Markup

- text-based formats for describing documents
- add directives to text to mark regions

- content elements
- style
- structure

Text Formats

- text formats have advantages

- human-readable
- easier to maintain (version control)
- easier to exchange
- easier to convert (to web page, to PDF, ...)

Markup Languages

- markup languages define rules for marking text
- e.g. stars for emphasis/italics

```
In the mid 1960s, there were so many British groups
in the US music charts that the Americans called it
the *British invasion*.
```

- semantic (emphasized) vs stylistic (italics)
- semantic is preferred

WYSIWYM

- not WYSIWYG
- where will lines be wrapped?

- WYSIWYM: What You See Is What You Mean

HTML

- HyperText Markup Language

- a document consists of elements
- e.g. paragraph: p, emphasized text: em

Tags

- elements are represented by tag pairs

- opening tag: , closing tag:

```
In the mid-1960s, there were so many British groups
in the US music charts that the Americans called it
the <em>British invasion</em>.
```

Paragraph Example

```
<p>
  The Beatles are regarded as the most important
  and influential band in the history of rock music.
  They are the best-selling band
  with more number one albums and singles
  than any other band or artist.
</p>
```

Whitespace

- whitespace is insignificant

```
In      the mid-1960s, there
     were so many British

  groups in the US music charts that the Americans
     called it      the    <em>British
invasion</em>.
```

Comments

- anything between `<!--` and `-->` is a comment
- ignored by the browser

```html
<p>The Beatles are regarded as the most important
   and influential band <!-- after Herman's Hermits -->
   in the history of rock music. They are
   the best-selling band with more number one albums
   and singles than any other band or artist.</p>
```

Attributes

- elements can have attributes
- name-value pairs

- opening tag: `<element name="value">`

Attribute Example

```
<p title="Introductory information about The Beatles">
  The Beatles are regarded as the most important
  and influential band in the history of rock music.
  They are the best-selling band
  with more number one albums and singles
  than any other band or artist.
</p>
```

Nesting Elements

- elements can be nested

```
<p>In the mid 1960s, there were so many British groups
   in the US music charts that the Americans called it
   the <em>British invasion</em>.</p>
```

Nesting Rule

- subelement opens later and closes earlier

- invalid:

```
<p>In the mid 1960s, there were so many British groups
   in the US music charts that the Americans called it
   the <em>British invasion</p></em>.
```

Self Closing Tags

- some elements can not have subelements
- single tag, ends with `/>`

- thematic break: `hr`
- line break: `br`

Self Closing Tag Example

```html
<p>The Beatles are regarded as <em>the most important and
   influential band</em> in the history of rock music.</p>

<hr />

<p>The band was formed in Liverpool<br /> in 1960.</p>
```

Element Hierarchy

- nesting elements creates a hierarchy
- top level element: `html`
- subelements: head, body

Document Template

- document type
- document language attribute

```html
<!DOCTYPE html>
<html lang="en">
  <head>
    METADATA OF DOCUMENT
  </head>
  <body>
    CONTENT OF DOCUMENT
  </body>
</html>
```

Metadata Elements

- title
- character set
- author, copyright, year, ...
- keywords

Metadata Example

```html
<head>
  <title>The Beatles</title>
  <meta charset="utf-8" />
</head>
```

Content Elements

- paragraphs, lists, tables
- intra-paragraph: emphasis, links, …
- embedded: image, audio, video, …

Full Example

```html
<!DOCTYPE html>
<html lang="en">
  <head>
    <title>The Beatles</title>
    <meta charset="utf-8" />
  </head>
  <body>
    <p>The Beatles are regarded as the most important and
       influential band in the history of rock music.</p>

    <p>The band was formed in Liverpool in 1960.</p>
  </body>
</html>
```

Lists

- unordered list: `ul`
- ordered list: `ol`
- contain list items: `li`

- definition list: `dl`
- every item is a term: `dt`, and a description: `dd`

Unordered List Example

```html
<p>Their famous lineup, called "The Fab Four", consisted
   of the following members:</p>
<ul>
  <li>John Lennon (rhythm guitar)</li>
  <li>Paul McCartney (bass guitar)</li>
  <li>George Harrison (lead guitar)</li>
  <li>Ringo Starr (drums)</li>
</ul>
```

Ordered List Example

```html
<p>The Beatles released 13 albums in the UK:</p>
<ol>
  <li>Please Please Me (1963)</li>
  <li>With the Beatles (1963)</li>
  ...
  <li>Abbey Road (1969)</li>
  <li>Let It Be (1970)</li>
</ol>
```

Definition List Example

```html
<dl>
  <dt>John Lennon</dt>
  <dd>Lennon released several successful albums...</dd>

  <dt>Paul McCartney</dt>
  <dd>McCartney had the most successful solo career...</dd>

  <dt>George Harrison</dt>
  <dd>Harrison had moderate success...</dd>

  <dt>Ringo Starr</dt>
  <dd>Starr also released singles and albums...</dd>
</dl>
```

Tables

- top level element: `table`
- for each row within table: `tr`
- for each cell within row: `td`

- in header row: `th` instead of `td`

Table Example

```
<table>
  <tr>
    <th>No</th>
    <th>Title</th>
    <th>Lead Vocals</th>
    <th>Duration</th>
  </tr>
  <tr>
    <td>1</td>
    <td>Sgt. Pepper's Lonely Hearts Club Band</td>
    <td>McCartney</td>
    <td>2:02</td>
  </tr>
</table>
```

Row Groups

- column titles: `thead`
- data: `tbody`
- summation: `tfoot`

Row Group Example

```html
<table>
  <thead>
    <tr>
      <th>No</th>
      <th>...</th>
    </tr>
  </thead>
  <tbody>
    <tr>
      <td>1</td>
      <td>...</td>
    </tr>
  </tbody>
</table>
```

Multi-column Cells

- span multiple columns: `colspan` attribute

```html
<tr>
  <th colspan="2">Title</th>
  <th>Lead Vocals</th>
  <th>Length</th>
</tr>
<tr>
  <td>1</td>
  <td>Sgt. Pepper's Lonely Hearts Club Band</td>
  <td>McCartney</td>
  <td>2:02</td>
</tr>
```

Multi-row Cells

- span multiple rows: `rowspan` attribute

```html
<tr>
  <td>4</td>
  <td>Getting Better</td>
  <td rowspan="2">McCartney</td>
  <td>2:48</td>
</tr>
<tr>
  <td>5</td>
  <td>Fixing a Hole</td>
  <td>2:36</td>
</tr>
```

Emphasis

- emphasized: `em`

```
<p>Their famous lineup, called <em>The Fab Four</em>,
  consisted of the following members:</p>
```

- strong: `strong`

```
<p>Their famous lineup, called <strong>The Fab Four</strong>,
  consisted of the following members:</p>
```

Quotes

- intra-paragraph quote: q

```
<p>
  Although their popularity increased in the UK, at first
  they were rejected by major record companies. A well-known
  story is about Decca Records turning them down,
  saying that <q>guitar groups are on the way out</q>.
  Finally, in 1962, they signed with EMI.
</p>
```

Block Quotes

- paragraph level quote: `blockquote`

```
<p>In a concert in 1963 that was attended
  by Queen Elizabeth, John Lennon famously said:</p>

<blockquote>
  For our last number I'd like to ask your help.
  Would the people in the cheaper seats clap your hands?
  And the rest of you, if you'll just rattle
  your jewelry.
</blockquote>
```

Preformatted Text

- whitespace is preserved: pre

```
<p>Here's how you create an unordered list
  in reStructuredText:</p>
<pre>
  - item 1
  - item 2
  - item 3
</pre>
```

Images

- image: `img`
- source attribute: `src`
- source can be a relative or absolute web address

- alternate text: `alt`
- always provide one for accessibility

Image Example

```
<img src="./_images/sgt-pepper.jpg"
     alt="Sgt. Pepper album cover"
     title="Sgt. Pepper" />

<p>Of the albums, "Sgt. Pepper" is considered to be
  one of the best rock albums of all time.</p>
```

Headings

- six levels of headings
- h1, h2, …, h6
- no structure between the levels

Heading Example

```
<h1>The Beatles</h1>
...
<h2>History</h2>
<p>The band was formed in Liverpool, England...</p>
...
<h2>Discography</h2>
<p>The Beatles released 13 albums in the UK:</p>
...
<h2>Later Careers</h2>
<p>After the band broke up...</p>
...
```

Links

- link: a
- destination address attribute: `href`

- absolute addresses: starting with `http://`
- relative addresses: starting from the current path

Link Example

```
<p>
  Although their popularity increased in the UK,
  at first they were rejected by major record companies.
  A well-known story is about Decca Records
  turning them down, saying that "guitar groups are
  on the way out". Finally, in 1962,
  they signed with <a href="http://www.emi.com/">EMI</a>.
</p>
```

Images as Links

- images can be made into links
- nest under link elements

```
<a href="http://en.wikipedia.org/wiki/Sergeant_Pepper">
  <img src="./_images/sgt-pepper.jpg"
       alt="Sgt. Pepper album cover"
       title="Sgt. Pepper" />
</a>
```

Section Anchors

- in-document links
- `id` attributes for specifying target

Section Anchor Example

```html
<p>...Although <a href="#history">they started out
playing rock and roll</a>, they later evolved...</p>

...

<h2 id="history">History</h2>
<p>The band was formed in England...</p>
```

Character References

- how to represent <?
- not to be confused with an opening tag
- character reference: &name ;

Character Reference Examples

Character	Reference
<	<
>	>
&	&
"	"

Unicode References

- numeric character references: &#number ;
- start number with x if in hex

Unicode Reference Examples

Character	Reference
<	<
<	<
Ğ	Ğ
€	€
Ֆ	Ջ

Non-breaking Space

- make sure line wrapping doesn't separate words
- entity: ` `

```
<p>Of the albums, "Sgt. Pepper" is considered
   to be one of the...</p>
```