Internet protocols: XML (eXtensible Markup Language) 
A language for creating other markup languages...

- XML defines content and not presentation.
- Derived from SGML.
- Create your own tags.
- Well defined structure.
- XML is strict about syntax.
- Unlike HTML errors, XML syntax halts document processing, and users or applications receive error messages, not a best-guess interpretation of the document structure.
  - This removes ambiguity.
- XML can be used to create markup languages like HTML.
- XML can work with many different platforms, from a web page, to a mobile phone to VB macros in Excel, etc...
  - More channels to customer

HTML only defines format

• `<html> <body> <H2>John Doe</H2> <P>2 Backroads Lane<br>Timbuctoo<br>045935435<br>John.Doe@Timbuctoo.com</P> </body> </html>`
  – (Note: This is not valid XML as its not well formed. Well formed HTML is called XHTML.)

• This will display as:
  – John Doe
    2 Backroads Lane
    Timbuctoo
    045935435
    John.Doe@Timbuctoo.com

• What we are specifying here is how the document is to be rendered, and not what information is contained in the document.

• While a human could read this and gather information about the embedded data, a machine could not. Humans can assist machines to obtain information from such pages by a technique known as page scraping. An example is Betman ([http://betman.org/index.htm](http://betman.org/index.htm)) which interacts with the Australian Race Site ([http://www.racetab.com.au/](http://www.racetab.com.au/)).
XML defines content

Same example in XML.

• <contact> <name>John Doe</name> <address>2 Backroads Lane</address> <country>Timbuctoo</country> <phone>045935435</phone> <email>John.Doe@Timbuctoo.com</email> </contact>

• What is being marked here is the structure of the data, not the way in which it is presented. The content has been decoupled from the presentation, which can now be done in several ways based on the same data. This form is readable by both humans and machines.

• The same information can now be presented differently.

• Formatting for display on different devices.

http://mobile.act.cmis.csiro.au/multiple_views/Multiple_vbs.htm

Betman site;

Search for ACME staff

Enter surname or part of surname.

Try this search from a mobile WAP device or the Gelon WAP simulator (Microsoft browser only) or the Yospace WAP simulator. Read an explanation of how the application works.

Summary: XML vs. HTML

There is more upfront setup for XML, but greatly increases platform flexibility and makes later programming easier.


Follow links on site to learn more…
XML basics

• <?xml version=1.0?> <!- An XML example --> <contact> <name>John Doe</name> <address>2 Backroads Lane</address> <country>Timbuctoo</country> <phone>045935435</phone> <email>John.Doe@Timbuctoo.com</email> </contact> What this means. <?xml version=1.0?> is a processing instruction. Conveys useful information to an application. The above says that this is an XML document and uses XML specification version 1.0. <!- An XML example --> is a comment. You can’t use a double hyphen inside a comment. <contact>...</contact> is an element whose type name is contact. Every element has a start tag and end tag. You can have nested elements.

• Keep the following rules in mind:
  • element type names are case sensitive.
  • each element must have a starting and ending tag.
  • tags must maintain their order in nested elements.
  • <contact/> denotes an empty element.
  • <movie type="mystery" rating="R" year="1968"> The Guns of Navarone </movie> Here; type, rating and year are attributes.

• The combination of elements and attributes, as shown in the examples above, can be used to define the structure of various types of data. In effect, each such definition represents a mark-up language for a specific type of data.

XML: reasons for namespaces

• The appeal of XML lies in the ability to invent tags that convey meaningful information. For example, XML allows you to represent information about a book in the following way.

• `<BOOK> <TITLE>XML Developer's Guide</TITLE> <PRICE currency="US Dollar">44.95</PRICE> </BOOK>` Similarly, you can represent information about an author in the following way.

• `<AUTHOR> <TITLE>Ms</TITLE> <NAME>Ambercrombie Kim</NAME> </AUTHOR>` Although the human reader can distinguish between the different interpretations of the TITLE element, a computer program does not have the context to tell them apart. Without additional information it cannot tell that the first TITLE element is intended to refer to a string representing the title of the book, and that the second element refers to an enumeration representing the title of the author: "Mr.," "Ms.,” "Mrs.,” and so on.

• Namespaces solve this problem by associating a vocabulary (or namespace) with a tag name. For example, the titles can be written as follows:

• `<BookInfo:TITLE xmlns:BookInfo="books-namespace-URI">XML Developer's Guide</BookInfo:TITLE> <AuthorInfo:TITLE xmlns:AuthorInfo="authors-namespace-URI">Ms.</AuthorInfo:TITLE>` The name preceding the colon, the prefix, maps to an XML namespace identified by a Universal Resource Identifier (URI). The namespace ensures global uniqueness when merging XML sources, while the associated prefix—a short name that substitutes for the namespace's URI—must be unique only in the tightly scoped context of the document. With this scheme, no conflicts exist between tags and attributes, and two tags can be the same only if they are from the same namespace and have the same tag name. This allows a document to contain both book and author information without confusion about whether the TITLE element refers to the book or the author. If a computer program wanted to display the name of a book in a user interface, it would use the object model to look for the TITLE element of the "BookInfo" namespace.

History of XML

• In 1969, Charles Goldfarb was leading an IBM research project on integrated law office information systems. Together with Ed Losher and Ray Lorie, he invented the Generalized Mark-up Language (GML). It was used as a means of allowing the text editing, formatting and information retrieval subsystems to share documents. IBM now produces over 90% of its documents with it.

• Goldfarb carried on the work on GML and invented Standard Generalized Mark-up Language (SGML) in 1974.

• This was later adapted for use as an all-purpose information standard. It was established as an ISO standard in 1986.

• It is extremely powerful, but complex. Used quite a lot in the domain of electronic publishing.

• Then came Hyper Text Mark-up Language (HTML). Tim Berners-Lee and Anders Berglund invented a tag-based language for marking up technical documents that a group of scientists in Europe shared over the Internet. This was later expanded to a simplified application of SGML and called HTML, the mark-up language that dominates web programming.

• HTML is the language of the web for rendering of documents. It has a fixed set of tags and is used primarily for defining how content is to be displayed. It is a particular instance of a mark-up language and can't be used to define new mark-up languages.

• The World Wide Web Consortium (W3C) combined the power of SGML with the simplicity of HTML and came up with XML. It is a subset of SGML. The latest specification standard is XML 1.0, released in February 1998. The specification for XML is less than a tenth of the size of the SGML specification. It has many of the features of SGML including:
  – Extensibility
  – Structure
  – Validity

• It is meant to be interoperable with both SGML and HTML.

**More on XML**


- Parsers
- Document Object Model interface
- Validating XML
- Transforming XML (CSS, XSLT)
- SOAP
- SMS messaging
Ways to interact with a server

<table>
<thead>
<tr>
<th>Encoding of request to server</th>
<th>Method and encoding of request to server</th>
<th>SOAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>HTML encoded</td>
<td>GET + (value=value, ...) or POST equivalent</td>
<td></td>
</tr>
<tr>
<td>HTML from XML using XSL</td>
<td>Sending SMS Text message from web form</td>
<td></td>
</tr>
<tr>
<td>XML encoded</td>
<td>Query call and messages database with XML interface</td>
<td></td>
</tr>
<tr>
<td>SOAP encoded</td>
<td>Not applicable</td>
<td></td>
</tr>
</tbody>
</table>

Imagine 3 types of applications:

- A web page that contains a form. The form provides radio buttons that determine the type of information requested. The results are viewed in a web browser.
- A web page that present information such as flight arrival information. The web page is targeted at PC browsers, Handheld browsers, WAP browsers, even SMS messages.
- A set of VB macros for an Excel spreadsheet that accesses data from a remote experiment.

Questions

• Which combination is best, which is next best.

• Why a particular combination is best. You need to consider "best" from at least two perspectives: functionality, implementation, flexibility, ..
Dynamic scripting languages: JSP vs. PHP

Use JSP J2EE for large enterprise sites; use PHP for small to medium sites for speed of development and performance.

- For an enterprise level application J2EE is the way to go. This due to performance, security, stability, etc.

- For small to medium sites, J2EE is slower in terms of performance and programming, and this is where PHP flourishes.

To make a decision, consider the following:

1. PHP is a more rapid development tool than Java. Once you know it, it is just easier to make simple pages out of it vs Java. In some ways PHP is easier to develop in and in some ways it is harder.
2. There is no real IDE for PHP. There are some tools for real time syntax checking (Komodo) and debugging, but they are not as mature as the pick of current Java IDE's.
3. There is never a need to restart a server when updating a PHP file unlike Java. This is not a problem with JSP's, but when you change servlets the server will unload all classes from memory and reload. This is a major pain if you are working on a production server.
4. PHP is fine for smaller projects and is very fast to develop in, however does not scale as well as Java. A large enterprise system is better suited to using Java.

Also, PHP is a loosely typed language. This has many nuances that are different from a strongly typed language like java. OOP is definitely not as powerful in PHP, as there is no private, protected and public typing of methods and fields. You can make classes and even extend classes, but it is poorly implemented IMO. I did all my PHP OOP style, but did not use any inheritance. The limitations of OOP principles is probably the most restrictive aspect of PHP.

http://www.experts-exchange.com/Web/Web_Languages/JSP/Q_20676285.html
Dynamic server-side scripting languages

Beyond JSP and PHP

<table>
<thead>
<tr>
<th>Pros</th>
<th>PHP</th>
<th>JSP</th>
<th>ColdFusion</th>
<th>ASP</th>
<th>.NET</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Open source. Well structured, so good for experienced C, Pascal, Java or Perl users. Useful built in functions. Cheap server (MySQL) and hosting options. Fast and easy to use for small/med sites. Easy Flash.</td>
<td>• Better language for dynamic functions and good tool support</td>
<td>• Very quick to learn and easy to code, flexible and extensible. Good user community.</td>
<td>• Open Source</td>
<td>• Its Microsoft. can be cheap if you already run your own MS servers. Reasonably priced hosted accounts available. Good if you already know VB/MS techs.</td>
<td>• Better than ASP; added flexibility of programs used: VB.NET, C#, Java (J#), Delphi or Cobol. Entire website can be driven by only one .dll. Visual Studio .NET 2003 free version called Webmatrix. Flash.</td>
</tr>
<tr>
<td>• Harder to code-structured code may take longer to learn for non-experienced VB/CF (less structured) only coders. Not powerful enough for large sites.</td>
<td>• Fewer hosting account options. Slow performance and more time consuming to program for small/med sites</td>
<td>• Somewhat simplistic/unstructured. Server license and hosting options are expensive. Uncertain future now that MacroMedia has bought Allaire.</td>
<td>• Sun; non-enterprise edition is open source</td>
<td>• Its Microsoft. Some don’t like using Visual Basic, others find it easier. User community is so-so.</td>
<td>• Perhaps a little more costly than PHP in the short run.</td>
</tr>
</tbody>
</table>
Dynamic server-side scripting languages

Ease of coding (less structured)
- PHP: Best
- JSP: Okay
- ColdFusion: Worst
- ASP: Okay
- .NET: Okay

Flexibility and extensibility
- PHP: Okay
- JSP: Okay
- ColdFusion: Okay
- ASP: Okay
- .NET: Okay

User Community
- PHP: Okay
- JSP: Okay
- ColdFusion: Okay
- ASP: Okay
- .NET: Okay

Tools
- PHP: Okay
- JSP: Okay
- ColdFusion: Okay
- ASP: Okay
- .NET: Okay

Cost
- PHP: Okay
- JSP: Okay
- ColdFusion: Okay
- ASP: Okay
- .NET: Okay

Apache/ Tomcat Open Source cheap; Enterprise version expensive
Dynamic server-side scripting languages

**PHP**
- [www.php.net](http://www.php.net)
- [http://www.pro-sites.com/dynamisites.php](http://www.pro-sites.com/dynamisites.php)
- [http://www.flash-db.com](http://www.flash-db.com)
- [http://www.codewalkers.com](http://www.codewalkers.com)
- [http://www.onlyphp.com](http://www.onlyphp.com)

**JSP**
- [www.jspin.com](http://www.jspin.com)
- JSTL - JSP Standard Tag Library
- XJTL - XML JSP Tag Library
  - [http://www.devsphere.com/xml/taglib/output/examples.html](http://www.devsphere.com/xml/taglib/output/examples.html)

**ASP/.NET**
- [www.microsoft.com/net/](http://www.microsoft.com/net/)
- [www.asp.net](http://www.asp.net)
- [www.asp.net/webmatrix/](http://www.asp.net/webmatrix/)

Resources
- [http://www.ezboard.com/](http://www.ezboard.com/)

Templates and tools
- [http://phplib.sourceforge.net/index.php?Poe_Session=645cd0f747d0d7206a850ffe84f5459](http://phplib.sourceforge.net/index.php?Poe_Session=645cd0f747d0d7206a850ffe84f5459)
- [http://lbdpc15.epfl.ch/examples/jsp/](http://lbdpc15.epfl.ch/examples/jsp/)

Also see: [www.macromedia.com/software/coldfusion/](http://www.macromedia.com/software/coldfusion/)
.NET examples

Jewelry site/ online store

www.kasana.com

Charitable org/ Information portal

www.oftdf.org
.NET case studies

- MSNBC (Leader in online news)
  http://www.microsoft.com/net/casestudies/casestudy.asp?CaseStudyID=14407

- Ministry of Sound (Famous London dance club)
  http://www.microsoft.com/net/casestudies/casestudy.asp?CaseStudyID=14162
PHP examples

The Corporate Culture at EXCEL
The impressions of EXCEL contractors and employees.

Please let us know what your impressions of the Corporate Culture at EXCEL Alternatives are.

Questions marked with "*" are required.

* 1. Quality place to work

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

* 2. Supervisory quality

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

* 3. Focus on professional development

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

* 4. Overall satisfaction

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

* 5. Customer quality

<table>
<thead>
<tr>
<th>Rating</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
</table>

Survey site

http://www.pro-sites.com/examples/survey_test1.php

Realestate site

http://www.pro-sites.com/examples/open_realty/index.php

http://www.templatemonster.com/show.php?tempi=1813&cat_type=author&type=1&arg1=43&arg2=&order=date
Web page development applications

• Macromedia
  – Dreamweaver– best application
  – Flash- Great for movies, etc…
  – Fireworks- useful; not as powerful as Photoshop

• Adobe
  – Photoshop- layers and other tools make web development easy, but more complex and harder to learn

• Microsoft
  – Frontpage– code is not as clean as Dreamweaver
Web Dev

September 2003
American medicine: 7/10 deaths from preventable causes
We have the best technology for keeping the sick alive, but we don’t effectively help the healthy stay healthy, or happy.

As we pour most of our resources into treating chronic disease, rather than preventing root causes, is it possible that this generation of youth shock medicine with a shorter life expectancy than the previous generation, for the first time in the history of the modern America?
The chart shows that being overweight (60% adults) or obese (30% adults, 15% kids up from 4% in the 80s) confers increased risk for at least 7 of the top ten killers in the US (bottom row plus diabetes). New evidence suggests it may also increase risk for pneumonia, bringing the total to 8/10. Researchers are now finding initial evidence linking obesity to COPD and accidents as well. Kids are suffering; 25% of obese kids are already insulin resistant.

References:

Links work best on the web: [www.duke.edu/~jml24/pyramid.mht][5]
Obesity Trends* Among U.S. Adults
BRFSS, 1985

(*BMI ≥ 30, or ~ 30 lbs overweight for 5’4” woman)

Obesity Trends* Among U.S. Adults

BRFSS, 2001

(*BMI ≥30, or ~ 30 lbs overweight for 5’4” woman)

How to change the problem overall: Focus areas

We are helping to give the right recommendations, and be comprehensive, as there is no quick fix for healthy lifestyle.

• Eat Smart
• Be Active
• Sleep Well
• Stay Relaxed
• Be Aware: drugs are lame

At a meeting called: Changing the American Diet, with Mark McClellan and Walter Willett, industry leaders agreed we need scientific consensus recommendations, a focus on kids, comprehensive solutions, and a multi-channel approach to educating all people.

Fitness Forward, with the guidance of its scientific advisory board composed of professionals trained in nutrition, exercise physiology, medicine and psychology, will soon complete development of a comprehensive, but easy to understand Healthy Lifestyles Pyramid using Flash and XML programming, to make it available to multiple media channels and interactive where possible.
How to change the problem overall
New food guide recommendations

The current food guide ‘pyramid’ has contributed to the metabolic syndrome (insulin resistance, obesity) and cardiovascular disease epidemics by 1. recommending 6-11 servings of carbs, processed or otherwise 2. not differentiating good vs. bad fats 3. not distinguishing meats from nuts and legumes, 4. Not distinguishing artificially sweetened fruit drinks from whole fruits & fruit drinks and 5. Disassociating daily physical activity or ‘expenditure,’ which should be considered a meal itself, from the issues of ‘consumption.’

The Willett Harvard triangle aims to correct those errors, many of which were already known over 10 years ago.

The current triangle was pushed through with extensive lobbying from the food industry.

References: Willett W al., Eat Drink and Be Healthy; Schlosser E, Fast Food Nation
How to change the problem overall
Activity, Drug Awareness, Sleep, Stress Reduction,

Many Fitness guides for adults and kids are available. CDC recommendations are minimal: 3-5 days per week of 30 minutes. Yet, dosage (time) is key (Kraus et al); the overall amount of activity is more important than concentrated vigorous exercise sessions.

Many programs exist regarding drugs; our focus will be on no smoking and caffeine in moderation (caffeine has now been linked to rebound metabolic slowing)

Consensus recommendations for sleep and stress reduction in children have never been effectively “packaged” and marketed

References: http://www.wakefitness.com/pyramid.htm; Kraus W. NEJM, 2002
Changing the problem overall: Multiple channels

Science: Research and Translation

Healthcare: Prevention and Treatment

Community: Prevention and Treatment

Business: Healthy Value Creation

School health

Religious community fitness

Community FitNet & multimedia marketing

Food manufacturing & distribution

GUIDE retail food & cooking

Fitness industry

Copyright © 2003
Fitness Forward Foundation
Mission Statement

The primary mission of Fitness Forward is to facilitate healthy lifestyles in youth

- Develop, evaluates, implement and disseminate healthcare, community-based and business programs that facilitate youth and parent healthy lifestyles through research and education on healthy diet, safe physical activity, balanced sleep, stress-reduction planning and drug awareness that is personalized for each family’s needs.

- The aim is to enhance people’s long-term health and feeling of wellness, with substantial reductions in the growing rates of obesity, low self-esteem, depression and anxiety.
Modern society offers people easy access to a lot of nice pleasures: sweet & savory food and drink, amazing movies, funny TV, life-like video games, spectator sports and concerts, fast cars, convenient highways, drugs that can change the way we feel, incredible medical care for the sick, and access to more information, music and images than ever before on the Internet– right??  The folks here at Fitness Forward appreciate all of those things too. Carpe Diem (Seize the Day); be free of guilt, so as to Eat, Drink and Be Merry.  **BUT>>**

*Check out a few of our programs:*
FitNet - Fitness portion of Lifestyle Plan

Link patient preferences with community resources to generate a feasible plan:

- **Guidance**
  - New targets
  - Venues and transport plan
  - Positive reinforcers

- **Access**
  - Decreased or no cost (targeted bargaining with org.s and insurers)
  - Close to home
  - Safe programs

**Fitness Preferences**

**Research Fitness Venues**

**Integrated Database**

- GIS
- Web Surveys
- FitNet Database

**FitNet Database**

**Integrated Database**

**Research Fitness Venues**

**Fitness Preferences**

**Web Surveys**

**GIS**

**July 2002**

**Link patient preferences with community resources to generate a feasible plan**
Online Triangle FitNet demo v1.0
Demo of FitNet coding at www.fitnessforward.org

- fitNet is an information tool that actively engages children in already active community programs
- We ultimately hope it can reach kids and child care providers (parents, doctors, school, etc..) through the web, Electronic Medical Record programs, in-store kiosks and other media outlets
GUIDE: Gain Understanding in Diet and Exercise
Promoting and enabling family’s healthy food purchases, balanced caloric consumption and a fit lifestyle, with cultural relevance

In-store Education

Clinic-based Marketing

In-store Volunteer Guidance

Healthy items w/ lower price

Building on NCI successes in grocery stores

Price Elasticity experiments for selectively lowering prices to drive sales, and community health

Clinic-based Marketing

Serving minority and poorer areas of Dorchester and Hyde Park, MA

Digital shopping card guidance

Partners

In-store kiosk

Online

AFB

Americas' Food Basket

Kroger

Food Lion

CityKi

Healthy shopping made easy.

Copyright © 2003
Fitness Forward Foundation
Healthy docs for healthy patients

We aid all youth age brackets, from in the womb to graduate school.

• “If medicine values disease prevention, and if physicians’ personal health practices are consistent predictors of prevention, we ought to cultivate healthy physicians in medical school.”

• “In order to give to others, physicians must have their basic wellness needs met. It is impossible to give what you don’t have.”

• Services directory, nutrition sessions, basic health assessments, meditation on the way along with Integrative lunch series

• Advanced diagnostics for rigorous screening and advanced medical training: learn and take a vested interest in medicine and your own health simultaneously

2. http://www.dev.kcom.edu/student/stillwell/home.htm; from AMSA
All students issued laptops and PDAs that use Microsoft Outlook.

Asked other technology subgroup members of Curriculum Committee to consider mapping academic schedule to Outlook.

fitMDnet algorithms would automate the population of the calendar, contact and task fields based on student preferences and doc input.
**FitNet Timeline**

**Phase 1: Triangle FitNet**
- Database development
- Gap assessment
- Fill gaps/ data collection (partnerships- county health dept, Nic. Enviro. school, UNC)

**Phase 2: Application Dev**
- Relational database design
- Algorithms coding
- XML/ Flash (.NET) interface for web and mobile devices (child, parent, doctor)
- Linkage to Microsoft Outlook & MapPoint

**Phase 3: Implementation**
- Web (privacy/ security)
- Mobile/ accel. study
- Pilot schools
- Pedi Primary Care
- EMR integration
Why XML/ Flash/ .NET?

- XML will allow us to integrate with EMRs, create web pages, and mobile phone applications without having to create entirely different software for each.

- Flash easily integrates with most platforms today and are easier to create using Macromedia tools, than most Javascript elements.

- .NET is easier to use with multiple programmers with varying preferences and skills for structured coding, making development faster.

- Side-by-side deployment allows multiple versions of an assembly to be installed and to run simultaneously on the same computer- overwriting no longer a problem; single .dll.

- XCOPY deployment: design, code, and debug on the development platform, and then just copy code to a staging server. The code is then ready to run without worrying about dependencies such as DLL registration or building COM or export packages.

- It is relatively low cost.

- I believe it will rapidly become the standard for dynamic web development because of its interoperability with different protocols, applications and systems.

- PHP is a good language, but .NET offers more easy to use tools that integrate with other Microsoft products. .NET works well with Sequel (PHP does as well).