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This document summarizes what CSS is and how to use tag selectors and their declarations. Visit CSS page at http://www.sonsoo.org/itis/css.html and the CSS tutorial page http://www.html.net/tutorials/css/.

1. Cascading Style Sheets (CSS)

Cascading style sheets (CSS), developed and recommended by W3C (CSS1 in 1996 and CSS2.1 in 2011), are sets of rules that specify formats and layouts of contents (e.g., font, color, margin, line, height, width, and background) of HTML/XHTML documents. HTML/XHTML contains information (texts) and markup that describe the information's structure. By contrast, CSS controls styles (formats and layouts) of structured Web contents.

Why do we use CSS? It provides efficient, consistent, sophisticated, and concise controls of formats and layouts, in particular, by its reusability and separation of styles from Web contents. Once a style is defined, the style can be applied to many places within a XHTML document and many XHTML documents repeatedly. This feature improves consistency, conciseness, and compactness. A well-written XHTML is much smaller (about a half) in file size than a HTML without CSS applied that presents the same contents. And CSS has various sophisticated options to control visual presentation.

The biggest benefit of using CSS is efficiency gain. A XHTML with CSS is well-structured and separates styles from contents. Therefore, it is easier to identify and correct problems in contents and styles; by contrast, HTML without CSS is messier and more difficult to manage the problems. Smaller file size in XHTML with CSS is less burdensome to Web servers, of course.

Imagine style functionality in wordprocessor like WordPerfect. Once you define a style for general paragraph, it is easy to manage the format of contents. If you want to change a font, for example, all you have to do is to change the font in the style; all paragraphs with the style applied are automatically changed to have a new font. Without the style, you have to change the font of all paragraphs one by one; obviously, it is not fun at all!

2. How Do CSS Look Like?

CSS consists of a series of style rules each of which has a *selector* and its *declaration*. A selector (e.g., tag, id, and class) refers to a specific section of a Web document. A declaration of a selector, enclosed by {}, consists of pairs of a *property* and its *value* that are separated by a colon (:). A pair of property and its value ends with a semi-colon (;). Therefore, the format of a style looks like,

```
selector {property:value; property:value;…}
```

An example is,

```
p {font:9pt Arial; color:#242424;}
```

CSS allows to list more than one selector; list more than one property and its value (you can list them in multiple lines for the sake of readability); and use a property (e.g., font, border, margin, padding) containing a set of related values.

```
h1, h2, h3 {font-family:helvetica; font-style:italic; color:#800000;}

/* This CSS is for the division */
div {position:relative;
    top:10px; left:0px;
    width: 600px;
    background-color:#ffffff;
    }

p {font: italic 10pt helvetica;}
```

In CSS, a comment is provided between /* and */ like in C and Java. It is recommended to provide as many comments as possible to describe your CSS.

3. How Do CSS Work?

When you click a hyperlink on a Web document, your Web browser requests information to the designated Web server that processes the request and sends requested information back to your Web browser. The request information includes HTML/XHTML files, video/audio clips, CSS files associated with the HTML/XHTML files, and others (e.g., javascript files).

Once your Web browser received all pieces of information, it begins to interpret HTML/XHTML files and their styles. Then the Web browser put all the information together as formatted in CSS to create the Web page you requested. This process is called *rendering* and each Web browser has its own rendering engine. Therefore, some Web browsers cannot interpret CSS correctly and give you a strange Web page that is quite different from what is intended. As a consequence, we need Web Standards and compliance to them.

4. Modes of CSS

CSS is used in four modes. Users can combine them in a HTML/XHTML documents.

4.1 *Inline CSS*: you may provide CSS as the value of a style attribute in a XHTML tag. <… `style="property: value;"` …> Since it is embedded in a tag, you don't need any selector and {}. This style is intuitive but naïve, of course. It does not provide many advantages of using CSS.

4.2 *Embedded CSS*: you may define styles in the <style>…</style> in the <head> section. In <style>, you need to provide the type of scripts used like `type="text/css"`. A style begins with selector (tag name) and sets of properties enclosed by braces, { and }. An example is,

```
<style type="text/css">
```

```
        @import url(http://www.sonsoo.org/site/js.css);
        body {background-color:#ffffff;}
        p {font:10pt Arial; font-style:italic;}
        a:link {text-decoration:none; color:#242424;}
        h1.left {border-left: 2px solid yellow;}
</style>
```

4.3 *External CSS*: You may write a CSS file and link it to the XHTML file using <link> in the <head> section. In fact, the second mode is not efficient if you have many styles defined and/or many Web documents that share the same styles.

4.4 A CSS file is an ASCII text containing definitions of styles WITHOUT opening and closing <style> tags. Then use the <link> tag to include the CSS file. This mode is a bit inconvenient (you have to write a CSS file separately) but most productive and thus recommended. See the following example.

```
<link rel="stylesheet" type="text/css" href="site/default.css" />
```

4.5 *Imported CSS*: You may import a CSS file stored in other Web site using `@import url()`. The <link> "references alternative style sheets that the reader can select," while imported style sheets by `@import` are "automatically merged with the rest of the style sheet." (W3C).

	Location of CSS	Range of Effects
Inline CSS	Within a particular tag	That particular tag
Embedded CSS	<style>…</style>	Within a Web document
External CSS	External ASCII file (.css) Called by <link> in <head>	Within the Web document
Imported CSS	Other Web site Called by `@import` in <style>	Within the Web document (merged)

5. Built-in Selectors and Their Declarations

Here let us discuss built-in tags and their style definitions. Three modes of style are used interchangeably for the sake of pedagogical purpose. See http://www.w3.org/TR/CSS21/

5.1 Controlling Fonts

When the name of a font-family consists of more than one word, enclose the name with quote. The property `font` has a set of font-related values, making it easy to control font styles.

- `style="font: italic bold 12pt Arial;"`
- `font-family:Arial, Helvetica, 'Courier New', sans-serif;`
- `font-size:12pt;`
- `font-weight:bold; /* normal, bolder, and lighter*/`
- `font-style:italic;`
- `color:#800000;`
- http://www.w3.org/TR/CSS21/fonts.html

Size: When specifying a size in CSS, you may use absolute or relative size. Absolute sizes are `pt` (point), `px` (pixel), `pc` (picas), `in` (inch), `cm` (centimeter), `em`, where relative sizes are %, x-small, small, medium, large, x-large, and xx-large.

Color: When specifying a color in CSS, you may use a color name (e.g., aqua, black, blue, fuchsia, gray, green, lime, maroon, navy, olive, purple, red, silver, teal, yellow, and white) or provide corresponding RGB color scheme. For instance, you may provide #000000 (black), #ff0000 (red), #800000 (maroon), #0000ff (blue), #008000 (green), #808080 (gray), #c0c0c0 (silver), #ffff00 (yellow), or #ffffff (white).

5.2 Controlling Texts

You can align text horizontally and vertically using `text-align` (left, right, center, and justify) and `vertical-align` (sub, super, top, bottom, middle, text-top, text-bottom) properties, respectively. `text-indent` controls the indentation of a paragraph, while `line-height` sets the distance between two adjacent lines; `letter-spacing` and `word-spacing` respectively control spaces between two adjacent characters and words. `text-decoration` describes the decoration of the element (none, underline, overline, line-through, blink).

- `style="text-align:center;"`
- `vertical-align:top;`
- `text-indent:2em;`
- `line-height:150%;`
- `letter-spacing:1px;`
- `word-spacing:2em;`
- `text-decoration:underline;`
- `text-transform: uppercase; /* capitalize; lowercase */`
- http://www.w3.org/TR/CSS21/text.html

5.4 Controlling Lists

The property style `list-style` specifies the values of `list-style-type` (disc, circle, square, decimal, lower-roman, upper-roman, lower-alpha, upper-alpha, none), `list-style-image`, and `list-style-position` (inside and outside) at a time.

- `ul {list-style:circle url(iuj.jpg) outside;}`
- `<ul style="list-style-type:circle;">`
- `list-style-image:url("iuj.jpg");`
- `list-style-position:outside;`
- http://www.w3.org/TR/CSS21/generate.html#propdef-list-style-type

5.5 Controlling Background

The property `background` has a set of background related values. `background-repeat` allows the image to be repeated (`repeat-x`, `repeat-y`, `no-repeat`); `background-attachment` determines if the image scrolls with the contents (`scroll` versus `fixed`); `background-position` specifies the initial position of the image (left/right/center and top/bottom/center).

- `body, div {background:url(tiger.gif) #790016 top center}`
- `<body style="background-color:white;">`
- `background-image: url("tiger.gif");`
- `background-repeat: no-repeat;`
- `background-attachment: fixed;`
- `background-position: right bottom;`
- http://www.w3.org/TR/CSS21/colors.html

6. Box Properties

Border properties set the style of borders of an element; margin properties set the margin of an element; and padding properties set the distance between the border and contents of an element. The margin is the distance between the main content and the border of an element. The following figure illustrates the relationship among margin, border, and padding.

Source: http://www.w3.org/TR/CSS21/box.html
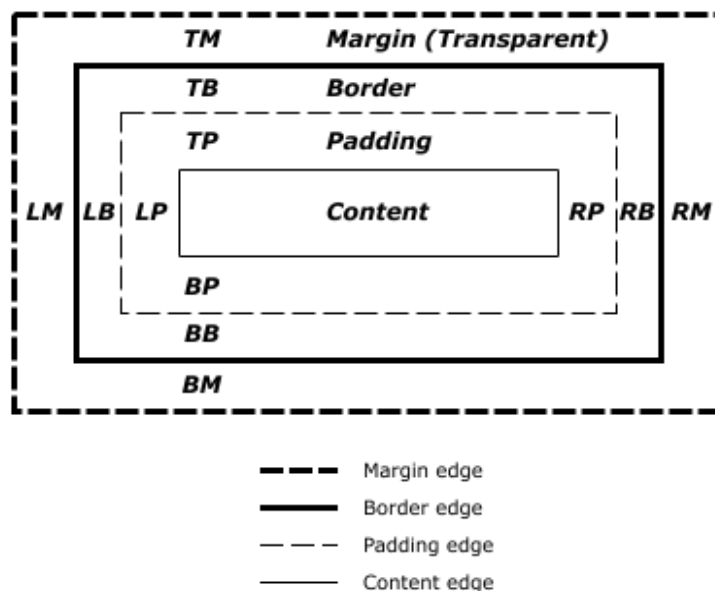
6.1 Controlling Borders

Border properties set the border style of an element including thickness, style of lines, and color. The property `border` has a set of border related values (border-width, border-style, and/or border color) that are individually specified by `border- top`, `border-right`, `border-bottom`, and `border-left`.

- `border: 3px double red;`
- `border-top: 1px solid yellow;`
- `border-right: 2px dotted blue;…`

The property `border-width` is a shorthand property to set `border-width-top`, `border-width-right`, `border-width-bottom`, and `border-width-left` (thin, medium, and thick, or actual length).

- `border-width: 2px thick medium thin;`
- `border-top-width: 2px;`
- `border-right-width: thick;…`

The property `border-style` sets the styles of four borders (none, dotted, dashed, solid, double, groove, ridge, inset, outset). `border-color` sets the colors of four borders.

- `border-style: solid;`
- `border-top-style: 1px dotted;`
- `border-left-style: 2px dashed;`
- `border-color: black blue green red;`
- `border-right-color: #ffffff;`

The property `border-spacing` sets the space of the border and `border-collapse` decides if the border can be collapse or not.
- `border-spacing: 10pt;`
- `border-collapse: collapse;`
- http://www.w3.org/TR/CSS21/tables.html#propdef-border-collapse
- http://www.html.net/tutorials/css/lesson9.asp
- http://www.html.net/tutorials/css/lesson11.asp

6.2 Width, Height, Float, and Clear

Properties `width` and `height` set the dimension of the element. If `float` is set to left or right, the element is moved to the left or right and the text will wrap on the right or left side of the element. If `clear` is set to right, the element will be "moved below any floating element" on the right side.

- `width:600px;`
- `height: 100px;`
- `float:left;`
- `clear:right;`
- `width:700px; float:left; clear:both;`

6.3 Controlling Margins

The property `margin` sets the value of four margins that are individually specified by `margin-top` through `margin-left`.

- `margin: 1pt 1em 10% 1px;`
- `margin-top: 1pt;`
- `margin-right:1em;`
- `margin-bottom:10%;`
- `margin-left:1px;`
- http://www.w3.org/TR/CSS21/box.html#margin-properties
- http://www.html.net/tutorials/css/lesson10.asp

If you want to eliminate the very top margin of the page, set the margin (margin-top) to 0 in the first content element after <body>. For example,

`<body>`

http://www.sonsoo.org/

```
<p style="border:0px; margin:0px; padding:0px;">Title of this page</p>
…
```

6.4 Controlling Padding

The property `padding` sets the distances between four borders and contents of an element. Or you may specify four paddings individually using by `padding-top` through `padding-left`.

- `padding: 0px 0pt 1px 1pt;`
- `padding-top: 0px;`
- `padding-right: 0pt`
- `padding-bottom:1px;`
- `padding-left:1et;`
- http://www.w3.org/TR/CSS21/box.html#propdef-padding-top

7. Pseudo Classes and Pseudo Elements

Pseudo-classes "differentiate[s] between different element types," while pseudo-elements "addresses sub-parts of elements." They use colon (:) to separate themselves from selectors.

7.1 *Pseudo-classes* are commonly used to control styles of anchors. Anchor pseudo-elements are `a:link` (unvisited link), `a:visited` (visited link), `a:hoover` (hoovering link when your mouse is over the link), `a:active` (active link when you click the link).

```
a:link {text-decoraton:none; font:bold Arial; color:#242424;}
a:visited {font:bold 10pt Arial; color:blue;}
a:hoover {font:bold 10pt Helvetica; color:maroon;}
a:active {font:12pt Helvetica; color:yellow;}
```

7.2 There are two types of *pseudo-element*. The `first-letter` pseudo-element controls the style of the first letter and thus gives "typographical effects." The `first-line` pseudo-element controls the style of the first line of a paragraph. The first line depends on the window size; Changing a window size results in change in the first line of a paragraph.

```
p:first-line {font:bold 14pt Arial;}
p:first-letter {font: 25pt Helvetica; color:red;}
```

8. Users Defined Styles: ID and Class Selectors

In addition to styles for built-in tags, you can also define your own styles using *id* (identification) and *class* (grouping of element) selectors and apply them to your XHTML documents.

8.1 Each id selector must be UNIQUE in a Web document; that is, an id selector should be used once within a single Web document. By contrast, a class selector is used to refer to multiple elements within a single Web document. Therefore, class selector tends to be more often used than its id counterpart.

8.2 When defining the style of a class or id selector, a class name begins with a period (.) and an id selector with a pound (#). For instance,

```
.class_heading {font:14pt bold Arial;}
```

```
#id_heading {font:18 Helvetica; color:#800000;}
```

8.3 A class selector is called by the `class="…"` attribute and an id selector by `id="…"` in individual tags. You must provide class and id names only without period and pound. For example,

```
<p class="class_heading">… </p>
<div id="id_heading" …>… </div>
```

9. Page Bookmarking: Destination Anchors

In a Web document, you may include page navigators (e.g., navigation bars or table of contents) using destination anchors.

9.1 Locate a bookmark place of the Web document (e.g., section 2) and then specify a destination anchor using `id="…''` in one of tags (elements). The following example defines a bookmark (destination anchor) at "Section 2" and names it as `sec2`.

```
<h3 id="sec2">Section 2</h3>
```

9.2 Once you make a hyperlink for a destination anchor defined, provide a hash or pound (#) followed by anchor name in the `href=""` attribute of `<a>`. For example, when you click on "Go to Section 2" link below, the Web browser leads you to the place where the destination anchor `sec2` is defined.

```
<a href="#sec2">Go to Section 2</a>
```

10. Validation

You can validate your CSS using the CSS validation service of the Web Consortium.

- http://validator.w3.org/
- http://jigsaw.w3.org/css-validator/