Simple Web Files (.txt files)

This is a simple Web page. It is just a plain-text file, as created in Windows Notepad, or Mac Text Edit, or UNIX emacs (text editors). Browsers render it in monospace as shown in the editor.

Canonical Web Page (.html files)

```html
<!DOCTYPE html>
<html>
<head>
  <title>My Web Page</title>
</head>
<body>
  Hello!
</body>
</html>
```

Tags

- HTML Tags are items inside angle brackets,
- HTML Tags come in two forms:
  - Singleton Tags: `<TAG>` or `<TAG />`
  - Enclosing Tags: `<TAG>…</TAG>`
- Singleton or opening Tags may contain optional attributes:
  - `<TAG NAME="value" NAME="value">` — Upper/Lower case matters in quoted strings

What Doesn’t Matter?

- Whitespace
  - Blanks
  - Tabs
  - Newlines (i.e., the ENTER key)
- Indentation (I indent 4 spaces per level)
- Capitalization, with a few exceptions:
  - I capitalize all HTML tags for readability
  - Standards committees recommend lower case
  - Advanced markup languages demand lower case
  - Quoted strings mix case as needed.

What Comes Next?

- Exploration of different tags and their actions,
- Definitions and encoding of color,
- Inclusion of graphics:
  - Bitmaps (.gif, .jpg, .png)
  - Scalable (.svg)
- Building complicated single-file Web pages,
- Divorcing of style from content:
  - Internal style definitions
  - External style sheets (.css)
User Content

```html
<!DOCTYPE html>
<html>
<head>
  <title>My Web Page</title>
</head>
<body>
  Hello!
</body>
</html>
```

What else can go in the `<head>`?

**Internal Definitions**

```html
<head>
  <title>My Web Page</title>
  <style type="text/css">
    style definitions go here
  </style>
  <script type="text/javascript"> 
    JavaScript program code goes here 
  </script>
</head>
```

What else can go in the `<head>`?

**External Files**

```html
<head>
  <title>My Web Page</title>
  <link rel="stylesheet" type="text/css" href="filename.css">
  <script type="text/javascript" src="filename.js"></script>
</head>
```

What can go in the `<head>`?

**Combinations**

```html
<head>
  <title>My Web Page</title>
  <link rel="stylesheet" type="text/css" href="filename.css">
  <style type="text/css"> 
    style definitions go here 
  </style>
</head>
```

What goes in the `<body>…</body>`?

**All your Content!**

- Text
- Color
- Embedded Graphics
- Tables
- Lists
- Links to any Resource File (Web pages, graphics, sound files, etc.)
- Formatting Directives

**Background Colors**

- `<body bgcolor="_____">`
  - Fill in the blank with a color name
  - Fill in the blank with a color number
- There are 142 148 defined color names
  - Black, Red, LightGray, Moccasin, PapayaWhip, etc.
  - RebeccaPurple added in 2014
  - see Companion book for a complete list
- There are $2^{24} = 16,777,216$ color numbers
<BODY> options

- <BODY>
- <BODY BACKGROUND="filename">*
- <BODY BGCOLOR="_____">*
- <BODY BGCOLOR="_____"
  TEXT="_____"
  LINK="_____"
  VLINK="_____">*

This method for specifying colors is obsolete! There’s a better way with CSS, covered later.

Color

- What are the primary colors for paint?
- What are the primary colors for ink?
- What are the primary colors for displays?
- They’re NOT the same!

Reflective Color Models

- Paint, Crayons, etc.
- Ink Jet & Laser Printers

Transmissive Color Model

- TVs, Flat Panel Displays, Video Projectors, HTML, etc.

Human Eye Response

Sensitivity of Retinal Cone Cells

- Colors are mixtures of Red, Green, and Blue
- Each R or G or B value requires one byte:
  - 0...255 in Decimal
  - 00...FF in Hexadecimal (00 = off, FF = full power)
- HTML color numbers are always in this order:
  - A hash mark #
  - Two hex digits for Red
  - Two hex digits for Green
  - Two hex digits for Blue
Color Examples

• #000000 = Black
• #0000FF = Blue
• #00FF00 = Lime (Green = #008000)
• #00FFFF = Cyan/Aqua
• #FF0000 = Red
• #FF00FF = Magenta/Fuchsia
• #FFFF00 = Yellow
• #FFFFFF = White

What if R=G=B?

• #000000 = Black
• #696969 = DimGray/DimGrey
• #808080 = Gray/Grey
• #A9A9A9 = DarkGray/DarkGrey
• #C0C0C0 = Silver
• #D3D3D3 = LightGray/LightGrey
• #FFFFFF = White

Color Cube

$2^{24} = 16,777,216$ Colors

What is the color #D42EEF?

• D4: $D \times 16^4 + 4 \times 16^1 = 13 \times 16 + 4 \times 1 = 208 + 4 = 212$
• 2E: $2 \times 16^4 + E \times 16^1 = 2 \times 16 + 14 \times 1 = 32 + 14 = 46$
• EF: $E \times 16^4 + F \times 16^0 = 14 \times 16 + 15 \times 1 = 224 + 15 = 239$
• 212 = High Red (Dominant digit = D, high)
• 46 = Low Green (Dominant digit = 2, low)
• 239 = High Blue (Dominant digit = E, high)
• Close to Magenta

Older Computers

• Older computers (prior to around 2000) didn't normally support millions of colors...
• ...but could support up to 256 colors (in a palette), so...
• ...how do they handle Web pages containing lots of colors?
• Answer: Pick no more than 256 colors, evenly distributed through the color cube, so any arbitrary color is "close enough" to one of them,
• Define those colors the same way in all browsers.
Older Computers

• The largest cube that fits in 256 is $6 \times 6 \times 6 = 216$.
• Pick 216 colors evenly distributed throughout the big color cube to put in the palette.
• These are known as “Browser Safe” colors.
• Hex values for R, G, and B are picked from the set 00, 33, 66, 99, CC, and FF (see Companion).
• Examples:
  – Color #FE359A maps onto #FF3399,
  – Color #33CC66 is browser safe and is unchanged.

For Web Designers

• Two Choices:
  – I don’t care about my users, I’ll use whatever colors I want or need. If they look a little different in older computers, so what? There aren’t too many of those machines left anyway.
  – I’ll use only browser safe colors in my Web pages to make them look the same everywhere, even on obsolete equipment. Somebody somewhere will appreciate all the effort.

What about Special Characters?

• If HTML uses <, >, and " in its tags, how can I put those characters into my text?
• How do I put foreign language characters (such as è, ñ, ô, Ç, Ð) into my text?
• How do I put special symbols (such as ©, ½, ×) into my text?
• Answer: Use “HTML Entities” (see Companion)
  – Named Entities: &name;
  – Numeric Entities: &#number;

Example Entities

• <: &lt; or &#60;
• >: &gt; or &#62;
• " : &quot; or &#34;
• & : &amp; or &#38;
• © : &copy; or &#169;
• ½ : &frac12; or &#189;
• È : &Euml; or &#203;
• ê : &euml; or &#235;

Simple Markup Tags

• Comment: <!-- ... -->
• Bold: <B>...</B>
• Italic: <I>...</I>
• Teletype: <TT>...</TT> (Monospace)
• Underline: <INS>...</INS>
• Strikethrough: <DEL>...</DEL>
• Superscript: <SUP>...</SUP>
• Subscript: <SUB>...</SUB>
Multiple Tags: Bold and Italic

- **Good:**
  - `<B><I> ... </I></B>`
  - `<I><B> ... </B></I>`
- **Bad:**
  - `<B><I> ... </I></B>`
  - `<I><B> ... </I></B>`
- Don’t cross the streams! Treat tag-pairs as parentheses.

Simple Structural Tags

- **Paragrapghs:** `<P>...</P>`
- **Headings:**
  - `<H1>...</H1>` (Largest)
  - `<H2>...</H2>`
  - `<H3>...</H3>` (Normal Size)
  - `<H4>...</H4>`
  - `<H5>...</H5>`
  - `<H6>...</H6>` (Smallest)

Deprecated Tags

- **Underline:** `<U>...</U>`
  - Use `<INS>...</INS>` instead
- **Strikethrough:** `<STRIKE>...</STRIKE>` or `<S>...</S>`
  - Use `<DEL>...</DEL>` instead
- **Centering:** `<CENTER>...</CENTER>`
  - Use styles instead
- **Fonts:** `<FONT>...</FONT>`
  - Use styles instead

Singleton Tags

- **Break Line:** `<BR>` or `<BR />`
- **Horizontal Rule:** `<HR>` or `<HR />`
- **In-Line Images:**
  - `<IMG SRC="filename">`
  - `<IMG SRC="filename" WIDTH="number" HEIGHT="number" ALT="text" TITLE="text">`

Links (Making Text into HyperText)

- **You need two things:**
  - Something to click on (image or text or both)
  - Somewhere to go when you click it.
- **The Anchor Tag:**
  - `<A HREF="http://www.cnn.com/">`
  - Click here for the News
  - `</A>`

Typesetting Simple Equations

- **E=mc^2**
  - E=mc<SUP>2</SUP>
  - E=mc*<SUP>2</SUP>
- **½**
  - &frac12;
  - <SUP>1</SUP>&frac12;<SUB>2</SUB>
- **355/113**
  - There's no entity to do this!
  - <SUP>355</SUP>&frac12;<SUB>113</SUB>
Putting it all together

```html
<!DOCTYPE html>
<html>
<head>
  <title>My Spiffy Web Page</title>
</head>
<body bgcolor="#FF8000" text="Blue">
<h1>Welcome!</h1>
<p>Welcome to my Web page! I hope you <b><i>really</i></b> like it! Come back often! I'll be changing it frequently.
</p>
<p>Here is one of my best links:<br>
<A href="http://www.cnn.com/">
<img src="CNNimage.gif">
</A>
</p>
<hr>
<p>Copyright © 2014 W. T. Verts</p>
</body>
</html>
```

What it looks like

**Welcome!**
Welcome to my Web page! I hope you really like it! Come back often! I’ll be changing it frequently.

Here is one of my best links:

![CNN](CNNimage.gif)

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