# CSS Style Sheets—A Set of Rules

The appearance of web pages is largely dependent on the interpretation the client's browser program makes of the HTML tags, especially the paragraph and heading tags. Font properties can be semi-controlled within HTML with the FONT and BASEFONT tags, but their use is cumbersome.

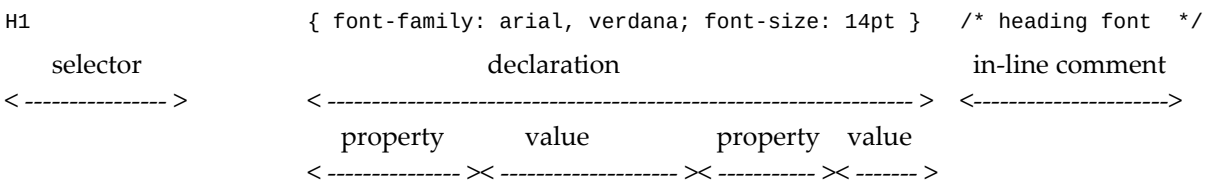
Styles define appearance elements that override the default browser's settings. Styles simplify coding HTML pages and provide a simple method for implementing a style sheet. Styles can be used to control the appearance of text, typography, color and background, and layout and provide more control than is available in native HTML. A style consists of a rule composed of one or more selectors and one or more pairs of property-value.

CSS styles are best considered to be partners with HTML. Theoretically HTML is used to hold "content", text and images, and CSS is used to control the visual appearance. But there are some HTML elements that cannot be reliably reproduced with CSS. New versions of the CSS standard try to remedy the gap, but they are not ready for prime time.

This paper describes the standard. But be aware that different browsers implement CSS differently! Not all features of the standard are operable in all browsers, and some features work differently than specified. Because of this, test all styles for operability and consistency and design to degrade gracefully in the browsers with which the site is expected to be viewed.

## Contents

## Elements of a Rule




In a property-value pair, the value is separated from the property by a colon (:). Pairs of property-value are separated by a semi-colon (;). The use of a semi-colon after the last pair is optional. Multiple values are separated by a comma (,).

### Comments

All comments are delimited in the same way regardless of how many lines they go on for. Examples:

```
body   { font-family: arial }    /* comment */
/* this comment
goes on for more
than one line  */
/*  colors
    #F5EFDF   beige (pale medium-grayed orange)
    #574E45   dark very greyed red orange
    #728785   medium very grayed blue-green
    #899C9A   lighter very grayed blue-green
    #AFA287   soft brown (grayed orange)
    #627573   dark gray blue-green
    #884737   brown (medium grayed red)
*/
```

## Editing Rules

- CSS is not case-sensitive. However those parts not under its control may be case-sensitive such as URLs, font family names, class attributes, and id attributes.
- The amount of white space has no effect on the results of the rule.
- Rules can be continued onto subsequent lines. They can broken after the semi-colon that separates pairs:

```
h1     { font-family: arial, verdana; color: blue;
     font-size: 14pt }
```

## Selector Forms

| *Selector Example* | *Type of Selector* | *Applicability* |
|---|---|---|
| * | universal selector | any HTML tag (almost!) |
| H1 | type selector | an HTML tag; declaration applies to all instances of the tag |
| H1, H2 | grouped selector | multiple HTML tags; declaration applies to each tag |
| .RED | class selector | generic class not specific to any tag; declaration applies to instances of any tag that is qualified with the class |
| P.RED | class selector | class of named HTML tag; declaration applies to instances of the tag that are qualified with the class |

| *Selector Example* | *Type of Selector* | *Applicability* |
|---|---|---|
| P.RED.BLUE | class selector | applies to instances of the tag that are qualified with both classes |
| #abc123 | ID selector | id, used in same way as class; declaration applies to instances of any tag that is qualified with the id |
| H1#abc123 | ID selector | id of named HTML tag; declaration applies to instances of the tag that is qualified with the id |
| H1 B | descendant selector | multiple HTML tags; declaration applies to <B> only when it is a descendant of <H1>; a descendant element is contained by an ancestor |
| #abc * | descendant selector | applies to all descendants of any tag qualified by the id |
| H2 + H3 | adjacent selector | declaration applies to <H3> when it is immediately preceded by <H2> [doesn't work in IE 6] |
| UL > LI | child selector | applies to <LI> only when it is a child of <UL> |
| UL.S > LI | child selector | applies to <LI> only when it is a child of <UL CLASS=S> |
| Q:BEFORE | pseudo-element selector | generates content to be placed before the HTML tag |
| Q:AFTER | pseudo-element selector | generates content to be placed after the HTML tag |
| P:FIRST-LINE | pseudo-element selector | applies to the first line of every instance of the HTML tag; note that the length (and content) of the first line depends on several factors |
| .cab:FIRST-LETTER | pseudo-element selector | applies to the first letter of every instance of the HTML tag; typically used for initial caps and drop caps |
| A:LINK | pseudo-class selector | declaration applies to instances of linked text that has not been visited |
| A:VISITED | dynamic pseudo-class selector | declaration applies to instances of linked text that has been visited |
| A:ACTIVE | pseudo-class selector | declaration applies to instances of linked text that is currently being selected (e.g., by a mouse button press) |
| A:HOVER | dynamic pseudo-class selector | declaration applies to instances of text when the mouse is moved over it |
| LI.MENU:HOVER | dynamic pseudo-class selector | declaration applies to instances of text when the mouse is moved over it |
| LI:FOCUS | dynamic pseudo-class selector | declaration applies to instances of text when it gets the focus |
| A:FOCUS:HOVER | dynamic pseudo-class selector | declaration applies to instances of text when it gets the focus and the mouse hovers over it |
| A.SPECIAL:LINK | class selector | declaration applies to instances of linked text that has not been visited and is qualified with the class |
| P.NAVBAR A:LINK | descendant pseudo-class selector | declaration applies to <A> only when it is a descendant of <P> |
| P:FIRST-CHILD | descendant pseudo-class selector | applies to the first child of the HTML tag |

## General Notes

1. Use of ID selector allows style properties to be set on a per-element basis, while ignoring structural elements of HTML. This use is discouraged.
2. Class and id names should not include underscore characters.

3. A *child* is also a *descendant*, but a *descendant* is not necessarily a *child*—it could be a grandchild.
4. There are more types of selectors that make more distinctions. These are well described by the CSS specification.
5. I am generally avoiding selectors which IE does not support.

### Pseudo-Element Examples

```
P.start:BEFORE   { content:  “Start here. “; }
<P CLASS=start>Please follow these directions carefully.</P>
```

is rendered “Start here. Please follow these directions carefully.”

```
Q:BEFORE  { content: open-quote; color: red; }
Q:AFTER    { content: close-quote; color: blue; }
<P>John Paul Jones said <Q>Ihave not yet begun to fight.</Q> This helped set his reputation.</P>
```

This is rendered: John Paul Jones said “I have not yet begun to fight.” This helped set his reputation. (Content can be one or more text characters, but not a character reference like –.)

```
IMG:BEFORE      { content: attr(alt); }
```

inserts the text of the HTML “alt” attribute before the image; if the image is not displayed, the user will still see the “alt” text.

```
P:first-line { text-transform: uppercase}    /* width of line depends on containing block */
<P>This somewhat long paragraph will span several lines, the first of which will be styled
differently.</P>

P:first-letter { font-size: 300%; color: blue; font-weight: 800}
<P>This somewhat long paragraph will span several lines, the first character of which will be
styled differently.</P>
```

These pseudo elements do not work in IE6/Win and IE7.

## Application: How a Style is Applied

- Rules are composed of one or more styles (as property-value pairs) and a selector. The style(s) are applied to HTML elements that match the selector. For example, `p {color: red}` applies to all <P>s, where it sets the text color to red.
- Class and id are invoked specifically:

```
<P   CLASS=red>
<P   CLASS="red">
<H2  ID=abc123>
<A   CLASS=SPECIAL  HREF="…"
<DIV CLASS="red right"     (space-separated list of classes)
```

- Styles may be inherited (generally inline elements inherit the style of the parent block element, e.g., bold text within a paragraph inherits the style of the paragraph—unless the bold tag has a style defined for it). This is discussed in detail on page 7.
- When properties in 2+ rules are in conflict, precedence “rules” determine which applies—the “cascade” effect.
- Each property has its own inheritance “rule.”
- A good way to begin is to set the basic font properties with the BODY selector as paragraph and list items inherit its properties. Tables inherit color but not size (in IE5.1) Set table font properties separately with the TD selector.
- When CSS is in-lined, be sure to include the HTML tag:

```
<META HTTP_EQUIV="Content-Style-Type" CONTENT="text/css">
```

### Media

1. A linked or imported stylesheet can be flagged as specific to one or more media. In HTML:
```
<LINK  REL="stylesheet"  TYPE="text/css"  HREF="main-styles.css"   MEDIA="screen, print">
<LINK  REL="stylesheet"  TYPE="text/css"  HREF="print-styles.css"  MEDIA="print">
<LINK  REL="stylesheet"  TYPE="text/css"  HREF="all-styles.css"    MEDIA="all">
```
2. An AT media rule can be included in a set of rules:
```
@media  print  {
    @import  "print-styles.css"
    body   { margin: 0; font-size: 10pt; }
}
```
3. The AT media does not work in IE6, what works is:
```
<LINK  REL="stylesheet"  TYPE="text/css"  HREF="screen-styles.css"  MEDIA="screen">
<LINK  REL="stylesheet"  TYPE="text/css"  HREF="print-styles.css"   MEDIA="print">
```
4. If you have one stylesheet for print and a second for screen, the former must mimic the latter, i.e., no style of the latter will be available to the former.
5. If one stylesheet is for screen and print and a second for print only, then the second stylesheet only needs to specify which elements should be printed differently.
6. If using a print stylesheet with an embedded stylesheet, you may want to specify the MEDIA attribute for the latter with value = "screen, print."

### Applying Styles Conditionally

When coping with browser incompatibilities, it can become necessary to use certain styles in some situations but not others, e.g., when the browser is IE or not.

Windows IE 5+ supports conditional comments. They are embedded within HTML comments and are consequently ignored by other browsers.

```
<!--[if IE 6]>
Special instructions for IE 6 here
<![endif]-->

<!--[if IE]>
Special instructions for any IE version here
<![endif]-->
```

Within the comment you can include operators:

| | |
|---|---|
| !: NOT | <!--[if ! IE]> |
| gt: greater than | <!--[if gt IE 6]> |
| gte: greater than or equal to | <!--[if gte IE 6]> |
| lt: less than | <!--[if lt IE 6]> |
| lte: less than or equal to | <!--[if lte IE 5.5]> |
| &: AND | <!--[if (gt IE 5)&(lt IE 7)]> |

These conditional comments must be placed in HTML, they have no meaning within a separate CSS file.

Uses:

- Add a <LINK> tag referring to a browser-specific stylesheet. See the next section for examples.

- Customize an element's CLASS name in order to have browser-specific selectors.
  Example:

```
div.foo         { color: inherit; }
.ie  div.foo    { color: red; }
.ie7 div.foo    { color: blue; }
. . .
<!--[if IE ]>
  <body class="ie">
<![endif]-->
<!--[if IE  7]>
  <body class="ie7">
<![endif]-->
<!--[if !IE]>-->
  <body>
<!--<![endif]-->
```

- Run a script conditionally.

```
<!--[if gte IE 5]>
<SCRIPT LANGUAGE="Javascript">
alert("Congratulations! You are running Internet Explorer 5 or greater.");
</SCRIPT>
<![endif]-->
```

- Include content conditionally.

```
<!--[if lt IE 7]>
<p>Please upgrade to Internet Explorer version 7.</p>
<![endif]>
```

## Methods of Incorporating Styles in HTML

| | |
|---|---|
| link | to incorporate separate stylesheet file, in HEAD section include <LINK> |
| embed/internal | place rules in HEAD section, include rules within <STYLE> and </STYLE> tags |
| inline | place rules within the STYLE attribute of an HTML tag, e.g., <H1 STYLE="*declaration*"> |
| @import rule | lets one stylesheet (external file or internal) link to a second, external, one; early browsers do not understand the syntax and simply ignore the statement (and the stylesheet it references). @import rules must precede any other CSS rules in a stylesheet. |

```
<LINK REL="stylesheet" TYPE="text/css" HREF="path/filename">
<STYLE TYPE="text/css" MEDIA="screen">  rules  </STYLE>
<P STYLE="font-size: 12pt">abcdef</P>
<LINK REL="stylesheet" TYPE="text/css" HREF="import.css">  where import.css contains only
    @import "modern.css";
<STYLE TYPE="text/css"> @import "modern.css"; </STYLE>
<STYLE TYPE="text/css"> @import url("modern.css"); </STYLE>
<STYLE TYPE="text/css"> @import "modern.css" print, tv; </STYLE>
```

Best practice: Use a separate stylesheet file for standards-compliant CSS. If you find a specific browser requires a workaround (aka hack), put that CSS in its own file and list it in the HTML after the main CSS file (to take advantage of the cascading effect wherein the last-defined style overrides any preceding ones). You can include IE version-specific CSS files by using Microsoft's non-standard extension.

```
<!--[if IE 6]>
<LINK REL="stylesheet"" TYPE="text/css" HREF="csshacks/style-ie6.css">
<![endif]-->
<!--[if IE 5]>
<LINK REL="stylesheet" TYPE="text/css" HREF="csshacks/style-ie5.css">
<![endif]-->
```

```
<!--[if IE 5.5000]>
<LINK REL="stylesheet" TYPE="text/css" HREF="csshacks/style-ie55.css">
<![endif]-->
<!--[if IE gte 6]>
<LINK REL="stylesheet" TYPE="text/css" HREF="csshacks/style-ie7.css">
<![endif]-->
<!--[if !IE 6]>
<LINK REL="stylesheet" TYPE="text/css" HREF="csshacks/style-notie6.css"
<![endif]-->
<!--[if !IE]>
<LINK REL="stylesheet" TYPE="text/css" HREF="csshacks/style-notie.css"
<![endif]-->
```

You can hide a single rule of CSS from Win IE 5.0 and earlier by putting a comment directly after the selector:

```
p/* */ { font-weight: 700; }
```

## The Cascade, i.e., Precedence Rules

When more than one rule applies to an element, the rule with the highest precedence is used. The various conditions are listed here in order of precedence, where 1 is the highest.

1. "! important" e.g., p {text-indent: 1em ! important }
2. media type
3. weight and origin

   for origin:
   1 = inline styles
   2 = embedded stylesheet
   3 = @import stylesheet
   4 = linked stylesheet

   for weight:
   if there are 2+ imported stylesheets, the last one listed has precedence
   if there are 2+ more linked stylesheets, the last one listed has precedence

4. specificity
5. all other conditions being equal, the last rule in the stylesheet

### Specificity

There is a complex algorithm for calculating specificity. Generally, ID selectors have the greatest specificity followed by the number of classes in a selector, then the number of element names in a selector.

IE6 gets the cascade wrong in come cases:

```
#x  a:hover  { rule } doesn't have precedence over  a:hover
<DIV ID=x> <A> text</A></DIV>
```

### Types of HTML Elements and the Inheritance of Styles

Some property values are inherited by the children of an element in the document tree—this is not the cascade. Each property is defined as inheritable or not. Generally text-related properties are inheritable and box-related properties are not. Consult the CSS2 Specification Appendix F Full Property Table for details on a particular property.

There are two CSS features that affect inheritance:

- Generally properties which are not inheritable have the value "inherit" which forces the HTML element to inherit the property value of its parent.

- The "*" universal selector, while strictly not involved in inheritance, has a similar result: it applies to all elements.

The type of an HTML element can affect the inheritance of styles. Some CSS properties apply only to blocks.

- block: generally block begins at left margin; example <P>, <OL>, <DIV>
- inline: generally contained within a block; example <I>, <SUB>, <A>, <SPAN>
- empty: have no content; example <BR>, <IMG>
- some elements can be either block or inline: <LI>, <TH>, <TD>
- <DIV> … </DIV> creates a block
- <SPAN> … </SPAN> creates inline content
- replaced element: is any element whose appearance and dimensions are defined by an external resource. Examples include images (<IMG> tags), plugins (<OBJECT> tags), and form elements (<BUTTON>, <TEXTAREA>, <INPUT>, and <SELECT> tags). All other elements types can be referred to as non-replaced elements.

## Property Groups

| | |
|---|---|
| typeface (font) | face, size, weight, style |
| typography | spacing, line height, alignment |
| color and background | colored elements, background color and image |
| layout and positioning | margin, padding, border, width, height, position |
| layer and transparency | z-index, filter, opacity |

## Units

Length is used to specify horizontal and vertical distances and font size, it is specified with a number and a unit of measure.

| | |
|---|---|
| absolute | inch (in), centimeter (cm), millimeter (ml), point (pt), pica (pc) |
| relative, not-scalable | pixel (px) |
| relative, scalable | %, em, x-height (ex) |

"Scalable" means the browser can change dimensions with the Text Size (IE) or Zoom (Firefox) tool.

- point: 1 pt = 1/72 inch; more applicable to printed documents
- pica: 1 pc = 12 pt; more applicable to printed documents
- pixel: relative to resolution of the canvas
- em: relative to the height of the element's font, one em is the height of the element's font; when used for font-size, it refers to the font-size of the parent element; it scales with the size of the font
- x-height: height of letter "x"; this is a common unit of measure in typography and is relative to the typeface (font)[1]. This unit seems most useful when used with a font family stack.
- percentage: relative to browser's default size

[1] With the type size controlled by the x-height, the size of the text letters varies by the font. For example, with Verdana, 2ex is the same size as 1em, whereas with Palatino Linotype, 2ex is smaller than 1em.

Units that are relative to the element's font are most useful in horizontal and vertical distance specifications.

The CSS2 specification allows lengths to be stated in numbers with or without decimals. I can find no limit to the number of decimal places which may be used, but I did find an article claiming 3 decimals were allowed. However . . . browser support is typically limited to 1 or 2 decimals. Some browsers round up, others round down. I conclude it is pointless to specify a dimension like 1.125em, best to stick with 1.1em or 1.12em. If you limit yourself to one decimal place, you will avoid the rounding discrepancies of the browsers.

### Units and Resolution

The unfortunate truth about resolution is that all text size UOMs are resolution-dependent. Some people think that points are resolution-independent (as they are in print media), but unfortunately they are not handled consistently by the various browsers, meaning not all browsers are standards-compliant when it comes to rendering points. Given the same font-size (regardless of unit), letters appear smaller at finer resolutions than at coarser ones.

Complete control over letter size is an impossibility.

See page 31 for a discussion of this as it pertains to page layout.

### Choosing a Unit

There is a lot of public discussion about which unit is the most reliably rendered by browsers. Have pity on the browsers which must contend with the operating system, the monitor's size, and the monitor's resolution! In fact "pixel-perfect" designs—which can be rendered identically on every monitor and with every browser—are strictly not possible. The obstacles are based on (1) the absence of a unit of measure that can be rendered identically on any monitor and (2) the deviations in the implementation of the standards by browsers—the so-called non-compliance.

Be aware that "screen size" and "screen resolution" are not synonyms. Some years ago a 14" screen would be 800 pixels wide, today it is often 1400 px. As a consequence all elements shrink with the site itself, making it difficult to read on a more "modern" screen. A 9 px font that looks okay on an 800 px wide screen looks like a 5 px font on a state-of-the-art laptop. Hopelessly small!

The units currently held to be the most reliably rendered are the em and the pixel. Use of em may provide the best typographical control for spacing of boxes (margins and paddings) and text indents while the pixel may be best for font sizes. Use the point for font sizes on a print stylesheet. I beg your forbearance for the examples in this document that use points, they were written before I learned better.

IE 6/7 and Firefox 3 render text sizes differently—even when the UOM is em or pixel. The only consistent UOM is the default (achieved by not specifying a font size); the use of a percentage of the default to adjust it up or down is equally reliable. Because of my preference that a web page be rendered identically in different browsers and the text be scalable, I now prefer the UOM percentage for some layouts and most text.

### Scaling

It was the intention of the WWW creators that text be presented in ways that could be adjusted by the user—to reflect their priorities and needs. The most obvious adjustment is to the size of the text, what I call scaling. The browsers support this in different ways: Internet Explorer provides a tool for the user to

change the text size to: Medium (the default), Smaller, Smallest, Larger, and Largest. Mozilla Firefox provides a zoom tool which lets the user increase or decrease the text size one step at a time.

But, unless the text is styled with a scalable unit of measure, it cannot be resized by the user. More and more websites these days are not scalable. Personally, I think this is a grievous error. It is easier for the web site's designers to choose a non-scalable unit of measure. By doing so, they are declaring their own convenience has precedence over the convenience of the user.

I recommend testing the effects of the text styles you are considering with different browsers and using their text size adjustment tools. I found that IE 6 renders the default serif font at the Medium size: 1em size smaller than at 2ex, but identical at larger and smaller settings. Firefox 3 is different, the differences in units is retained as the text becomes larger and smaller.

Personally, I find the percentage unit of measure the most predictable and reliable for use with text. This is discussed further in the next section.

My thanks to Craig Grannell whose article Setting Web Type to a Baseline Grid includes the following fabulous tip: "By setting the web page's overall font-size value to 62.5% in the BODY rule, text can be sized in ems using a value a tenth of the target pixel size." This means that if you want text to look like it is sized as 12 pixels, you can specify it as 1.2 ems.

```
body { font-size: 62.5%; }
h1   { font-size: 2.7em; }
```

This tip is based on the following: The default size for 'medium' text in all modern browsers is 16px. You can reduce this to 10px by setting body size to 10 ÷ 16 = 62.5%. This is best done in the BODY selector. Now 1em = 10px anyplace in the document.

### Screen Sizes and Resolution

It helps to design a web page to accommodate the variety of screen sizes it may encounter. The display resolution, or pixel dimension, is expressed in terms of the number of pixels in each dimension (width x height). Early monitors had a fixed resolution, and consequently a fixed pixel size. Modern monitors have a range of resolutions available from which the user can choose.

Aspect ratio is the proportion of the width of the screen size to its height in whole numbers, usually written like 3:2.

| *width x height* | *type* | *aspect ratio* | *comments* |
|---|---|---|---|
| 640 x 480 | VGA | 4:3 | "Video Graphics Array" |
| 800 x 600 | SVGA | 4:3 | "Super Video Graphics Array" |
| 1024 x 768 | XGA | 4:3 | "Extended Graphics Array" common in 2002, often recommended as the basis for an optimal page design MINE |
| 1280 x 1024 | WXGA | 5:4 | "Wide Extended Graphics Array" |
| 1920 x 1200 | WUXGA | 16:10 | "Widescreen Ultra Extended Graphics Array" 2009 |
| 1600 x 900 | HD+ | 16:9 | "High Definition" commonly found in corporate offices by 2012 |
| 240 x 320 | QVGA | 3:4 | "Quarter VGA" used on some mobile devices |

The browser window can be the same size as the screen, or smaller, at the discretion of the user.

The number of pixels per inch (ppi) is a function of both the resolution setting of the monitor and the width of the monitor. The ppi for a particular monitor is greater with a finer resolution, like 1600 x 1200, than with a coarser resolution, say 1280 x 1024. When the resolution is the same but the monitor sizes are different, the ppi is smaller on the wider monitor.

The web page designer must decide how to accommodate a window that is wider or narrower than the page content. You can find lots of advice with Google. I tend to prefer liquid layouts (whose width fits the actual window size) with some maximum width. You can use a set of stylesheets, each designed for a range of window sizes, but will need JavaScript to pick and load the stylesheet.

## Link Properties and Selectors

These properties apply to the A tag. They can also apply to other tags.

| | |
|---|---|
| outline-width | 0 \| 1px |
| outline-style | 0 \| solid \| dashed |
| outline-color | white \| #336699 \| rgb(255,0,0) \| invert |
| outline | 0 \| none \| 1px solid red [IE 8+] |

*Outline* properties control the style of dynamic outlines. The outline is drawn over a box, i.e., it is always on top and does not influence the position or size of the box. The three outline properties have the same values as corresponding border properties. An outline is used to indicate the element with the focus.

IE and Firefox use a default focus outline that is a finely dotted rectangle, IE's is black while Firefox uses the same color as the text.

The outline is not always a good idea. But it is desirable to indicate the focus in some way, see below and page 47. The way to turn off the focus outline for all A elements is:

```
A  { outline: 0 }
A  { outline: none }    /* this is the same as the preceding example */
```

Note that IE 7 ignores the *outline* property.

### Link Pseudo-Class Selectors

There are five link pseudo classes that refer to the state of a link:

| *Pseudo Class* | *Type* | *Applies to* |
|---|---|---|
| :link | static | links that have not yet been visited |
| :visited | static | links that have been visited by the user |
| :hover | dynamic | while user designates element with a pointing device, but does not activate it |
| :active | dynamic | while an element is being activated (between the time the user presses the mouse button and releases it) |

| *Pseudo Class* | *Type* | *Applies to* |
|---|---|---|
| :focus | dynamic | while an element has the focus (accepts keyboard events) |

Sometimes these are mutually exclusive, sometimes they are not. The static pseudo-classes are mutually exclusive. The three dynamic pseudo classes are not mutually exclusive in CSS2.[1]

The CSS2 specification does not define a number of interaction details. Among them it does not define how "the states are entered and left." And "user agents are not required to reflow a currently displayed document due to pseudo-class transitions." This leeway and the inevitable native differences in the browsers' implementation of the link states can drive you crazy trying to get the link interaction in a page to work identically in IE 7 and Firefox 3, for example.

You will have less work and grief if you accept some differences in interaction between the browsers.

In HTML 4.0 the link pseudo-classes apply to A elements with an "href" attribute. Consequently the following two rules have similar effects:

```
A:link  { color: red }
:link   { color: red }
```

1. It's best to have separate entries for each of A: LINK, A: VISITED, A: ACTIVE, and A:HOVER, in this order. The sequence matters!
2. In my test, when I set only A:ACTIVE and A:VISITED (not as a group), the order did not change the results in IE7 and Firefox 3.
3. If you group A:HOVER and A:VISITED, HOVER should precede ACTIVE.
4. The browsers differ in their handling of the link states (no surprise).
5. See also page 47 for a thorough discussion of styling links and handling browser differences.

## Typeface Properties

*In the following lists of properties, a "Y" indicates the property is implemented in the principal browsers, a "P" means partially implemented, a "N" means not implemented. An underlined value is the initial value.*

| | | |
|---|---|---|
| font-family | Y | arial \| helvetica, "New Century Schoolbook" \| sans-serif |
| font-style | Y | <u>normal</u> \| italic \| oblique |
| font-variant | | <u>normal</u> \| small-caps |
| font-weight | Y | <u>normal</u> \| bold \| bolder \| lighter \| 100 \| 200 \| … \| 900 (400 is normal) |
| font-size | Y | 12pt \| 1em<br><u>medium</u> \| xx-small \| x-small \| small \| large \| x-large \| xx-large<br>larger \| smaller<br>150% |
| font-stretch | | ultra-condensed \| extra-condensed \| condensed \| semi-condensed \|normal \| semi-expanded \| expanded \| extra-expanded \| ultra-expanded \| wider \| narrower |
| font | | EXAMPLE: bold italic 24pt helvetica |

[1] The dynamic link pseudo-classes were mutually exclusive in CSS1.

Font-family can have more than one value. They are specified in the order in which they should be used and are separated by commas. If the first font family is not available, then the next font family is tried. It's a good practice to always specify a generic font family like "serif", "sans-serif", or "monospace" as the last choice.

```
font-family: verdana, arial, sans-serif;
font-family: "Book Antiqua", times, "times roman", serif;
```

If you are going to specify typeface properties (and why wouldn't you?) be sure to specify them for all necessary elements. The CSS2 specification says that all the typeface properties are inherited. That suggests that when you specify a typeface for the BODY tag, it will apply to LI and TD as well. But this is not the case in some browsers (this is a specification conformance issue). IE6, as I recall, does not let LI and TD inherit from BODY. To be safe, specify typeface properties for BODY (I changed my mind, see below) and other text block elements. Be aware that inheritance does not apply to font-weight and font-size; unless specified explicitly, header tags are rendered larger and bold.

The following table gives font-size equivalents for pixels and percentages; "default" is the value when not specified in any way, i.e., there is no font-size given and browser text size is set to "medium." "Default px" is the default font-size in pixels. "Default %" is the percentage that corresponds to the default font-size in pixels.

| *Tag* | *Default px* | *Default %* |
|---|---|---|
| P | 16px | 100% |
| H1 | 32px | 200% |
| H2 | 24px | 150% |
| H3 | 18px | 110% |
| other non Hx | 16px | 100% |

When font-size is stated as a percent, that percentage is applied to the font-size set in the BODY tag. If there is no font-size set for the BODY tag, then the percentage applies to the default size. Consequently, if BODY is 12px, then H1 at 200% is 24px (that is, 200% of 12px), not 32px. Here's the rub: If you use % for all font-sizes, you have to work out the percent values for each element other than P and its variants to achieve the rendered size you want. If you want to set non-P tag sizes as a percent of their default size, you cannot set a font-size on BODY.

Best practices:

- Use a scalable UOM for font-size. My choice is the percentage.
- Do not set font-size on the BODY tag. There are some valid exceptions to this rule.

Use the following table to find percent sizes that correpond to pixels sizes when there is no BODY font-size. It doesn't matter what the tag is, the percent is calculated as the desired px divided by 16.

| *Desired px* | *Corresponding %* |
|---|---|
| 9px | 56% |
| 10px | 63% |
| 11px | 69% |
| 12px | 78% |
| 13px | 81% |
| 14px | 88% |

| *Desired px* | *Corresponding %* |
|---|---|
| 17px | 106% |
| 18px | 113% |
| 20px | 125% |

The challenge is when HTML elements with font-size as % are nested. In this case the descendant selector base size is that of the parent.

The following obeservations were made after testing font-size UOMs and text size scaling with two browsers, IE 6 and Firefox 3.0.6:

- For the most part IE and Firefox render text sizes differently. The only consistent UOM is the default; the use of a percentage of the default to adjust it up or down is equally reliable. By "consistent" and "reliable" I mean that the text is rendered the same in both browsers at different scaling settings.
- The ex UOM reflects the font face. It behaves differently with Palatino Linotype than the default font. Having it scale predictably likely means using font family stacks.
- The 1em size is virtually identical to the 2ex size.

CAUTION: The following discussion has some errors which are not apparent to me right now (October 2010). The basic error is that there is no font-size = normal, so I cannot figure out what I had tested to come up with the following. And I've moved on from IE 6 to IE 7, so these observations may no longer hold.

A test of Windows Internet Explorer 6.0 reveals the following interesting facts:

- Font size = *normal* is rendered in different sizes for each tag P, H1, H2, H3, and H4. The H tags are rendered as bold. H4 is rendered in a size that appears to be the same as P.
- Font sizes *medium*, *small*, *large*, and *larger* are rendered in the same size for each tag P, H1, H2, H3, and H4. The H tags are rendered as bold.
- For P *medium* is the same size as *normal* when the browser text size = Medium.
- For P *larger* appears smaller than *medium* when the browser text size = Medium.
- The sizes at which text with Font sizes *normal*, *medium*, *large*, *larger*, *small*, *smaller* are rendered is affected by the browser's View Text Size setting.

You can use the following correspondences to choose a relative font size that corresponds, at the browser's Text size = Medium setting, to the size you desire. The main shortcoming of this table is that it discusses font size in points. You should use points only in printed pages.

| **<P>** | **<P>** | **<H1>** | **<H1>** | **<H2>** | **<H2>** |
|---|---|---|---|---|---|
| normal | 100% | normal | 200% | normal | 153% |
| 8 pt | 71% | 13 pt | 107% | | |
| 9 pt | 76% | 14 pt | 113% | | |
| 10 pt | 81% | 15 pt | 122% | | |
| 11 pt | 95% | 16 pt | 129% | 16 pt | 129% |
| 12 pt | 100% | 17 pt | 145% | 17 pt | 145% |
| 13 pt | 107% | 18 pt | 153% | 18 pt | 153% |
| | | 24 pt | 200% | | |

It appears that "normal" font size for H1 is 24 pt. And that "normal" for H2 is 18 pt.

## Which Fonts Can You Use?

Generally the fonts displayed on a web page are ones that exist on the reader's computer. There's no point in designing a web page around a font like Adobe Garamond because few readers are likely to have this font on their computers. So when you specify fonts, choose ones that are likely to exist on visitors' computers regardless of operating system and browser—for Mac and Windows, Netscape and IE—such as:

arial, helvetica, verdana
times, times roman, times new roman
courier, courier new
symbol

Windows 97 fonts (commonly bundled with the OS) are likely to be found on visitors' computers:

book antiqua, bookman old style
cooper black
copperplate gothic

Webdings font is supplied with:

IE4, IE4.01 SP1, IE4.01 SP2, IE5, Office 2000 Premium, Windows 2000, Windows 98, Windows 98 Second Edition, Windows XP; Macintosh System X

Microsoft typography is discussed on its website: www.microsoft.com/typography. It has a page that lists the fonts used by the various Microsoft products. Fonts shipped with Apple products can be found at wikipedia: http://en.wikipedia.org/wiki/Apple_fonts#Fonts_in_Mac_OS_X.

Design is easier when you know the environment of your readers because it is fixed. This is often the case on intranets.

## Font Family Stacks

I thank Stephen Morley (http://safalra.com) for his comments on font family stacks. All quotes in this section are from his webpage "The Myth of the 'Web-Safe' Fonts" (http://safalra.com/web-design/typography/web-safe-fonts-myth/).

It is good practice to specify more than one typeface in the font-family property. But a web design that looks good when any of the specified typefaces is used needs care in the choice of the typefaces.

"Typefaces differ in many respects, but the most significant variable effecting readability is the 'aspect ratio' — the ratio of the height of minuscules (lowercase letters) to the overall height. Typefaces such as Verdana have large aspect ratio to aid readability, but this has the effect of making the characters look larger than those of other typefaces at the same point size."

Because all typefaces in the font-family will be presented with the same font-size, you should choose a family of typefaces that has similar aspect ratios. Stephen Morley calls these groups "font family stacks." He recommends:

- A 'wide' sans serif stack composed of Verdana and Geneva. "Both typefaces have a large aspect ratio, leading to their characters appearing wide in comparison to most typefaces." Be sure to specify "sans-serif" as the last font.
- A 'narrow' sans serif stack composed of Tahoma, Arial, and Helvetica. "All three are normal sans serif typefaces, although Tahoma has a slightly larger aspect ratio for which narrower character spacing compensates." Be sure to specify "sans-serif" as the last font.

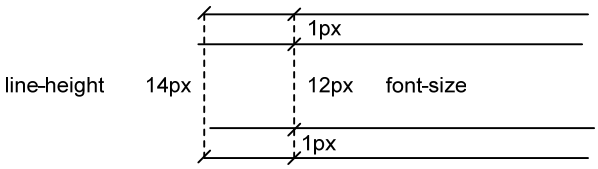
- A 'wide' serif stack composed of Georgia, Utopia, and Palatino. "Both are normal serif typefaces, and they are almost identical in appearance." Be sure to specify "serif" as the last font.
- A monospace stack composed of Courier New and Courier. "Both are monospace typefaces, suitable for samples of computer programming code." Be sure to specify "monospace" as the last font.

## Typography Properties

| | | |
|---|---|---|
| word-spacing | | normal \| 1em \| -2px |
| letter-spacing | | normal \| 2px \| 0.2em |
| text-decoration | P | none \| underline \| overline \| line-through \| blink |
| vertical-align (in-line elements and table cells only) | | baseline \| sub \| super \| top \| text-top \| middle \| bottom \| text-bottom 10% \| -50% |
| text-transform | | none \| capitalize \| uppercase \| lowercase |
| text-align | P | left \| right \| center \| justify (N) |
| text-indent | Y | 0 \| 5px \| 120% \| -2em [for first formatted line] |
| line-height | | normal \| 1.2 \| 150% \| 1.5em |
| text-shadow | | none \| [see specs] |
| white-space | | normal \| pre \|nowrap |

The *line-height* property applies to the height of boxes generated by non-replaced inline elements. The height of an inline box may be different than the font size of the text in the box (say, when line-height > 1em); in that case there may be space above and below rendered letters. The excess of line-height over font-size is called *leading*. Half the leading is called *half-leading*.

Browsers center text vertically in an inline box, adding half-leading at top and bottom. In the following example, the difference between the 12px font-size and the 14px line-height is 2px, so 1px is added at the top and bottom of the letters. Use this technique to vertically center a text block.




When line-height < font-size, the inline box honors the line-height and the rendered letters will bleed outside the inline box into an adjacent line box.

Line-height, unless overridden, is inherited by all descendants. Its effect on its descendants depends on how it is specified. This is illustrated in the following table.

| *Line-height in BODY element* | *Body font-size 16px calculated line-height* | *Header font-size 32px calculated line-height* | *Footer font-size 10px calculated line-height* |
|---|---|---|---|
| 120% | 16px × 120% = 19.2px | 19.2px | 19.2px |
| normal | 16px × 120% = 19.2px | 32px × 120% = 38.4px | 10px × 120% = 13.4px |

| *Line-height in BODY element* | *Body font-size 16px calculated line-height* | *Header font-size 32px calculated line-height* | *Footer font-size 10px calculated line-height* |
|---|---|---|---|
| 20px | 20px | 20px | 20px |
| 1.5 | 16px × 1.5 = 24px | 32px × 1.5 = 48px | 10px × 1.5 = 15px |

Thus there are best practices for the use of line-height:
- for the BODY element use 1.4 or 1.5
- for all headers use 1.2 (12-2010 I've come to prefer 1.0)

The height of the line boxes is determined by the tallest inline box or replaced element. Within a line box there could be text of different sizes and/or superscripts and/or subscripts, each of which can increase the line box height. You can prevent a superscript and subscript from increasing the height of the line box by:

```
sup, sub  { line-height: 0; }
```

The *vertical-align* property applies to vertical positioning of the contents of an inline box within a line box—but only in the context of a parent inline-level element or a parent block-level element that generates anonymous inline boxes. So, in the following examples it applies to the SUP and SUB elements:

```
<P> . . . <SUP> . . . </SUP> . . . </P>
<P> . . . <SUB> . . . </SUB> . . . </P>
```

This also works with TD elements and IMG elements.

The *white-space* property controls word-wrapping and the collapse of sequences of white space.
- "normal" specifies line breaks per normal word-wrapping and the collapse of multiple contiguous blank characters.
- "pre" prevents the collapse of white space, allowing line breaks at newline characters.
- "nowrap" prevents line breaks within text except for newline characters. This is useful in preventing line breaks on hyphens in dates.

Be aware that while preformatted text may appear as desired on the screen, it may cause the printed page to shrink to fit. I discovered this on a web page with a three-column table. The preformatted text fit well within its cell when viewed on the screen, but when printed it was too wide for the printed cell (because the printed page width was much less than the screen width); the browser shrunk all the page elements so that the preformatted text could be printed completely within its cell's width. This was true for IE and Firefox 3.

## List Properties

| | |
|---|---|
| list-style-type | <u>disc</u> \| circle \| square \| decimal \| decimal-leading-zero \| lower-roman \| upper-roman \| lower-alpha \| upper-alpha \| none |
| list-style-image | <uri> \| none \|<br>example: ul {list-style-image: url(yellow_square.gif)} image can be created with Visio |
| list-style-position | outside \| inside |

Font and color properties of list text are inherited from BODY and P selectors and can be overridden by LI and UL/OL selectors. Color properties of list bullets/numbers are inherited in order from the (1) UL text color property and (2) LI text color property (so LI overrides UL). The only way to color a LI text differently than its bullet is to apply a local style with SPAN. You can size the LI text with a style applied

to the UL, LI, or with SPAN. Styles cannot change the bullet size; use a custom image to do this. Note that IE's default text size does control the bullet size! Background color does not apply to bullet.

List item example:

| | |
|---|---|
| list-style-position: outside | * text of list item xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx |
| list-style-position: inside | * text of list item xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx |

Tips:

1. Use UL/OL margin-left to control position of the bullets.

2. To reduce left margin of list: <ol style="margin-left: 0">. Putting this code in <STYLE> or separate stylesheet file doesn't work in IE 5.1, but it does in IE6. Setting the list left margin to "0" makes the list item text align at the left margin of the parent element (often BODY); the bullets are placed in the left margin.

3. Use UL list-style-type = none to make simple, compact list.

4. Use LI left padding to control space between bullet and text.

5. Use a negative OL/UL margin-top (e.g., -18px) to eliminate white space above the list. The amount of margin depends on the size of the font.

6. Use LI top/bottom margin(s) to control space between list items.

7. Use negative LI text-indent to effect a hanging indent.

8. For list of entries which are indented differently (like a site map):

```
<STYLE>
ul.map  {list-style-type: none; line-height: 16px; margin-left: 0px}
.p5   {margin-left: 20pt}                  /* using px didn't work properly */
.p10  {margin-left: 40pt}
</STYLE>

<UL CLASS=map>
<DIV CLASS=p5>
<LI>this line is to be indented 5 spaces
</DIV>
<DIV CLASS=p10>
<LI>this line is to be indented 10 spaces
</DIV>
</UL>
```

   NOTE: in example #8, each LI must be in a DIV, so you must use DIVs without CLASS for those LIs that do not need indention.

9. The color of the LI controls the color of the bullet. To have the color of the list item text differ from the color of the bullet, use SPAN to specify the color of the text:

```
<STYLE>
li       { color: red }
li span  { color: blue }
</STYLE>
. . .
```

```
<UL>
<LI><SPAN>this line is colored differently from its bullet</SPAN>
</UL>
```

10. In Firefox UL ignores the * universal selector.

11. IE's non-standard implementation of the box model is especially evident in lists. If you applied a border to a UL, you would see:
    - in Firefox3, the border surrounds both the bullets and the list item text
    - in IE6, the border surrounds only the list item text, leaving the bullets outside.

    This makes controlling the location of the bullets so that it appears the same in Firefox and IE6 problematic (because any left margin is applied to the box, the bullets will be in different locations). My solution is to remove the padding and specify the left margin, which has the effect in Firefox of moving the box inside the bullets to match IE:
    ```
    ul.square   { list-style-type: square; padding: 0; margin-left: 15px; }
    ```

See Layout Techniques for more tips.

## Color & Background Properties

| | | | |
|---|---|---|---|
| color | Y | black \| rgb(255,0,0) \| #FF1122 | [for all elements] |
| background-color | P | transparent \| black \| rgb(255,0,0) \| #FF1122 \| inherit | [for all elements] |
| background-image | Y | none \| url(pic.jpg) \| inherit | |
| background-repeat | | repeat \| no-repeat \| repeat-x \| repeat-y | |
| background-attachment | | scroll \| fixed | |
| background-position | | right top \| center center \| left bottom \| 50% 0% \| 18px 0px<br>0% 0% | |
| background | | 'background-color' 'background-image' 'background-repeat' 'background-attachment' 'background-position'<br>[missing properties are set to their default value] | |

Background can be a solid color and/or an image. If not specified, it is not inherited from the parent element, but appears that way because the default value of background-color is "transparent." The default BODY background color is white. A background image overlays the background color.

In terms of the box model, "background" applies to the content, padding, and border areas; margins are always transparent. When a border is not a solid line, the background is visible behind it. (Border colors and styles are set with the border properties.)

An image can be positioned in different ways:
- Initial position can be specified as coordinates relative to the top left corner of the element, stated as a percentage or absolute length. The CSS property is *background-position*. This only applies to block-level and replaced elements.
- Image can be fixed in the viewport or allowed to scroll. The CSS property is *background-attachment*.
- Image can be repeated (tiled) horizontally and/or vertically. The CSS property is *background-repeat*.

Image is limited to within the box's border edge—unless it is fixed within the viewport.

You can create a vertical line that extends the height of the viewport with:

```
body      { background-color: #ACBFDB; max-width: 1024px;
            margin-left: 164px; padding-left: 20px; margin-right: 15%; padding-right: 20px;
            margin-top: 0;
            background-image: url(BeigeD14x1px.gif); background-repeat: repeat-y;
            background-position: 150px 0px;
            font-family: verdana, arial, san-serif; font-size: 77%; }
```

The only way I've found to make the vertical line start some distance below the top of the page is to cover it up with a top margin on BODY. In this case, the HTML rule must follow the BODY rule. (Setting the background-position: 150px 50px had no effect, nor did margin-top: 50px; in the latter, the box shifted down but the image did not.)

```
html      { border-top: 18px solid #ACBFDB; margin: 0; padding: 0; }
```

Best to specify background for BODY element than for the HTML element.

When an image 10px wide and 1px tall is repeated vertically the result is a 10pixel wide vertical line. When an image 10px tall and 1px wide is repeated horizontally the result is a 10pixel wide horizontal line. Sometimes this is the only way to render a thick line in just the right place.

You can place a "border" at the bottom of the page with:

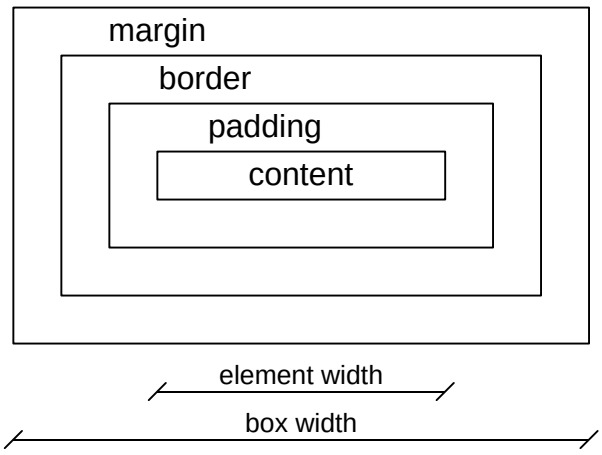
```
html      { background-image: url(Beige1x20px.gif); background-repeat: repeat-x;
            background-position: bottom left;}
```

Here the image is 20px tall and 1px wide. This background image cannot be combined with another background image for the HTML or BODY elements.

Use caution when positioning the image with percentages: Any percentage refers to a position on the image AND on the containing box. As the window is resized, the relative position of the image and the content will change.

## Box Properties

Properties control the different parts of the box model illustrated below.




| | |
|---|---|
| margin-top<br>margin-bottom | 0 \| auto \| 2em \| 10% \| -1px |

| | |
|---|---|
| margin-left<br>margin-right<br>margin | 0 \| 'margin-top' 'margin-right' 'margin-bottom' 'margin-left' \| top-and-bottom left-and-right [applies to all sides] |
| padding-top<br>padding-bottom<br>padding-left<br>padding-right<br>padding | 0 \| 2em \| 20%<br><br>0 \| 'padding-top' 'padding-right' 'padding-bottom' 'padding-left' \| top-and-bottom left-and-right [applies to all sides] |
| border-top-width<br>border-bottom-width<br>border-left-width<br>border-right-width<br>border-width | medium \| thin \| thick \| 1em<br><br>0 \| 'border-width-top' 'border-width-right' 'border-width-bottom' 'border-width-left' \| top-and-bottom left-and-right [applies to all sides] |
| border-top-color<br>border-bottom-color<br>border-left-color<br>border-right-color<br>border-color Y | white \| rgb(255,0,0) \| #336699 [initial value is the value of the 'color' property]<br><br>0 \| 'border-color-top' 'border-color-right' 'border-color-bottom' 'border-width-left' \| top-and-bottom left-and-right [applies to all sides] |
| border-top-style<br>border-bottom-style<br>border-left-style<br>border-right-style<br>border-style P | none \| solid \| double \| groove \| ridge \| inset \| outset \| dotted \| dashed [last 2 are N]<br><br>0 \| 'border-style-top' 'border-style-right' 'border-style-bottom' 'border-style-left' \| top-and-bottom left-and-right [applies to all sides] |
| border-top<br>border-bottom<br>border-left<br>border-right<br>border | 'border-width' 'border-style' 'border-color' e.g., 1px solid red<br><br>'border-width' 'border-style' 'border-color' \| none<br>[missing properties are set to their default value; applies to all sides] |
| -moz-background-clip | padding \| . . . [applies to Mozilla browsers like Firefox] |

- In CSS1 the box model only applied to block elements, but in CSS2 it applies to all elements. You can always change the box type for inline elements to block: display: block.
- Margins are always transparent so parent element shines through.
- Padding area uses same background as element itself.
- Technically, padding and margin properties are not inherited. But placement of an element is relative to its ancestors. For instance, margins can apply to both <UL> and <LI>.
- Collapsing margins. Vertical margins between 2 adjoining block boxes or two nested block boxes in the normal flow collapse, meaning that adjoining margins combine to form a single margin with a length = the greater of the two adjacent margins.

- In IE 7, but not Firefox 3, a bottom margin on a footer element is ignored. You can make the space appear by using bottom padding instead.
- Margin, padding, and border properties can be specified for all sides at once. For example, *margin: 5px* applies to all four sides; *padding: 3px* applies to all four sides; *border: 3px solid red* applies width, style, and color to all sides.
- Margin, padding, and border properties can be specified for all sides at once and each side can have a different value. For example, *border-color: red blue green yellow* specifies the top margin as red, the right margin as blue, the bottom margin as green, and the left margin as yellow. Note that the individual margins are specified in clockwise movement from the top of the box.
- Border style is touchy. In IE6 all styles except solid are not rendered properly if the width is 2px or less or the color is not the default. The double style needs at least 3px width to be rendered. The other styles are difficult to see with a width of 1px. A width of 5px makes the style stronger and visible in any color, however they are rendered the best in the default color.
- In a table, when a border is not a solid line, the table background is visible behind it. The W3C specification says "Borders are drawn in front of the element's background" which in the case of a TD means the TD's background shows behind a dotted TD border. The table's background should only affect the table border. Well, then IE7 does this correctly, but Firefox 3 does not. I had a case with a box with a gray background and a background-image that ran down the right side where there was a dotted border, in FF the gray background showed beneath the dotted border.
- The solution to the above problem is property { `-moz-background-clip: padding;` }. It blocks the box background from beneath the border for Firefox 3.
- If you apply a border to BODY, the bottom border is rendered after the last BODY tag, which for a short page could be mid-screen. If you want a border to appear for the entire screen (view port), define it for the HTML tag (although even this may vary by browser—NOT in IE7 and FF3):
  ```
  html   { border: 6px solid white; }
  ```
- You can simulate a page border with background image, see page 19.

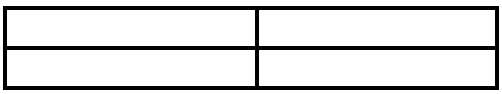
The application of the box model is discussed in the section Layout & Positioning Properties.

## Table Border Properties

Tables and their cells use the same box properties as described above—with the exception that internal table elements do not have margins (per the CSS spec). Tables (not internal table elements) have three additional properties.

| | |
|---|---|
| border-collapse | collapse \| separate \| inherit |
| border-spacing | 0 \| 1pt \| 2px \| 1px 3px \| inherit |
| empty-cells | show \| hide \| inherit |

Separate borders look like:



Collapsed borders look like:

| | |
|---|---|
| | |

When borders are separate you can specify the space between the inter-cell borders. You can specify the same amount of space between vertically-adjacent cells as for horizontally-adjacent cells, or you can specify a different space for each:

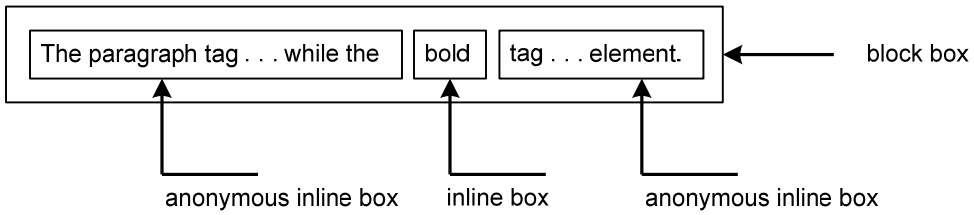
`border-spacing: 4px 6px` the space between horizontally-adjacent cells is 4px, and the space between vertically-adjacent cells is 6px.

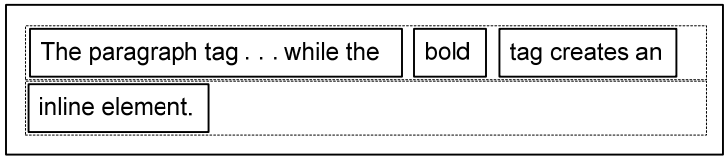
The empty-cells property applies to separated borders.

At least in IE 6, even if the table and its cells have a border: none, there will be an inter-cell gap of 1 pixel. Setting border-collapse: collapse removes this gap.

## Layout & Positioning Properties

Every element exists in at least one box. In a simple layout utilizing normal flow, each HTML element is a block and the blocks flow sequentially and vertically (beneath each other). Block elements have block boxes and inline elements have inline boxes. Within a block-level element each text line has a line box. Each box has the properties of the box model (above). There are additional boxes, but these are the most obvious.




the dotted line is the line box

Some elements establish a containing block: BODY, DIV, OL, UL. Each box is positioned relative to its containing block, but it is not confined and may overflow.

| | | |
|---|---|---|
| width | auto ǀ 2px ǀ 130% | [not inherited] |
| min-width | 50px ǀ 20% ǀ inherit | [ not in IE 6] |
| max-width | 500px ǀ 80% ǀ none ǀ inherit | [ not in IE 6] |
| height | auto ǀ 100px ǀ 50% | |
| min-height | 50px ǀ 20% ǀ inherit | [ not in IE 6] |
| max-height | 500px ǀ 80% ǀ none ǀ inherit | [ not in IE 6] |
| visibility | visible ǀ hidden ǀ collapse ǀ inherit | |

| | |
|---|---|
| position | static \| relative \| absolute \| fixed |
| top | 10px \| 20% \| auto \| 0 [relative to top edge of containing block] |
| bottom | 10px \| 20% \| auto \| 0 [relative to bottom edge of containing block] |
| left | 10px \| 20% \| auto \| 0 [relative to left edge of containing block] |
| right | 10px \| 20% \| auto \| 0 [relative to right edge of containing block] |
| float | none \| left \| right [refers to side of current line] |
| clear | none \| left \| right \| both [if floating elements are allowed and on which sides] |
| display | inherit \| inline \| block \| list-item \| none \| run-in \|table \| etc. |
| table-layout | auto \| fixed \| inherit |
| overflow | visible \| hidden \| scroll \| auto \| inherit |
| clip | auto \| inherit \| rect (<top> <right> <bottom> <left>) |

The *width* property applies to the content only (what W3C calls "bounding box"); it is exclusive of border, margin, and padding. *Width* and *height* properties do not apply to in-line elements. The value of *auto* is calculated based on the flow, positioning, left and right margins, and if the element is replaced. Word wrap is controlled by the width property, not the size of the viewport. When the width exceeds the viewport, a horizontal scroll bar appears.

The *max-width* property can be set at the BODY element to apply to all content. The content is reflowed as the viewport width is changed, there is no horizontal scroll bar. On the BODY tag it does not affect background color, i.e., background color is applied to the entire viewport regardless of width. This property is not a good idea on the BODY element in print stylesheets.

The *height* property applies to the content height of boxes generated by block-level, inline-block, and replaced elements; it does not apply to non-replaced inline-level elements. It excludes padding.

When *height* is specified as a percentage, it refers to the height of the current element's containing block. If the containing box height is not set explicitly, i.e., it depends on content, then the value is interpreted as "auto." When `height: auto`, if the element is block-level non-replaced in the normal flow, then the computed height reflects the content. Thus, you cannot use `height: 100%` to force a child DIV to have the same height as its parent TD. Darn!

The *visibility* property applies to all elements. Hidden objects still affect the layout. Use *display: none* to remove an element from the layout.

The *display* property can be used to make a box non-existent. This means its content is both invisible and it does not take up space on the page. It is often used in conjunction with JavaScript that changes the property from *none* to *block* and back again when something happens. It can also be used to change the default type of an HTML element (e.g., from inline to block and vice versa). Value *run-in* creates a run-in box which becomes the first inline box of a block box—a run-in heading.

The *display* property can be used to define a table. You can use DIVs or OLs to hold content.

```
<DIV ID="table"   STYLE="display: table">
    <DIV ID="heading" STYLE="display: table-row"> . . .</DIV>
    <DIV ID="body"    STYLE="display: table-row">
        <DIV ID="leftcol" STYLE="display:table-cell"> . . . </DIV>
        <DIV ID="centcol" STYLE="display:table-cell"> . . . </DIV>
```

```
        <DIV ID="ritecol" STYLE="display:table-cell"> . . . </DIV>
    </DIV>
    <DIV ID="footer"  STYLE="display: table-row"> . . .</DIV>
</DIV>
```

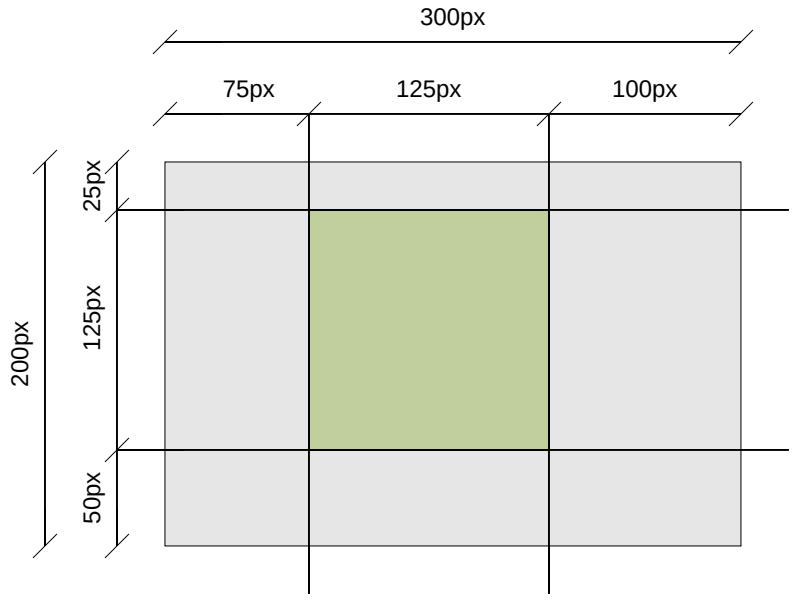
The *table-layout* property sets the algorithm used to display the table cells, rows, and columns. There are two values—fixed and auto (automatic).

- The fixed table layout allows the browser to lay out the table faster than the automatic table layout.
- In a fixed table layout, the horizontal layout only depends on the table's width, the width of the columns, and not the content of the cells.
- By using fixed table layout, the user agent can begin to display the table once the entire first row has been received.
- In an auto table layout, the column width is set by the widest unbreakable content in the column cells.
- The auto layout algorithm is sometimes slow since it needs to access all the content in the table before determining the final layout.

The *overflow* property specifies how the content of a block is clipped when it overflows the box. *Visible* specifies the content is not clipped, and may be rendered outside the box. *Hidden* specifies the content is clipped. *Scroll* specifies the content is clipped and a scroll bar is always present. *Auto* is variable; it may be that the content is clipped and the scroll bar is presented only when there is an overflow.

The *clip* property defines the portion of an element's rendered content that is visible, called the clipping region. By default this is 100%. The *clip* property applies only to absolutely positioned elements and to elements that have an *overflow* property with a value other than "visible." The rectangular clipping region is defined by offsets from the element's box's sides. The offsets have a length value, e.g., "5px"; "auto" is equivalent to 0, and negative values are permitted. A rectangular area that is smaller than the element can be defined. It is also possible to define a clipping region with negative values for one or more sides that extends beyond the element on those sides. Examples:

```
clip {rect(5px, 10px, 10px, 5px); overflow: hidden;}
clip {rect(auto, auto, 10px, 5px);}
clip {rect(5px, -5px, -5px, 5px);}
```




A clipping region is defined by its x-y coordinates as offsets from the original size.

Regarding the specification of the offsets: We want to clip green rectangle from the above image.
The top offset = 25px
The right offset = 300px – 100px = 200px
The bottom offset = 200px – 50px = 150px
The left offset = 75px

Clipping can be applied to simulate cropping an image, and can be useful in keeping all displayed images to a particular size. Caution: the original image is unchanged and its size is not reduced to that of the clipped region, it keeps the original size.

Positioning schemes need lots of discussion. In CSS2 a box may be laid out according to three positioning schemes: normal flow, floats, absolute positioning. The following discussion may be inadequate to design a multi-column layout.

- *position: static* specifies the box is a normal box and laid out according to the normal flow. The left and top properties do not apply.
- *position: relative* specifies the box's position is shifted relative to its position in the normal flow. The box offsets (*top, bottom, left, right*) apply. This shifting may cause boxes to overlap. A relatively positioned box establishes a new containing block for normal flow children and positioned descendants.
- *position: absolute* specifies the box's position in terms of the box offset properties. Absolute positioned boxes are taken out of the normal flow, meaning they have no impact on the layout of later siblings. Shifting may cause boxes to overlap.
- *position: fixed* specifies the box's position according to the absolute model with the addition that the box is fixed with respect to some reference. The reference depends on the media. Consult the W3 spec for more details. The object can be fixed on the screen, so that it always appears in the upper right corner regardless of scrolling. May not be supported by Win IE 6.
- *float* property specifies the box is shifted to the left or right on the current line. A floated box is not in the flow; non-positioned boxes created before and after it flow vertically as if the float did not exist. The top of the floated box is aligned with the top of the current line box (or bottom of the preceding block box if no line box exists). If there isn't enough horizontal room on the current line for the float, it is shifted downward until a line has room for it. A floated box must have an explicit width. Several floats may be adjacent. Margins of floated boxes never collapse with margins of adjacent boxes.
- A float can overlap boxes in the normal flow. (1) When, for example, an adjacent normal box has negative margins. (2) When a float is contained within a container box that has a visible border or background, that float does not automatically force the container's bottom edge down as the float is made taller. Instead the float is ignored by the container and will hang down out of the container bottom like a flag. This second example apparently does not happen in IE (because it violates the W3C spec). One solution is to use a final DIV with *clear: both*, but this offends some as it requires HTML code to solve a format problem. The solution to 2 is to use the CSS2 *after* pseudo class (which is not recognized by Win IE):

```
.clearfix:after {content: "."; display: block; height: 0; clear: both; visibility: hidden;}
.clearfix       {display: inline-table;}                  /* hack for Mac IE  */
/* Hide next line from Mac IE \*/
* html .clearfix {height: 1%;}
/* End hide from Mac IE        */
```

For the HTML, just add a class of .clearfix to any element containing a float needing to be cleared. Should this container box be placed following a previous external float, the IE height fix will trigger Microsoft's proprietary and illegal Float Model, for which you will be sorry.

- With preformatted text, such as done with HTML tags PRE and BLOCKQUOTE and the CSS *white-space:pre* property, you can snug the border of the containing box to the text within with float. Say the width of a block is 1000 px and there is preformatted text no wider than 500px, if you apply float to the preformatted text, its border will shrink to just the width of the widest line. A left float will shift the box to the left of its containing box, a right float will shift the box to the right of its containing box; in neither case will the horizontal alignment of the preformatted text change.
- The *clear* property specifies which sides of an element's box(es) may NOT be adjacent to an earlier floated box. It only applies to elements that generate boxes that are not absolutely positioned. This property applied to all elements in CSS1. In CSS2 and CSS 2.1 the *clear* property only applies to block-level elements. Value *left* positions the current box below any earlier left-floated boxes. Value *right* positions the current box below any earlier right-floated boxes. Value *none* positions the current box below all earlier floated boxes. When *clear* is used on a floated box the top outer edge of the current box is positioned below the bottom outer edge of the earlier floated box(es) within its floated parent container (?).

## Layer & Transparency Properties

CSS provides a way to layer positioned content that straight HTML cannot. Content can be placed above or below (the third dimension, the z axis) other content. Layering can provide a convenient way to place a box outside of the normal flow. It can also be used to dynamically cover up or reveal lower boxes. There is one CSS property for layers:

| | | |
|---|---|---|
| z-index | 0 \| 3 \| auto | [stacking order of layers; 0 is base] |

Transparency in visual material is like the use of a scrim on a stage set—it allows the viewer to see through the surface to the background, but only slightly. Transparency is a property of an upper layer that sits on top of a lower layer, it partially reveals the lower layer.

Transparency and opacity are opposite ends of the same spectrum: the greater the transparency the less the opacity, and vice versa.

In CSS complete transparency is the default, so that lower boxes can be seen underneath higher boxes. A box layered on top of another can employ a semi-transparent background to partially obscure the lower box, or a completely opaque background to completely obscure the lower box. These effects can be achieved in a variety of ways, some of which are detailed below.

The closest to a standard established by the W3C for transparency is a CSS 3.0 recommendation; it was formalized after the browser vendors implemented the capability. There are four CSS properties that effect transparency:

| *Property* | *Values of x* | *Example* | *Applicable Browsers* |
|---|---|---|---|
| filter: alpha(opacity=x) | $0 \leq x \leq 100$ | filter: alpha(opacity=50) | Internet Explorer |
| opacity: x | $0 \leq x \leq 1.0$ | opacity: 0.5 | Safari and Mozilla |

| *Property* | *Values of x* | *Example* | *Applicable Browsers* |
|---|---|---|---|
| -moz-opacity: x | 0 ≤ x ≤ 1.0 | -moz-opacity: 0.5 | Mozilla 1.6 and below |
| color: rgba(r, g, b, x) | 0 ≤ x ≤ 1.0 | color: rgba(15, 30, 120, 0.4) | none yet |

In each of these properties the greater the value of x, the greater the opacity (and the less the transparency). The "opacity" property is the CSS recommendation. Be sure to use both filter and opacity properties together. The –moz-opacity property is likely no longer necessary.

In the W3C recommendation, the transparency-opacity property applies to all elements. As currently implemented, transparency applies to the elements for which it is specified and all of their descendants. [1] There are some challenging quirks to the implementation:

- Each browser implements transparency differently, witness the different CSS properties. Some browsers have additional requirements.
- CSS opacity requires, for IE6, the use of (1) positioning (with the position: absolute or float property) of the container element or (2) "zoom: 1" in the transparent element. This is not needed for an IMAGE tag. (Zoom is a non-standard CSS property used only by IE.)
- If you apply transparency to the BODY selector, it applies to all elements on the page regardless of layers.
- Descendant elements have the same transparency as their parent element, which is why the text of a P element within a transparent DIV is also transparent. Effect a non-transparent descendant element by positioning it on top of the transparent element (perhaps with the margin property or the z-layer property).
- Placing transparent text over an image can result in the text edges looking jagged. Use of "background: transparent" can improve this, more so in Firefox than IE6. Depending on the image, a better solution is to use the image as the background for the text; be sure not to use margins or padding for the text as this will shift the text background so it is not aligned with the underlying image.
- Using Javascript to effect transparency can be done, but it is tricky and why have a design that cannot be done by straight CSS?

### Transparent Images

Images themselves can be created to include transparency. The only formats that support transparency are the GIF and PNG formats. The transparent GIF format is GIF89a (as opposed to the non-transparent GIF87). PNG images can have single color 100% transparency (like GIF) or variable transparency (aka alpha channel, or 256 levels of transparency per pixel); the alpha channel is in addition to the RGB channels.

Transparency is handled differently by browsers. Please note that Microsoft Internet Explorer for Windows doesn't support variable transparency (though it does support single color transparency in both PNGs and GIFs). Apparently IE7 does support variable transparency.

I typically create diagrams with Visio. I can save Visio shapes as JPEG, PNG, or GIF. But I have only had success creating an image file with a transparent background with GIF settings: Background Color =

[1] When opacity is specified for an element, it applies to all contents of that element: text, background, image. If you want to limit the opacity to one of the three, you must put the others in a non-descendant element.

Default, Transparency = color R255 G255 B255 (white), Resolution = Screen, Size = Source, Data Format = non-interlace, and Color Translation = Normal.

### Applying Transparency to HTML Elements

In the following examples the opacity property is used by itself for simplicity of illustration only. When you try this be sure to add the filter property.

- You can apply transparency directly to an image:

```
<IMG SRC=". . ." STYLE="opacity: 0.4">
```

- You can apply transparency to an image via its container:

```
<DIV STYLE="margin:0 auto;"><SPAN STYLE="opacity: .25; zoom: 1;"><IMG SRC=". . ." width="50"
height="50"></SPAN></DIV>
```

- You can apply transparency to text and its background:

```
<DIV STYLE="font-weight: 800; color: black; background-color: blue; opacity: 0.4; zoom: 1">All
the text and the background color here are 60% transparent.</DIV>
```

- You can apply transparency to the background of a box but not the text by placing the text in a non-descendant element:

```
<DIV STYLE="background-color: #ff9944; opacity: 0.3; zoom: 1; height: 36px;"></DIV>
<P STYLE="font-weight: 800; color: black; margin-top: -30px;">
This text is a P that is not contained within the DIV. The DIV is 70% transparent and reveals its
container, in this case BODY. The text is pushed on top of the transparent box with a negative
top margin.</p>

<DIV STYLE="background-color: #ff9944; opacity: 0.3; zoom: 1; height: 36px;">
</DIV>
<P STYLE="font-weight: 800; color: black; position: relative; top: -50px;">
This text is a P that is not contained within the transparent DIV. The P is positioned on top of
the transparent DIV with relative positioning.</P>
```

- You can place semi-transparent text over an image; in this case a background prevents the text edges from looking jagged:

```
<DIV STYLE="background: url(filename) repeat">
<P STYLE="color: white; background: transparent; opacity: 0.5; zoom: 1;">The text is 50%
transparent while the background image is not. The text has some jagged edges in IE6.</P></DIV>

<DIV STYLE="background: url(SnowRings.jpg); height: 300px; width: 460px;">
<P STYLE="color: white; font-weight: bold; font-size: 40px; background: url(SnowRings.jpg);
opacity: 0.7; zoom: 1;">
The text has no jagged edges.</P></DIV>
```

- You can apply or remove transparency on hyperlinks:

```
<STYLE TYPE="text/css">
a.linkopacity img {filter:alpha(opacity=50); opacity: 0.5;}

a.linkopacity:hover img {filter:alpha(opacity=100); opacity: 1.0;}
</STYLE>
. . .

<A CLASS="linkopacity" HREF=". . "><IMG SRC="image.jpg" WIDTH="100" HEIGHT="119" STYLE="border:
1px solid black;"></A>
```

- You can imitate the look of sepia prints by layering a semi-transparent image on top of a solid color background.

```
<DIV STYLE="background-color: blue">
<IMG SRC="filename" STYLE="opacity: 0.5">
</DIV>
```

- You can place fully opaque text on a semi-transparent image. In the example the image fills the window.

```
<BODY STYLE="background-color: #BBC6C0; margin: 0; padding: 0">
<IMG  SRC="SnowRings.jpg" STYLE="filter: alpha(opacity=30); opacity: 0.3">
<DIV  STYLE="z-layer: 5; position: absolute; top: 1px; left: 1px; margin: 10px">
<H1>This text should be fully opaque and with a semi-transparent background image.</H1>
<P>Is that what happens? YES!</P>
</DIV>
```

- There is a different effect when you (1) layer a semi-transparent image over a colored background than when you (2) layer a semi-transparent colored background over an image. They can look identical if you reverse the opacity of (1). For example (1) matches (2) when the opacity in (1) is 70% and the opacity in (2) is 30%.

- It is not possible to apply transparency to only the background of inline text (within SPAN). You could get the same effect by layering an identical text element on top of the first and placing a semi-transparent SPAN in the lower element. That way the semi-transparent text will be overlaid by fully opaque text.

- The Alpha Channel filter used to effect semi-transparency has several attributes. According to the Microsoft Developer Network "you can set the opacity as uniform or graded, in a linear or radial fashion." This is discussed at msdn2.microsoft.com/en-us/library/ms532967(VS.85).aspx. There are examples at www.jegsworks.com/demos/DemoDHTML/filter-alpha.htm.

## Interaction

Interaction, the dynamic response to the user's action, can be achieved in CSS by the dynamic pseudo-class selectors:

| | |
|---|---|
| :hover | applies when user designates an element but does not activate it; this seems akin to the mouseover event<br>[IE 6 applies only to A tag,[1] implemented in IE 7b3] |
| :focus | applies while an element has the focus; elements get focus by access with [Tab] key or mousedown. The ability to get the focus can be disabled with JavaScript (such as "blur()"), but this is a bad practice. Focus persists after (1) link is active (and linked-to page is loaded) and (2) browser Back button is selected.<br>[not in IE 6 and 7b3] |
| :active | applies while an element is being activated; a link remains active when the user returns via the browser's back-button |

Assigning these selectors to style rules enables CSS alone to dynamically change the appearance of content. Implementation of these selectors is incomplete, be sure to check with other sources like http://www.satzansatz.de/cssd/pseudocss.html#active-and-focus .

While common dynamic responses are to change color, background, and border, a more dramatic treatment is to make elements appear and disappear.

[1] So use the A tag without the HREF attribute, and assign it at least two classes, one to suppress normal A styling and the other to effect the HOVER.

There are a few design issues for appearing/disappearing elements:

- the effect their existence has on the page layout. The *display:none* property removes an element from the layout while the *visibility:hidden* property does not. However, if the element exists in its own higher layer (*z-index*), it has no effect on the page layout.
- how quickly the transition is effected. With just CSS the transition can appear abrupt. JavaScript can be employed to add a delay period.

Another dynamic response is to change the cursor icon. Normally the cursor is an I bar when moved over text, an arrow when moved over non-text elements, or a pointer when moved over links. If a page contains dynamic responses, you may want to indicate their presence by changing the cursor. The *cursor* property is used to specify the type of cursor:

| | |
|---|---|
| cursor | default \| crosshair \| pointer \| url("filename") \| wait \| help \| auto |

The *default* value is often rendered as an arrow. The *text* value is often rendered as an I-bar. The *wait* value is often rendered as an hourglass. The *help* value is often rendered as a question mark or an arrow with question mark. The *auto* value directs the browser to determine the cursor based on the current context. If providing a custom cursor image, it is a good idea to specify more than one and/or a generic cursor in the event the user agent cannot handle the custom cursor:

```
P  { cursor: url("first.cur", url("path/second.cur"), default; }
```

For custom cursors, the image that you use for the cursor must be either a .cur, .csr, or .ani file format. The .ani format is animated. The file must be on your website.

## Special Techniques

### Layout Issues and Monitors

A common goal of a web designer is to have each page rendered so that all text can be viewed with only a vertical scrollbar, at most. That is, text fits horizontally within the width of the monitor's screen. This was a simple matter when all screens were the same width.

Screens are available in the original 4:3 aspect ratio format and the new widescreen 16:9 and 16:10 aspect ratios as well as a few others. The aspect ratio refers to the ratio between the width of the screen and its height, screens being wider than they are high. The early VGA display mode had a resolution of 640 x 480, the SVGA had a resolution of 800 x 600. In the first case, the screen was 640 pixels wide, in the second case the screen was 800 pixels wide. In those days it was safe to design web pages with a width of 640 pixels. But with today's common wide-screen resolutions, 1280 x 800 and 1440 x 900, that leaves a lot of screen "real estate" going to waste.

Modern monitors are available in a variety of sizes from 15" to 21" and beyond (measured diagonally), and with a variety of video adapters. Modern operating systems offer the ability to choose a resolution. So how do you design a page layout that looks good at each end of the spectrum? Some choices are easier than others. But keep in mind that real design is about working well within restrictions.

1. Limit page width to 640 pixels and either center the page within the screen or fix the left margin. This is called a fixed layout. See Layout Techniques and Table Techniques for details on centering content within the screen.

2. Allow page width to match screen width. This requires a careful layout so that lines of text do not become too long to read easily. This involves specifying widths as percentages and is often called a liquid layout.

3. Optimize Web pages for 1024 x 768 (currently the most widely used screen size), but use a liquid layout that stretches well for any resolution, from 800 x 600 to 1280 x 1024. The so-called liquid layout is nice, but it merely resizes the same layout into a larger space. It does not address the fact that at larger resolutions you have the ability to offer an entirely different experience.

4. Use onResize JavaScript code to choose a stylesheet to match the resolution. There is a good discussion of this at http://particletree.com/features/dynamic-resolution-dependent-layouts/ These are sometimes called adaptive layouts.

```
<link rel="stylesheet" type="text/css" href="css/default.css" title="default">
<link rel="alternate stylesheet" type="text/css" href="css/thin.css" title="thin">
<link rel="alternate stylesheet" type="text/css" href="css/wide.css" title="wide">
<link rel="alternate stylesheet" type="text/css" href="css/wider.css" title="wider">
<script type="text/javascript">
function chooseStylesheet()
{
var browserWidth = getBrowserWidth();
if (browserWidth < 750){ changeLayout("thin"); }
if ((browserWidth >= 750) && (browserWidth <= 950)){ changeLayout("wide");}
if (browserWidth > 950){ changeLayout("wider"); }
}
function getBrowserWidth()
{
if (window.innerWidth){
    return window.innerWidth;}
else if (document.documentElement && document.documentElement.clientWidth != 0){
    return document.documentElement.clientWidth;    }
else if (document.body){return document.body.clientWidth;}
    return 0;
}
function changeLayout(sheetTitle)
{
}
</script>
. . .
<body onResize=”chooseStylesheet()”>
```

5. Use JavaScript to set the value of CSS properties based on the screen width. There is a good discussion of this at http://www.themaninblue.com/writing/perspective/2004/09/21/ and http://www.alistapart.com/articles/switchymclayout

## Layout Techniques

Web pages whose content exceeds the viewport will be presented with a vertical scroll bar. Some page designs look different with the scroll bar than without it, in this case as you click from page to page where some pages have a vertical scroll bar and some do not, the content will be seen to jump. There is a perfectly nifty solution that reserves space for the vertical scroll bar:

```
    html  { overflow-y: scroll }
```

Remember that BODY defines a box and has margins, borders, and padding. This is why a table will not automatically extend to the full width of the screen. It can be helpful to clear the margins and padding:

```
body   { margin: 0; padding: 0; }
```

It's a good idea to assign font and margin properties to the BODY element. If you use tables and lists, you will have to assign similar properties to TD and LI (because they do not inherit from BODY).

```
body, td, li   { font-family: verdana; font-size: 9px }
```

Default text margins, such as for paragraphs and lists, can be overridden by CSS. They can be increased or reduced. You can push a line of text all the way up to the preceding line by a negative top margin.

Overlapping text and images is done with negative margins and short line height; in CSS2 this can be done with absolute positioning and layers.

Be careful using *width* in CSS. Don't use a fixed width greater than the narrowest screen that is commonly expected to be used (e.g., 15" monitor with 800 x 600 resolution), or else a horizontal scroll bar will appear. A fixed width must be no greater than 650px for the whole line to print, or else the right side is truncated. Better to use relative length width (specified with %). A better way to handle the printing problem is with a print stylesheet.

Center the BODY with CSS. The correct way to center an element is to set its left and right margins to "auto."

```
<body style="margin-left: auto; margin-right: auto; width:640px;">
. . .
</body>
```

Designing a web page to improve search engine access to the actual content may result in locating code that renders non-content items (like navigation links) at the top of the web page—at the bottom of the HTML file (where they are read last by web crawlers). These items are positioned absolutely in a higher layer:

```
#top    { z-index: 3; position: absolute; top: 15px; right: 20px; text-align: right; }
```

You can overlay a horizontally centered BODY with an absolutely-positioned block that is also centered—essentially combining the previous two designs. In this case first you create an absolutely-positioned block, then create a child block that is horizontally centered with the same width as BODY.

```
body    { margin: 0 auto; max-width: 600px; padding: 0; }
#top    { z-index: 3; position: absolute; top: 15px; left: 15px; right: 15px; }
#fix    { margin: 0 auto; max-width: 600px; }
. . .
<body>
<p>This is a base body content and can have several blocks.</p>
<div id=top>
<div id=fix>
<p>text of top line</p>
</div>
</div>
```

There are some layout HTML elements that cannot be reproduced with CSS, especially to do with tables. The ability in CSS to float a box is nice, but does not in all cases substitute for an HTML table.

Text within a box can have a border and be indented (*margin-left*) and have internal margins (*padding*).

```
<DIV STYLE="font-family: Arial, Verdana, sans-serif; font-size: 9pt; font-weight: 500;
     color: #100080; vertical-align: middle; text-align: left; padding: 20px;
     border: 1px solid black; width: 500; margin-left: 15%">
text goes here
</DIV>
```

A **hanging indent** can be effected with a left margin and a negative text indent:

```
<P STYLE="margin-left: 15px; text-indent: -15px">The first line of this text starts at 0
relative to its containing block, all subsequent lines are indented 15 pixels.</P>
```

Another way to reduce the space between two paragraphs is to set the top margin of the second paragraph to a negative value.

When there isn't enough space for a full paragraph break, you can put more white space between two consecutive lines with the SPAN tab using the CSS HEIGHT property:

```
<P>Standard paragraph style prevails here, especially line height.<BR>
<SPAN STYLE="height: 26px"></SPAN>This line is lower than the preceding line's normal
spacing. The amount of spacing is up to you.</P>
```

Note: this is okay in IE 5.5 but not IE6. In IE 6:

```
<P>blah blah blah
<IMG SRC="single-pixel.gif" HEIGHT=20 WIDTH=1 ALIGN=top>
<BR>
blah blah blah</P>
```

**Hanging punctuation**. Commonly long quotes are indented and bracketed by quotation marks. If you do nothing the quotation marks will be aligned with the left margin of the text. Hanging punctuation puts them into the left margin so the text lines up.

```
blockquote { text-indent: -0.5em; }
```

**Centered box.** No text on either side.

```
<P STYLE="border: 3px inset; position: relative: left: 30%; width: 40%; padding: 10px">
text
</P>
```

**Text overlays on an image.** Perhaps the easiest way to do this so that the overlays stay in position when the page is scaled is to put them in a DIV with a background image. You can force the size of the DIV to match that of the image with WIDTH and HEIGHT. Each overlay is an absolutely positioned P, with its position relative to the DIV. The DIV is relatively positioned in order to establish a new containing block for positioned descendants.

```
.hot  { font-family: arial, helvetica, sans-serif; font-size: 200%; font-weight: 800;
    border: 2px solid white; padding: 4px; }
. . .
<DIV STYLE="background-image: url(pic.jpg); width: 120px; height: 200px; position:
relative">
<P STYLE="position: absolute; top: 25px;  left: 40px" class=hot>text</P>
<P STYLE="position: absolute; top: 100px; left: 20px" class=hot>text</P>
</DIV>
```

**Text aligned right on the same baseline.** This is commonly used to place secondary information on the same line visually. Semantically the texts are different. Example:

# Title Text on the Left

lesser text on the right

The challenge here is aligning text of different heights on the same baseline in such a way that all the text is scalable. The solution:

```
<p  style="float:right; margin-top:-42px; height:24px; line-height:24px">[Print]</p>
<h2 style="height:24px; line-height:24px">Title Text on the Left</h2>
```

In this example, the amount of the top margin for the text on the right was determined by trial and error. Were the text the same size, you would not need to control the height, line height, and top margin.

This result needs more work if you are going to place the text within an absolutely positioned box, such as when you locate this code just before the </BODY> statement and when the content is to be rendered at the top of the page. This particular example adds links to the text on the right and an image to the text on the left; the image had to be cropped to remove a visual padding so that the actual image and text are visually set on the baseline. The design layout holds at different zooms.

```
body        { font-family: arial, helvetica, sans-serif; font-size: 80%; }
#top        { z-index: 3; position: absolute; top: 15px; left: 15px; right: 15px;
padding-bottom: 3px; }
#auxnav     { float: right; font-size: 85%; padding-top: 6px; margin-right: 6px; width:
150px; text-align: right; }
p.crop      { width: 300px; overflow: hidden; }
p.crop img  { margin: 0 0 -11px 0; }
. . .
<div id=top>
<p id=auxnav>
[  <a HREF="../index.html" class=n hidefocus="true">Home</a>, <a
HREF="../software/index.html" class=n hidefocus="true">Software</a> ]
</p>
<p class=crop><img src="../favicon16.ico" class=logo height="32" width="32">
Susan Dorey Designs Portfolio
</p>
</div>
```

Another variation of the above handles the problem where the floated right box is not sitting on the same baseline as the left box:

```
<p id=auxnav><span style="display: block; padding-top: 9px">
[  <a HREF="../index.html" class=n hidefocus="true">Home</a>, <a
HREF="../software/index.html" class=n  hidefocus="true">Software</a> ]
  </span></p>
```

**Keeping text on a baseline grid**. Print typographers have long designed documents so text aligns with a vertical grid. You can do this with web pages and thereby improve the page's vertical rhythm. Start by establishing a baseline height, then specifying line heights, margins, and padding to maintain that height over the variety of HTML elements that compose the content. Paragraph text can adhere to the baseline height (with line-height). You will need to pay particular attention to the box model for headings and lists as the browser default values do not fit the baseline height.

- You must use ems for all vertical measurements in order that typographic integrity is maintained when text is resized.
- Start by clearing all browser vertical measurements: * {margin: 0; padding: 0}
- Every variation from the basic text size should take up multiples of the baseline height. This can be accomplished by adjusting the line-height and margin accordingly.
- Typically the space between paragraphs is set by browsers with a top and bottom margin of 1em. But if you are using a baseline height of 18px based on a body font-size of 12px, you can maintain the grid with top and bottom margin of 18 ÷ 12 = 1.5em .
- If you are using a subheading sized at 14px, you must set the line-height to 18 ÷ 14 = 1.286em. Correspondingly, set the top and bottom margins to the same dimension.
- You can use asymmetrical margins for headings, provided the margins combine to be multiples of the basic line height. For example combine a top margin as 1.5 line height with a bottom margin of 0.5 line height.

**Layer two letters (or phrases) with slight offset**:

```
<STYLE>
DIV#one   { z-index: 0;
            position:absolute;
            top: 100px; left: 100px;
```

```
            font-family: arial; font-size: 100pt; font-weight: 700; color: red }
DIV#two   { z-index: 1;
            position:relative;
            top: 25%; left: 20%;
            font-family: arial; font-size: 100pt; font-weight: 700; color: blue }
</STYLE>
</HEAD>
<BODY>
<H1>Layers B on top of A and offset to the right and below </H1>
<DIV ID=one>A</DIV>
<DIV ID=two>B</DIV>
```

**Create checkerboard**, accommodating partial CSS implementation by browsers. Background-color does not work with TD or TR tags in IE5.

```
<STYLE>
table   { background-color: black}
tr      { height: 150px}
td.y    { color: yellow}
</STYLE>
</HEAD>
<BODY>
<TABLE CELLSPACING="0" CELLPADDING="6" >
<COLGROUP VALIGN="top" SPAN=2 WIDTH=150></COLGROUP>
<TR>
<TD CLASS=y>text goes here
<TD BGCOLOR=yellow>more text
<TR>
<TD BGCOLOR=yellow>text again
<TD CLASS=y>text text text
</TABLE>
```

Create a **domino-effect bullet** using paragraph tag for bullet (with background color) and second paragraph for list item (pushing text up to same line as bullet). You can adjust the height of the bullet with the font size.

```
<STYLE>
body, td   {font-family: Verdana, Arial; font-size: 9pt}
p.x        {margin-left: 65px; margin-top: -35px}
.white     {background-color: white; width: 15px; font-size: 8pt}
.black     {background-color: black; width: 15px; margin-left: 20px; font-size: 8pt}
</STYLE>
</HEAD>
<BODY>
…
<P><SPAN CLASS=black> </SPAN><SPAN CLASS=white> </SPAN></P>
<P CLASS=x>Soft Tables Control Central Alerts&#151;itemizes
alerts that are presented on Control Central. </P>
```

**Right floated text box.** I use these for page table of contents. It could also be used for a callout. The following figure illustrates the desired layout:

The text box floated to the right holds the table of contents. There are several ways to accomplish this.

(1) Within a containing DIV place the right floated text box as the first HTML element, followed by the text paragraphs on the left. This is the standard approach, the float right applies to elements that follow in the tree. The disadvantage of this approach has to do with search engines: the right floated text box has more prominence because it appears earlier in the element tree.
(2) Within a containing DIV place the right floated text box after the first left paragraph HTML element. This only works if you fix the width of the left text to allow room for the right text. This solution fails when the window is shrunk by the user.
(3) You can simulate this by using a table to separate the side-by-side text boxes. This will look similar only if there is no difference in height between the two.

By not specifying a width, the box assumes the width of the longest element. If it breaks a line, you can prevent that by using " " for the intra-word spaces.

```
<DIV STYLE="float: right; right: 15%; border: 3px inset; padding: 10px; font-size: 10px;
line-height: 1.5 ">
<P>Contents<BR>
. . .
</P>
</DIV>
<P>this text to be placed to the left of the previous box and aligned on the top.
</P>
```

**Left floated image.** In this example the image is floated to the left of the paragraph text and a margin separates the two.

```
img            { float: left }
body  p, img   { margin: 2em }
<P><IMG . . .> paragraph text </P>
```

**Dramatic drop cap.** A drop cap is the situation where the initial letter of a paragraph is larger, often a different font, color, and slant, and drops below the top line of the paragraph. The height of the initial letter is a multiple of the adjacent lines of text. Its alignment with the surrounding text is governed by specific typographic rules:

- Dropped initial letters should fit snugly within the surrounding copy.
- The top of the initial letter should align optically with the top of the opening word or words, with exceptions for points on top or bottom of the letter (like A or W) which may protrude slightly.
- The bottom of the initial letter should align optically with the baseline of the final line of text beside which it sits; the bottoms of round letters like the C and O are allowed to fall slightly below the lines they align with.
- When the initial letter has both serifs and a vertical stroke, the serifs should protrude into the left margin so the left side of the vertical stroke of the letter aligns vertically with the left side of the text of the full lines underneath.

CSS2 includes the first-letter pseudo class which can be used for drop caps, but it does not allow the necessary typographic control.

The basic approach here is to place the initial letter in a floated SPAN and continue the rest of the text in Ps like the following example. You will have to adjust the height of the drop cap and the space between it and the surrounding text with trial-and-error. You combine a generous width with a negative right margin to pull the floated copy snug to the drop cap in Win IE6 and Firefox 3; I found that using width alone does not work identically in both browsers. The example uses scalable units of measure, which Firefox 3 scales correctly but Win IE6 does not. You can avoid the scaling problem by using fixed units of measure; in my testing, scaling drop caps while retaining the typographic alignments is unlikely. A less-

than-100% line height for the drop cap forces it up on the line, but so does a negative top margin which lets me get the bottom margin correct.

```
<STYLE>
p       { font: normal normal .9em verdana; line-height: 1.3; }
.drop   { font: bold italic 6.6em "times new roman"; color: gray;
          border: none; float: left; width: 50px; margin-top: -16px; margin-bottom: -21px;
          margin-right: -16px; }
</STYLE>
</HEAD>
<BODY>
<P><SPAN class=drop>i</SPAN>n this instance of a drop cap, the initial letter is lower case.
I saw this done in a fashion magazine and found the effect dramatic. If you want to achieve
the typographers' preferences regarding alignment with the top line of the paragraph and the
last floated line, plan to use a custom style for each letter. You will have to adjust the
drop cap's margins to effect the best separation. In this example the initial letter is
exactly 4 lines tall.</P>
```

Many web sites offer advice on drop caps. None that I have seen produce typographically-correct drop caps, let alone ones that are scalable.

**Arrange list items in columns where the list items flow horizontally.** For example:

list item 1 list item 2 list item 3 list item 4 list item 5
list item 6

The width property in the UL selector keeps the list in one box and keeps the following text away.

```
div.toc     { font-size: 90%;
          border: 1px solid black;
          line-height: 1.5; }
div.toc ul { list-style-type: none; width: 100%}
div.toc li { width: 200px;
          padding-left: 10px;
          padding-right: 30px;
          width: 180px;
          float: left; }
```

```
<DIV CLASS=toc>
<UL>
<LI><A HREF="#navt">Navigation Tips</A>
<LI><A HREF="#docs">Other Documents</A>
<LI><A HREf="#glan">At A Glance</A>
<LI><A HREF="#list">List of Family Members</a>
<LI><A HREF="#note">Notes for the Reader</A>
<LI><A HREF="#cont">Contact Me</A>
</UL>
</DIV>
```

**Make columns from list items** with *list-style: none* and *float: left*. The width and margin of the LI rule controls how many columns there are. The following example will create 4 columns. The P elements are placed below their LI element, making a pair of rows. When there are more than four LIs, the next 1–4 ones will make a second pair of rows.

```
<STYLE>
ol      { padding: 10px 0px; margin: 0px 0px }
ol li   { list-style: none; float: left; width: 20%; margin: 2px }
ol li p { margin: 0px 0px 5px 0px }
</STYLE>
. . .
<!-- this list makes a four column table of x pairs of 2 rows -->
<OL>
<LI>cell1a
<P>cell2a</P>
```

```
<LI>cell1b
<P>cell2b</P>
<LI>cell1c
<P>cell2c</P>
<LI>cell1d
<P>cell2d</P>
<LI>cell1e
<P>cell2e</P>
<LI>cell1f
<P>cell2f</P>
</OL>
```

**Floating thumbnails**. This can be used to enable a series of thumbnail images with a caption centered under each to flow across the page and wrap as the window is resized. From realworldstyle.com/thumb_float.html.

```
<STYLE>
div.float   {  float: left;  width: 120px;  padding: 10px;  }
div.float p {  text-align: center;   }
</STYLE>
<BODY>
<DIV CLASS="float">
  <IMG SRC="image1.gif"><BR>
  <P>caption 1</P>
</DIV>
<DIV CLASS="float">
  <IMG SRC="image2.gif"><BR>
  <P>caption 2</P>
</DIV>
<DIV CLASS="float">
  <IMG SRC="image3.gif"><BR>
  <P>caption 3</P>
</DIV>
```

When you have several groups of thumbnails that you want to group visually with a background and/or border, enclose them in a container DIV. Because when you float an element with CSS, it no longer takes up any "space" and the background and border show up above the images instead of surrounding them, you need to put some content other than the floated DIVs into the container DIV. Like a spacer DIV:

```
div.container {  border: 2px dashed #333;  background-color: #fff;  }
div.spacer    {  clear: both;  }
. . .
<BODY>
<DIV CLASS="container">
<DIV CLASS="spacer">  </DIV>
<DIV CLASS="float"><IMG SRC="image1.gif"><BR><P>caption 1</P></DIV>
<DIV CLASS="float"><IMG SRC="image2.gif"><BR><P>caption 2</P></DIV>
<DIV CLASS="float"><IMG SRC="image3.gif"><BR><P>caption 3</P></DIV>
<DIV CLASS="spacer">  </DIV>
</DIV>
```

**Page header and/or footer** with fixed positioning.

```
#header    { position: fixed; width: 100%; height: 15%;
             top: 0; right: 0; bottom: auto; left: 0; }
#footer    { position: fixed; width: 100%; height: 150px;
             top: auto; right: 0; bottom: 0; left: 0; }
<BODY>
<DIV ID=header> . . . </DIV>
. . .
<DIV ID=footer> . . . </DIV>
```

**Page footer** that stays at the bottom of the viewport. Requires a fixed-height DIV for the footer. There are only four divs required for this to work. The first is a container div that surrounds everything. Inside that are three more divs: a header, a body and a footer:

```
<div id=container>
    <div id=header> . . . </div>
    <div id=body> . . . </div>
    <div id=footer> . . . </div>
</div>
```

This is explained at http://matthewjamestaylor.com/blog/keeping-footers-at-the-bottom-of-the-page

```
html, body  { margin:0; padding:0; height:100%; }
#container  { min-height:100%; position:relative; height:100%; }
#header     { background:#ff0; padding:10px; }
#body       { padding:10px; padding-bottom:60px; }  /* Height of the footer */
#footer     { position:absolute; bottom:0; width:100%; height:60px;   /* Height of the footer */
              background:#6cf; }
```

**Two-column layout** with left column primary and it floats.

```
body       { margin: 0 }
#left      { float: left; width: 67%; background: #cccccc; margin-right: 15px;
             padding-bottom: 20px; }
#right     { float: left; padding . .  }
<BODY>
<DIV ID=left> left column content </DIV>
<DIV ID=right> right column content </DIV>
```

**Multi-column layouts** can be achieved by using layered DIVs. Specifying width and positioning with pixels keeps layout correct when window is resized, using percentages does not.

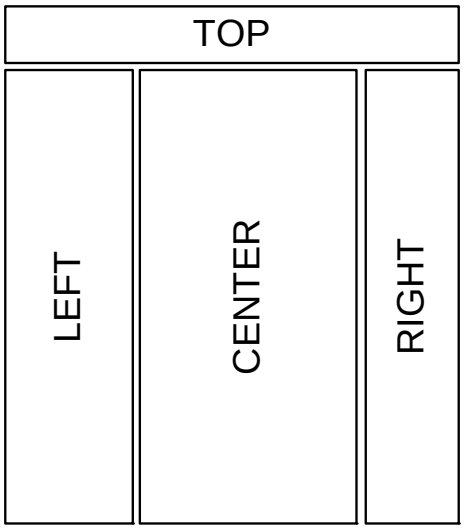
```
<STYLE>
body       { margin: 0}
#left      { z-index: 0;  top: 0; left: 0; width: 150px;
             border: 1px outset black; padding: 10px;
             font-family: arial; font-size: 20px; font-weight: 500; color: red }
#right     { z-index: 1; position: absolute; top: 0; left: 170px; width: *;
              border: 1px inset green; padding: 6px;
             font-family: arial; font-size: 16px; font-weight: 500; color: blue }
</STYLE>
</HEAD>
<BODY>
<DIV ID=left> blah blah blah</DIV>
<DIV ID=right>blah blah blah</DIV>
```

**Multi-column layouts** can be achieved by using nested DIVs:

```
<STYLE>
body    { font-family: arial; font-size: 10pt; font-weight: 500; color: black;
          line-height: 1.3}
H1      { font-family: arial; font-size: 14pt; font-weight: 700; color: black }
#one    { position: relative; left: 0; top: 0; width: 100%; border: solid 1px blue }
#two    { position: relative; left: 0; top: 0 }
#three  { position: relative; left: 0; top: 0; width: 100%; border: solid 1px orange }
#left   { position: absolute; left: 0; top: 0; padding-left: 10%; padding-right: 10%;
          width: 40%; border: solid 1px black }
#right  { position: relative; top: 0; left: 40%; width: 40%; border: solid 1px red }
</STYLE>
</HEAD>

<BODY>
<H1>Test of nested divs</H1>
<P>There are three horizontal divisions used here.  The first and second are separated by a
horizontal rule.  The first and third each contain two divisions, one for a left column, the
other for a right column.
Division borders are used to reveal their location.
</P>
```

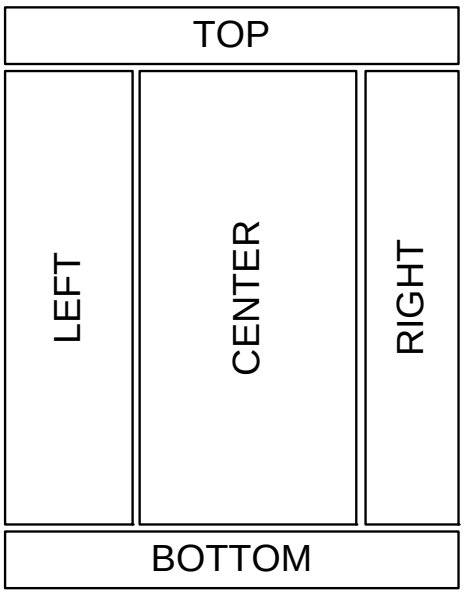
```
<P>Each of the three horizontal divisions is defined as position = relative, left = 0, top =
0, and width = 100 percent.
The width was necessary.
</P>
<P>There are no html tags in the divisions.  All formatting is done with CSS.
</P>

<DIV ID=one>
<DIV ID=left>
This is text that should fit on the left in the top division.
It has position = absolute, left = 0, and top = 0;
these are with respect to the containing block with is division one.
It has left and right padding and a width = 40 percent.
</DIV>
<DIV ID=right>
and this is text that should fit on the right.
It should start on the same line as the text on the left.
To do that, it has position = relative, left = 40 percent (to put it next to the column on
the left), and top = 0.
As in the column on the left, these are with respect to the containing block with is
division one.
It has no padding, and a width = 40%.
These two columns can be side-by-side with a height that floats ONLY when the shortest
has a position = absolute.
</DIV>
</DIV>

<DIV ID=two>
<HR>
this is text that should fit in a page-wide rectangle.
It is in the second horizontal division.
</DIV>

<DIV ID=three>
<DIV ID=left>
 
</DIV>

<DIV ID=right>
this text should be on the right of a blank area in the third horizontal division.
</DIV>
</DIV>
```

**A three-column layout with top** can be achieved with absolute positioning.



```
<STYLE>
body    { font-family: arial; font-size: 12pt; font-weight: 500; color: black; margin: 0; }
#top    { height: 100px; padding: 10px; border: 1px solid;}
#left   { position: absolute; top: 122px; left: 0;   width: 20%; border: 1px solid; }
#center { position: absolute; top: 122px; left: 21%; width: 60%; border: 1px solid; }
#right  { position: absolute; top: 122px; left: 82%; width: 17%; border: 1px solid; }
</STYLE>
</HEAD>
<BODY>
<DIV ID=top>
<H1>Test of layers and absolute positioning with CSS2</H1>
</DIV>
<DIV ID=left>left</DIV>
<DIV ID=center>center</DIV>
<DIV ID=right>right</DIV>
```

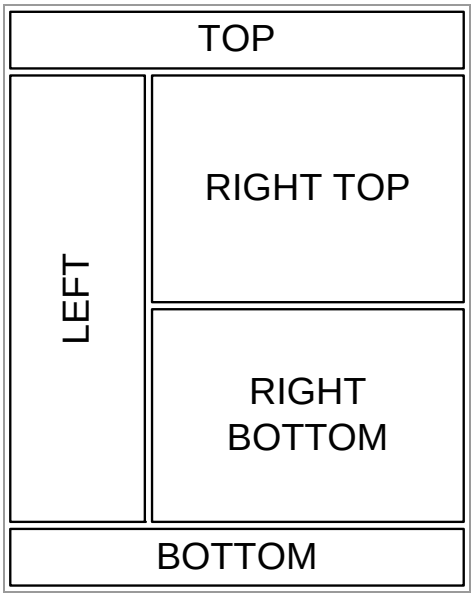
**A three-column layout with top and bottom** can be achieved with absolute positioning. In this example, the bottom DIV is positioned directly below the center DIV, so you must make sure the center DIV is the longest or else there will be overlap. BEWARE: Not sure of the following code.




```
<STYLE>
body    { font-family: arial; font-size: 12pt; font-weight: 500; color: black; margin: 0 }
#top    { height: 100px; padding: 10px; border: 1px solid}
#left   { position: absolute; top: 122px; left: 0; width: 20%; border: 1px solid; }
#center { margin-top: 0; margin-left: 20%; margin-right: 20%; border: 1px solid; }
#right  { position: absolute; top: 122px; left: 80%; width: 19.8%; border: 1px solid; }
#bottom { border: 1px solid; }
</STYLE>
</HEAD>
<BODY>
<DIV ID=top>
<H1>Test of layers and absolute positioning with CSS2</H1>
</DIV>
<DIV ID=left>left</DIV>
<DIV ID=center>center</DIV>
<DIV ID=right>right</DIV>
<DIV ID=bottom>Bottom</DIV>
```

**A two column layout with top, bottom, and two rows in one column.** A layout for the diagram below. The margin: 0 auto in the all div may be needed to center the div in non-IE browsers. My early notes say the background in div all allows divs left and right to extend to the same height; this does not seem to be

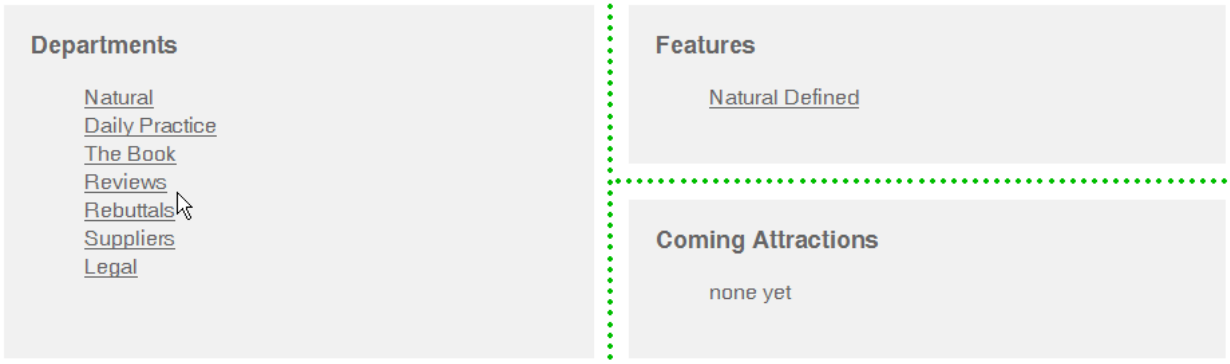
true in IE 6. In the bottom div, clear: both lets the div land under the floated divs. Padding may be necessary in the body rule if bottom margin in the all div doesn't work.




```
<STYLE>
body       { margin: 0; font-family: arial; font-size: 17px; font-weight: 500; color: black; }
#all       { width: 100%; margin: 0 auto;  background-color: gray; }
#top       { height: 80px; padding: 3px; background-color: #D0E9EA}
#left      { float: left; width: 25%;   padding: 3px; background-color: #D6EAD5 }
#righttop  { float: left; width: 73.7%;   padding: 3px; margin: 0; background-color: #E0DCC2 }
#rightbot  { float: left; width: 415px; padding: 3px; margin: 0; background-color: #FEF29E}
#bottom    { clear: both; padding: 3px; background-color: #DFCCE3}
</STYLE>
</HEAD>

<BODY>

<DIV ID=all>

<DIV ID=top>
<P>Test of layout with 5 divs. This is the top full-width div. The layout can be changed when the
window is resized.</P>
</DIV>

<DIV ID=left>
<P>Left column.
The float=left in this div enables the right divs to be floated to the right of this div,
else they are positioned beneath.
Setting the width to a % allows it to resize properly and retain the layout.
When the height of this div is less than the combined divs to the side, the lower or both are
positioned beneath this one.</P>
</DIV>

<DIV ID=righttop>
<P>Right top div.  Setting the width to * extends this div ALMOST to the right side of the
window.
And it allows it to resize properly.
The actual width of the div is a factor of the length of each word and the effect of word
wrapping.
</P>
<P>Setting the width to a % effects the layout.
For instance, if the left column is 25%, settting the width of this div to 75% positions it below
the left div.
When this width is 73.7%, it is positioned to the side and fills the window.
```

```
You probably have to experiment.
</P>
</DIV>

<DIV ID=rightbot>
<P>Right bottom div.  When the width of this div is fixed, e.g., set to a a number of pixels,
it does not resize properly.</P>
</DIV>

<DIV ID=bottom>Bottom
<P>And here is some text to demonstrate text wrapping.</P>
</DIV>

</DIV>
```

I recently redesigned part of my website. I wanted one page to look like:




This design has three cells separated by a green border placed equidistantly between them. The design is such that the relationships are maintained when the page is resized and content is added to each cell, in particular the bottom of the left cell is aligned with the bottom of the right bottom cell. This was originally accomplished with a table, CSS, and JavaScript. As of Dec, 31, 2010 I found a solution without JavaScript:

| | |
|---|---|
| overall grid | table with 2x2 cells, leftmost column spans two rows |
| green dividing line with white background | cell border—cells 1 and 3; cell background has special property for Firefox 3 to keep background from showing behind the border |
| content of cells | held within DIV within TD, DIV has padding that accomodates the thick white bar |
| gray background | cell background, auto fills entire cell (right up to border) |
| thick white background for green dividing lines, 10 pixels wide | 1) for vertical bars, as background image of each TD (white 10x1pixel gif)<br>2) for horizontal bar in cell 2, as bottom border of TD<br>3) for horizontal bar in cell 3, as top border of DIV |

```
<style>
#grid     { background-color: white; padding: 0; }
#grid td  { padding: 0; background-color: #dddddd;  }
#grid ul  { margin-bottom: 0; }
#cell1    { border-right:  4px dotted #00BE00; }
#cell3    { border-top:    4px dotted #00BE00; }
#cell1    { background-image: url(../White10x1px.gif); background-position: top right;
background-repeat: repeat-y }
#cell2    { background-image: url(../White10x1px.gif); background-position: top left;
background-repeat: repeat-y }
#cell3    { background-image: url(../White10x1px.gif); background-position: top left;
background-repeat: repeat-y }
#cell1 div  { padding: 20px 30px 20px 20px; }
#div2     { padding: 20px 20px 20px 30px;  }
#cell3 div  { border-top: 10px solid white; padding: 20px 20px 20px 30px; }
```

```
#cell2    { border-bottom: 10px solid white; }
td        { -moz-background-clip: padding; } /*  blocks background beneath green dotted border */
</style>

<table id=grid>
<tr>
<td id="cell1" rowspan=2>
<div>
<h2>Departments</h2>
<ul>
<li><a href="articles-toc.html" hidefocus="true">Natural</a>
. . .
</ul>
</div>   <!--end of DIV for cell1 -->

<td id=cell2>
<div id=div2>
<h2>Features</h2>
<ul>
<li><a href="natural-defined.html" hidefocus="true">Natural Defined</a>
</ul>
</div>   <!--end of DIV for cell2 -->

<tr>
<td id=cell3>
<div>
<h2>Coming Attractions</h2>
<ul>
<li>none yet
</ul>
</div>   <!--end of DIV for cell3 -->

</table>
```

**Crop an image with negative margins.** This technique requires the image be placed in a parent element, such as a paragraph, that is floating (or set to a certain width). This technique will not work on full width (block) elements. Negative margins are used to hide the unwanted edges of the image. Set the parent's *overflow* property to "hidden" to hide the area if the image extends outside the parent.

```
<P class=crop><IMG SRC=". . .”></P>
.crop  { width: 300px; overflow: hidden; }
.crop img  { margin: 0 -10px -20px -5px; }
```

### Line Techniques

A horizontal line can have color, height, indentation, border, and positioning:

```
<HR STYLE="color: yellow; height: 25pt; margin-left: 20%; border-color: black; border-style:
solid">
```

### Border Techniques

In Windows IE 6, a button can be simulated with a border that varies by color and width on its four sides. This is not CSS-standard, but takes advantage of an IE "feature". It does not work in Mac IE.

```
a:link, a:hover, a:active
      { border-color: white gray gray white; text-decoration: none; border-style: solid;
        border-width: 1px 2px 2px 1px; padding: 1px }

<P>This is a <a href="me.html"> test of a link appearance </a> that manages to
look as if it were a button with a three-dimensional effect.</P>
```

### Table Techniques

Margin doesn't work for rows or cells, this is the CSS specification.

Never set the BODY width to 100%—as doing so will ruin any table widths you set.

The declaration *max-width* doesn't seem to work on the TABLE element. At least not in IE 7, it does work as expected in Firefox 3..

Set column width with CSS:

```
td {width: 50% }
```

Note that in HTML you can set the column width to "*" which sets it to the available space, which can be handy when the window width is changed by the user. This capability does not exist in CSS. If you need it, do it in HTML. Well, not so as it turns out. The CSS solution is to set the widths on the first TDs, or perhaps use TH for this; for the column for which you would use "*" in HTML, use `width: 100%` in CSS.

If you want to control the column widths, be sure to set the table width:

```
table {width: 100% }
```

Make table be a certain percentage width:

```
<table style="width: 70%; margin-left: 15%; margin-right: 15%;">
. . .
</table>
```

Caution: According to a web page I read, "widths on tables have always been more like a polite advice than a strict rule. If the table needs more space than the width allows, it takes more space."

Center a table with CSS. The "correct" way to center a table is to set its left and right margins to "auto." Non-compliant browsers complicate this. Some will incorrectly center a table if it is contained within a block having text-align: center.

```
<div   style="text-align: center;">
<table style="margin-left: auto; margin-right: auto; text-align: left;">
. . .
</table>
</div>
```

Make table be a certain percentage width with fixed-width side margins:

```
<table style="width: 97.5%; margin-left: 10px; margin-right: 10px;">
. . .
</table>
```

Make table be fixed width, in this example 100px but could be any width:

```
tr, td    {text-align: left;}
. . .
<div   style="width: 98%; margin: 1%">
<table style="text-align: center; margin-left: auto; margin-right: auto; width: 100px">
. . .
</table>
</div>
```

When the BODY element is centered with *max-width* and auto side margins, you won't be able to use `width = 100%` and fixed-width table side margins and keep the table within the body (when the viewport is narrowed, the table will extend beyond the BODY border into the white space on the right). If you want the table to have visual side margins (i.e., white space that looks like side margins) and remain within the BODY element borders, then you must style the table similarly:

```
<table style="width: 97.5%; margin-left: 10px; margin-right: 10px">
```

This styling lets the table remain within the BODY when the viewport is narrowed. In this case, max-width won't work right, especially when one column has width = "*".

For tables, align text in cells at the top (instead of the default middle). In this case *vertical-align* replaces the deprecated HTML *valign* attribute.

```
td {vertical-align: top}
tr {vertical-align: top}
```

Table grid lines are nicely handled by CSS:

```
table, td  {border-style: solid; border-width: 2px; border-color: red}
```

You can style the table border differently than the cell borders. The default cell border is inset. When you style the table border differently, you retain the default cell borders as:

```
td  {border-width: 1px; border-style: inset}   /* border-color is not needed */
```

Table rows (TR) can be styled in limited ways. What works: background-color, color, padding. What does not work: margin, border. This is a result of the specification of applicability for these properties. You can apply border to TD:

```
tr.even td { border: solid 1px blue }
```

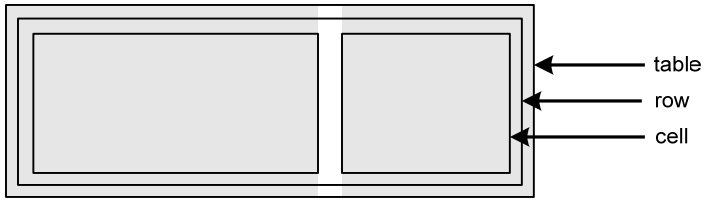
If you want only rows to have a top border:

```
tbody td { border-top: solid 1px blue }
```

If you apply a background color to a TD, a 1 pixel "border" will appear regardless of an actual applied border. The way to get rid of it is:

```
td { padding: 0 }.
```

When you want to place content in side-by-side columns with a vertical line (thin or thick) between them, place the content in a single row in a 2-column table (a 1x2 table). You may apply a background color to the table. Apply padding to each TD. To the right TD apply a left border. This border, which may be a thin line or a thick bar, will extend the full height of the row. In the following example, the border is white.




Maybe you want additional spacing between some, but not all rows, like this example:

| |
|---|
| blah |
| blahhh |
| blah |
| blah |

This is easily accomplished by using two tables and placing the additional spacing between the two, perhaps as a bottom margin.

## Link Techniques

Be sure to

- Highlight links in some way so user can recognize them.
- Don't disable focus.

- Reflect focus by unique highlighting. Browsers typically present a dotted outline around a link, if you hide this be sure to use a different highlighting technique.
- Don't disable [Tab] access to links.[1]
- Consider differentiating visually between the various states of a link: link (unvisited), hover, focus active, visited.
- Consider positioning the focus on the first link when the page opens in order to facilitate [Tab] access to the page links.
- Consider styling the ACTIVE state to make it obvious. (I use a pen-and-tablet instead of a mouse. Sometimes a tap on a link gives it the focus but does not activate it. Without special styling the only way to tell the link is not active is when the page is not replaced.)

Browsers have a default method of highlighting the presence of a link. For text it is underlined and colored differently. For an image it is given as a border. You can override this styling with CSS.

For text choose from different techniques for highlighting the presence of the link:

| | |
|---|---|
| bold text | font-weight: bold |
| underline text | text-decoration: underline |
| | border-bottom: 3px solid black (not IE 7) |
| no underlining | text-decoration: none |
| differently colored text | color: pink |
| different background color | background-color: pink |

For an image, you can remove the border:

```
a:link  img  {border: none }
```

If you want the style applied to all link variations:

```
a  img  { border: none }
```

Browsers typically render a fine dotted border for the FOCUS state (the focus outline). You can remove this with JavaScript and CSS:

```
<A HREF=". . ." hidefocus="true"><IMG . . .></A>                /*  for IE 7  */
a   { outline: none }                                           /*  for Firefox  */
```

You can set the focus on the first link when the page opens:

```
<script type="text/javascript">
function setfocus()
{ document.links[0].focus(); }
</script>
</head>
<body onload="setfocus()">
```

Browsers are different, for example:

| *State* | *Link Opens in New Window* | *IE 7* | *Firefox 3* |
|---|---|---|---|
| after link activated | yes | status = link, active, focus | status = visited |
| after link activated | no | status = visited | status = visited |

[1] Using the *blur* method for the *onfocus* event handler, <A HTML = . . ." ONFOCUS="blur()"> . . . </A> will disable the focus. This will disable [Tab] access and is a bad idea.

For the first case, if you want to automatically revert to VISITED, you must use JavaScript to remove the focus from the link (but it does not remove "active"). Note that the HIDEFOCUS attribute is specific to IE only; and be aware that in hiding the focus outline, you are also hiding any indication that a link has the focus.

```
<A HREF=" . . . " TARGET="_blank" HIDEFOCUS="true">link text here</A>
```

You may want to style links differently for mouse navigation than for tabbed navigation. The former is accomplished by the pointer device (typically a mouse). The latter is accomplished by moving through links with the [Tab] key.

For tabbed navigation, the only way users can see which link they are on—which link has the focus—is if the FOCUS state is styled uniquely. You can use a different property to indicate FOCUS. For example `border-bottom: 3px solid black`. This works just find in Firefox 3 but not at all in IE 7 (which seems to consider this state ACTIVE). Some developers use the technique of blurring the focus (`onfocus="blur()"`) which may be fine for mouse navigation, but not for tabbed navigation; this has the undesirable result of obscuring which link has the focus during tabbed navigation.

Tabbed navigation in IE 7 seems to set the link state to ACTIVE (not FOCUS which seems more appropriate).

It may prove desirable to use JavaScript for mouse event handlers. It may be that an **onmousedown** event handler can block the focus outline in IE7 with `blur()`. QuirksMode.org has a good discussion of mouse event handlers: http://www.quirksmode.org/js/events_mouse.html

> The onmousedown attribute is similar to the onclick attribute, but differs in that the event is triggered the moment the mouse button is pressed on the element, rather than at the point at which the mouse button is released (onclick is effectively a combination of onmousedown and onmouseup event on the element in question). This event isn't often seen in practice, possibly because it can so easily cause events to be triggered accidentally. If you're using an onclick event, the user can move the cursor off the element, release the mouse button, and avoid triggering the action if it was an accidental button press; this is not the case with onmousedown. [from sitepoint.com]

Should you think of using JavaScript to force the browsers to behave identically, be aware that while you can use JavaScript to change CSS2 properties, you cannnot refer to the pseudo classes selectors, thus you cannot access those states directly.

### Image Techniques

**Floating thumbnails** are effected: see page 39.

Image loading sequence may be the same as HTML sequence when HEIGHT and WIDTH are omitted.

When you want to **layer text over an image**, create the text as one or more P elements within a DIV having the image as background. In the sample code below, the image is 422x586 pixels. The DIV is sized to hold a border and a padding of 2px, so it is larger than the actual image. Centering the image in the DIV provides a visual padding (like a matte on a framed painting).

```
.hot        { font-family: arial, helvetica, sans-serif; font-size: 200%; font-weight: 800;
              border: 2px solid red; width: 40px; height: 40px; padding-top: 6px; text-align:
center; }
. . .
div style="width: 430px; height: 594px; border: 2px solid #989898; background-image:
url(jobsd/4b.jpg); background-repeat: no-repeat; background-position: center center; margin-
bottom: 1em">
```

```
<p style="position: relative; top: 25px;  left: 40px" class=hot>1</p>
<p style="position: relative; top: 100px; left: 20px" class=hot>2</p>
</div>
```

Presenting an image as a background is super—until you print the page. Browsers do not print backgrounds by default. IE has a setting on Tools, Internet Options, Advanced to print backgrounds. Some browsers have no such setting. What to do?

1. Don't use images as background if they are critical to the content. Instead insert them with the IMG HTML tag.
2. Use DIVs with absolute positioning and filled with an IMG, all with a z-index that puts it behind the content. The images will print and look like a background.
3. Include both the image as an IMG tag and as a CSS background. On the screen stylesheet use `display: none` to hide the IMG tag. On the print stylesheet use `display: none` to hide the element with the background.

**Present images with border and matting**:

```
<img src=" . . ." class="left">
img.left  { border: 2px solid white; padding: 6px; margin-right: 2em; float-left; }
```

## Menu Techniques

A menu is considered to be a list of navigation choices. A menu contains a list of menu items, each list has either a horizontal or vertical orientation. Each menu item may be associated with (have) a lower level menu with one or more menu items.

There are a number of ways in which menus can be presented.

- Fixed. Entire menu is always visible, the layout indicates relationships.
- Dynamic. The main menu is always visible, but the lower level menus appear only when their parent menu item is selected.
- Cascading. A form of dynamic menu where the main menu is always visible, while each next lower level menu appears below a horizontal list or to the side of a vertical list. Consequently the levels alternate between horizontal and vertical.
- Expand/collapse. A lower level menu appears when the expand (+) icon is activated, disappears when the collapse (-) icon is activated. Menu entries typically appear below but may appear to the side. Not all menu items can be expanded/collapsed. This may be used to reflect a vertical tree structure.
- Fixed lower level menu appears dynamically. All subordinate menu entries, regardless of level, appear at once when the main menu item is selected.

Not all menu items may have a hypertext link, some may be headings. At any level, there may be a mix of menu item types—links and headings.

Methods of selecting a menu in order to open its lower level items:

- click: done with HTML A tag or onClick event.
- mouseover (event): needs JavaScript.
- hover (pseudo-class): can be done with CSS alone.

Menu items can be represented by several HTML tags: UL/LI, TD, IMG, SPAN, DT/DD, Hn. Of these, UL/LI is the most semantically appropriate (MENU as a list was deprecated in favor of UL). Using a UL for a horizontal menu requires property *list-style: none*. It can be helpful to contain the entire menu in a DIV. When all lower level menu items appear at once, they can be contained in a DIV; the DIV can employ a mouseout event handler to close it.

Operationally, the issues seem to be:

- How are lower menu levels displayed and what does the user have to do to make it happen?
- How long are the lower menu levels displayed and what does the user have to do to make them disappear? It can be aggravating to the user to have opened a four-level menu one level at a time only to have the cursor slip off—letting all lower levels close. This situation is made more likely when menu items are small and/or have little margins or padding.
- If there are more than two levels, how can the user "back up"? or do they have to start over?

Example of a menu with a fixed lower level menu that appears dynamically: http://jhu.edu/ The lower level menu appears on mouseover-hover and stays open as long as the cursor is positioned on it; it may have one or more levels. The main menu is a horizontal UL, the box for the lower level menus is a child DIV with visibility:hidden and z-index:9999. The mouseout event is used to hide the submenu box.

Example of a menu with a fixed lower level menu that appears dynamically: http://artgallery.yale.edu/ The lower level menu appears when a main menu item is clicked and stays open as long as the cursor is positioned on it; it may have one or more levels. The lower level menu is on a higher layer, when it appears it does not displace other content. [While I like the appearance and operation of the menu, I do not care for how it and the rest of the page is implemented, with lots of JavaScript and tables.]

An example of a cascading menu is at website:
http://demotemplates.joomlashack.com/aqua_dark/index.php?option=com_content&task=view&id=11&Itemid=47 All behavior is controlled by CSS. In HTML the main menu is a UL, each submenu is its own UL. Each menu item is a LI. Each submenu UL is nested in its parent's LI:
<LI> . . . <UL><LI> . . . </LI><LI> . . . </LI></UL></LI>
The menu is contained in a DIV with id = tabmenu, which is contained in a DIV with class = menutab.

Use of CSS classes and IDs:

- In the main menu, menu items with no sub-menu have LI class = mainlevel
- In the main menu, menu items with a sub-menu have no LI class
- Main menu items with no submenu have A class = mainlevel
- Main menu items with a submenu have A class = child
- Submenu items with no submenu have A class = sublevel
- Submenu items with a submenu have A class = child
- The active menu item has LI ID = active
- The active submenu item has A class = sublevel_current
- The active submenu item has A ID = active_menu

Key CSS elements that control the appearance:

- .menutab { background: . . . }
- #tabmenu { float: none; position: relative; z-index: 900; background: . . . }
- #tabmenu ul { float: left; list-style: none; position: relative }
- #tabmenu ul li { position: relative }
- #tabmenu a { float: left }
- #tabmenu ul li.mainlevel { background: . . . }
- #tabmenu ul li.mainlevel a.mainlevel,
  #tabmenu ul li.mainlevel a.mainlevel_current,
  #tabmenu ul li.mainlevel a.child
  {display: block; background: . . . }
- #tabmenu ul li.mainlevel a.child {display: block }

- #tabmenu ul li#active.mainlevel { background: . . . }
- #tabmenu ul li.mainlevel a#active_menu,
  #tabmenu ul li#active.mainlevel a.child { display: block, background: . . . }
- #tabmenu li { float: left; background: none }
- #tabmenu ul ul a { background: none }
- #tabmenu li.hover ul,
  #tabmenu li li.hover ul,
  #tabmenu li li li.hover ul,
  #tabmenu li li li li.hover ul,
  #tabmenu li.iehover ul,
  #tabmenu li li.iehover ul,
  #tabmenu li li li.iehover ul,
  #tabmenu li li li li.iehover ul,
  { background: . . .}
- [define hover colors:] #tabmenu li.hover a,
  #tabmenu.li.iehover a
  { color: . . . }
- Ditto for ul li a.hover and its variants

See the website for more details.

### Interaction Techniques

Text can be hidden by *display: none* and then made visible by *display: block*. Text can be toggled back and forth by JavaScript that dynamically changes the display value; e.g., …. thisText.display = "none" … .

Change the appearance of content in response to events. For example, change the background color when the mouse pointer hovers over the content. The basic approach: (1) in HTML have event handlers set the content's class name(s), (2) in CSS define the style for the changed appearance using the class name from #1. In the following example, the content whose appearance is changed when the mouse pointer hovers over it is placed within a DL, but it also could be a DIV, SPAN, P, or something else. There is no CSS for dl.pkg.

```
<STYLE>
dl      { border-bottom: 1px solid #ccc; padding: 10px 0; }
dl.over { background-color: #eee; }
</STYLE>
. . .
<DL CLASS="pkg" ONMOUSEOVER="this.className = 'over pkg';" ONMOUSEOUT="this.className =
'pkg'"> this content is restyled . . . </DL>
```

## Bibliography & Resources

| | |
|---|---|
| World Wide Web Consortium is the standards-making body; they publish the specifications | www.w3.org/Style/CSS/ |
| CSS Pointers Group | css.nu |
| uses of symbol font | www.bbsinc.com/symbol.html |
| color test | www.bbsinc.com/bbs-cgi-bin/colorEditor.cgi |
| known issues | developer.netscape.com/support/bugs/known/css.html |

| | |
|---|---|
| implementation across several browsers | www.quirksmode.org<br>css.nu/pointers/bugs.html<br>www.westciv.com.au/style_master/academy/browser_support<br>www.thesitewizard.com/css/excludecss.shtml<br>www.w3.org/Style/CSS/#support (as of 1-07 look for the line "These sources document the level of support in various browsers:")<br><br>www.positioniseverything.net/explorer.html (CSS bugs in IE) |
| ditto – for HTML | webdev.wrox.co.uk/reference/html4db/result.asp |
| CSS validation service | jigsaw.w3.org/css-validator/ |
| design ideas | www.csszengarden.com<br>www.mezzoblue.com/zengarden/resources<br>www.alistapart.com/ |
| global reset styles[1] | http://perishablepress.com/press/2007/10/23/a-killer-collection-of-global-css-reset-styles/ |

[1] This is highly worthwhile reading. Each browser implements CSS in its own way, which all too often is at variance with the standards and with other browsers. "Using a well-crafted set of global CSS reset styles enables designers to make assumptions about the default behavior of browsers." These styles reset the default browser styles. And help to minimize the browser differences. The reset styles are placed at the top of your stylesheet.