E-Business Technologies
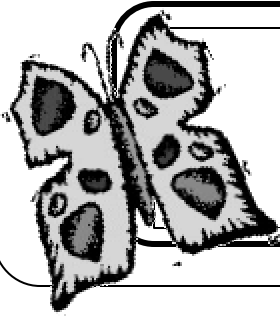
Craig Van Slyke and France Bélanger
John Wiley & Sons, Inc.

Slides by Fred Niederman

Electronic Business Applications Development
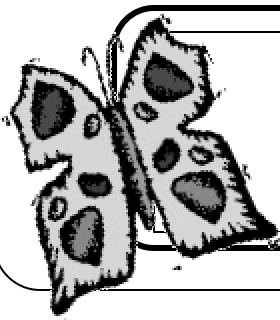
Chapter 5

Key Ideas

- One of the challenges for web developers is interacting with many different environments.
- Markup languages add information to text generally for formatting purposes.
- Programming languages create actions on web pages and in non-web programs.

Terminology

Markup Languages

- Allow storage of text in a single document
- Interpreters read and format the text
- Examples:
  - HTML
  - Virtual Reality Modeling Language (VRML)
  - Dynamic HTML
  - Standard Generalized Markup Language (SGML)
  - Extensible Markup Language (XML)

Programming Languages

- Programs or applets perform actions
- Compiler – turns source into machine code
- The browser acts as an interpreter
- Examples
  - Java, Perl/CGI (object oriented)
  - C++, COBOL, Fortran, Pascal (traditional)

Scripting Language

- Add functionality without separate compilers
- Don't check user errors
- Examples
  - Server-side script
    - Active Server Pages (ASP)
  - Client-side scripts
    - JavaScript
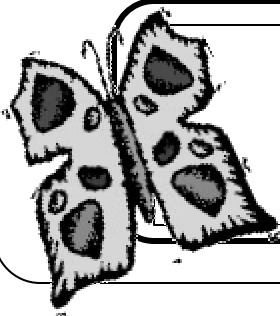   - VBScript

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More Terms

- Program – file containing a set of actions
  - Executable file once compiled
- Document
  - Material for presentation normally with formatting instructions
- Script
  - May be integrated into documents
- Applet
  - Java programs in executable form loaded on server but executed by browser.

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Markup Language: HTML

Hypertext Documents

- Tags
- Example
  - <i>italicized</i>
- Case insensitive
  - <i>italicized<i> is the same as <I>italicized<Ii>

HTML Example

```
<HTML>
<HEAD>
<TITLE> Title of Document </TITLE>
</HEAD>
<BODY>
<H2> First HTML Example </H2>
<P> This is a paragraph of text on this page <P>
<A href= "file2.html"> Linked Page </A>
</BODY>
</HTML>
```

Note: when you type this yourself, if you cut and paste the beginning tag, be sure to add the slash to the ending tag

Other Important Tags

- <META>
- <STYLE>
- <TITLE> -- used for bookmarks, should be meaningful
- Headings <H1> to <H6>
- Other tags you'll want to check out:
  - Paragraphs, lists, tables, forms, images, hyperlinks, frames

Alternative Tools for Writing HTML Documents

- HTML assistants or editors
  - Notepad or Wordpad
- Coding directly in HTML
  - WordPad or UNIX vi allow saving without adding extras
  - Use extensions .htm or html for browser recognition

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Coding with HTML Assistants and Converters

- HTML assistants or editors
  - Use Word or Excel and save file as HTML
  - Many other converters available on-line
- Limitations
  - Adds lots of extra code
  - May be difficult to maintain or use with other programs
- HTML editors
  - Applications specifically for creating HTML documents
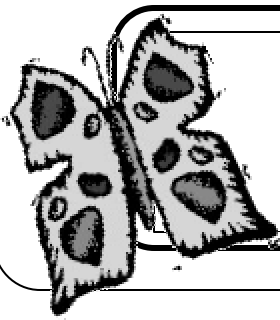 - Example: MS Front Page

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Validating Code

- Always a good idea to check the outcome
  - Good idea to use multiple browsers
- Data Type Definitions (DTD) describe the structure of the document
- Documents can be validated to make sure the content is consistent with the DTD

Other Markup Languages

Standard Generalized Markup Language (SGML)

- The "superset" of HTML
- Generally large and complex set of rules

Dynamic HTML

- Elements that move or change based on user actions
- Style sheets describe DHTML properties
  - <STYLE> and </STYLE>
  - Cascading style sheets (CSS)
    - Inline
    - Embedded
    - Linked

JavaScript within DHTML

- Create "events"
  - Showtext event
  - Hidetext event
- Basic steps to writing DHTML pages
  - Write a style sheet
  - Name the resulting action
  - Create activating element
  - Write the JavaScript function that will modify the target element
- Netscape DOM; Microsoft DOM

Virtual Reality Modeling Language (VRML)

- For 3-D images
- Platform independent
- Files called "worlds"
- Web3D consortium
  - X3D (Extensible 3D)
- Written with a plain text editor
- Viewed with browser "plug-ins"

Extensible Markup Language (XML)

- Subset of SGML
- Define your own tags
- More strict specifications than HTML
- Coding
  - Tags enclosed in angle brackets
  - Tags require end tags
  - Attribute values must be surrounded by quotation marks
  - XML tags are case sensitive
  - Comments can be included
  - Tags must be nested properly

Coding in XML

- Extremely important that everyone use same coding scheme
- Plan ahead
- Develop or use existing DTD
- Mark up XML document
- Consider use of XSL and/or CSS for formatting
- Can also use DOM

XML Example

```
<?xml version = "1.0">
<BOOK>
<TITLE>Evaluation of distance learning </TITLE>
<AUTHOR>France Belanger </AUTHOR>and
<AUTHOR>Dianne H. Jordan</AUTHOR>and
<CHAPTER>
<P> Since the dawn of human history....</P>
<P> The 20th Century has seen....</P>
</CHAPTER>
</BOOK>
```
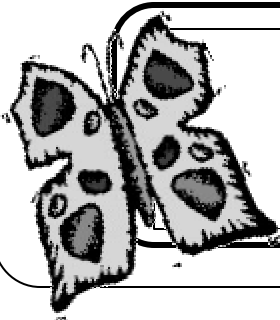
E-business in Practice

- Will XML Replace HTML?
  - What are the benefits of XML?
  - What are the difficulties in shifting
  - Is XHTML the answer or a weak

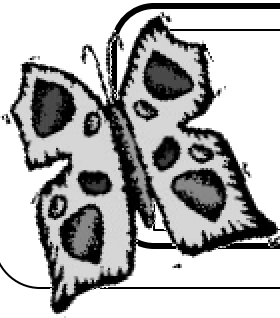# *Scripting Language: Active Server Pages*

Active Server Pages

- Microsoft product
  - Built into Windows 2000 and XP
- Server side scripting
- ASP.DLL library
- Relatively easy
- Many advanced functions
  - Can populate webpage with information from database
  - Can be updated as database is updated
- Performance as "downside"

ASP Example

```
<%@ LANGUAGE = "VBScript" %>
<HTML>
<HEAD><TITLE> Form Processing </TITLE> </HEAD>
<BODY>
<%
First = Request.Form ("First")
Last = Request.Form ("Last")
Previous = Request.Form ("Previous")
%>
<% Response.Write First %>
<% Response.Write Last %>
<% If Previous = "yes" then %>
Previous Visitor
<% Else %>
New Visitor
<% End If %>
</BODY>
</HTML>
```

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Scripting Language: JavaScript

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JavaScript

- Originally "LiveScript" by Netscape
- Can be written within the HTML page
- Can make text or menus appear with movement of mouse

JavaScript Example

```
<HTML>
<HEAD><TITLE> JavaScript Example </TITLE> </HEAD>
<SCRIPT language ="javascript">
Function showtext (text) {
…  code to show text.  …
}
Function hidetext (text) {
…  code to hide text  …
}
</SCRIPT>
<BODY>
<H2 align=center> EXAMPLE OF JAVASCRIPT</H2>
<DIV ONMOUSEOVER="showtext ('Smile')">
 ONMOUSEOUT="hidetext ('Smile')">
<IMG src="Smile.gif">
 <DIV id="Smile" CLASS =<"texthide">
 <P> This is a beautiful day! <BR> Give a smile to those <BR> who need it most:
The sad and angry! </P>
</DIV>
</BODY>
</HTML>
```

JavaScript Components

- Data types
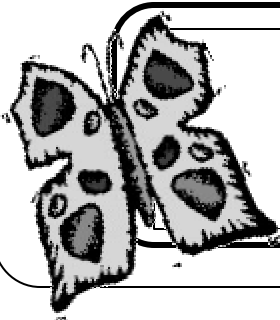- Operators
- Statements
  - (If-else; for, and while-do)

JavaScript Structure

1. Javascript included within <SCRIPT></SCRIPT> tags in the HTML file
2. Functions/statements in curly brackets { }
3. Evaluation/comparison in parentheses ( )
4. Array elements in square brackets [   ]
5. Comments between slashes (/) or /* */ if multiple lines
6. Statements end with semicolon (;)

Programming Language: Java

Java Concepts

- Developed by Sun Microsystems
- Designed for running on any platform
- Designed for reusability
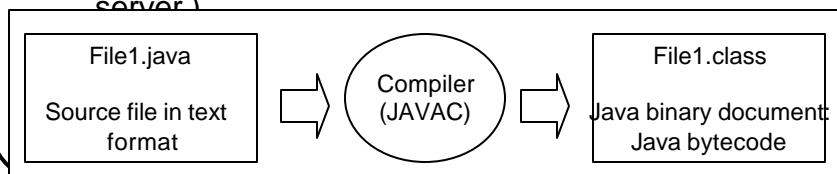- Full-fledged programming language

Java Applets

- Develop files on text editor or Java development tool
- Uses .java extension for programs
- JAVAC – java is a compiled language, needs compiler
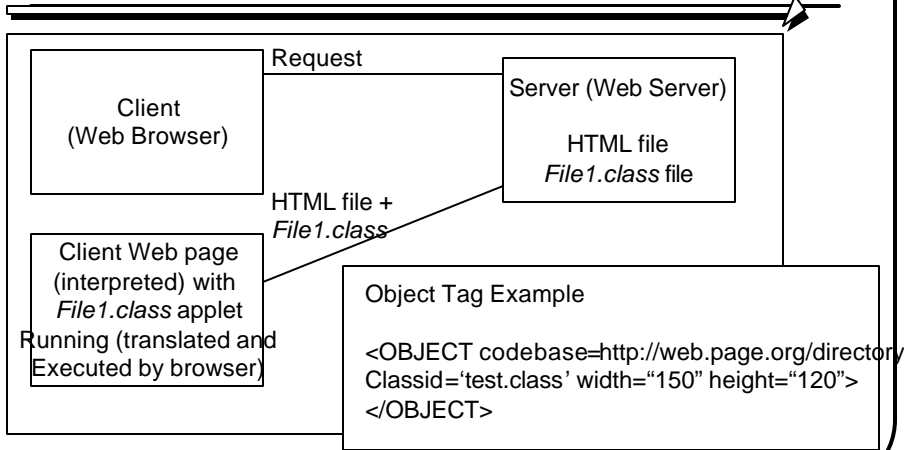- The executed program is stored in a separate .class file

How Java Applets Work

- The java binary file is stored on the server
- The browser requests this file
- The server sends the HTML page and .class file back to the browser
- This file is translated and run on the browser locally
- (Some Java programs, "servlets" are run on the server.)

File1.java		Compiler		File1.class
Source file in text format	⇨	(JAVAC)	⇨	Java binary document: Java bytecode

Web Environment with Java

Client
(Web Browser)

Request

Server (Web Server)

HTML file
File1.class file

HTML file +
File1.class

Client Web page
(interpreted) with
File1.class applet
Running (translated and
Executed by browser)

Object Tag Example

<OBJECT codebase=http://web.page.org/directory
Classid='test.class' width="150" height="120">
</OBJECT>

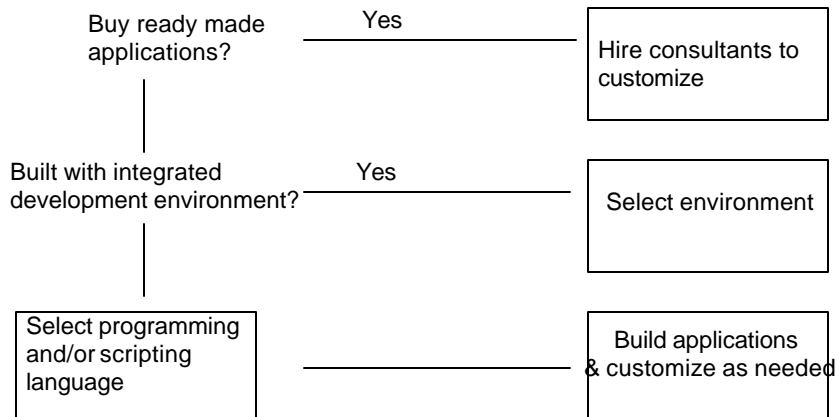# Writing Java Applets and Servlets

- Key components
  - Programming language
  - Runtime environment
  - Class Libraries
    - The key to efficient Java programming is using already existing Java classes that can be imported from a variety of Java Libraries
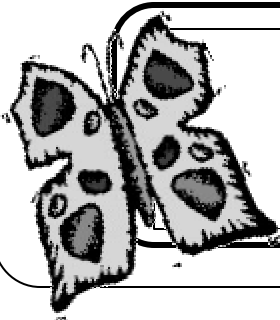
Major Languages

- Perl/CGI
  - Practical Extraction and Report Language
  - Common Gateway Interface scripts
  - Interpreted language
- VBScript
  - Tightly integrated with Internet Explorer
  - Subset of Visual Basic language
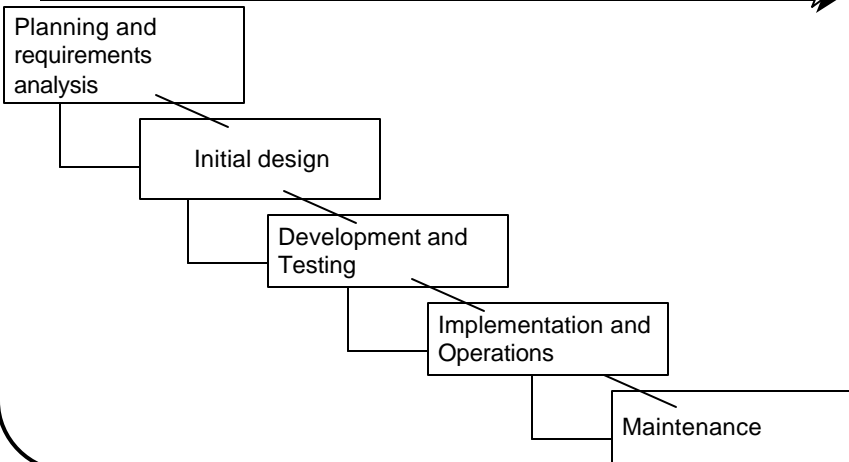- Python
  - Source code freely available

Decision Point

Buy ready made applications?	Yes	Hire consultants to customize
Built with integrated development environment?	Yes	Select environment
Select programming and/or scripting language		Build applications & customize as needed

Managerial Issues

Selection of Development Environment

- Integration of languages
- Training
- Hardware/software
- Life span

Development Life Cycle

Planning and requirements analysis

Initial design

Development and Testing

Implementation and Operations

Maintenance

Web Site Design and Usability

- Content is key
- Storyboard for relationships among pages
- Usability
- Browser Support

Summary

- Markup, scripting, and programming languages have different functions and different levels of complexity.
- Tags are a basic mechanism for showing format and structure
- Scripting languages can run on the application side as applets or server side as servlets
- Full programming languages can be sent with HTML files and run on the client browser
- Managers balance numerous factors in selecting tools and approaches to web service design.

Expanding the Domain

- For examples of electronic commerce application development see:

  - Perl Compiler
    - www.perl.com
  - XML and the WWW consortium
    - http://www.w3.org/XML
  - XSL
    - http://www.w3.org/TR/xsl/
  - VMRL in Chemistry (to see VMRL as used by one interest group)
    - http://www.ch.ic.ac.uk/rzepa/vrml/

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