17">Table of Contents
&"87%" class="t2" height="17">Index

Real World XML

By Steven Holzner

Publisher : New Riders Publishing
Pub Date : January 16, 2003
ISBN : 0-7357-1286-7
Pages : 1200

Steven Holzner's friendly, easy-to-read style has turned this book (formerly known as Inside XML) into the leading reference on XML. Unlike other XML books, this one is packed with hundreds of real-world examples, fully tested and ready to use!

Holzner teaches you XML like no other author can, covering every major XML topic today and detailing the ways XML is used now--connecting XML to databases (both locally and on web servers), stying XML for viewing in today's web browsers, reading and parsing XML documents in browsers, writing and using XML schemas, creating graphical XML browsers, working with the Simple Object Access Protocol (SOAP), and a great deal more. Real World XML is designed to be the standard in XML coverage--more complete, and more accessible, than any other.

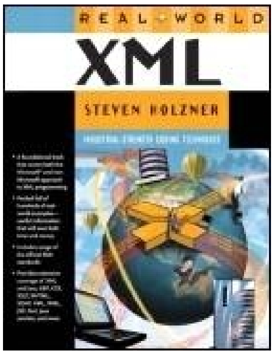
"The author's approach is definitely bottom up, written in a highly personable tone. He makes efficient use of example code, which sets this book apart from many I have read in the past. His examples bring to life the code without overwhelming the reader, and he does not present any examples for which the reader has not been prepared. In addition, no prior knowledge of XML is assumed. As such, this is an excellent book for both beginners and intermediate level web designers and programmers. Experts, too, will find this book of value, due to its emphasis on real world applicability. Overall, this book will benefit all web developers and programmers, with a special emphasis on beginner and intermediate developers."-Donna A. Dulo, MS, MA, Senior Systems Engineer, U.S. Department of Defense

"This book will provide a brilliant basis for anyone wishing to keep up to speed with the new XML developments."-Mr. Andrew Madden, Department of Computer Science, University of Wales

"I found this book's strengths to be: its exhaustive specification reference for the conscientious developer; access to the official specs, which is key; the wide variety of choices provided for all aspects of XML; several alternatives provided for each editor, browser, parser, stylesheet transform engine, and programming language; and working examples that show the power of the tools used."-Jaime Ryan, Software

Developer/Documentation Manager, Blue Titan Software

[Team LiB]
[Team LiB]



&"87%" class="t2"
height="17">Table
of Contents
&"87%" class="t2"
height="17">Index

Real World XML

By Steven Holzner

Publisher : New Riders Publishing
Pub Date : January 16, 2003
ISBN : 0-7357-1286-7
Pages : 1200

[Team LiB]
[Team LiB]

Copyright

Copyright &"docText">New Riders Publishing is a division of Peachpit Publishing Group

210 W. 103rd St.

Indianapolis, IN 46290

Find us on the World Wide Web at: http://www.newriders.com

For resources mentioned in this book, see: http://www.newriders.com

Credits

Associate Publisher: Stephanie Wall

Production Manager: Gina Kanouse

Senior Product Marketing Manager: Tammy Detrich

Publicity Manager: Susan Nixon

Senior Project Editor: Lori Lyons

Copy Editor: Krista Hansing

Indexers: Chris Morris and Lisa Stumpf

Composition: Wil Cruz and Amy Parker

Interior Design: Jeff Carlson

Cover Illustration: Alan Clements

Colophon

This book was written and edited in Microsoft Word, and laid out in QuarkXPress. The fonts used for the body text are Minion and Mono. It was printed on 50# Husky Offset Smooth paper at Edwards Brothers, Inc. in Ann Arbor, Michigan. Prepress consisted of PostScript computer-to-plate technology (filmless process). The cover was printed at Moore Langen Printing in Terre Haute, Indiana, on 12 pt., coated on one side.

Notice of Rights

Trademarks

All terms mentioned in this book that are known to be trademarks or service marks have been appropriately capitalized. New Riders nor Peachpit Press cannot attest to the accuracy of this information. Use of a term in this book should not be regarded as affecting the validity of any trademark or service mark.

W3C® Massachusetts Institute of Technology (MIT), Institut National de Recherche en Informatique et en Automatique (INRIA), Keio University (Keio)

Notice of Liability

The information in this book is distributed on an "As Is" basis, without warranty. While every precaution has been taken in the preparation of this book, neither the authors nor New Riders nor Peachpit Press shall have any liability nor responsibility to any person or entity with respect to any loss or damages caused or alleged to be caused directly or indirectly from the information contained in this book or by the computer software or hardware products described in it.

Library of Congress Catalog Card Number: 2002100320

06 05 04 03 7 6 5 4 3 2 1

Printed and bound in the United States of America

Dedication

To Nancy, of course!

Reviewers Praise Real World XML

> The author's approach is definitely bottom up, written in a highly personable tone. He makes efficient use of example code, which sets this book apart from many I have read in the past. His examples bring to life the code without overwhelming the reader, and he does not present any examples for which the reader has not been prepared. In addition, no prior knowledge of XML is assumed. As such, this is an excellent book for both beginners and intermediate level web designers and programmers. Experts, too, will find this book of value, due to its emphasis on real world applicability. Overall, this book will benefit all web developers and programmers, with a special emphasis on beginner and intermediate developers.
>
> Donna A. Dulo, MS, MA, Senior Systems Engineer, U.S. Department of Defense
>
> This book will provide a brilliant basis for anyone wishing to keep up to speed with the new XML developments.

Mr. Andrew Madden, Department of Computer Science, University of Wales

I found this book's strengths to be: its exhaustive specification reference for the conscientious developer; access to the official specs, which is key; the wide variety of choices provided for all aspects of XML; several alternatives provided for each editor, browser, parser, stylesheet transform engine, and programming language; and working examples that show the power of the tools used.

Jaime Ryan, Software Developer/Documentation Manager, Blue Titan Software

[Team LiB]
[Team LiB]

Comments from the Previous Edition

Steve Holzner has successfully given each topic good, detailed treatment each chapter builds on the last providing the reader a solid understanding of XML, its related technologies, and how it fits into the current application development arena. This book will appeal to the novice and experienced XML programmers alike.

Beth Breidenbach, Senior Software Engineer, MCSD Getronics

Inside XML's building block approach, clear explanations, and extensive examples are perfectly targeted for an introduction to XML.

Tom Comerford, Director Supratext, LLC

Readers will find this book an excellent companion for XML development. Well-constructed examples are ample throughout, making this book not only a genuine learning tool, but a fine resource as well.

Andrew J. Indovina, Software Engineer/e-Commerce Developer

[Team LiB]
[Team LiB]

About the Author

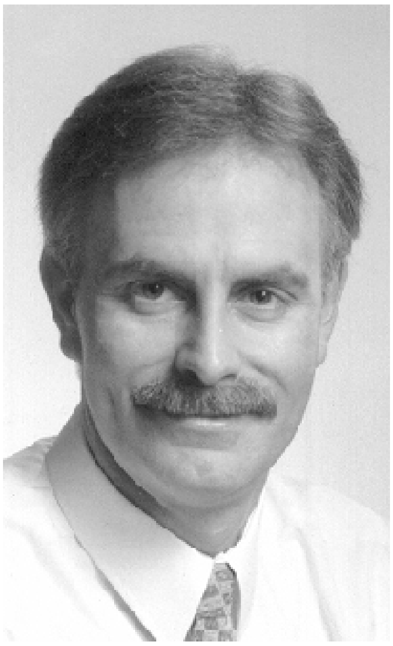
Steven Holzner is an award-winning author who has been writing about XML for as long as it's been around. He's the author of 75 books on programming, and a former contributing editor to PC Magazine. A number of his books have been programming bestsellers, and he's had books translated into 16 languages around the world, selling more than 1.5 million copies. He received his Ph.D. at Cornell University, and has been on the faculty of both Cornell and MIT. His hobbies include travel, chess, classical music, and writing books on philosophy.

[Team LiB]
[Team LiB]

About the Technical Reviewers

These reviewers contributed their considerable hands-on expertise to the entire development process for Real World XML. As the book was being written, these dedicated professionals reviewed all the material for technical content, organization, and flow. Their feedback was critical to ensuring that Real World XML fits our reader's need for the highest-quality technical information.

Steve Heckler is President of Accelebrate, an IT training and technical writing firm in Atlanta. An avid ASP.NET, Java, and XML developer and trainer, Steve served more than six years as a senior manager and trainer at a leading east-coast IT training firm prior to founding Accelebrate. He holds a Bachelor and Masters degree from Stanford University.



Carl Burnham is a web developer, technology specialist, and author, with 17 years of experience supporting IT operations within the private/public sectors. He founded Southpoint.com, a popular travel destination guide, in 1996. Carl is author of the book, Web Hosting, a Complete Strategy, and has coauthored several technology books.

[Team LiB]
[Team LiB]

Acknowledgments

A book like the one you're holding is the work of a great many people, not just the author. The people at New Riders have been great, and I'd like to thank Stephanie Wall, Associate Publisher extraordinaire; Lori Lyons and Krista Hansing, Project/Copy Editors, who kept things moving along; and finally, the Technical Reviewers, Steve Heckler and Carl Burnham, who did a great job of checking everything. Thanks, everyone,

for all your much-appreciated hard work.

Preface

Welcome to Real World XML. This book is designed to be as comprehensive and as accessible as possible for a single book on XML. XML is a standard, not an implementation, and it's become an umbrella for a great number of topics. You'll find XML just about everywhere you look on the Internet today, and even in many places behind the scenes (such as internally in Netscape Navigator 6). I believe this book provides more complete coverage of what's going on in XML than any other XML book today.

You'll find coverage of all the official XML standards here. I'll also take a look at many of the most popular and important implementations of XML that are out there, and put them to work in this book.

That's just part of the story we'll also put XML to work in depth, pushing the envelope as far as it can go. The best way to learn any topic like XML is by example, and this is an example-oriented book. You'll find hundreds of tested examples here, ready to be used.

Writing XML is not some ordinary and monotonous task: it inspires artistry, devotion, passion, exaltation, and eccentricity not to mention exasperation and frustration. I'll try to be true to that spirit and capture as much of the excitement and power of XML in this book as I can.

What Is Inside This Book

This book is designed to give you as much of the whole XML story as one book can hold. We'll not only see the full XML syntax from the most basic to the most advanced but also dig into many of the ways in which XML is used.

There are hundreds of real-world topics covered in this book, like connecting XML to databases both locally and on Web servers styling XML for viewing in today's browsers, reading and using XML documents in browsers, creating our own graphically based browsers, and a great deal more.

Here's a sample of some of the topics in this book note that each of these topics themselves have many subtopics (too many to list here):

- The complete XML syntax
- Well-formed XML documents
- Valid XML documents
- Document type definitions (DTDs)
- Namespaces
- The XML Document Object Model (DOM)
- Canonical XML
- XML schemas
- Parsing XML with JavaScript
- XML and data binding
- XML and Cascading Style Sheets (CSS)
- XML and Java
- XML and .NET

- DOM parsers
- SAX parsers
- Extensible Stylesheet Language (XSL) transformations
- XSL formatting objects
- XLinks
- XPointers
- XPath
- XBase
- XHTML 1.0 and 1.1
- Resource Description Framework (RDF)
- Simple Object Access Protocol (SOAP)
- Vector Markup Language (VML)
- Wireless Markup Language (WML)
- Server-side XML with JavaServer Pages (JSP), Active Server Pages (ASP), Java servlets, and Perl

This book starts with the basics. I do assume that you have some knowledge of HTML, but not necessarily much. We'll see how to create XML documents from scratch in this book, starting at the very beginning.

From there, we'll move up to see how to check the syntax of XML documents. The big attraction of XML is that you can define your own tags, like the `<DOCUMENT>` and `<GREETING>` tags in this document, which we'll see early in Chapter 1:

```
<?xml version="1.0" encoding="UTF-8"?>
<DOCUMENT>
    <GREETING>
        Hello From XML
    </GREETING>
    <MESSAGE>
        Welcome to the wild and woolly world of XML.
    </MESSAGE>
</DOCUMENT>
```

Because you can create your own tags in XML, it's also important to specify the syntax you want those tags to obey (for example, can a `<MESSAGE>` appear inside a `<GREETING>`?). XML puts a big emphasis on this, too, and there are two main ways to specify the syntax you want your XML to follow with XML document type definitions (DTDs) and XML schemas. We'll see how to create both.

And because you can make up your own tags in XML, it's also up to you to specify how they should be used Netscape Navigator won't know, for example, that a `<KILLER>` tag marks a favorite book in your collection. Because it's up to you to determine what a tag actually means, handling your XML documents in programming is an important part of learning XML, despite what some second-rate XML books try to claim. The two languages I'll use in this book are JavaScript and Java; before using them, I'll introduce them in special sections with plenty of examples, so even if you're not familiar with these languages, you won't have to go anywhere else to get the skills you need.

The major browsers today are becoming more and more XML-aware, and they use scripting languages to let you work with your XML documents. We'll be using the most popular and powerful of those scripting languages here, JavaScript. Using JavaScript, we'll be able to read XML documents directly in browsers like the Microsoft Internet Explorer.

It's also important to know how to handle XML outside browsers, because there are plenty of things that JavaScript can't handle. These days, most XML development is taking place in Java, and there is an endless arsenal of Java resources available for free on the Internet. In fact, the connection between Java and XML is a natural one, as we'll see. We'll use Java to read XML documents and interpret them, starting in Chapter 11. That doesn't mean you have to be a Java expert far from it, in fact because I'll introduce all the Java we'll need right here in this book. And because most XML development is done in Java today, we're going to find a wealth of tools here, ready for use.

You can also design your XML documents to be displayed directly in some modern browsers, and I'll take a look at doing that in two ways with Cascading Style Sheets (CSS) and the Extensible Stylesheet Language (XSL). Using CSS and XSL, you can indicate exactly how a tag that you make up, like `<PANIC>` or `<BIG_AND_BOLD>` or `<AZURE_UNDERLINED_TEXT>`, should be displayed. I'll take a look at both parts of XSL XSL transformations and formatting objects in depth.

In addition, we'll see various other XML specifications in this book as well, such as XLinks, XBase, and XPointers, which let you point to particular items in XML documents in very specific ways. The XML specifications are made by a body called the World Wide Web Consortium, abbreviated W3C, and we'll become very familiar with those specifications here, seeing what they say and seeing what they lack.

I'll wind up the book by taking a look at a number of the most popular uses of XML on the Internet in several chapters. XML is really a language for defining languages, and there are hundreds of such XML-based languages out there now. Some of them are gaining great popularity, and I'll cover them in some depth in this book.

There is an astonishing wealth of material on XML available on the Internet today, so I'm also going to fill this book with the URIs of dozens of those resources (in XML, you use Uniform Resource Identifiers, not URLs, although in practice they are the same thing for most purposes today). In nearly every chapter, you'll find lists of free online programs and other resources. (However, there's a hazard here that I should mention URIs change frequently on the Internet, so don't be surprised if some of these URIs have changed by the time you look for them.)

[Team LiB]
[Team LiB]

Who Is This Book For?

This book is designed for just about anyone who wants to learn XML and how it's used today in the real world. The only assumption that I make is that you have some knowledge of how to create documents using Hypertext Markup Language (HTML). You don't have to be any great HTML expert, but a little knowledge of HTML will be helpful. That's really all you need.

However, it's a fact of life that most XML software these days is targeted at Windows. Among other things, this means you should have access to Windows for many of the topics covered in this book, and in Chapters 7 and 8, we'll be taking a look at the XML support in Microsoft Internet Explorer. I wish there was more support for the other operating systems I like, such as Unix, but right now a lot of it is Windows-only. I'll explore alternatives when I can. One hopeful note for the future is that there are more and more Java-based XML tools appearing daily, and those tools are platform-independent.

[Team LiB]
[Team LiB]

At What Level This Book Is Written

This book is written at several different levels from basic to advanced because the XML spectrum is so broad. The rule of thumb is that this book was written to follow HTML books in level. We start at the basic level and gradually get more advanced in a slow, steady way.

I'm not going to assume that you have any programming knowledge (at least until we get to the advanced topics in Chapter 20, such as JavaServer Pages and using Perl with XML) when you start this book. We'll be using both JavaScript and Java in this book, but all you need to know about those languages will be introduced before we use them, and it won't be hard to pick up.

Because there are so many uses of XML available today, this book involves many different software packages; all the ones I'll put to work in the text are free to download from the Internet; I'll tell you where to get them.

[Team LiB]
[Team LiB]

Conventions Used

There are several conventions that I use in this book that you should be aware of. The most important one is that when I add new sections of code, I'll mark them with gray highlighting to point out the actual lines I'm discussing so that they stand out. (This sample is written in one of the languages built on XML, the Wireless Markup Language (WML), which is targeted at "micro-browsers" in cellular phones and personal digital assistants, or PDAs.)

```
<?xml version="1.0"?>
<!DOCTYPE wml PUBLIC "-//WAPFORUM//DTD WML 1.1//EN" "http://www.wapforum.org/DTD/wml_1.1.
➥xml">
<wml>
    <card id="Card1" title="First WML Example">
        <!-- This is a comment -->
        <p>
            Greetings from WML.
        </p>
    </card>
</wml>
```

Also, where there's something worth noting or some additional information that adds something to the discussion, I'll add a sidebar:

More on SOAP

With a common name like SOAP, it's hard to search the Internet for more information about the Simple Object Access Protocol unless you're really into pages on personal cleanliness and daytime television. For more information, you might check out this starter list: http://msdn.microsoft.com/xml/general/soapspec.asp, www.oasis-open.org/cover/soap.html, www.develop.com/soap/, and www.develop.com/soap/soapfaq.xml.

Well, we're ready to go. If you have comments, I encourage you to write to me, care of New Riders. This book is designed to be the new standard in XML coverage, truly more complete and more accessible than ever before. Please do keep in touch with me with ways to improve it and keep it on the forefront. If you think the book lacks anything, let me know I'll add it, because I want to make sure this book stays on top.

[Team LiB]
[Team LiB]

Chapter 1. Essential XML

Welcome to the world of Extensible Markup Language, XML. This book is your guided tour to that world, so have no worries you've come to the right place. That world is large and expanding in unpredictable ways every minute, but we're going to become familiar with the lay of the land in detail here. And there's a lot of territory to cover because XML is getting into the most amazing places, and in the most amazing ways, these days.

XML is a language defined by the World Wide Web Consortium (W3C, www.w3c.org), the body that sets the standards for the Web, and this first chapter is all about getting a solid overview of that language and how you can use it. For example, you probably already know that you can use XML to create your own elements, thus creating a customized markup language for your own use. In this way, XML supercedes other markup languages such as Hypertext Markup Language (HTML); in HTML, all the elements you use are predefined and there are not enough of them. In fact, XML is a metamarkup language because it lets you create your own markup languages.

[Team LiB]
[Team LiB]

Markup Languages

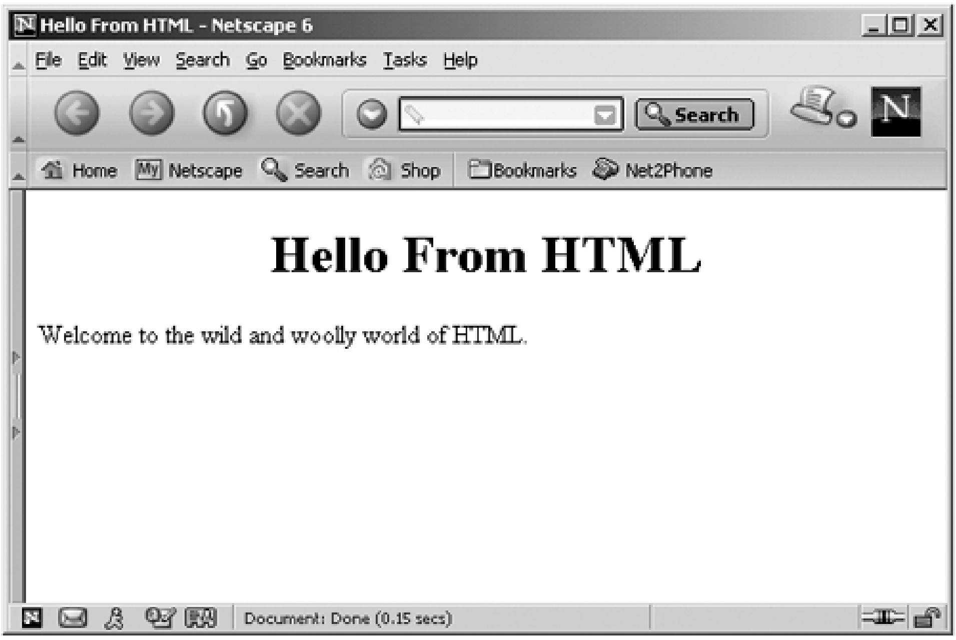
Markup languages are all about describing the form of the document that is, the way the content of the document should be interpreted. The markup language that most people are familiar with today is, of course, HTML, which you use to create standard Web pages. Here's an example HTML page:

Listing ch01_01.html

```
<HTML>
    <HEAD>
        <TITLE>Hello From HTML</TITLE>
    </HEAD>
    <BODY>
        <CENTER>
            <H1>
               Hello From HTML
            </H1>
        </CENTER>
        Welcome to the wild and woolly world of HTML.
    </BODY>
</HTML>
```

You can see the results of this HTML in Figure 1-1 in Netscape Navigator. Note that the HTML markup in this page that is, tags such as `<HEAD>`, `<CENTER>`, `<H1>`, and so on is there to give directions to the browser. That's what markup does; it specifies directions on the way the content is to be interpreted.

Figure 1-1. An HTML page in a browser.


Hello From HTML - Netscape 6
File Edit View Search Go Bookmarks Tasks Help
Search
Home
My Netscape
Search
Shop
Bookmarks
Net2Phone

Hello From HTML

Welcome to the wild and woolly world of HTML.

Document: Done (0.15 secs)

When you think of markup in terms of specifying how the content of a document is to be handled, it's easy to see that there are many kinds of markup languages all around already. For example, if you use a word processor to save a document in Rich Text Format (RTF), you'll find all kinds of markup codes embedded in the document. Here's an example; in this case, I've just created an RTF file with the letters `abc` underlined and in bold using Microsoft Word try searching for the actual text (hint: it's near the very end):

```
{\rtf1\ansi\ansicpg1252\uc1 \deff0\deflang1033
\deflangfe1033{\fonttbl{\f0\froman\fcharset0\fprq2{\*\panose
02020603050405020304}Times New Roman;}}{\colortbl;\red0
\green0\blue0;\red0\green0\blue255;\red0\green255\blue255;
\red0\green255\blue0;\red255\green0\blue255;\red255\green0
\blue0;\red255\green255\blue0;\red255\green255\blue255;\red0
\green0\blue128;\red0\green128\blue128;\red0\green128\blue0;
\red128\green0\blue128;\red128\green0\blue0;\red128\green128
\blue0;\red128\green128\blue128;\red192\green192\blue192;}
{\stylesheet{\widctlpar\adjustright \fs20\cgrid \snext0 Normal;}
{\*\cs10 \additive Default Paragraph Font;}}{\info{\title  }
{\author Steven Holzner}{\operator Steven Holzner}{\creatim
\yr2000\mo\dy\hr\min}{\revtim\yr2000\mo4\dy17\hr13\min55}
{\version1}{\edmins1}{\nofpages1}{\nofwords0}{\nofchars1}
{\*\company SteveCo}{\nofcharsws1}{\vern89}}\widowctrl\ftnbj
\aenddoc\formshade\viewkind4\viewscale100\pgbrdrhead\pgbrdrfoot
\fet0\sectd \psz1\linex0\endnhere\sectdefaultcl {\*\pnseclvl1
\pnucrm\pnstart1\pnindent720\pnhang{\pntxta .}}{\*\pnseclvl2
\pnucltr\pnstart1\pnindent720\pnhang{\pntxta .}}{\*\pnseclvl3
\pndec\pnstart1\pnindent720\pnhang{\pntxta .}}{\*\pnseclvl4
\pnlcltr\pnstart1\pnindent720\pnhang{\pntxta )}}{\*\pnseclvl5
\pndec\pnstart1\pnindent720\pnhang{\pntxtb (}{\pntxta )}}
{\*\pnseclvl6\pnlcltr\pnstart1\pnindent720\pnhang{\pntxtb (}
{\pntxta )}}{\*\pnseclvl7\pnlcrm\pnstart1\pnindent720\pnhang
{\pntxtb (}{\pntxta )}}{\*\pnseclvl8\pnlcltr\pnstart1
\pnindent720\pnhang{\pntxtb (}{\pntxta )}}{\*\pnseclvl9\pnlcrm
\pnstart1\pnindent720\pnhang{\pntxtb (}{\pntxta )}}\pard\plain
\sl480\slmult1\widctlpar\adjustright \fs20\cgrid {\b\fs24\ul abc }{\b\ul \par }}
```

The markup language that most people are familiar with these days is HTML, but it's easy to see how that language doesn't provide enough power for anything beyond creating standard Web pages.

HTML 1.0 consisted of only a dozen or so tags, but the most recent version, HTML 4.01, consists of almost 100 and if you include the other tags added by the major browsers, that number is closer to 120. But as handling data on the Web and other nets intensifies, it's clear that 120 tags isn't enough and, in fact, you can