SNS COLLEGE OF TECHNOLOGY

Coimbatore-35
An Autonomous Institution

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A++' Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ARTIFICIAL INTELLIGENCE

AI IN WEB TECHNOLOGY

III YEAR - VI SEM

UNIT 1 – INTRODUCTION TO WEB TECHNOLOGY AND DESIGN

INTRODUCTION TO WEB TECHNOLOGY AND DESIGN

HTML “Hello World!”

Document Type Declaration

Document Instance

```
<!DOCTYPE html
        PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
        "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>
      HelloWorld.html
    </title>
  </head>
  <body>
    <p>
      Hello World!
    </p>
  </body>
</html>
```

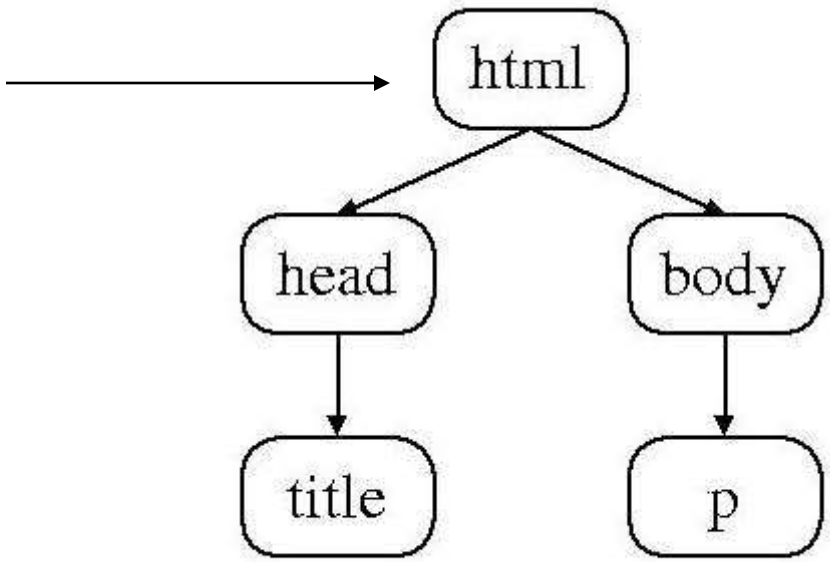
HTML “Hello World”

HTML Tags and Elements

- Any string of the form < … > is a *tag*
- All tags in document instance of Hello World are either end tags (begin with </) or start tags (all others)
  - Tags are an example of markup, that is, text treated specially by the browser
  - Non-markup text is called character data and is normally displayed by the browser
- String at beginning of start/end tag is an element name
- Everything from start tag to matching end tag, including tags, is an element
  - Content of element excludes its start and end tags

HTML Element Tree

Root Element



HTML Root Element

- Document type declaration specifies name of root element:
  `<!DOCTYPE html`
- Root of HTML document must be `html`
- XHTML 1.0 (standard we will follow) requires that this element contain the xml namespace `xmlns` attribute specification (name/value pair)

```
<html xmlns="http://www.w3.org/1999/xhtml">
```

HTML head and body Elements

- The body element contains information displayed in the browser client area
- The head element contains information used for other purposes by the browser:
  - title (shown in title bar of browser window)
  - scripts (client-side programs)
  - style (display) information
  - etc.

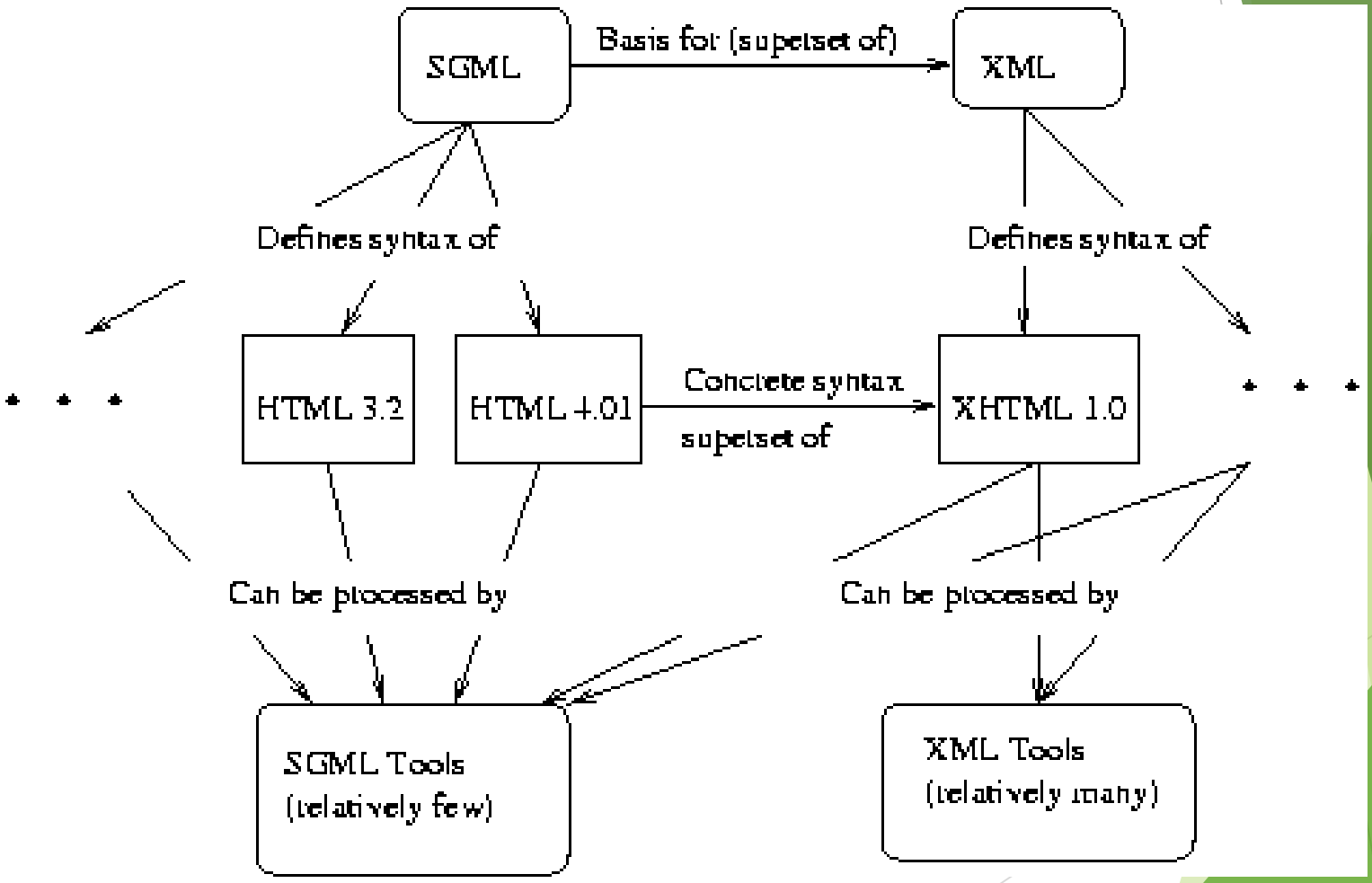
HTML History

- 1990: HTML invented by Tim Berners-Lee
- 1993: Mosaic browser adds support for images, sound, video to HTML
- 1994-~1997: "Browser wars" between Netscape and Microsoft, HTML defined operationally by browser support
- ~1997-present: Increasingly, World-Wide Web Consortium (W3C) recommendations define HTML

HTML Versions

- HTML 4.01 (Dec 1999) syntax defined using Standard Generalized Markup Language (SGML)
- XHTML 1.0 (Jan 2000) syntax defined using Extensible Markup Language (XML)
- Primary differences:
  - HTML allows some tag omissions (e.g., end tags)
  - XHTML element and attribute names are lower case (HTML names are case-insensitive)
  - XHTML requires that attribute values be quoted

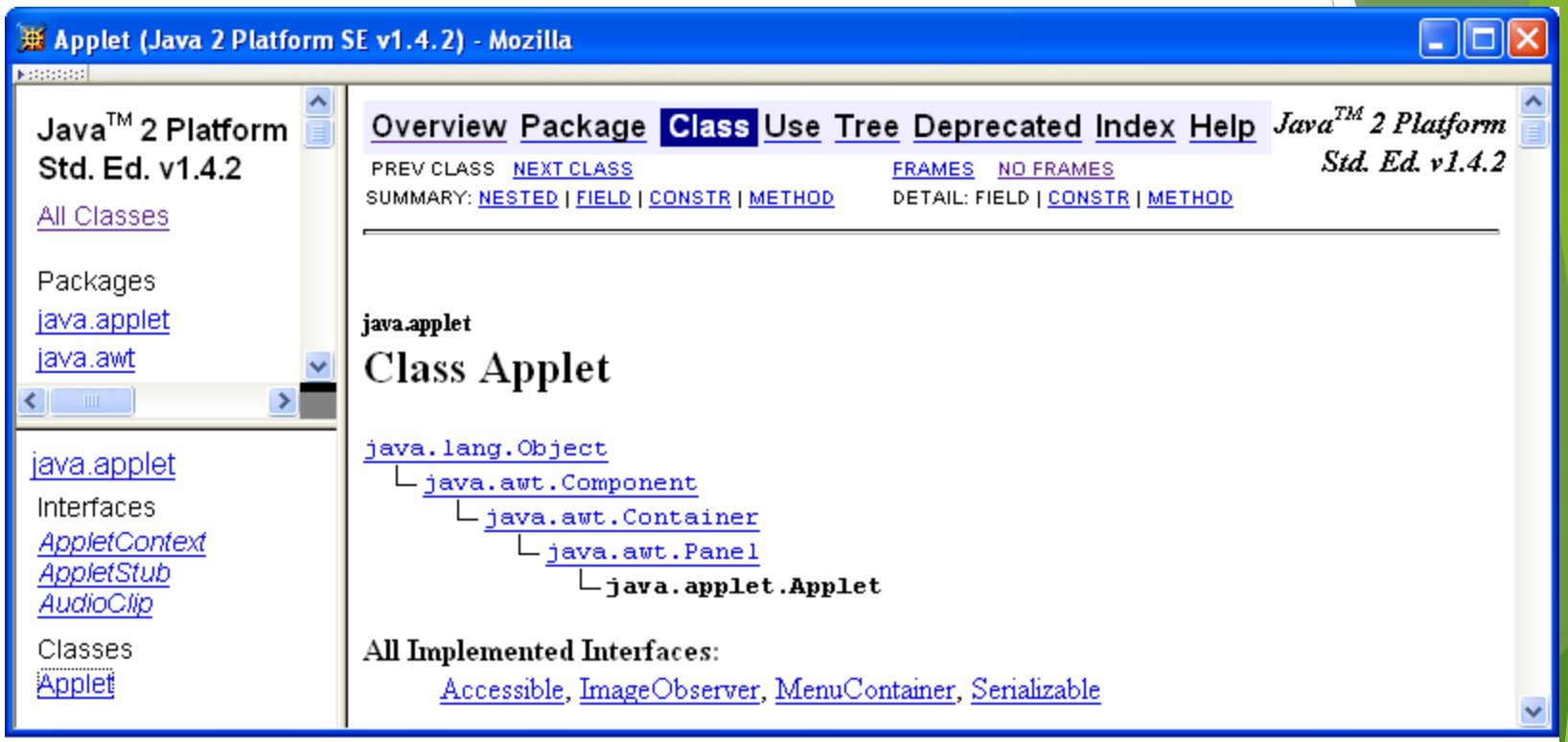
SGML and XML


SGML
Basis for (supetset of)
XML
Defines syntax of
Defines syntax of
HTML 3.2
HTML 4.01
Concrete syntax
supetset of
XHTML 1.0
Can be processed by
Can be processed by
SGML Tools
(relatively few)
XML Tools
(relatively many)

HTML “Flavors”

- For HTML 4.01 and XHTML 1.0, the document type declaration can be used to select one of three “flavors”:
  - Strict: W3C ideal
  - Transitional: Includes deprecated elements and attributes (W3C recommends use of *style sheets* instead)
  - Frameset: Supports frames (subwindows within the client area)

HTML Frameset



HTML Document Type Declarations

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

- XHTML 1.0 Frameset:
  <!DOCTYPE html
  PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN“
  "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">

- HTML 4.01 Transitional:
  <!DOCTYPE HTML
  PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN“
  "http://www.w3.org/TR/html4/loose.dtd">

XHTML White Space

- Four white space characters: carriage return, line feed, space, horizontal tab
- Normally, character data is normalized:
  - All white space is converted to space characters
  - Leading and trailing spaces are trimmed
  - Multiple consecutive space characters are replaced by a single space character

XHTML White Space

```
<body>
  <p>
    Hello World!

    This is my second HTML paragraph.
  </p>
</body>
```

XHTML White Space

```
<p>
  Hello World!
</p>
<p>
  This is my second HTML paragraph.
</p>
```

Unrecognized HTML Elements

```
<!DOCTYPE html
        PUBLIC "-//W3C//DTD XHTML 1.0 Strict//EN"
        "http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <titl>
      HelloWorldBadElt.html
    </title>
  </head>
  <body>
    <p>
      Hello World!
    </p>
  </body>
</html>
```

Misspelled element name

Unrecognized HTML Elements

`title` character data

Belongs here

Unrecognized HTML Elements

`title` character data

Displayed here

Unrecognized HTML Elements

- Browsers ignore tags with unrecognized element names, attribute specifications with unrecognized attribute names
  - Allows evolution of HTML while older browsers are still in use
- Implication: an HTML document may have errors even if it displays properly
- Should use an HTML validator to check syntax

Unrecognized HTML Elements

Example for non-frame browsers (old)

```
<HTML>
    <HEAD>
        <TITLE>A simple frameset document</TITLE>
    </HEAD>
    <FRAMESET cols="20%, 80%">
        <FRAME src="contents_of_frame1.html“ />
        <FRAME src="contents_of_frame2.html“ />
        <NOFRAMES>
            <P>This doc contains frames</P>
        </NOFRAMES>
    </FRAMESET>
</HTML>
```

HTML References

- Since < marks the beginning of a tag, how do you include a < in an HTML document?
- Use markup known as a reference
- Two types:
  - Character reference specifies a character by its Unicode code point
    - For <, use < or < or <
  - Entity reference specifies a character by an HTML-defined name
    - For <, use <

HTML References

TABLE 2.2: Example entity and character references.

Character	Entity Reference	Character Reference (decimal)
<	<	<
>	>	>
&	&	&
"	"	"
’	'	'
©	©	©
ñ	ñ	ñ
α	α	α
$\forall$	∀	∀

HTML References

- Since < and & begin markup, within character data or attribute values these characters must ***always*** be represented by references (normally `<` and `&`)
- Good idea to represent > using reference (normally `>`)
  - Provides consistency with treatment of <
  - Avoids accidental use of the reserved string]]>

HTML References

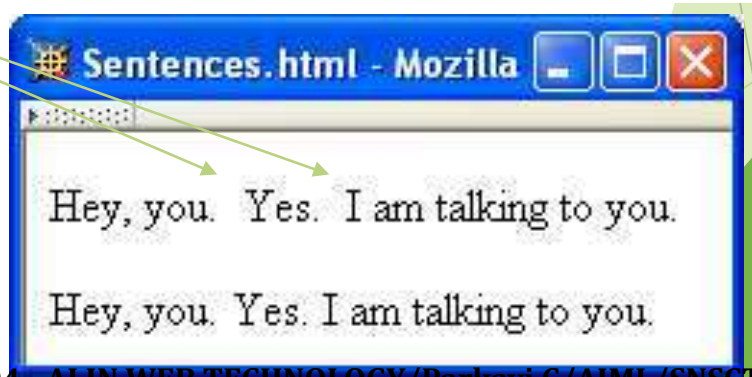
- Non-breaking space (   ) produces space but counts as part of a word
  - Ex: keep together keep together …

HTML References

- Non-breaking space often used to create multiple spaces (not removed by normalization)

```
<p>
  Hey, you.  Yes.  I am talking to you.
</p>
<p>
  Hey, you.  Yes.  I am talking to you.
</p>
```

  + space displays as two spaces



XHTML Attribute Specifications

- Example:

```
<html xmlns="http://www.w3.org/1999/xhtml" lang="en" xml:lang="en">
```

  - Valid attribute names specified by HTML recommendation (or XML, as in xml:lang)
  - Attribute values must be quoted (matching single or double quotes)
  - Multiple attribute specifications are space-separated, order-independent

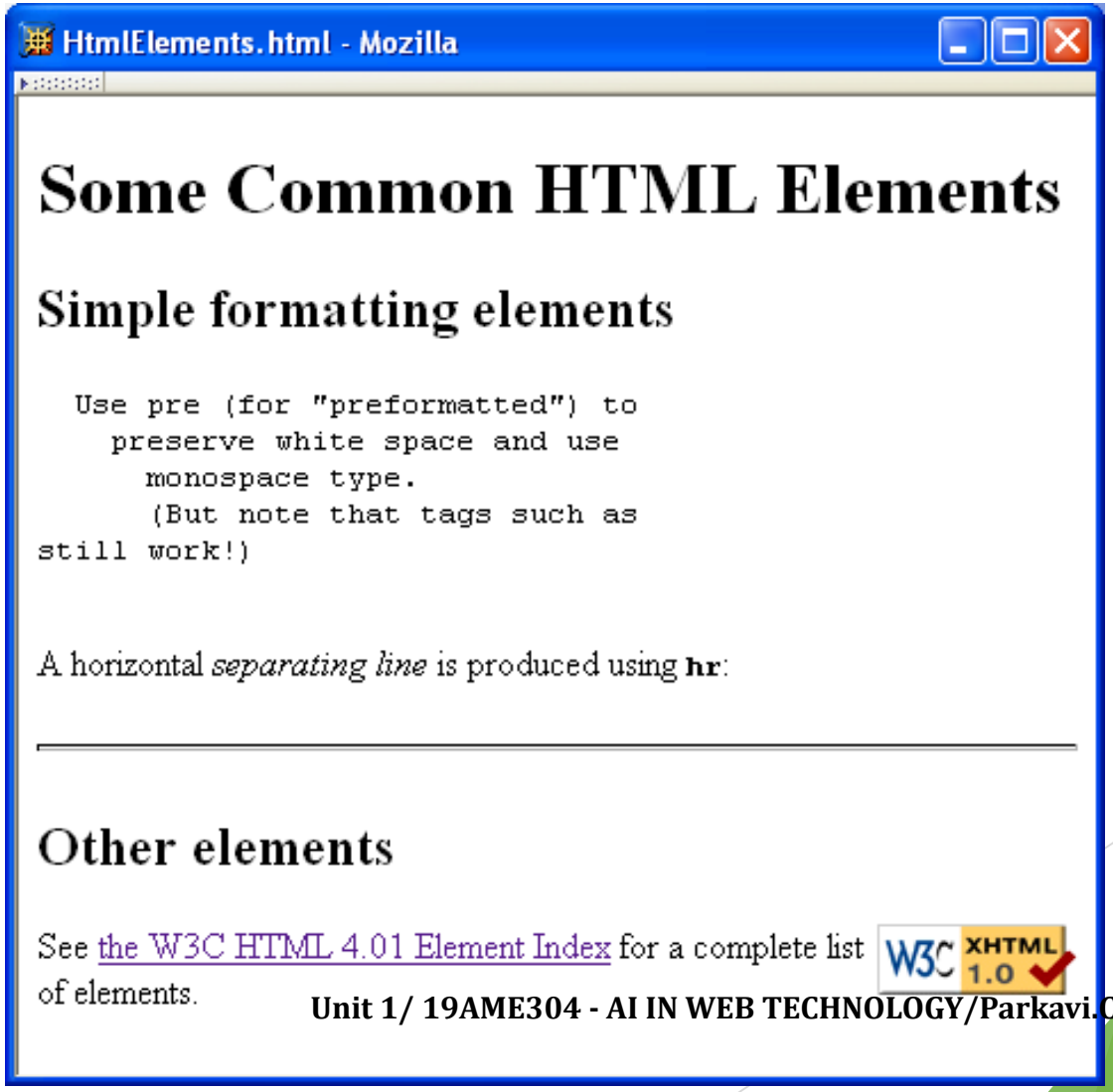
XHTML Attribute Values

- Can contain embedded quotes or references to quotes

- May be n
  - Best to
    brows

```
value = "Ain't this grand!"
value = "He said, &quot;She said&quot;, then sighed."
value = "He said, "She said", then sighed."
```

Common HTML Elements



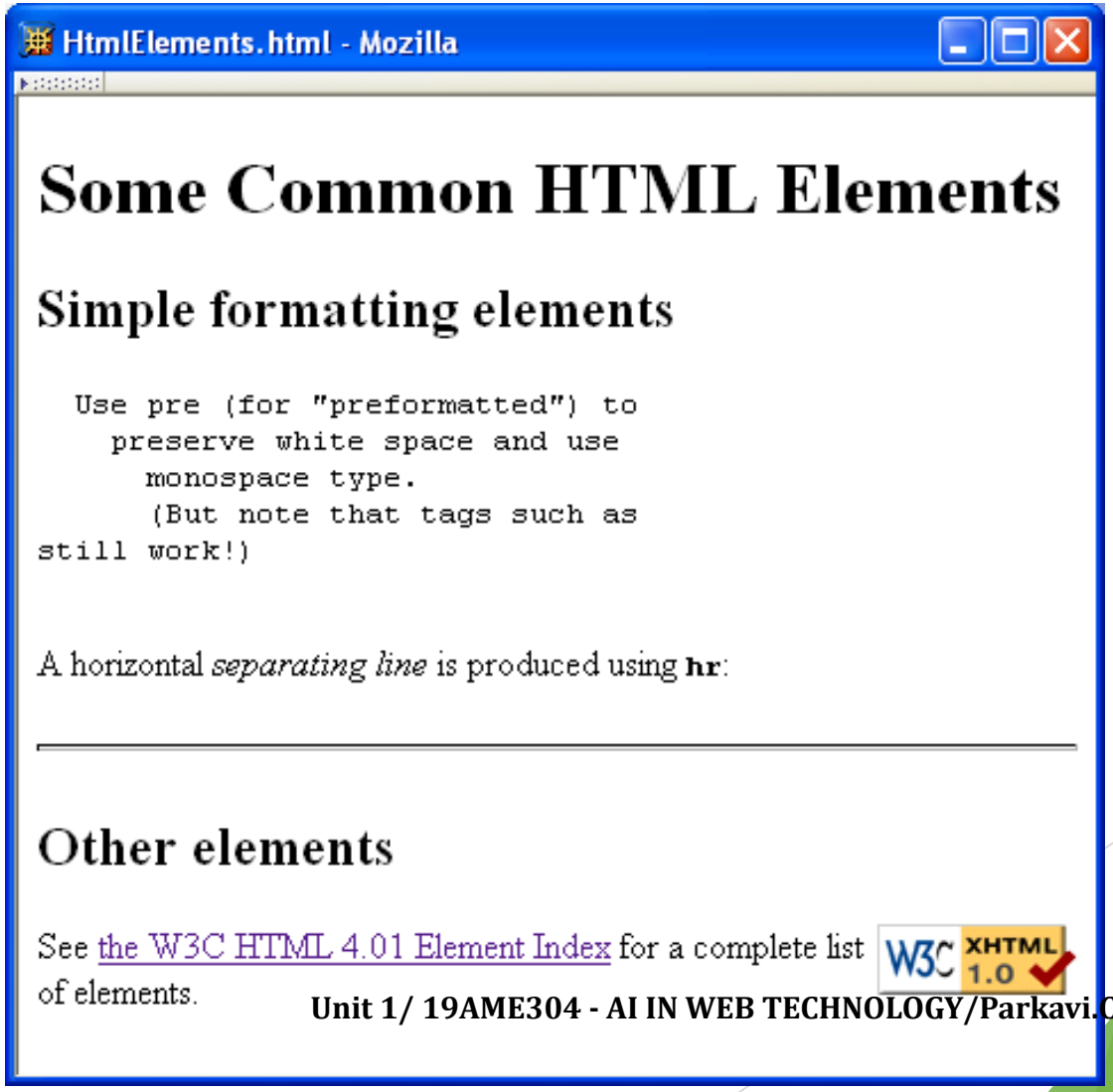
Common HTML Elements

- Headings are produced using h1, h2, …, h6 elements:

```
<h1>
  Some Common HTML Elements
</h1>
<h2>
  Simple formatting elements
</h2>
```

- Should use h1 next highest, etc.
  - Change style (next chapter) if you don't like the "look" of a heading

Common HTML Elements



Common HTML Elements

- Use `pre` to retain format of text and display using monospace font:

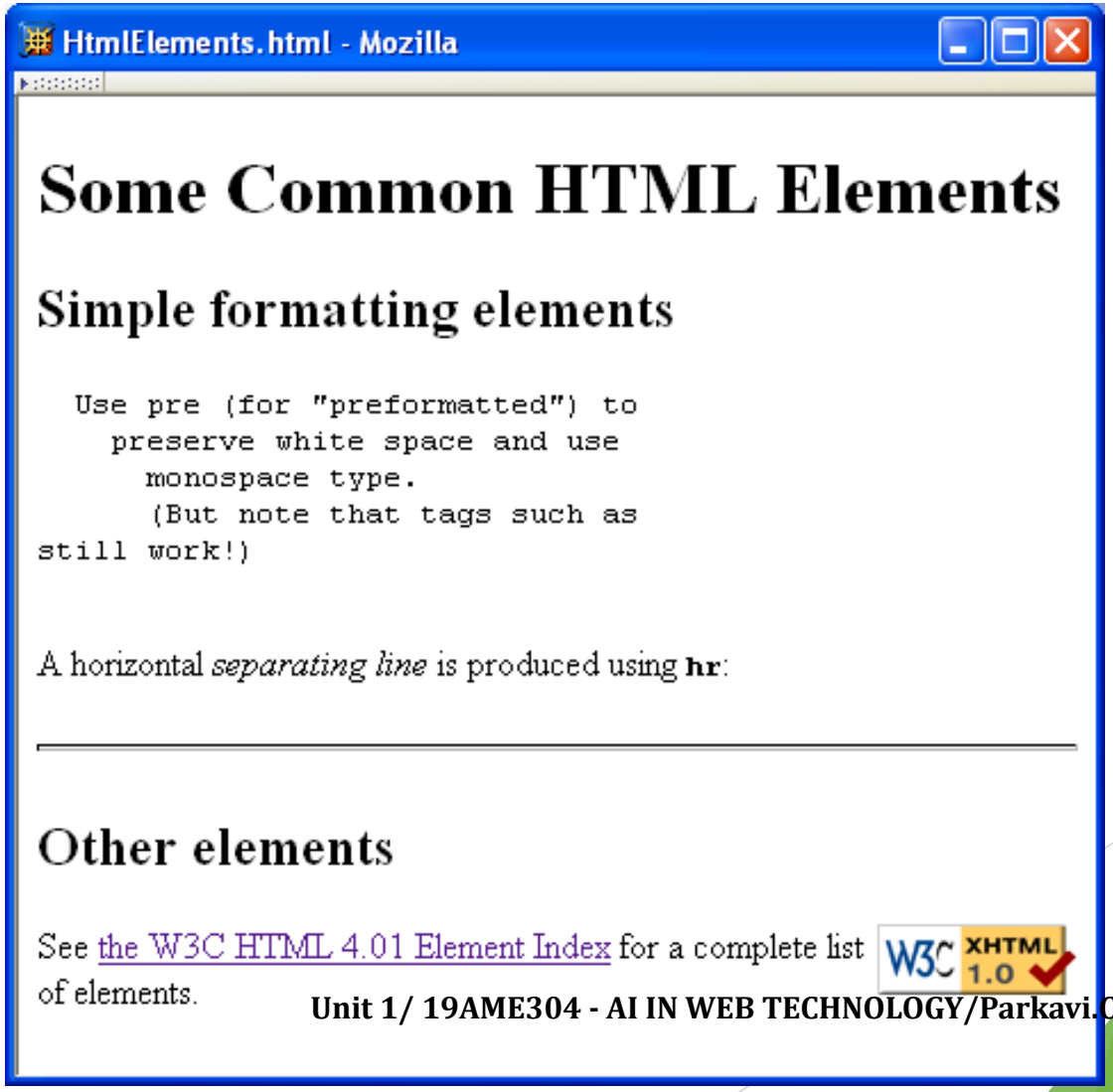
```
<pre>
Use pre (for "preformatted") to
  preserve white space and use
    monospace type.
    (But note that tags such as<br />still work!)
</pre>
```

- Note that a
still treate

Common HTML Elements

- br element represents line break
- br is example of an empty element, i.e., element that is not allowed to have content
- XML allows two syntactic representations of empty elements
  - Empty tag syntax
 is recommended for browser compatibility
  - XML parsers also recognize syntax
</br> (start tag followed immediately by end tag), but many browsers do not understand this for empty elements

Common HTML Elements



Common HTML Elements

- Text can be formatted in various ways:
  - Apply style sheet technology (next chapter) to a span element (a styleless wrapper):

```
<span style="font-style:italic">separating line</span>
```

  - Use a phrase element that specifies semantics of text (not
  - Use a font style element
    - Not recommended, but frequently used

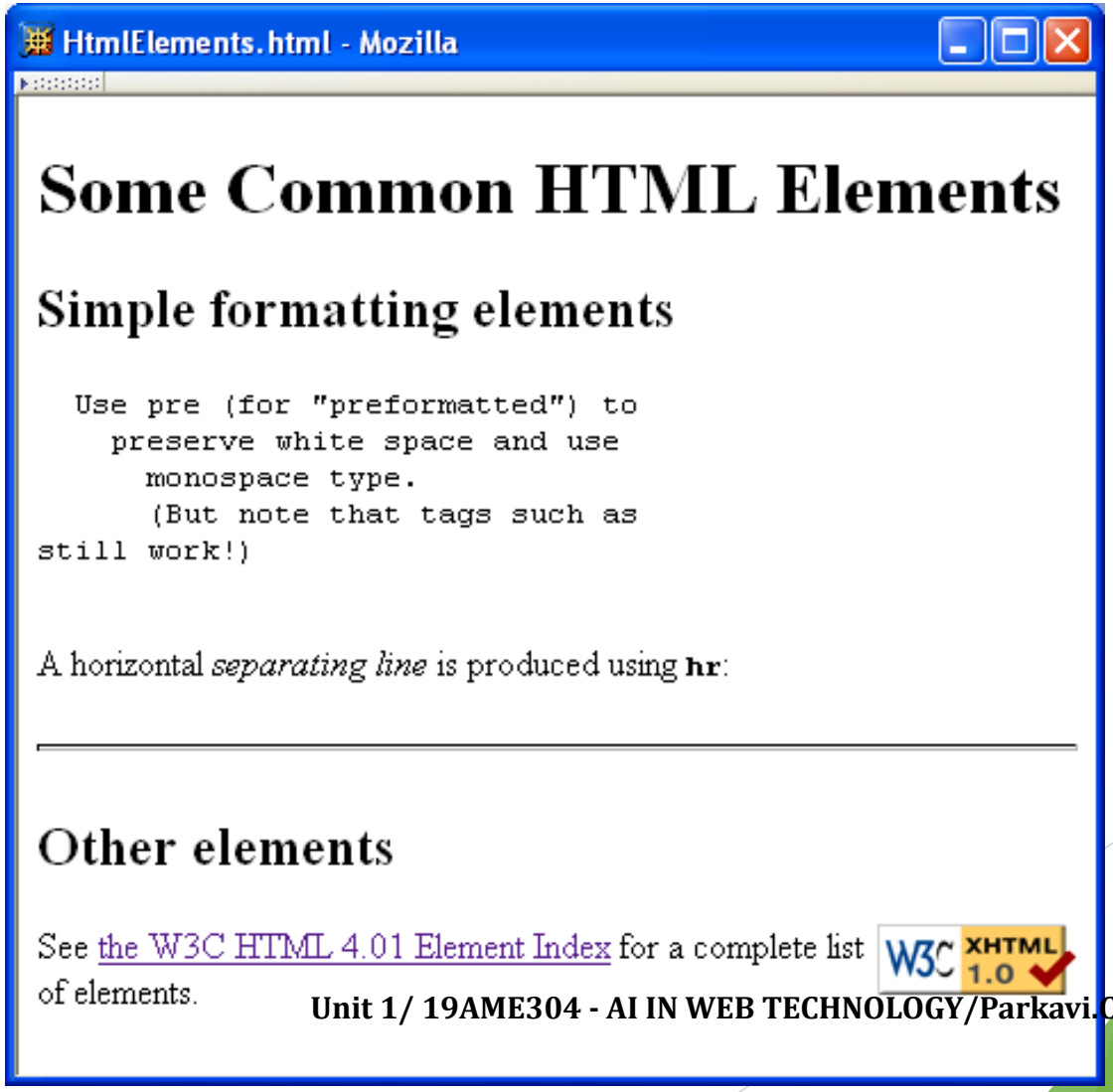
```
<strong>hr</strong>
```

Common HTML Elements

TABLE 2.3: HTML font style elements.

Element	Font used by content
b	Bold-face
i	Italic
tt	"Teletype" (fixed-width font)
big	Increased font size
small	Decreased font size

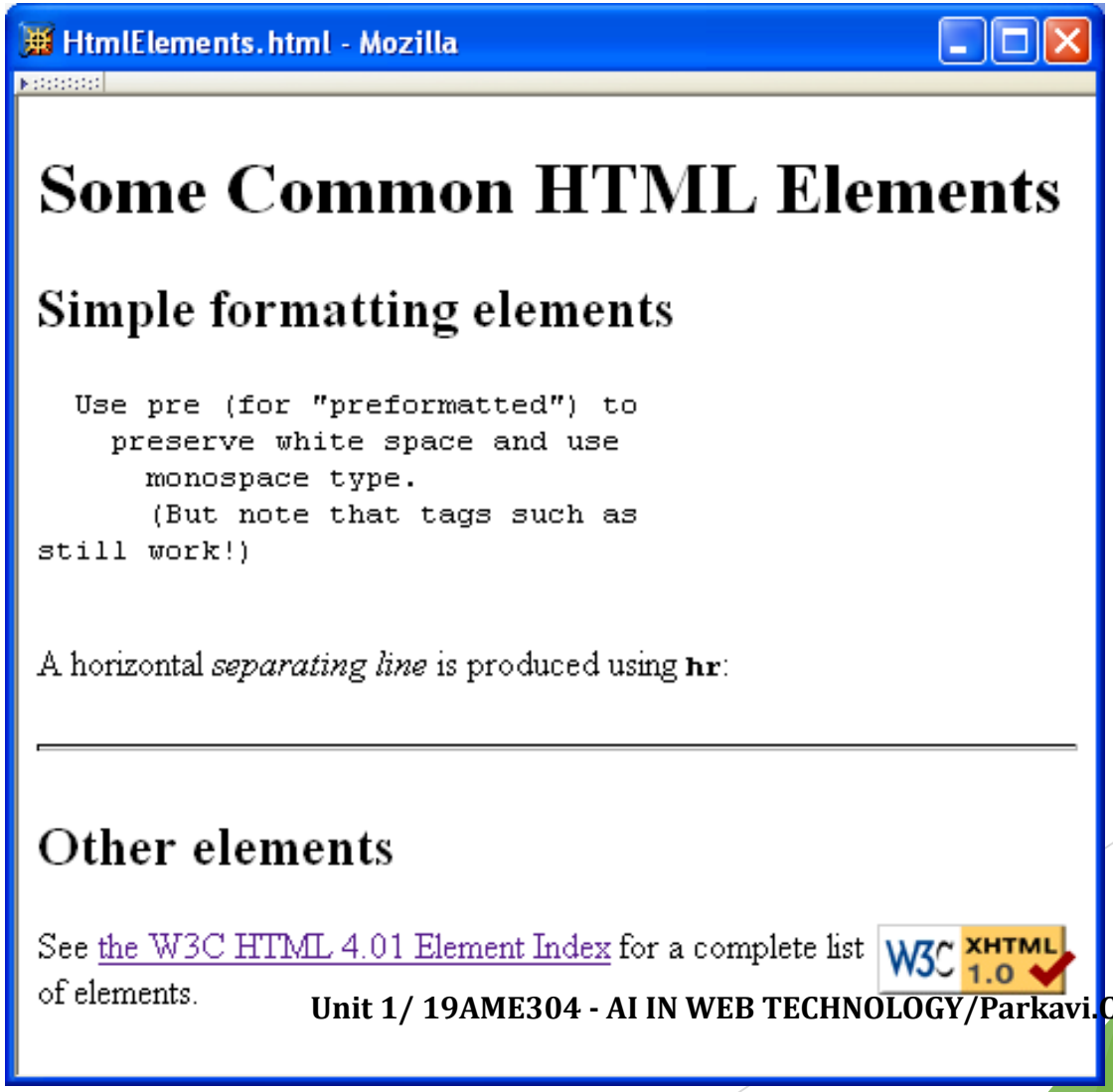
Common HTML Elements



Common HTML Elements

- Horizontal rule is produced using `hr`
- Also an empty element
- Style can be modified using style sheet technology

Common HTML Elements



Common HTML Elements

- Images can be embedded using `img` element

```
<img
    src="http://www.w3.org/Icons/valid-xhtml10"
    alt="Valid XHTML 1.0!" height="31" width="88"
    style="float:right" />
```

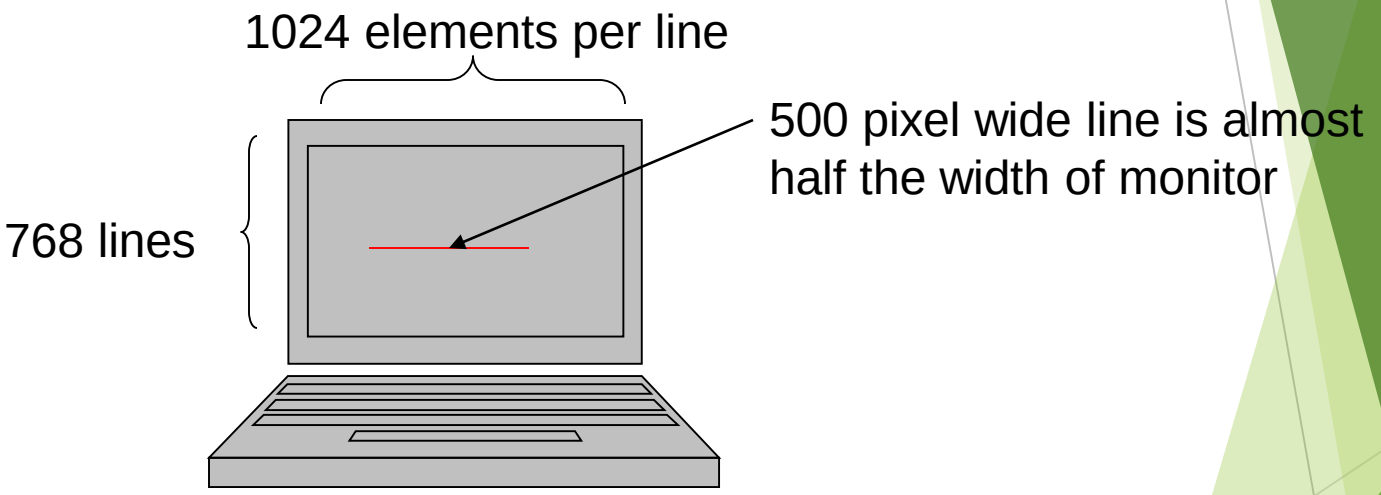
- Attributes:
  - `src`: URL of image file (required). Browser generates a GET request to this URL.
  - `alt`: text description of image (required)
  - `height` / `width`: dimensions of area that image will occupy (recommended)

Common HTML Elements

- If height and width not specified for image, then browser may need to rearrange the client area after downloading the image (poor user interface for Web page)
- If height and width specified are not the same as the original dimensions of image, browser will resize the image
- Default units for height and width are “picture elements” (pixels)
  - Can specify percentage of client area using string such as “50%”

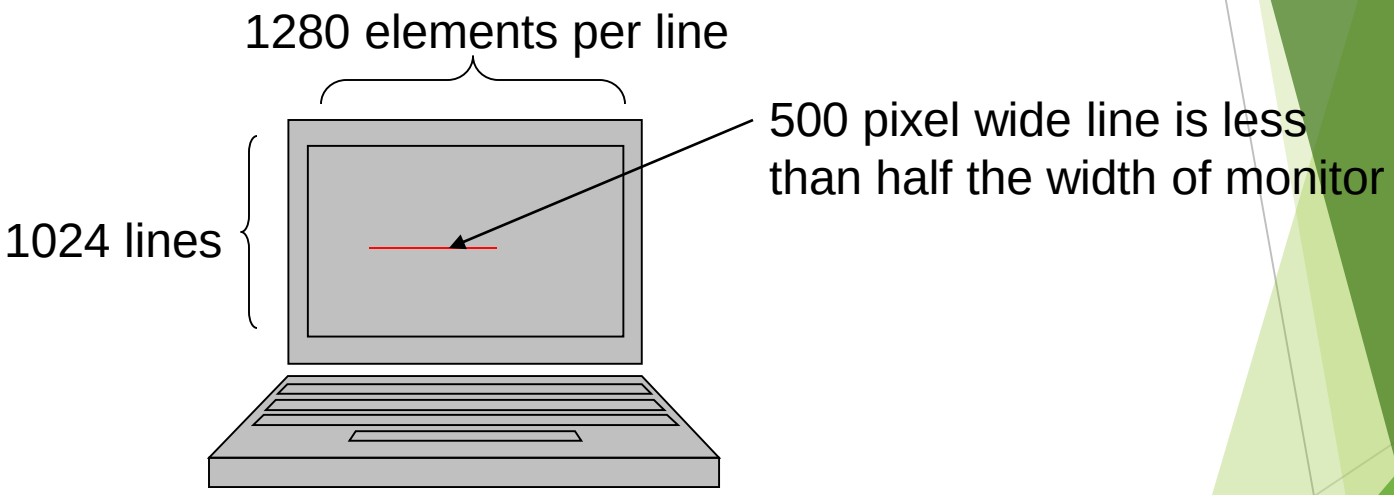
Common HTML Elements

- Monitor resolution determines pixel size

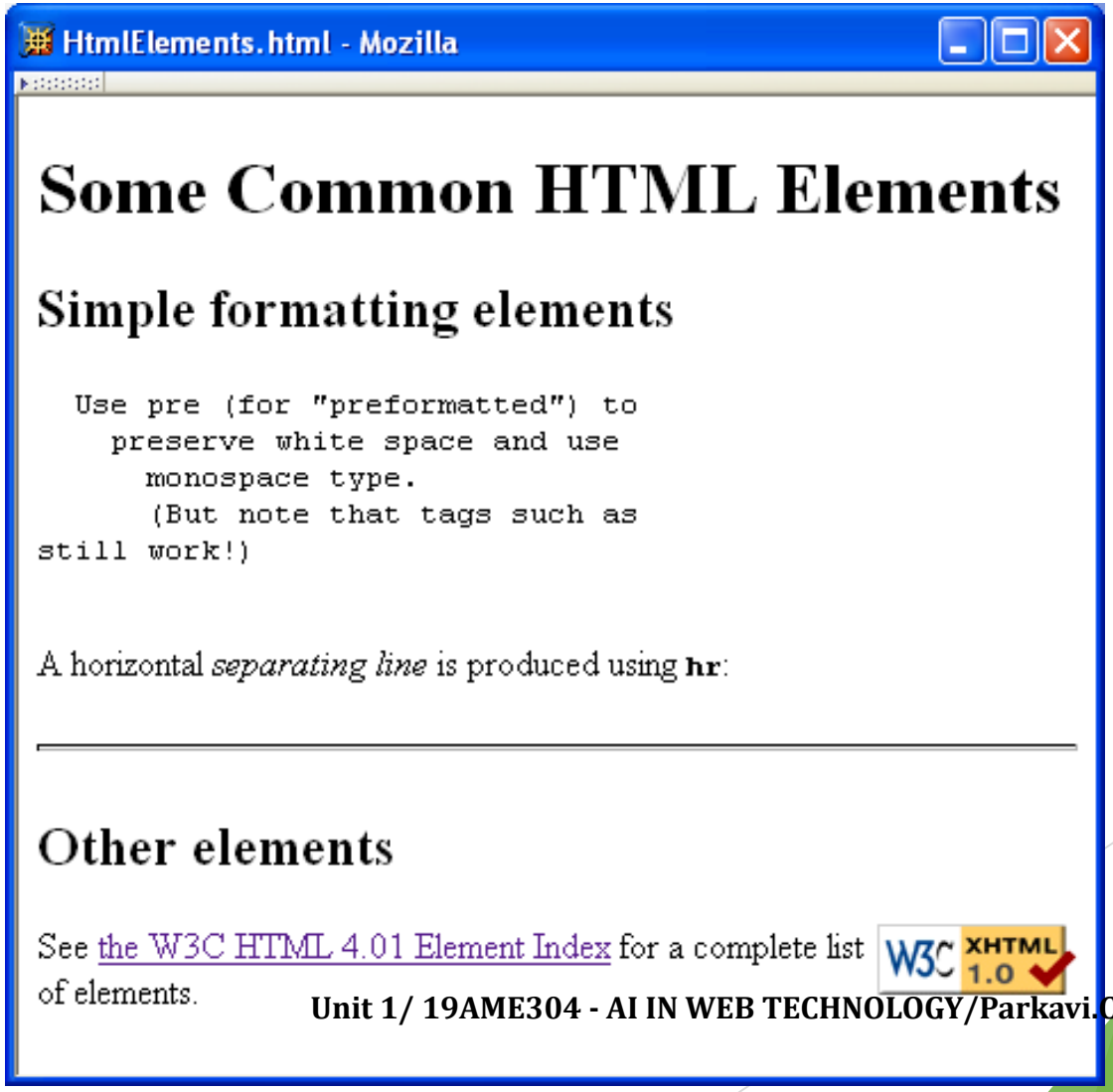


Common HTML Elements

- Monitor resolution determines pixel size



Common HTML Elements



Common HTML Elements

- Hyperlinks are produced by the anchor element a

```
See
<a href="http://www.w3.org/TR/html4/index/elements.html">the
  W3C HTML 4.01 Element Index</a>
for a complete list of elements.
```

- Clicking on a hyperlink causes browser to issue GET request to URL specified in `href` attribute and render response in client area
- Content of anchor element is text of hyperlink (avoid leading/trailing space in content)

Common HTML Elements

- Anchors can be used as source (previous example) or destination
- The fragment portion of a URL is used to reference a destination

```
<a id="section1" name="section1"></a>
```

- Browser scrolls so destination anchor is at (or near) top of client area

```
<a href="http://www.example.org/PageWithAnchor.html#section1">...
```

Common HTML Elements

- <!-- Notice that img must nest within a "block" element, such as p -->
- Not allowed to use -- within comment

```
<!-- This is NOT
  -- a good comment.
  -->
```

```
<!-- Can't end with more than two dashes! --->
```

Nesting Elements

- If one element is nested within another element, then the content of the inner element is also content of the outer element
- XHTML requires that elements be properly nested

```
<tt><strong>hr</strong></tt>
```

✗

```
<tt><strong>hr</tt></strong>
```

Nesting Elements

- Most HTML elements are either block or inline
  - Block: browser automatically generates line breaks before and after the element content
    - Ex: `p`,`div`
  - Inline: element content is added to the “flow”
    - Ex: `span`, `tt`, `strong`, `a`

Nesting Elements

- Syntactic rules of thumb:
  - Children of body must be blocks
  - Blocks can contain inline elements
  - Inline elements *cannot* contain blocks
- Specific rules for each version of (X)HTML are defined using SGML or XML (covered later)

Relative URL's

- Consider an <img> start tag containing attribute specification

```
src="valid-xhtml10.png"
```

- This is an example of a relative URL: it is interpreted relative to the URL of the document that contains the img tag
  - If document URL is http://localhost:8080/MultiFile.html then relative URL above represents absolute URL http://localhost:8080/valid-xhtml10.png

Relative URL's

TABLE 2.4: Absolute URL's corresponding to relative URL's when the base URL is `http://www.example.org/a/b/c.html`.

Relative URL	Absolute URL
`d/e.html`	`http://www.example.org/a/b/d/e.html`
`../f.html`	`http://www.example.org/a/f.html`
`../../g.html`	`http://www.example.org/g.html`
`../h/i.html`	`http://www.example.org/a/h/i.html`
`/j.html`	`http://www.example.org/j.html`
`/k/l.html`	`http://www.example.org/k/l.html`

Relative URL's

- Query and fragment portions of a relative URL are appended to the resulting absolute URL
  - Example: If document URL is http://localhost:8080/PageAnch.html and it contains the anchor element

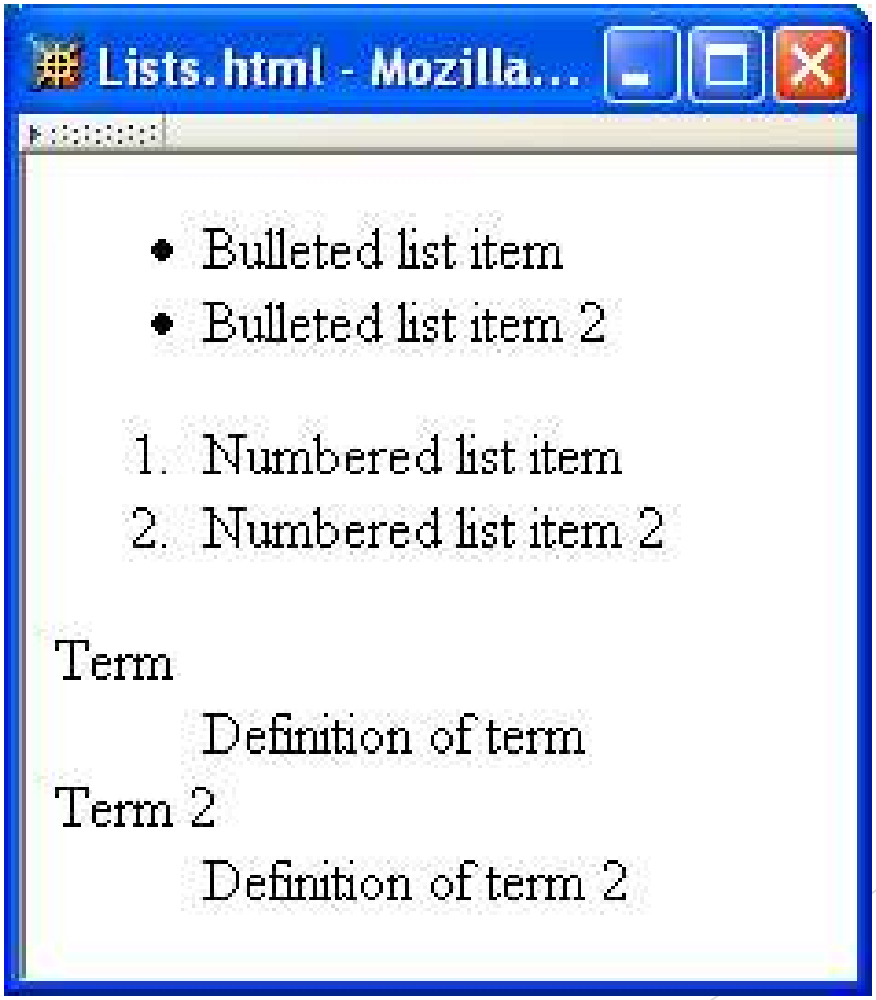
    then the corresponding absolute URL is http://localhost:8080/PageAnch.html#section1

```
<a href="#section1">...
```

Relative URL's

- Advantages:
  - Shorter than absolute URL's
  - Primary: can change the URL of a document (e.g., move document to a different directory or rename the server host) without needing to change URL's within the document
- Should use relative URL's whenever possible

Lists


Lists.html - Mozilla...
Bulleted list item
Bulleted list item 2
1. Numbered list item
2. Numbered list item 2
Term
Definition of term
Term 2
Definition of term 2

Lists

Unordered List

Ordered List

Definition List

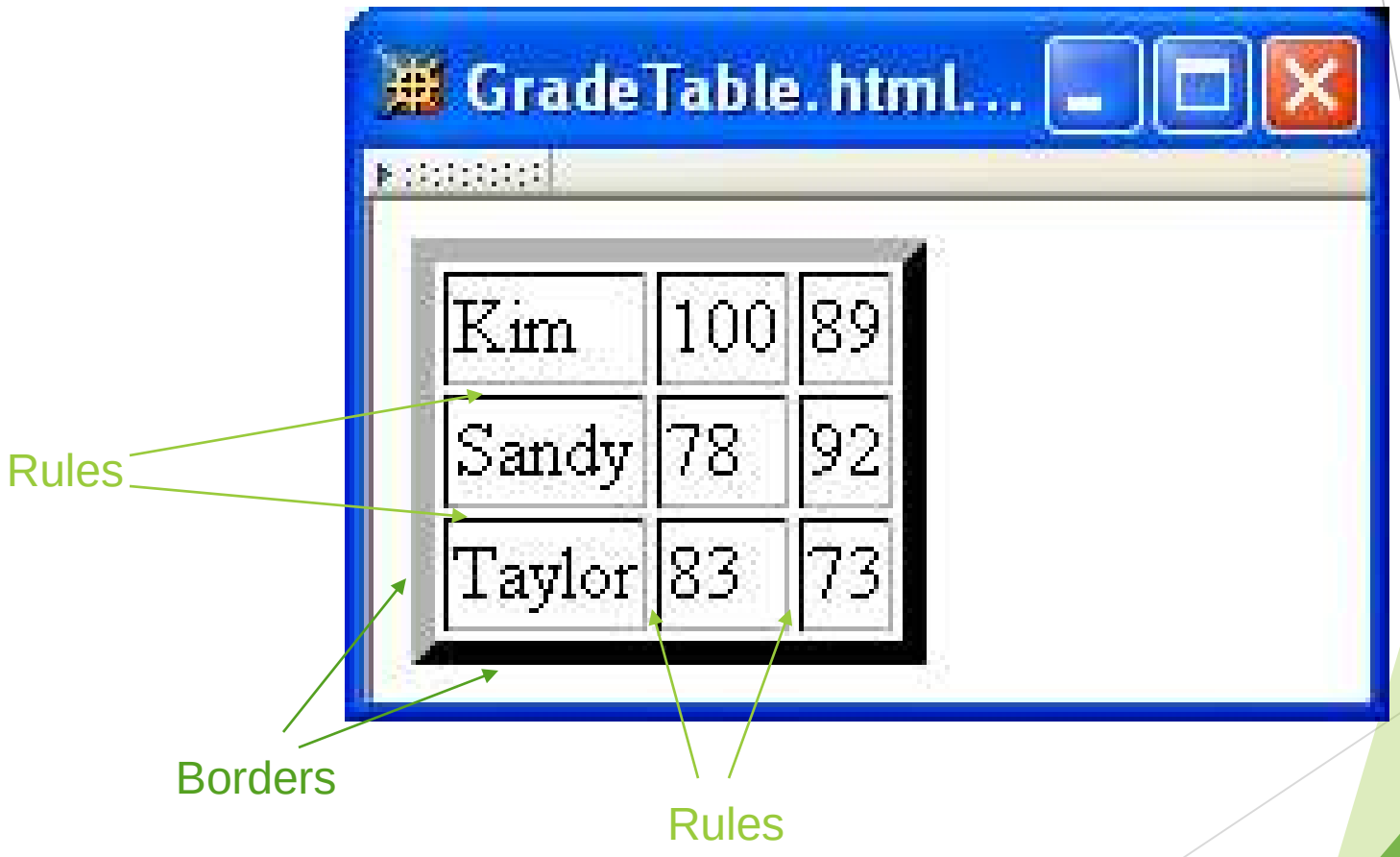
```
<ul>
  <li>Bulleted list item</li>
  <li>Bulleted list item 2</li>
</ul>
<ol>
  <li>Numbered list item</li>
  <li>Numbered list item 2</li>
</ol>
<dl>
  <dt>Term</dt>
  <dd>Definition of term</dd>
  <dt>Term 2</dt>
  <dd>Definition of term 2</dd>
</dl>
```

List Items

Lists


```
<ul>
  <li>Bulleted list item
    <ul>
      <li>Nested list item</li>
      <li>Nested list item 2</li>
    </ul>
  </li>
  <li>Bulleted list item 2</li>
</ul>
```

Tables


GradeTable.html...
Kim 100 89
Sandy 78 92
Taylor 83 73
Rules
Borders
Rules

Tables

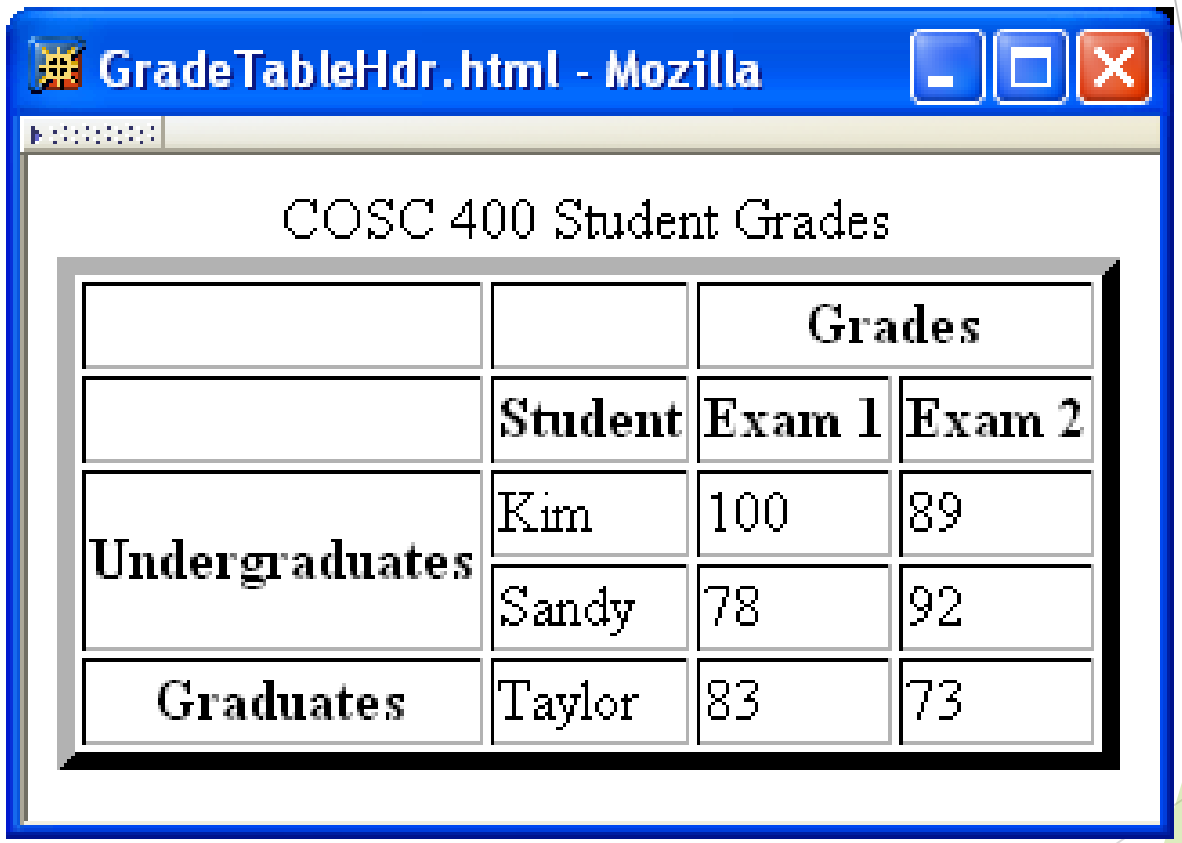
Border 5 pixels, rules 1 pixel

```
<table border="5">
  <tr>
    <td>Kim</td><td>100</td><td>89</td>
  </tr>
  <tr>
    <td>Sandy</td><td>78</td><td>92</td>
  </tr>
  <tr>
    <td>Taylor</td><td>83</td><td>73</td>
  </tr>
</table>
```

Table Row

Table Data

Tables

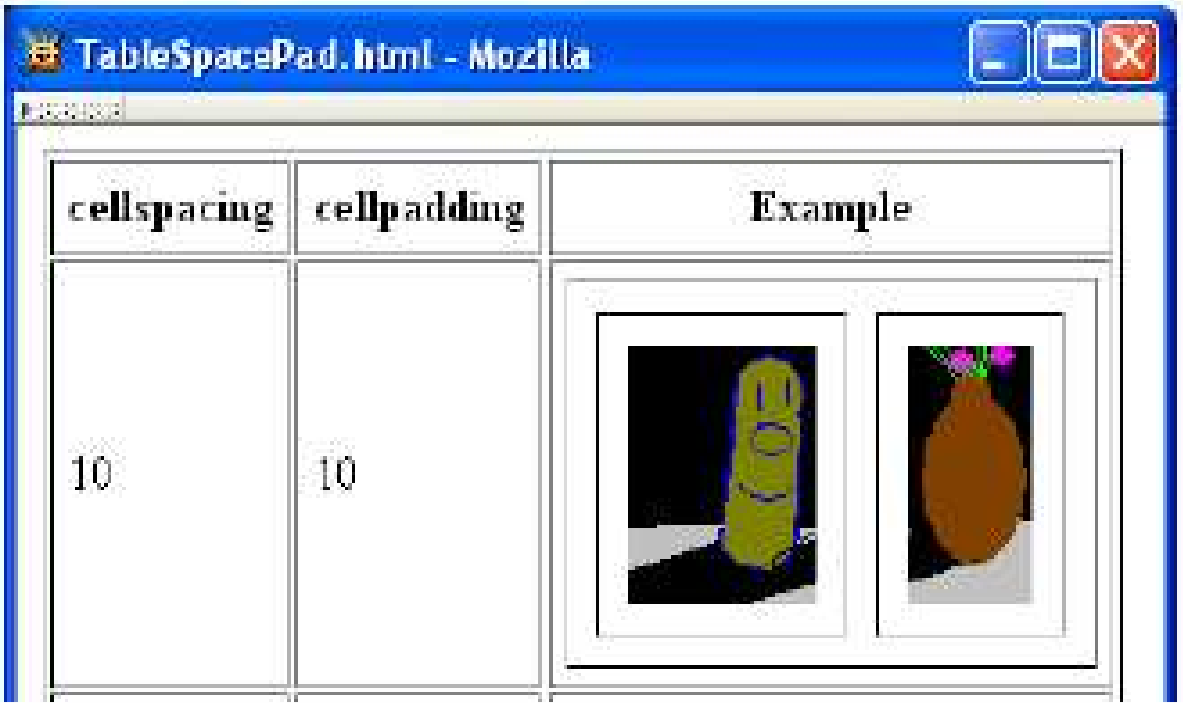

GradeTableHdr.html - Mozilla
COSC 400 Student Grades
Grades
Student
Exam 1
Exam 2
Undergraduates
Kim
100
89
Sandy
78
92
Graduates
Taylor
83
73

Tables

```
<table border="5">
  <caption>
    COSC 400 Student Grades
  </caption>
  <tr>
    <td> </td><td> </td><th colspan="2">Grades</th>
  </tr>
  <tr>
    <td> </td><th>Student</th><th>Exam 1</th><th>Exam 2</th>
  </tr>
  <tr>
    <th rowspan="2">Undergraduates</th><td>Kim</td><td>100</td><td>89</td>
  </tr>
  <tr>
    <td>Sandy</td><td>78</td><td>92</td>
  </tr>
  <tr>
    <th>Graduates</th><td>Taylor</td><td>83</td><td>73</td>
  </tr>
</table>
```

Table Header

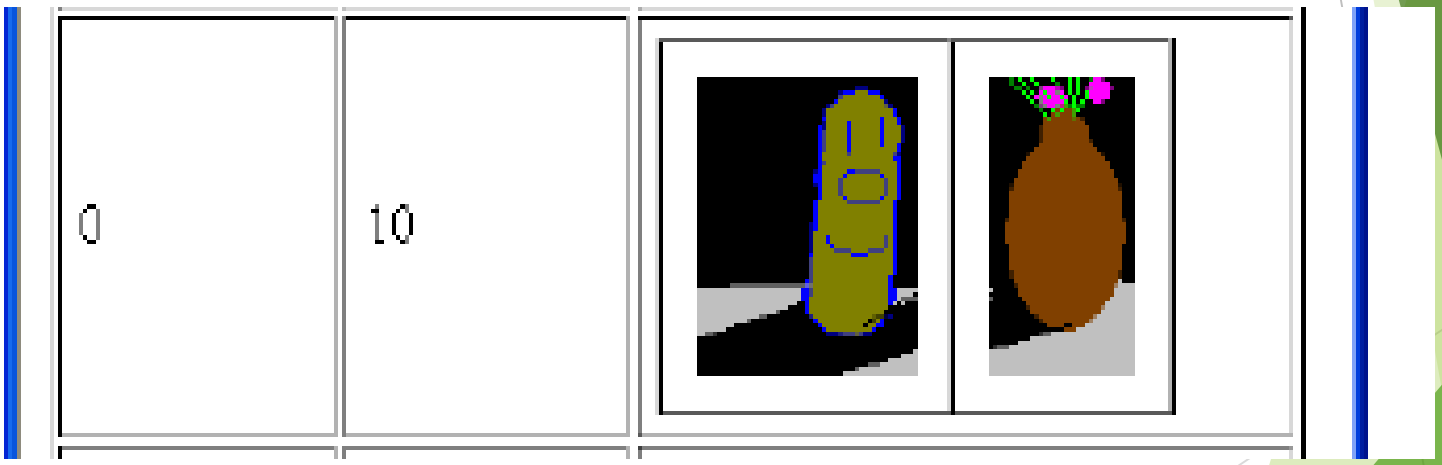
Tables




```
<table border="1" cellspacing="10" cellpadding="10">
```

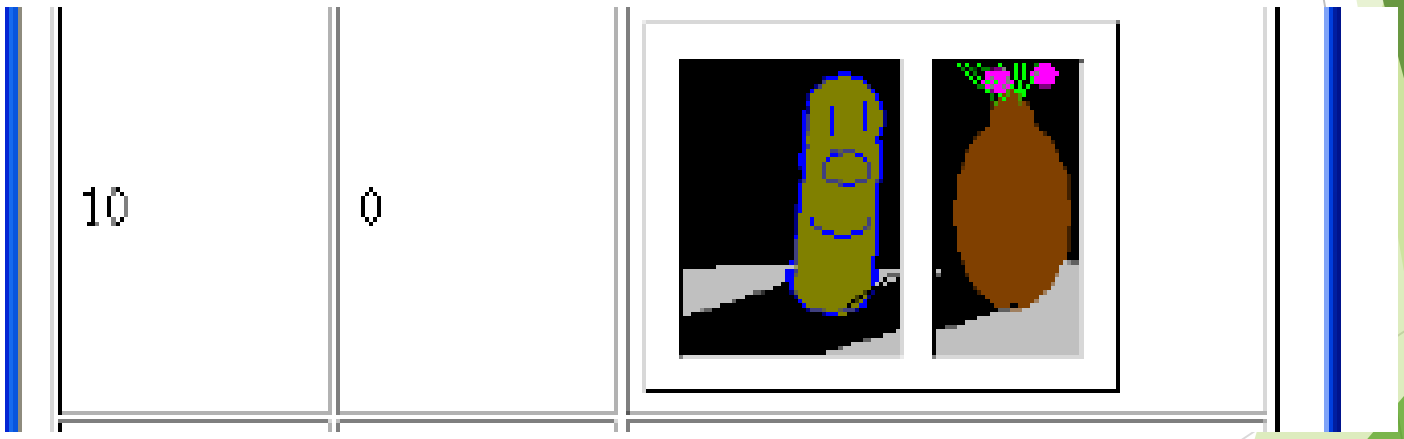
Tables

cellspacing cellpadding



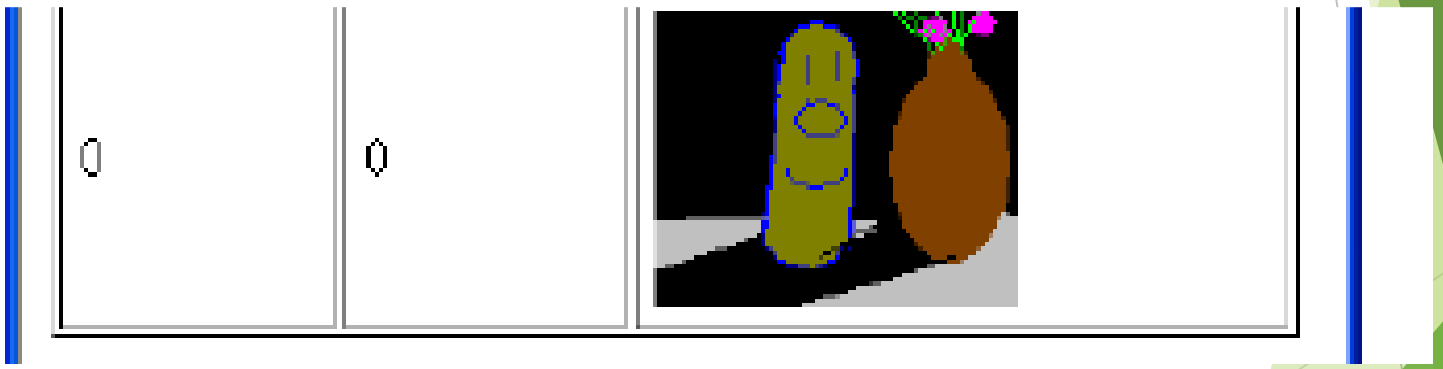
Tables

cellspacing cellpadding

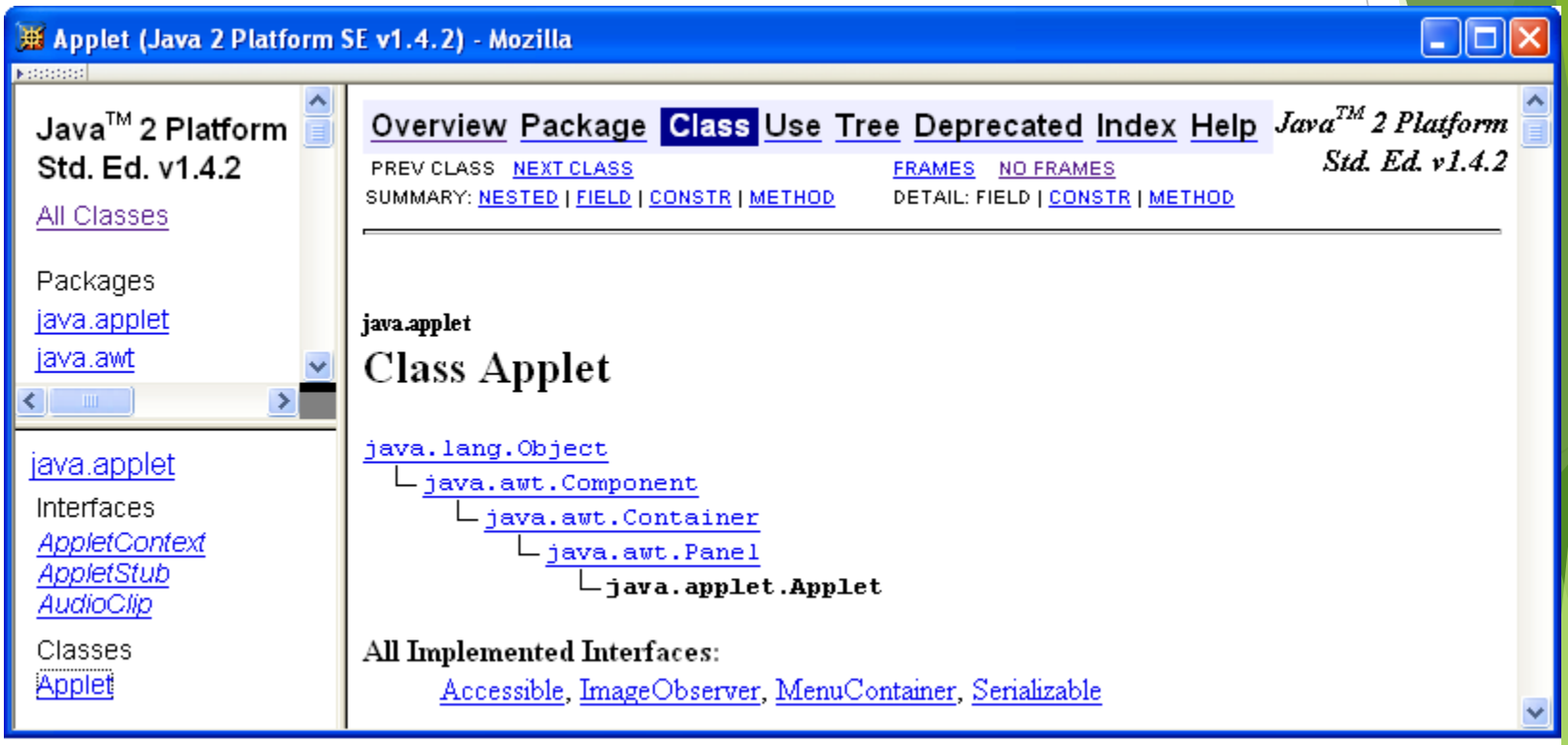


Tables

cellspacing cellpadding



Frames



Frames

```
<!DOCTYPE html
   PUBLIC "-//W3C//DTD XHTML 1.0 Frameset//EN"
   "http://www.w3.org/TR/xhtml1/DTD/xhtml1-frameset.dtd">
<html xmlns="http://www.w3.org/1999/xhtml">
  <head>
    <title>Java 2 Platform SE v1.4.2</title>
  </head>
  <frameset cols="20%,80%">
    <frameset rows="1*,2*">
      <frame src="overview-frame.html"
        id="upperLeftFrame" name="upperLeftFrame"></frame>
      <frame src="allclasses-frame.html"
        id="lowerLeftFrame" name="lowerLeftFrame"></frame>
    </frameset>
    <frame src="overview-summary.html"
        id="rightFrame" name="rightFrame"></frame>
  </frameset>
</html>
```

1/3,2/3 split

Frames

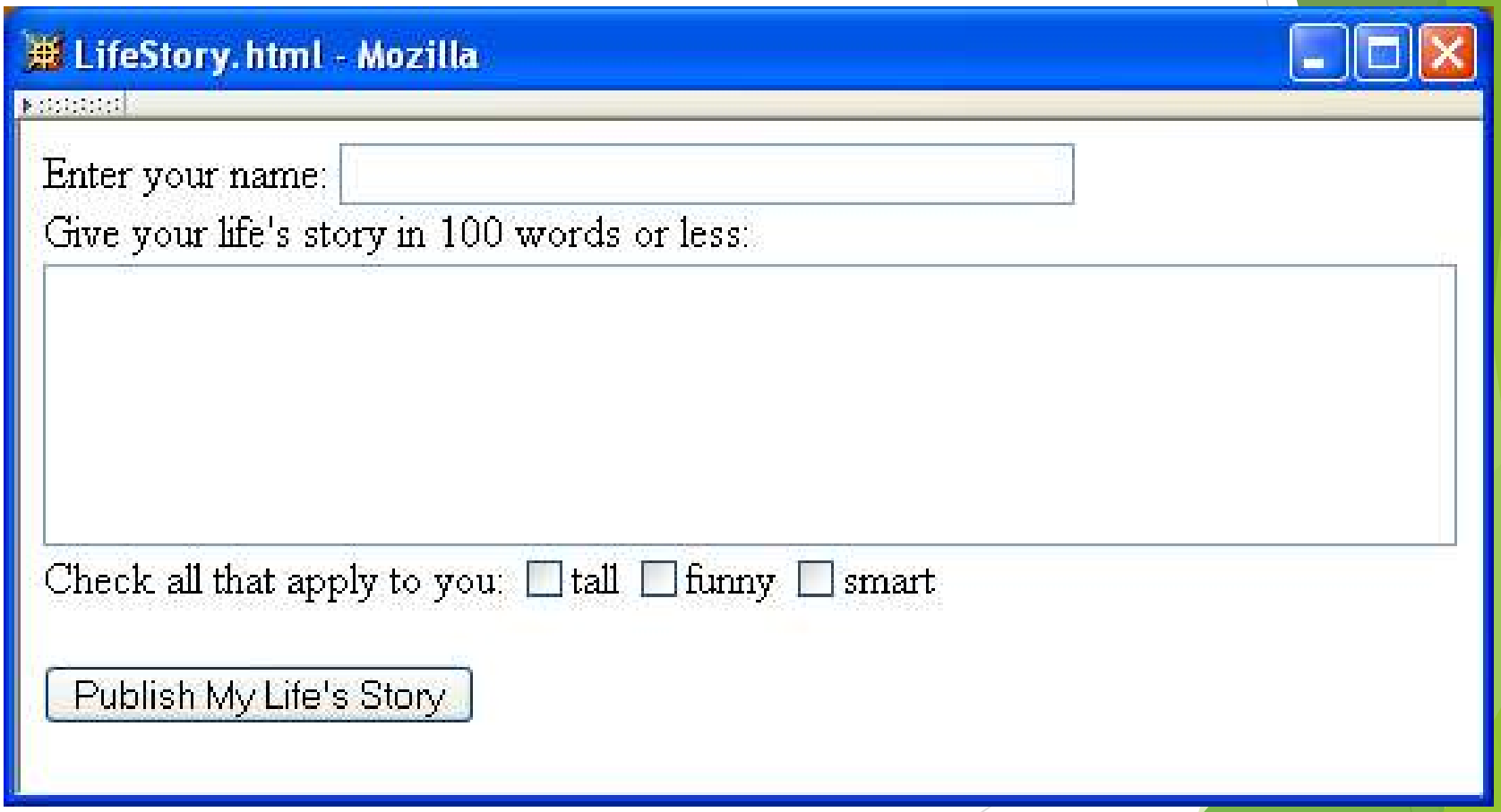
- Hyperlink in one frame can load document in another:
- Value of target attribute specification is id/name of a frame

```
<a href="java/applet/package-frame.html" target="lowerLeftFrame">
```

Frames

- User interface issues:
  - What happens when the page is printed?
  - What happens when the Back button is clicked?
  - How should assistive technology "read" the page?
  - How should the information be displayed on a small display?
- Recommendation: avoid frames except for applications aimed at "power users"

Forms


LifeStory.html - Mozilla
Enter your name:
Give your life's story in 100 words or less:
Check all that apply to you:
tall
funny
smart
Publish My Life's Story

Forms

Each form is content of a `form` element

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Forms

`action` specifies URL where form data is sent in an HTTP request

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Forms

HTTP request method (lower case)

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Forms

- The XHTML grammar require any child of the *form* element to be a block
- Many form elements are actually *inline*, so including a block element on top such a *div* or a table is a simple way to be compliant with the grammar

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

div is the block element analog of span (no-style block element)

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Form control elements must be content of a block element

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

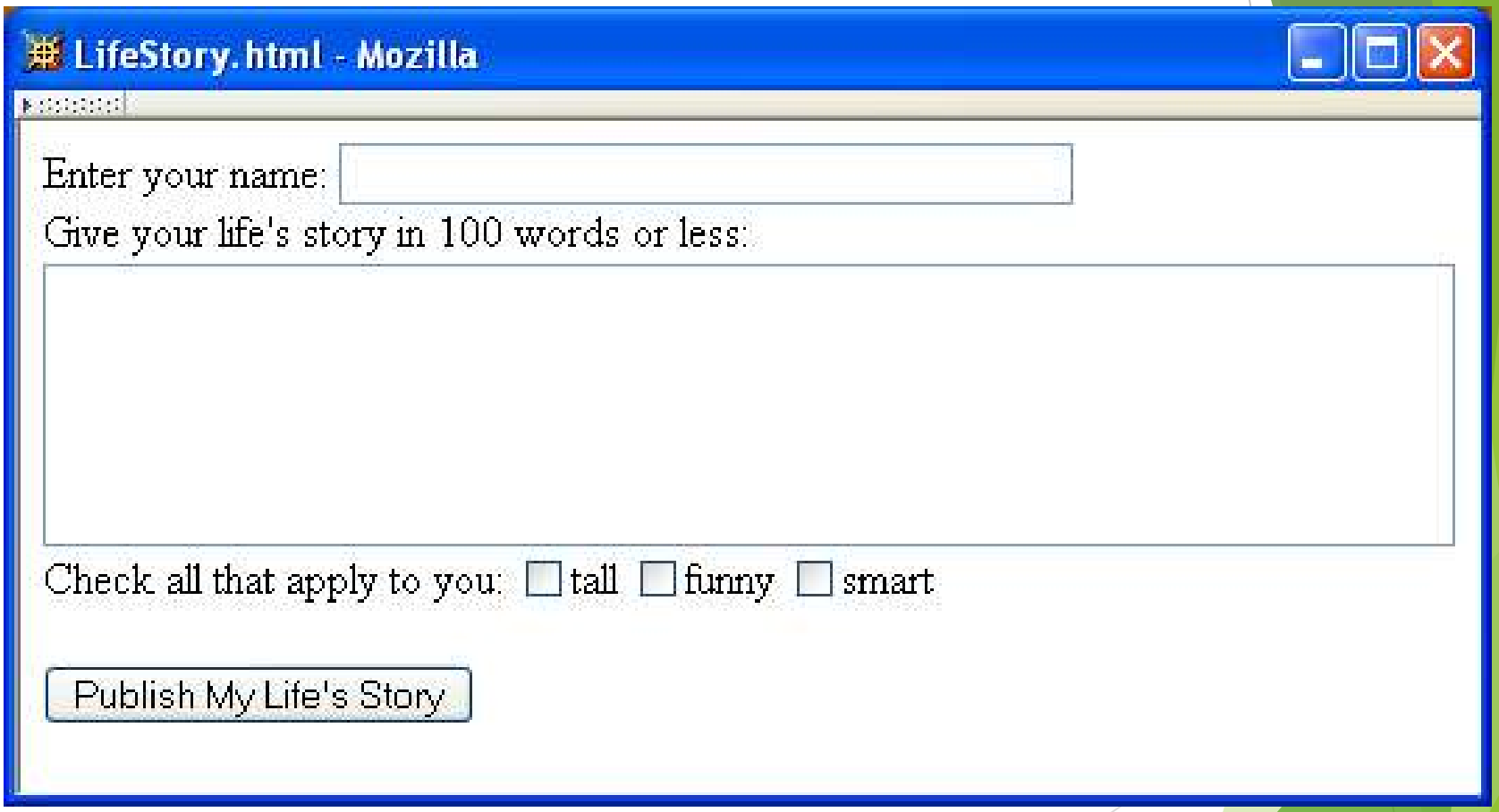
Text field *control* (form user-interface element)

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Text field used for one-line inputs

Forms


LifeStory.html - Mozilla
Enter your name:
Give your life's story in 100 words or less:
Check all that apply to you: tall funny smart
Publish My Life's Story

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Name associated with this control's data in HTTP request

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Width (number of characters) of text field

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

input is an empty element

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Use `label` to associate text with a control

Only one control inside a label element!

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

Form controls are inline elements

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

textarea control used for multi-line input

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

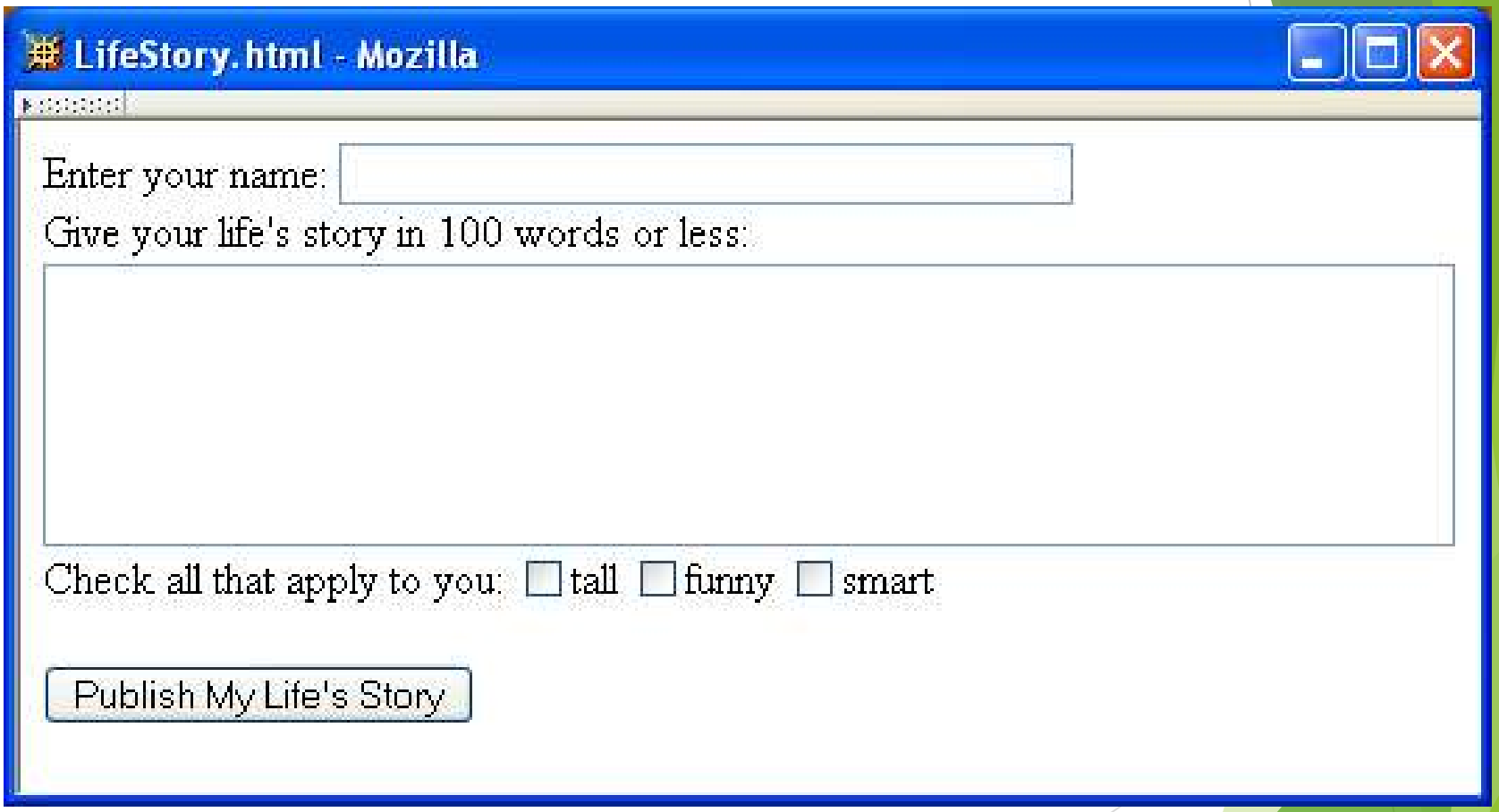
Height and width in characters

Forms

```
<form action="http://www.example.org" method="get">
  <div>
    <label>
      Enter your name: <input type="text" name="username" size="40" />
    </label>
    <br />
    <label>
      Give your life's story in 100 words or less:
      <br />
      <textarea name="lifestory" rows="5" cols="60"></textarea>
    </label>
    <br />
```

`textarea` is not an empty element; any content is displayed

Forms


LifeStory.html - Mozilla
Enter your name:
Give your life's story in 100 words or less:
Check all that apply to you:
tall
funny
smart
Publish My Life's Story

Forms

```
Check all that apply to you:
<label>
  <input type="checkbox" name="boxgroup1" value="tall" />tall
</label>
<label>
  <input type="checkbox" name="boxgroup1" value="funny" />funny
</label>
<label>
  <input type="checkbox" name="boxgroup1" value="smart" />smart
</label>
<br /><br />
<input type="submit" name="doit" value="Publish My Life's Story" />
</div>
</form>
```

Checkbox control

Forms

```
    Check all that apply to you:
    <label>
      <input type="checkbox" name="boxgroup1" value="tall" />tall
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="funny" />funny
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="smart" />smart
    </label>
    <br /><br />
    <input type="submit" name="doit" value="Publish My Life's Story" />
  </div>
</form>
```

Value sent in HTTP request if box is checked

Forms

Controls can share a common name

```
    Check all that apply to you:
    <label>
      <input type="checkbox" name="boxgroup1" value="tall" />tall
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="funny" />funny
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="smart" />smart
    </label>
    <br /><br />
    <input type="submit" name="doit" value="Publish My Life's Story" />
  </div>
</form>
```

Forms

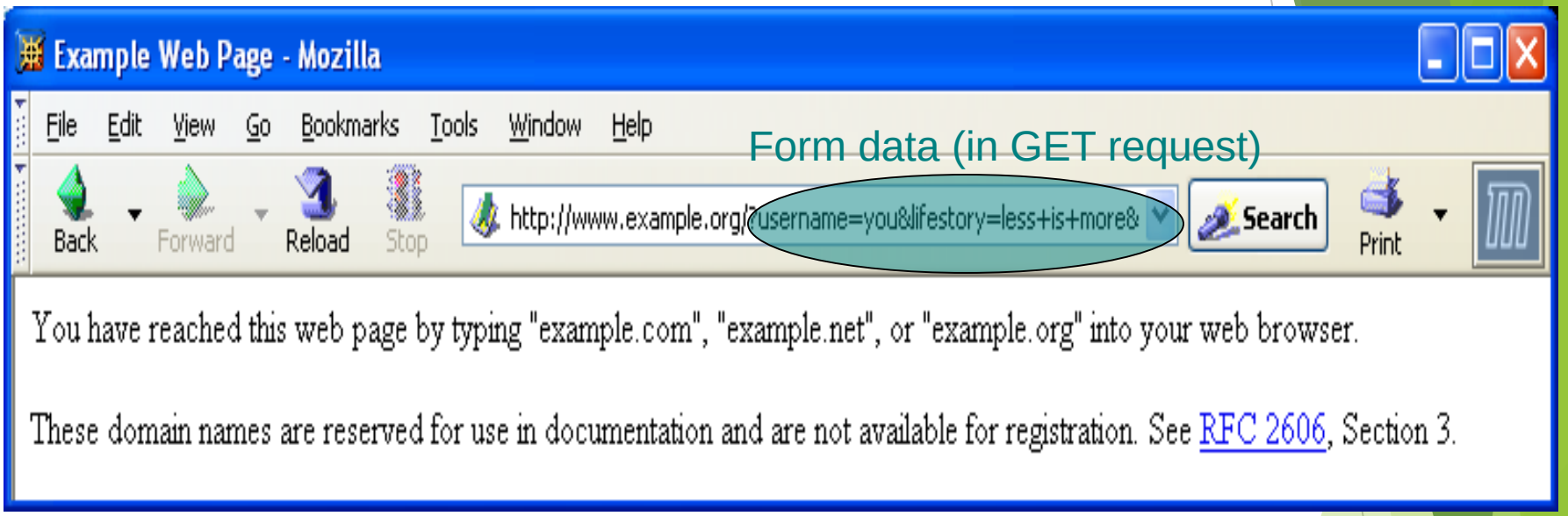
```
Check all that apply to you:
<label>
  <input type="checkbox" name="boxgroup1" value="tall" />tall
</label>
<label>
  <input type="checkbox" name="boxgroup1" value="funny" />funny
</label>
<label>
  <input type="checkbox" name="boxgroup1" value="smart" />smart
</label>
<br /><br />
<input type="submit" name="doit" value="Publish My Life's Story" />
</div>
</form>
```

Submit button: form data sent to action URL if button is clicked

Forms


Example Web Page - Mozilla
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.example.org/?username=you&lifestory=less+is+more&
Search
Print
You have reached this web page by typing "example.com", "example.net", or "example.org" into your web browser.
These domain names are reserved for use in documentation and are not available for registration. See RFC 2606, Section 3.

Forms


Example Web Page - Mozilla
File Edit View Go Bookmarks Tools Window Help
Back Forward Reload Stop
http://www.example.org/?username=you&lifestory=less+is+more&
Search
Print
Form data (in GET request)
You have reached this web page by typing "example.com", "example.net", or "example.org" into your web browser.
These domain names are reserved for use in documentation and are not available for registration. See RFC 2606, Section 3.

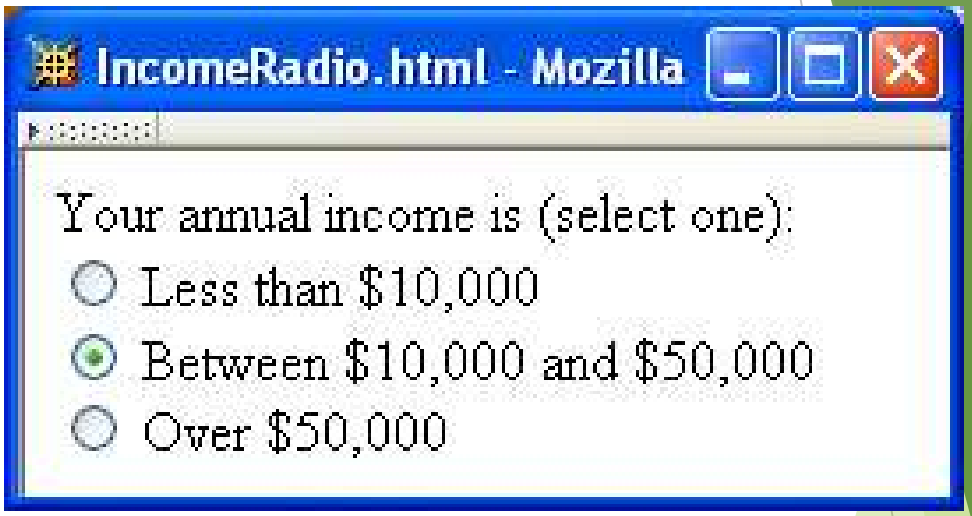
Forms

```
    Check all that apply to you:
    <label>
      <input type="checkbox" name="boxgroup1" value="tall" />tall
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="funny" />funny
    </label>
    <label>
      <input type="checkbox" name="boxgroup1" value="smart" />smart
    </label>
    <br /><br />
    <input type="submit" name="doit" value="Publish My Life's Story" />
  </div>
</form>
```

Displayed on button and sent to server if button clicked

Forms

Radio buttons: at most one can be selected at a time.



Forms

```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" />
    Between $10,000 and $50,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

Radio button control

Forms

```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" />
    Between $10,000 and $50,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

All radio buttons with the same name form a *button set*

Forms

```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" />
    Between $10,000 and $50,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

Only one button of a set can be selected at a time

Forms

```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" /> This button is initially selected
    Between $10,000 and $50,000 (checked attribute also applies
</label><br />                        to check boxes)
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

Forms

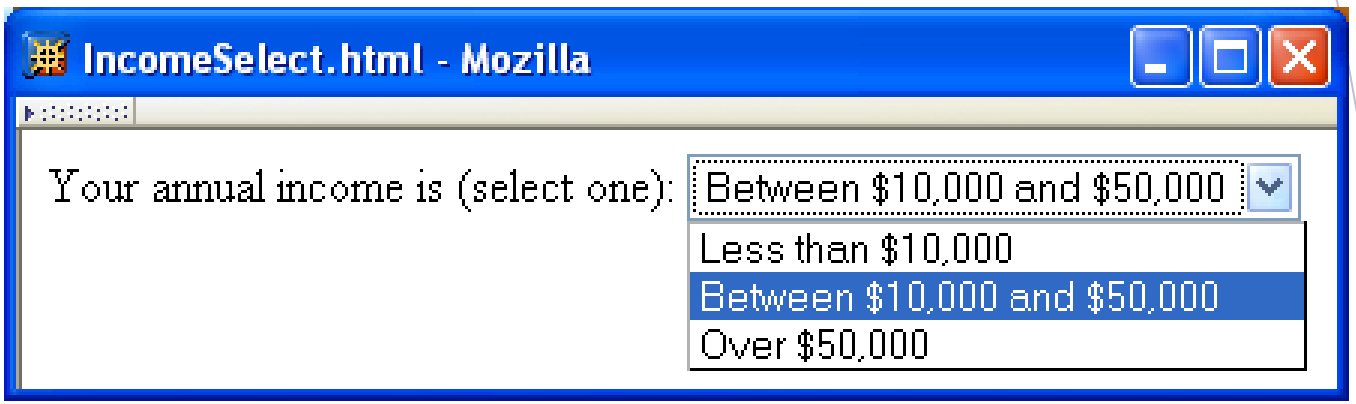
```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" /> Boolean attribute: default false,
    Between $10,000 and $50,000 set true by specifying name as
</label><br />                                value
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

Forms

```
Your annual income is (select one):<br />
<label>
  <input type="radio" name="radgroup1" value="0-10" />
    Less than $10,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="10-50"
         checked="checked" />
    Between $10,000 and $50,000
</label><br />
<label>
  <input type="radio" name="radgroup1" value="&gt;50" />
    Over $50,000
</label>
```

Represents string: >50

Forms


IncomeSelect.html - Mozilla
Your annual income is (select one):
Between $10,000 and $50,000
Less than $10,000
Between $10,000 and $50,000
Over $50,000
Menu

Forms

```
Your annual income is (select one):
<select name="income">
  <option value="0-10">Less than $10,000</option>
  <option value="10-50" selected="selected">
    Between $10,000 and $50,000
  </option>
  <option value="&gt;50">Over $50,000</option>
</select>
```

Menu control; name given once

Forms

```
Your annual income is (select one):
<select name="income">
  <option value="0-10">Less than $10,000</option>
  <option value="10-50" selected="selected">
    Between $10,000 and $50,000
  </option>
  <option value="&gt;50">Over $50,000</option>
</select>
```

Each menu item has its own value

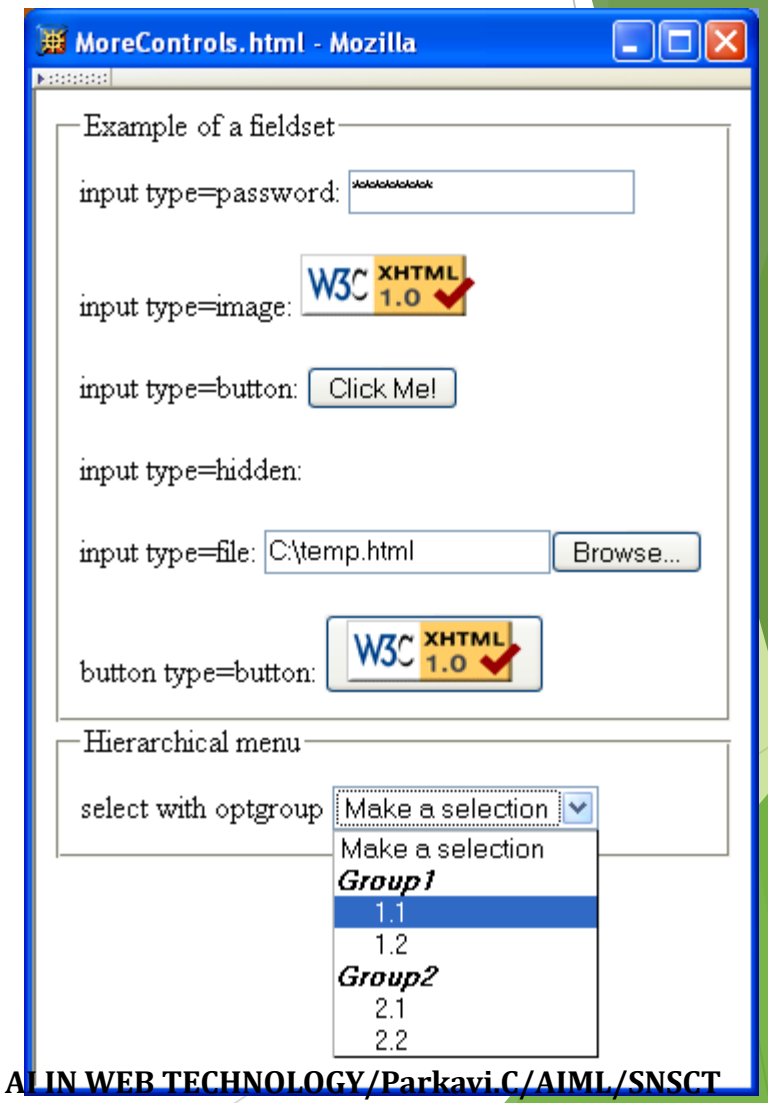
Forms

```
Your annual income is (select one):
<select name="income">
  <option value="0-10">Less than $10,000</option>
  <option value="10-50" selected="selected">
    Between $10,000 and $50,000
  </option>
  <option value="&gt;50">Over $50,000</option>
</select>
```

Item initially displayed in menu control

Forms

- Other form controls:
  - Fieldset (grouping)
  - Password
  - Clickable image
  - Non-submit buttons
  - Hidden (embed data)
  - File upload
  - Hierarchical menus



Forms

TABLE 2.5: HTML 4.01/XHTML 1.0 non-deprecated form controls.

Element	type Attribute	Control
input	text	Text input
input	password	Password input
input	checkbox	Checkbox
input	radio	Radio button
input	submit	Submit button
input	image	Graphical submit button
input	reset	Reset button (form clear)
input	button	Push button (for use with scripts)
input	hidden	Non-displayed control (stores server-supplied information)
input	file	File select
button	submit	Submit button with content (not an empty element)
button	reset	Cancel button with content (not an empty element)
button	button	Button with content but no predefined action
select	N/A	Menu
option	N/A	Menu item
optgroup	N/A	Heading in a hierarchical menu
textarea	N/A	Multi-line text input
label	N/A	Associate label with control(s)
fieldset	N/A	Groups controls
legend	N/A	Add caption to a fieldset

XML DTD

- Recall that XML is used to define the syntax of XHTML
- Set of XML files that define a language are known as the document type definition (DTD)
- DTD primarily consists of declarations:
  - Element type: name and content of elements
  - Attribute list: attributes of an element
  - Entity: define meaning of, *e.g.*, `>`

XML DTD

- Example from

http://www.w3.org/TR/xhtml1/DTD/xhtml1-strict.dtd

```
<!ELEMENT html (head, body)>
<!ATTLIST html
    %i18n;
    id          ID          #IMPLIED
    xmlns       %URI;           #FIXED 'http://www.w3.org/1999/xhtml'  >

<!ENTITY % i18n
    "lang       %LanguageCode;      #IMPLIED
    xml:lang    %LanguageCode;      #IMPLIED
    dir         (ltr|rtl)           #IMPLIED"  >
```

XML Element Type Declaration

```
<!ELEMENT html (head, body)>
```

Element type name

XML Element Type Declaration

```
<!ELEMENT html (head, body)>
```

Element type *content specification* (or *content model*)

XML Element Type Declaration

```
<!ELEMENT html (head, body)>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT html (head, body)>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT br EMPTY>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT br EMPTY>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	EMPTY	None
Arbitrary	ANY	Any content (no restrictions)
Sequence	(elt1, elt2, ...)	Sequence of elements that must appear in order specified
Choice	(elt1 | elt2 | ...)	Exactly one of the specified elements must appear
Character data	(#PCDATA)	Arbitrary character data, but no elements
Mixed	(#PCDATA | elt1 | elt2 |...)*	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT select (optgroup|option)+>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT select (optgroup|option)+>
```

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

<!ELEMENT textarea (#PCDATA)>

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

<!ELEMENT textarea (#PCDATA)>

Element type *content specification* (or *content model*)

TABLE 2.6: Basic XML content specifications.

Specification Type	Syntax	Content Allowed
Empty	`EMPTY`	None
Arbitrary	`ANY`	Any content (no restrictions)
Sequence	`(elt1, elt2, ...)`	Sequence of elements that must appear in order specified
Choice	`(elt1 | elt2 | ...)`	Exactly one of the specified elements must appear
Character data	`(#PCDATA)`	Arbitrary character data, but no elements
Mixed	`(#PCDATA | elt1 | elt2 |... )*`	Any mixture of character data and the specified elements in any order

XML Element Type Declaration

```
<!ELEMENT select (optgroup|option)+>
```

Element type *content specification* (or *content model*)

XML Element Type Declaration

```
<!ELEMENT select (optgroup|option)+>
```

Element type *content specification* (or *content model*)

TABLE 2.7: XML content specification iterator characters.

Character	Meaning
?	Sequence/choice is optional (appears zero or one times)
*	Sequence/choice may be repeated an arbitrary number of times, including none
+	Sequence/choice may appear one or more times

XML Element Type Declaration

```
<!ELEMENT select (optgroup|option)+>
```

Element type *content specification* (or *content model*)

TABLE 2.7: XML content specification iterator characters.

Character	Meaning
?	Sequence/choice is optional (appears zero or one times)
*	Sequence/choice may be repeated an arbitrary number of times, including none
+	Sequence/choice may appear one or more times

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption`

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by optional footer

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by optional footer then

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by optional footer then
  - One or more `tbody` elements

XML Element Type Declaration

```
<!ELEMENT table
      (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by optional footer then
  - One or more `tbody` elements or

XML Element Type Declaration

```
<!ELEMENT table
     (caption?, (col*|colgroup*), thead?, tfoot?, (tbody+|tr+))>
```

- Child elements of `table` are:
  - Optional `caption` followed by
  - Any number of `col` elements or any number of `colgroup` elements then
  - Optional header followed by optional footer then
  - One or more `tbody` elements or one or more `tr` elements

XML Attribute List Declaration

Element type name

```
<!ATTLIST html
   lang          NMTOKEN     #IMPLIED
   xml:lang      NMTOKEN     #IMPLIED
   dir           (ltr|rtl)   #IMPLIED
   id            ID          #IMPLIED
   xmlns         CDATA       #FIXED 'http://www.w3.org/1999/xhtml'>
```

XML Attribute List Declaration

```
<!ATTLIST html
    lang        NMTOKEN    #IMPLIED
    xml:lang    NMTOKEN    #IMPLIED
    dir         (ltr|rtl)  #IMPLIED
    id          ID         #IMPLIED
    xmlns       CDATA      #FIXED 'http://www.w3.org/1999/xhtml'>
```

Recognized attribute names

XML Attribute List Declaration

```
<!ATTLIST html
   lang          NMTOKEN     #IMPLIED
   xml:lang      NMTOKEN     #IMPLIED
   dir           (ltr|rtl)   #IMPLIED
   id            ID          #IMPLIED
   xmlns         CDATA       #FIXED 'http://www.w3.org/1999/xhtml'>
```

Attribute types
(data types allowed as attribute values)

XML Attribute List Declaration

ASCII characters: letter, digit, or . - _ :

```
<!ATTLIST html
   lang          NMTOKEN     #IMPLIED
   xml:lang      NMTOKEN     #IMPLIED
   dir           (ltr|rtl)   #IMPLIED
   id            ID          #IMPLIED
   xmlns         CDATA       #FIXED 'http://www.w3.org/1999/xhtml'>
```

XML Attribute List Declaration

Attribute value must be ltr or rtl

```
<!ATTLIST html
   lang          NMTOKEN    #IMPLIED
   xml:lang      NMTOKEN    #IMPLIED
   dir           (ltr|rtl)  #IMPLIED
   id            ID         #IMPLIED
   xmlns         CDATA      #FIXED 'http://www.w3.org/1999/xhtml'>
```

XML Attribute List Declaration

```
<!ATTLIST html
   lang          NMTOKEN    #IMPLIED
   xml:lang      NMTOKEN    #IMPLIED
   dir           (ltr|rtl)  #IMPLIED
   id            ID         #IMPLIED
   xmlns         CDATA      #FIXED 'http://www.w3.org/1999/xhtml'>
```

Like NMTOKEN but must begin with letter or _ :
Attribute value must be unique

XML Attribute List Declaration

```
<!ATTLIST html
   lang          NMTOKEN    #IMPLIED
   xml:lang      NMTOKEN    #IMPLIED
   dir           (ltr|rtl)  #IMPLIED
   id            ID         #IMPLIED
   xmlns         CDATA      #FIXED 'http://www.w3.org/1999/xhtml'>
```

Any character except XML special characters < and &
or the quote character enclosing the attribute value

XML Attribute List Declaration

TABLE 2.8: Key attribute types used in XHTML 1.0 Strict DTD.

Attribute type	Syntax	Usage
Name token	`NMTOKEN`	Name (word)
Enumerated	`( string1 | string2 | ... )`	List of all possible attribute values
Identifier	`ID`	Type for `id` attribute
Identifier reference	`IDREF`	Reference to an `id` attribute value
Identifier reference list	`IDREFS`	List of references to `id` attribute values
Character data	`CDATA`	Arbitrary character data (except < and &)

XML Attribute List Declaration

```
<!ATTLIST html
   lang          NMTOKEN     #IMPLIED
   xml:lang      NMTOKEN     #IMPLIED
   dir           (ltr|rtl)   #IMPLIED
   id            ID          #IMPLIED
   xmlns         CDATA       #FIXED 'http://www.w3.org/1999/xhtml'>
```

Attribute default declarations

XML Attribute List Declaration

TABLE 2.9: XML attribute default-value declarations.

Default type	Syntax
No default value provided by DTD, attribute optional	`#IMPLIED`
Default provided by DTD, may not be changed	`#FIXED` followed by any valid value (quoted)
Default provided by DTD, may be overridden by user	Any valid value (quoted)
No default value provided by DTD, attribute required	`#REQUIRED`

XML Entity Declaration

- Entity declaration is essentially a macro
- Two types of entity:
  - General: referenced from HTML document using &

XML Entity Declaration

- Entity declaration is essentially a macro
- Two types of entity:
  - General: referenced from HTML document using &

```
<!ENTITY gt    "&#62;">
```

Replacement text;
recursively replaced if it is a reference

XML Entity Declaration

- Entity declaration is essentially a macro
- Two types of entity:
  - General: referenced from HTML document using &
  - Parameter: reference from DTD using %

```
<!ENTITY gt        "&#62;">
```

```
<!ENTITY % LanguageCode "NMTOKEN">

<!ATTLIST html
  lang          NMTOKEN    #IMPLIED
  xml:lang      %LanguageCode; #IMPLIED
```

XML Entity Declaration

- Entity declaration is essentially a macro
- Two types of entity:
  - General: referenced from HTML document using &
  - Parameter: reference from DTD using %

```
<!ENTITY gt        "&#62;">
```

```
<!ENTITY % LanguageCode "NMTOKEN">
<!ATTLIST html
  lang          NMTOKEN    #IMPLIED
  xml:lang      %LanguageCode;  #IMPLIED
```

DTD Files

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

System Identifier: URL for primary DTD document

- DTD document contains element type, attribute list, and entity declarations
- May also contain declaration of external entities: identifiers for secondary DTD documents

DTD Files

External entity name

```
<!ENTITY % HTMLlat1 PUBLIC
    "-//W3C//ENTITIES Latin 1 for XHTML//EN"
    "xhtml-lat1.ent">
%HTMLlat1;
```

DTD Files

```
<!ENTITY % HTMLlat1 PUBLIC
    "-//W3C//ENTITIES Latin 1 for XHTML//EN"
    "xhtml-lat1.ent">
%HTMLlat1;
```

System identifier (relative URL)

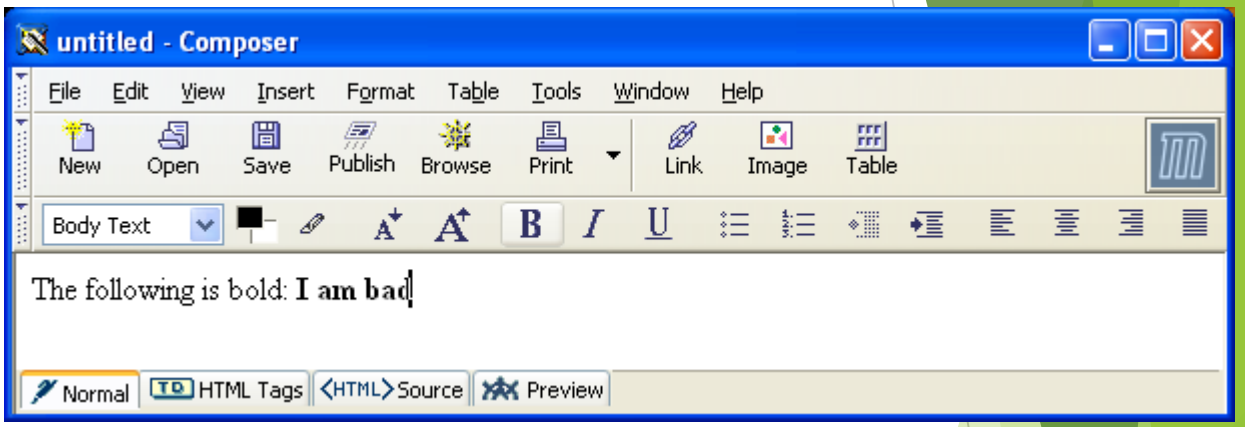
DTD Files

```
<!ENTITY % HTMLlat1 PUBLIC
    "-//W3C//ENTITIES Latin 1 for XHTML//EN"
    "xhtml-lat1.ent">
%HTMLlat1;
```

Entity reference; imports content (entity declarations, called *entity set*) of external entity at this point in the primary DTD

HTML Creation Tools

- Mozilla Composer



- Microsoft FrontPage
- Macromedia Dreamweaver
- Etc.