4. Internet Programming

A small sample table.

```
<table>
<thead>
<tr>
<th>Head 1</th>
<th>Head 2</th>
<th>Head 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>R1, C1</td>
<td>R1, C2</td>
<td>R1, C3</td>
</tr>
<tr>
<td>R2, C1</td>
<td>R2, C2</td>
<td>R2, C3</td>
</tr>
</tbody>
</table>
```
Reference

Web site development

- To develop a Web site, three steps:
  1. Obtain the appropriate equipment
     - Web Server – hardware and software
  2. Register the Web Server to an Internet Service Provider (ISP)
     - Obtain the IP address and DNS address
  3. Develop the contents
     - Internet Programming
Internet Programming

- Web service is a kind of client / server process
- Need interaction between client and server
- Programming for providing Web service can also be divided into
  - **Client-side programming**: to define the operation to be performed on the client’s machine
  - **Server-side programming**: to define the operation to be performed on the server
Server-side Programming

Skills that are often required:
• CGI
• PHP
• ASP
• Perl
• Java Servlet, …

Client-side Programming

Skills that are often required:
• XHTML
• Javascript
• Java
• Dreamweaver
• Flash
• SMIL, XML …
4.1 XHTML – Extensible HyperText MarkUp Language
Web programming using XHTML

- Nowadays, there are many tools that help to develop Web page
  - Dreamweaver, Visual studio
- Provide sophisticated tools to allow Web page developed in a **graphical** manner
- Finally, the job of these tools is to convert the user design to XHTML code
- Understanding of XHTML allows us
  - fine tuning the codes generated by these tools
  - understand the source of a Web page
What is XHTML?

- Unlike procedural programming languages, e.g. C, C++, XHTML is a markup language that specifies the format of a document to be seen in a browser.
- XHTML has replaced the HTML as the primary means of describing the Web page content.
- Become a World Wide Web Consortium (W3C) recommendation.
- W3C is an industry consortium.
- Seeks to promote standards for the evolution of the Web and interoperability between WWW products by producing specifications and reference software.
- Compared with HTML, XHTML provides more robust, richer and extensible features.
Features of XHTML

- **Platform independent**
  - The same piece of code can give the same display in Mac, Linux and Windows

- **Text-based**
  - Program is written with ASCII characters
  - Can be written using a text editor, such as notepad

- **An XHTML file must have an extension of .html or .htm**

- **Information is generally enclosed inside paired tags**
  - E.g. `<html> ... </html>`
  - There are many tags in XHTML. They specify different information required to display the Web page content

start tag

end tag (with a /)
Basic Structure of XHTML

<html>
  <!-- This is a comment -->
  <head>
    <title>
      This is title, describing the content
    </title>
  </head>
  <body>
    This is body, main part of the page
  </body>
</html>
Example

```xml
<?xml version = "1.0"?>
<!DOCTYPE html PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
 "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">

<!-- main.html -->
<!-- Our first Web page -->

<html xmlns = "http://www.w3.org/1999/xhtml">
  <head>
    <title>Internet and WWW How to Program - Welcome</title>
  </head>

  <body>
    <p>Welcome to XHTML!</p>
  </body>
</html>
```

useful for validating the code to see if they meet the xhtml standard

define the namespace of html

define the title of the web page

Example

<p> - new paragraph
See the title defined in head

That’s the content defined in body
● An XHTML document can be divided into 2 sections

● **head** section
  - contains information of how the page is formatted
  - e.g. `<title> … </title>` can be found in head section to indicate the title of the Web page when it is shown in browser

● **body** section
  - contains the actual page contents
  - e.g. `<p>Welcome to XHTML!</p>` shows a line of text “Welcome to XHTML!” on the new paragraph
Tags

- Tags: case **insensitive**
  - `<center>` is same as `<CENTER>`
- Browse will not display information within tag that does not understand
- Tags: **no precise** positioning
- Many start tags define attributes that provide additional information
- E.g. `<html xmlns = "http://www.w3.org/1999/xhtml">`

```
start tag  attribute name  attribute value
```

ENG224
INFORMATION TECHNOLOGY – Part I
4. Internet Programming
Common Tags – Headers

- Some text may be more important than the others.
- XHTML provides six headers, called header elements, for specifying the relative importance of information:
  - `<h1>` ... `</h1>`, `<h2>` ... `</h2>` to `<h6>` ... `</h6>`
- It is assumed the text in `<h1>` is more important than that in `<h2>` and so on so forth.
- By default, the size of the text that is more important is bigger.
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>Internet and WWW How to Program - Headers</title>
  </head>
  <body>
    <h1>Level 1 Header</h1>
    <h2>Level 2 header</h2>
    <h3>Level 3 header</h3>
    <h4>Level 4 header</h4>
    <h5>Level 5 header</h5>
    <h6>Level 6 header</h6>
  </body>
</html>

6 headers are all used to indicate the relative importance of text.
4. Internet Programming

Text under `<h1>` has the largest size.
Meta Tag

- HTML interacts with the search engines through using *meta tag*

```
<head>
  <meta name="keywords" content="lecture notes, html, form, feedback">
  <meta name="description" content = "this web site describes ...">
</head>
```

These words are compared with words in search requests

Description of a page seen on searching
One of the most important XHTML features is the hyperlink
– Link to another resources, such as web page, image, etc.

Achieve by using the anchor tag <a>:
– To a web page:
  <a href="http://www.eie.polyu.edu.hk">PolyU</a>
<body>
  <h1>Here are my favorite sites</h1>

  <p><strong>Click a name to go to that page.</strong></p>

  <!-- Create four test hyperlinks -->

  <p><a href="http://www.polyu.edu.hk">PolyU</a></p>
  <p><a href="http://www.eie.polyu.edu.hk">EIE</a></p>
  <p><a href="http://www.eie.polyu.edu.hk/~enpklun">Dr Daniel Lun's Home</a></p>

</body>

Don’t introduce spaces between different parts of a URL address

strong tag lets the text to be displayed with bold font
Other similar tags include <u> underlining and <em> italic
Here are my favorite sites

Click a name to go to that page.

PolyU
EIE
Dr Daniel Lun’s Home
ENG224 Home page

This line is shown with a bold font
Four links are included
Linking Email Addresses

- To a **mail address**:
  
  <a href="mailto:enpklun@polyu.edu.hk"> Email me </a>

- With a **subject**:
  
  <a href="mailto:enpklun@polyu.edu.hk?subject=title"> Email me </a>

- **Multiple recipients**:
  
  <a href="mailto:address1,address2, address3"> Email me </a>
Linking Images

- **Background Image** can be defined as an attribute of the body tag:
  
  ```html
  <body background="image.gif">
  ```

- To show an **Image inside a page**:
  
  ```html
  <img src="image.gif" border="0" height="256" width="256" alt="text description of the image"/>
  ```

- We can create an **image hyperlink**
  
  ```html
  <a href="page1.html">
  <img src="image.gif" ...
  </a>
  ```
4. Internet Programming

Will scale to this size to display

```html
<body>
  <p><img src = "xmlhtp.jpg"
      height = "238" width = "183"
      alt = "XML How to Program book cover"/>
  <img src = "jhtp.jpg"
      height = "238" width = "183"
      alt = "Java How to Program book cover"/>
</p>
</body>
```

empty element: do not markup text

jhtp.jpg in fact cannot be found. With the `alt` attribute, the statement is displayed if the image is not found
4. Internet Programming

“The image displayed at the specified size

“alt” statement (may not display the same for Netscape)
Color

- 2 ways to specify:
  - Use hexadecimal numbers
  - RGB format: FF: strongest, 00 weakest
    - #FF0000
    - #00FF00
    - #0000FF
  - Use color names
    - Black, White, Red, Cyan, Green, Purple, Magenta, Blue, Yellow, OrangeRed, SpringGreen, BlueViolet, Gold, DarkGoldenrod, Burlywood, …
Color

- Background color:
  - `<body bgcolor="#00FF00"> … </body>`
  - `<body bgcolor ="green"> … </body>`

- Text color, links, visited links and activated links:
  - `<body bgcolor ="white" text="black" link="purple" vlink="blue" alink="yellow">`

- Font color:
  - `<font color="green"> … </font>`
The format of displayed text can be changed by using `<font> … </font>`

**Attributes:**
- **Color:**
- **Size:**
  - Relative: +1, +2, -3, …
  - Absolute: 10, 12, …
- **Face:**
  - Font used
  - Arial, Verdana, Helvetica, Times, …
  - Multiple fonts:
  - `<font face="Arial, Helvetica, sans-serif">`
<body bgcolor="#ffff00">
  <p><font face="courier" color="green" size="24">
      This is a test.</font></p>
  <hr />
  <font face="times" color="red">
      This is a test.</font>
</p>
  <p>
      <font face="arial" color="red" size="+1">
          This is a test.</font>
  </p>
  <br />
  <font face="times" color="#ff00ff" size="+2">
      This is a test.</font>
</p>
</body>
This is a test.

This is a test.

This is a test.

This is a test.

size = 24

default size

size = +1, +2, +3
Lists

- Unordered list
  - a list that does not order its items by letter or number
  - `<ul> … </ul>` creates a list where each item begins with a bullet
  - List items: `<li> … </li>`
  - For example
    `<ul>
      <li>Apple</li>
      <li>Orange</li>
      <li>Banana</li>
    </ul>`
Lists

- Ordered list
  - List that order their items by letter or number
  - `<ol type="style"> ... </ol>`

  When style equals to
  - 1: decimal, 1, 2, 3, ...
  - I: uppercase Roman, I, II, III, ...
  - i: lowercase Roman, i, ii, iii, ...
  - A: uppercase Latin, A, B, C, ...
  - a: lowercase Latin, a, b, c, ...

- List items: `<li> ... </li>`
Table

- Organize data into rows and columns

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>$0.25</td>
</tr>
<tr>
<td>Orange</td>
<td>$0.50</td>
</tr>
<tr>
<td>Banana</td>
<td>$1.00</td>
</tr>
<tr>
<td>Pineapple</td>
<td>$2.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$3.75</strong></td>
</tr>
</tbody>
</table>
<table attribute="value"> … </table>

Attribute examples:
- border="1" ⇒ the larger the number, the thicker is the border.
  "0" means no border
- align="center" ⇒ the table is aligned at the center of the browser
- width="60%" ⇒ to set the table width to 60% of the browser’s width

Caption of the table: <caption> … </caption>

Insert a table row: <tr> … </tr>

The head, body and foot sections are defined by
<thead> … </thead>
<tbody> … </tbody>
<tfoot> … </tfoot>
### Price of Fruit

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>$0.25</td>
</tr>
</tbody>
</table>

The use of `th` tag defines the content of header or footer cells.

The `tr` tag inserts a new row.

The `th` tag inserts a table row.

The `caption` tag: `<caption><strong>Price of Fruit</strong></caption>`
The use of `<tr>` tag defines the content of header or footer cells.

The use of `<td>` tag defines the content of body cells.

The use of `<th>` tag defines the content of header or footer cells.

```html
<table>
  <tbody>
    <tr>
      <td>Orange</td>
      <td>$0.50</td>
    </tr>
    <tr>
      <td>Banana</td>
      <td>$1.00</td>
    </tr>
    <tr>
      <td>Pineapple</td>
      <td>$2.00</td>
    </tr>
  </tbody>
  <tfoot>
    <tr>
      <th>Total</th>
      <td>$3.75</td>
    </tr>
  </tfoot>
</table>
```
### Price of Fruit

<table>
<thead>
<tr>
<th>Fruit</th>
<th>Price</th>
</tr>
</thead>
<tbody>
<tr>
<td>Apple</td>
<td>$0.25</td>
</tr>
<tr>
<td>Orange</td>
<td>$0.50</td>
</tr>
<tr>
<td>Banana</td>
<td>$1.00</td>
</tr>
<tr>
<td>Pineapple</td>
<td>$2.00</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>$3.75</strong></td>
</tr>
</tbody>
</table>
Col span and Row span

- **colspan** and **rowspan** allow merging columns/rows
  - `<colspan="number">`
    - data cell spans more than one column
  - `<rowspan="number">`
    - data cell spans more than one row
<table border="1" width="60%">
  <caption>Average Grades</caption>
  <tr>
    <th colspan="4">Report</th>
  </tr>
  <tr>
  </tr>
  <tr>
    <td>Maths</td> <td>A</td> <td rowspan="2" align="center">B</td> <td>C</td>
  </tr>
  <tr>
    <td>English</td> <td>C</td> <td>A</td> <td></td>
  </tr>
</table>
ENG224
INFORMATION TECHNOLOGY – Part I

4. Internet Programming

Average Grades

<table>
<thead>
<tr>
<th></th>
<th>2000</th>
<th>2001</th>
<th>2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maths</td>
<td>A</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>English</td>
<td>C</td>
<td>B</td>
<td>A</td>
</tr>
</tbody>
</table>
Forms

- When browsing web sites, users often need to provide information such as email address, search keywords, etc.
- Forms allows user to input information.
4. Internet Programming

www.abc.com/form.htm

www.abc.com
method = post or get
action = program name
(script) in server to receive the data
Name = ??? and others

1. Web Client
2. Internet
3. Web Server

App —- CGI —- Web Server —- Internet —- Web Client
A form element is inserted into a web page by the `<form>` tag

```html
<form method = "value1" action = "value2"> … </form>
```

Attributes:
- `method = "post"` or `"get"
  - Indicates the way the Web server will organize and send you the form output
  - `post`: causes changes to server data, e.g., update a database
  - `get`: does not cause any changes in server-side data, e.g., make a database request
- `action = ""`
  - Path to script, e.g., CGI
4. Internet Programming

use *post* method

```html
<form method="post" action="/cgi-bin/formmail">
  <input type="radio" name="size" value="large" checked="checked" /> large
  <input type="radio" name="size" value="medium" /> medium
  <input type="radio" name="size" value="small" /> small
</form>
```

Only the radio button of large is checked

script that will be called to execute in the server
Forms

- Elements inside a form are introduced by the `<input>` tag
- `<input>`
  - `type=“hidden”` name=“variable name”
    value=“value that sends to the server”
  - `type =“text”` name=“” value =“” size=“25”
  - `type =“submit”` value =“”
  - `type =“reset”` value =“”
  - `type =“checkbox”` value =“” name=“”
Form example I

```html
<input type="checkbox" name="things" value="ham"/> Ham
<input type="checkbox" name="things" value="sweetcorn"/> Sweet Corn
<input type="checkbox" name="things" value="mushroom"/> Mushroom
<input type="checkbox" name="things" value="chicken"/> Chicken
<input type="checkbox" name="things" value="peas"/> Peas
```

The words show on screen

Indicate all 5 checkboxes belong to the same group

Thing that sends back to server
Form example II

Data that would send to server but do not display on screen

```
<input type="hidden" name="title" value="Feedback" />

<p>
    <label>Name:
        <input type="text" name="name" size="25" maxlength="30" />
    </label>
</p>

<input type="submit" value="Submit your entries" />
<input type="reset" value="Clear Your Entries" />
```

send the input the textbox to server

clear the content of textbox
Form example III

Space is counted here

<code>
<p><label>Comments:<br />
<textarea name= "comments" rows="4" cols="36">
Enter your comments here.
</textarea> </label></p>
<p><label>Please input your password:
<input name= "secret" type="password" size="25"/>
</label></p>
<input type= "submit" value="Submit Your Entries"/>
<input type= "reset" value="Clear Your Entries"/>
</code>
Form example IV

The “selected” value here mean Amazing is selected default value

```html
<p><label>Rate our site:<br>
<select name= "rating">
  <option value="Amazing" selected="selected">Amazing</option>
  <option value="3">3</option>
  <option value="2">2</option>
  <option value="1">1</option>
  <option value="0">0</option>
</select></label>
<input type= "submit" value="Submit Your Entries"/>
<input type= "reset" value="Clear Your Entries"/>
```