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The Printer Working Group

# CSS Print Profile

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## Abstract

This specification defines a subset of the Cascading Style Sheets Level 2 specification with additions from the proposed features of Paged Media Properties for Cascading Style Sheets Level 3, to provide a strong basis for rich printing results without a detailed understanding of each individual printer's characteristics.

It also defines an extension set that provides stronger layout control for the printing of mixed text and images, tables and image collections.

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Print WG mailing lists in order to participate in discussions, clarifications and review of the WG product.

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## 1. Overview

This document specifies a profile of the Cascading Style Sheets, level 2 (CSS2) specification [CSS2] and selected portions of the Paged Media Properties (PAGEMEDIA) [PAGEMEDIA] of Cascaded Style Sheets, level 3 (CSS3) specification [CSS3]. This profile is appropriate for a spectrum of printing devices from low cost printers to high-end printers. Conformance to this profile means that a user agent supports, at minimum, the features defined in this specification. This subject is addressed in Section 2, Conformance, below.

As defined in [CSS2]:

> CSS2 is a style sheet language that allows authors and users to attach style (e.g., fonts, spacing, and aural cues) to structured documents (e.g., HTML documents and XML applications). By separating the presentation style of documents from the content of documents, CSS2 simplifies Web authoring and site maintenance. CSS2 builds on CSS1 (see [CSS1]) and, with very few exceptions, all valid CSS1 style sheets are valid CSS2 style sheets. CSS2 supports media-specific style sheets so that authors may tailor the presentation of their documents to visual

browsers, aural devices, printers, Braille devices, handheld devices, etc.

In summary, CSS2 specifies how developers can author style sheets for presenting documents across multiple devices and media types. While this is very important, it is also important that authors have an understanding of what features are supported on these different devices. Likewise, it is important that similar devices operate in a similar manner. Otherwise, authors will need to develop style sheets for each version of each device -- raising the cost of content development and decreasing interoperability.

The CSS Print Profile specifies a conformance profile for printing devices, identifying a minimum set of properties, values, selectors, and cascading rules. The resulting CSS Print Profile is very similar to CSS2 with elements from CSS3 that address concerns unique to paged media.

### 1.1 Glossary

PP-UA
A CSS Print Profile conforming user agent, that is, a printer.

## 2. Conformance

The key words "MUST", "MUST NOT", "REQUIRED", "SHALL", "SHALL NOT", "SHOULD", "SHOULD NOT", "RECOMMENDED", "MAY" and "OPTIONAL" in this document are to be interpreted as described in RFC 2119 (see [RFC2119]). However, for readability, these words do not appear in all uppercase letters in this specification.

The primary role of a profile is to define a subset of features that provides a minimal guarantee of interoperability. In the case of the CSS Print Profile, this guarantee is that a conforming user agent will support the features defined in this specification following the CSS2 conformance clause ([CSS2] Section 3.2), recast and summarized below:

1. A CSS Print Profile conforming user agent (PP-UA) shall support the all and print CSS2 media types. A PP-UA may support other CSS2 media types, as well.
2. For each source document, a PP-UA shall attempt to retrieve all associated style sheets that are appropriate for the supported media types. A failure to retrieve a style sheet due to problems such as a loss of network connection should not stop the PP-UA from processing the document.
3. A PP-UA shall parse the style sheets according to this specification. In particular, the PP-UA shall recognize all CSS Print Profile at-rules, blocks, declarations, and selectors. If a PP-UA encounters a property that applies for a supported media type, the PP-UA shall parse the value according to the

property definition. This means that the PP-UA shall accept all valid values and may ignore declarations with invalid values. PP-UA shall ignore rules that apply to unsupported media types.

4. For each element in a document tree, the PP-UA shall assign a value for every applicable property according to the property's definition and the rules of cascading and inheritance.
5. If the source document comes with alternate style sheets (such as with the "alternate" keyword in HTML 4.01 [HTML4]), the PP-UA may ignored the style sheet or treat it in some implementation dependent manner.

As with CSS2, there are qualifications to this conformance clause:

1. Values may be approximated when required by the PP-UA.
2. The inability of a PP-UA to implement part of this specification due to the limitations of a particular device (e.g., a PP-UA cannot render colors on a monochrome page) shall not imply non-conformance.

It is recommended that authors use this conformance profile to take advantage of forward compatibility. Authors may use style properties with an understanding that the cascading rules are processed correctly and that unknown properties and values are ignored. For example:

```
body {
  background-position: center center;
  background-position: 45% 55%;
}
```

A PP-UA that can accept percentage values for the background-position property will process the first background-position declaration and then replace that value with the second background-position declaration. A PP-UA that cannot accept percentage values will process the first background-position declaration and ignore the second background-position declaration.

Each CSS construct in the following sections is annotated to indicate how it should be treated by a conforming printer:

| Key | Description |
|---|---|
| Yes | Support is mandatory; a conforming PP-UA must honor this attribute, although the values mandated for support may be a subset of the full range. |
| No | Support is optional; a conforming printer may ignore this construct for one of the following reasons, but cannot treat it as an error:<br>- The construct references some functionality that is not possible on the printed page.<br>- The attribute is not needed because the document encoding is |

restricted to unicode.

- The construct is part of functionality that is deemed too complex for low cost printers, such as language specific processing, printing on landscape oriented pages, buffering of images for later use, or vertical alignment of cell data in tables that span multiple pages.

### 2.1. Enhanced Layout Extension Conformance

To further support print applications requiring more exacting page layout (e.g., photo album pages or pages from a digital TV), the CSS constructs with a "Yes", or a range of values, in the CSS Print-Enhanced column may be supported in an optional, discoverable (via some means outside the scope of this document) Enhanced Layout Extension. If support for this extension is indicated, all of the following properties marked with "Yes" for CSS Print-Enhanced, must be supported.

## 3. Selectors

In CSS2, pattern matching rules determine which style rules apply to elements in the document tree [CSS2].

The following table summarizes CSS Print Profile selector syntax. In addition to the selectors marked "Yes" in the CSS Print or CSS Print-Enhanced columns, the CSS Print Profile includes the CSS2 grouping mechanism (See [CSS2] Section 5.2.1).

| Pattern | Meaning | Selector type | CSS Print, CSS Print-Enhanced |
|---|---|---|---|
| * | Matches any element | Universal selector | Yes, Yes |
| E | Matches any E element (i.e., any element of type E) | Type selectors | Yes, Yes |
| E F | Matches any F element that is a descendant of an E element | Descendant selectors | Yes, Yes |
| E > F | Matches any F element that is a child of an element E | Child selectors | Yes, Yes |
| E:first-child | Matches element E when it is the first child of its parent | The :first-child pseudo-class | No |

| | | | |
|---|---|---|---|
| E:link<br>E:visited | Matches element E if E is the source anchor of a hyperlink of which the target is not yet visited (:link) or already visited (:visited). | The link pseudo-classes | No |
| E:active | Matches E during certain user actions. | The dynamic pseudo-classes | No |
| E:hover | Matches E during certain user actions. | The dynamic pseudo-classes | No |
| E:focus | Matches E during certain user actions. | The dynamic pseudo-classes | No |
| E:lang(c) | Matches element of type E if it is in (human) language c (the document language specifies how language is determined). | The :lang() pseudo-classes | No† |
| E + F | Matches any F element immediately preceded by an element E. | Adjacent selectors | No |
| E[foo] | Matches any E element with the "foo" attribute set (whatever the value). | Attribute selectors | No, Yes |
| E[foo="warning"] | Matches any E element whose "foo" attribute value is exactly equal to "warning". | Attribute selectors | No, Yes |
| E [foo~="warning"] | Matches any E element whose "foo" attribute value is a list of space-separated values, one of which is exactly equal to "warning". | Attribute selectors | No |
| E[lang\|="en"] | Matches any E element whose "lang" attribute value has a hyphen-separated list of values beginning (from the left) with "en". | Attribute selectors | No† |
| | Matches the first formatted | The :first-line | |

| | | | |
|---|---|---|---|
| E:first-line | line of an E element. | pseudo-element | No |
| E:first-letter | Matches the first formatted letter of an E element. | The :first-letter pseudo-element | No |
| E:before | Matches/creates generated content before an E element. | The :before pseudo-element | No |
| E:after | Matches/creates generated content after an E element. | The :after pseudo-element | No |
| E.classid | The same as E [class~=classid] | Class selectors | Yes, Yes |
| E#myid | Matches any E element id equal to "myid". | ID selectors | Yes, Yes |
| @page :first | Specifies style for the first page of a document | Page pseudo-classes | Yes, Yes |
| @page :left | Specifies style for the left pages of a document | Page pseudo-classes | No |
| @page :right | Specifies style for the right pages of a document | Page pseudo-classes | No |

Table Notes:

† if the PP-UA supports the xml:lang attribute for the selection and control of language specific processing, then this selector must be supported.

## 3.1 at-rules

The following table summarizes CSS Print Profile at-rule syntax.

| at-rule | Function | CSS Print | CSS Print-Enhanced |
|---|---|---|---|
| @import | Imports an external style sheet. | No | Yes |
| @charset | Defines character set for the style sheet. | Yes | Yes |
| @media | Groups a set of style rules to apply only to one or more particular media. | Yes | Yes |
| @font-face | Defines a named font-family, including for downloading. | No | No |

| | | | |
|---|---|---|---|
| @page | Defines a (optionally named) page formatting context. | Yes | Yes |
| @color-profile | Defines a named color-profile. | No | No |
| @bottom | Defines an area on the page for a running footer[PAGEMEDIA] | Yes | Yes |
| @top | Defines an area on the page for a running header[PAGEMEDIA] | Yes | Yes |

## 4. Properties

The following table summarizes CSS Print Profile properties and property values. Refer to [CSS2] for the definition of these properties and values.

| Name | CSS Print | CSS Print-Enhanced | CSS Values | Initial value |
|---|---|---|---|---|
| 'azimuth' | No | No | <angle> \| [[ left-side \| far-left \| left \| center-left \| center \| center-right \| right \| far-right \| right-side ] \|\| behind ] \| leftwards \| rightwards \| inherit | center |
| 'background' | background-color \| inherit | ['background-color' \|\| 'background-image' \|\| 'background-repeat' \|\| 'background-position'] \| inherit | ['background-color' \|\| 'background-image' \|\| 'background-repeat' \|\| 'background-attachment' \|\| 'background-position'] \| inherit | see individual properties |
| 'background-attachment' | No | No | scroll \| fixed \| inherit | scroll |
| 'background-color' | Yes | Yes | <color> \| transparent \| inherit | transparent |
| 'background-image' | No | Yes | <uri> \| none \| inherit | none |
| | | | [ [ <percentage> \| | |

| | | | | |
|---|---|---|---|---|
| 'background-position' | No | Yes | <length> ]{1,2} \| [ [top \| center \| bottom] \|\| [left \| center \| right] ] ] \| inherit | 0% 0% |
| 'background-repeat' | No | Yes | repeat \| repeat-x \| repeat-y \| no-repeat \| inherit | repeat |
| 'border' | No | Yes | [ <border-width> \|\| <border-style> \|\| [<color> \| transparent] ] \| inherit | see individual properties |
| 'border-collapse' | No | Yes | collapse \| separate \| inherit | collapse |
| 'border-color' | No | Yes | [<color> \| transparent]{1,4} \| inherit | see individual properties |
| 'border-spacing' | No | Yes | <length> <length>? \| inherit | 0 |
| 'border-style' | No | none, solid | <border-style> {1,4} \| inherit | see individual properties |
| 'border-top' 'border-right' 'border-bottom' 'border-left' | No | Yes | [ <border-width> \|\| <border-style> \|\| [<color> \| transparent] ] \| inherit | see individual properties |
| 'border-top-color' 'border-right-color' 'border-bottom-color' 'border-left-color' | No | Yes | <border-color> \| transparent \| inherit | the value of the 'color' property |
| 'border-top-style' 'border-right-style' 'border- | No | Yes | <border-style> \| inherit | none |

| | | | | |
|---|---|---|---|---|
| bottom-style' 'border-left-style' | | | | |
| 'border-top-width' 'border-right-width' 'border-bottom-width' 'border-left-width' | No | Yes | <border-width> \| inherit | medium |
| 'border-width' | No | Yes | <border-width> {1,4} \| inherit | see individual properties |
| 'bottom' | No | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'caption-side' | No | Yes | top \| bottom \| left \| right \| inherit | top |
| 'clear' | No | Yes | none \| left \| right \| both \| inherit | none |
| 'clip' | No | Yes | <shape> \| auto \| inherit | auto |
| 'color' | Yes | Yes | <color> \| inherit | depends on user agent |
| 'content' | inherit \| [<string> \| counter (pages†)]+ | inherit \| [<string> \| counter (pages†)]+ | [ <string> \| <uri> \| <counter> \| attr(X) \| open-quote \| close-quote \| no-open-quote \| no-close-quote ]+ \| inherit | empty string |
| 'counter-increment' | "pages"† | "pages"† | [ <identifier> <integer> ]+ \| none \| inherit | none |
| 'counter-reset' | Yes | Yes | [ <identifier> <integer>? ]+ \| none \| inherit | none |
| 'cue' | No | No | [ 'cue-before' \|\| 'cue-after' ] \| inherit | see individual properties |

| | | | | |
|---|---|---|---|---|
| 'cue-after' | No | No | <uri> \| none \| inherit | none |
| 'cue-before' | No | No | <uri> \| none \| inherit | none |
| 'cursor' | No | No | [ [<uri> ,]* [ auto \| crosshair \| default \| pointer \| move \| e-resize \| ne-resize \| nw-resize \| n-resize \| se-resize \| sw-resize \| s-resize \| w-resize\| text \| wait \| help ] ] \| inherit | auto |
| 'direction' | No | No | ltr \| rtl \| inherit | ltr |
| 'display' | No | inline \| block \| list-item \| none \|inherit | inline \| block \| list-item \| run-in \| compact \| marker \| table \| inline-table \| table-row-group \| table-header-group \| table-footer-group \| table-row \| table-column-group \| table-column \| table-cell \| table-caption \| none \| inherit | inline |
| 'elevation' | No | No | <angle> \| below \| level \| above \| higher \| lower \| inherit | level |
| 'empty-cells' | No | No | show \| hide \| inherit | show |
| 'float' | No | Yes | left \| right \| none \| inherit | none |
| 'font' | [ [ 'font-style' \|\| 'font-weight' ]? 'font-size' [ / 'line-height' ]? 'font- | [ [ 'font-style' \|\| 'font-weight' ]? 'font-size' [ / 'line-height' ]? 'font-family' ] | [ [ 'font-style' \|\| 'font-variant' \|\| 'font-weight' ]? 'font-size' [ / 'line-height' ]? 'font-family' ] \| caption \| icon \| menu \| message-box \| | see individual properties |

| | | | | |
|---|---|---|---|---|
| | family' ] \| inherit | \| inherit | small-caption \| status-bar \| inherit | |
| 'font-family' | Yes* | Yes* | [[ <family-name> \| <generic-family> ],]*<br>[ <family-name> \| <generic-family> ] \| inherit | depends on user agent |
| 'font-size' | Yes ** | Yes ** | <absolute-size> \| <relative-size> \| <length> \| <percentage> \| inherit | medium |
| 'font-size-adjust' | No | No | <number> \| none \| inherit | none |
| 'font-stretch' | No | No | normal \| wider \| narrower \| ultra-condensed \| extra-condensed \| condensed \| semi-condensed \| semi-expanded \| expanded \| extra-expanded \| ultra-expanded \| inherit | normal |
| 'font-style' | Yes ** | Yes ** | normal \| italic \| oblique \| inherit | normal |
| 'font-variant' | No | Yes | normal \| small-caps \| inherit | normal |
| 'font-weight' | Yes ** | Yes ** | normal \| bold \| bolder \| lighter \| 100 \| 200 \| 300 \| 400 \| 500 \| 600 \| 700 \| 800 \| 900 \| inherit | normal |
| 'height' | Yes | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'left' | No | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'letter- | No | Yes | normal \| <length> | normal |

| | | | | |
|---|---|---|---|---|
| spacing' | | | \| inherit | |
| 'line-height' | Yes | Yes | normal \| <number> \| <length> \| <percentage> \| inherit | normal |
| 'list-style' | No | Yes | [ 'list-style-type' \|\| 'list-style-position' \|\| 'list-style-image' ] \| inherit | see individual properties |
| 'list-style-image' | No | Yes | <uri> \| none \| inherit | none |
| 'list-style-position' | Yes | Yes | inside \| outside \| inherit | outside |
| 'list-style-type' | disc, decimal, lower-alpha, upper-alpha, none and inherit | disc, decimal, lower-alpha, upper-alpha, none and inherit | disc \| circle \| square \| decimal \| decimal-leading-zero \| lower-roman \| upper-roman \| lower-greek \| lower-alpha \| lower-latin \| upper-alpha \| upper-latin \| hebrew \| armenian \| georgian \| cjk-ideographic \| hiragana \| katakana \| hiragana-iroha \| katakana-iroha \| none \| inherit | disc |
| 'margin' | Yes | Yes | <margin-width> {1,4} \| inherit | see individual properties |
| 'margin-top'<br>'margin-right'<br>'margin-bottom'<br>'margin-left' | Yes | Yes | <margin-width> \| inherit | 0 |
| 'marker-offset' | No | No | <length> \| auto \| inherit | auto |

| | | | | |
|---|---|---|---|---|
| 'marks' | No | No | [ crop \|\| cross ] \| none \| inherit | none |
| 'max-height' | No | No | <length> \| <percentage> \| none \| inherit | none |
| 'max-width' | No | No | <length> \| <percentage> \| none \| inherit | none |
| 'min-height' | No | No | <length> \| <percentage> \| inherit | 0 |
| 'min-width' | No | No | <length> \| <percentage> \| inherit | depends on user agent |
| 'orphans' | No | No | <integer> \| inherit | 2 |
| 'outline' | No | No | [ 'outline-color' \|\| 'outline-style' \|\| 'outline-width' ] \| inherit | see individual properties |
| 'outline-color' | No | No | <color> \| invert \| inherit | invert |
| 'outline-style' | No | No | <border-style> \| inherit | none |
| 'outline-width' | No | No | <border-width> \| inherit | medium |
| 'overflow' | No | Yes | visible \| hidden \| scroll \| auto \| inherit | visible |
| 'padding' | No | Yes | <padding-width> {1,4} \| inherit | see individual properties |
| 'padding-top'<br>'padding-right'<br>'padding-bottom'<br>'padding-left' | No | Yes | <padding-width> \| inherit | 0 |
| 'page' | Yes | Yes | <identifier> \| auto | auto |
| | auto \| | | auto \| always \| | |

| | | | | |
|---|---|---|---|---|
| 'page-break-after' | always \| inherit | auto \| always \| inherit | avoid \| left \| right \| inherit | auto |
| 'page-break-before' | auto \| always \| inherit | auto \| always \| inherit | auto \| always \| avoid \| left \| right \| inherit | auto |
| 'page-break-inside' | Yes | Yes | avoid \| auto \| inherit | auto |
| 'pause' | No | No | [ [<time> \| <percentage>]{1,2} ] \| inherit | depends on user agent |
| 'pause-after' | No | No | <time> \| <percentage> \| inherit | depends on user agent |
| 'pause-before' | No | No | <time> \| <percentage> \| inherit | depends on user agent |
| 'pitch' | No | No | <frequency> \| x-low \| low \| medium \| high \| x-high \| inherit | medium |
| 'pitch-range' | No | No | <number> \| inherit | 50 |
| 'play-during' | No | No | <uri> mix? repeat? \| auto \| none \| inherit | auto |
| 'position' | No | Yes ‡ | static \| relative \| absolute \| fixed \| inherit | static |
| 'quotes' | No | No | [ <string><string>]+ \| none \| inherit | depends on user agent |
| 'richness' | No | No | <number> \| inherit | 50 |
| 'right' | No | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'size' | <length>{1,2} \| auto \| portrait \| inherit | <length>{1,2} \| auto \| portrait \| landscape[2] \| inherit | <length>{1,2} \| auto \| portrait \| landscape \| inherit | auto |
| 'speak' | No | No | normal \| none \| spell-out \| inherit | normal |

| | | | | |
|---|---|---|---|---|
| 'speak-header' | No | No | once \| always \| inherit | once |
| 'speak-numeral' | No | No | digits \| continuous \| inherit | continuous |
| 'speak-punctuation' | No | No | code \| none \| inherit | none |
| 'speech-rate' | No | No | <number> \| x-slow \| slow \| medium \| fast \| x-fast \| faster \| slower \| inherit | medium |
| 'stress' | No | No | <number> \| inherit | 50 |
| 'table-layout' | No | Yes | auto \| fixed \| inherit | auto |
| 'text-align' | left \| center \| inherit | left \| right \| center \| inherit | left \| right \| center \| justify \| <string> \| inherit | depends on user agent and writing direction |
| 'text-decoration' | none, underline, and inherit | none, underline, and inherit | none \| [ underline \|\| overline \|\| line-through \|\| blink ] \| inherit | none |
| 'text-indent' | Yes | Yes | <length> \| <percentage> \| inherit | 0 |
| 'text-shadow' | No | No | none \| [<color> \|\| <length> <length> <length>? ,]* [ <color> \|\| <length> <length> <length>?] \| inherit | none |
| 'text-transform' | No | Yes | capitalize \| uppercase \| lowercase \| none \| inherit | none |
| 'top' | No | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'unicode-bidi' | No | No | normal \| embed \| bidi-override \| inherit | normal |

| | | | | |
|---|---|---|---|---|
| 'vertical-align' | No | Yes[1] | baseline \| sub \| super \| top \| text-top \| middle \| bottom \| text-bottom \| <percentage> \| <length> \| inherit | baseline |
| 'visibility' | No | Yes | visible \| hidden \| collapse \| inherit | inherit |
| 'voice-family' | No | No | [[ <specific-voice> \| <generic-voice> ],]*<br>[ <specific-voice> \| <generic-voice> ] \| inherit | depends on user agent |
| 'volume' | No | No | <number> \| <percentage> \| silent \| x-soft \| soft \| medium \| loud \| x-loud \| inherit | medium |
| 'white-space' | Yes | Yes | normal \| pre \| nowrap \| inherit | normal |
| 'widows' | No | No | <integer> \| inherit | 2 |
| 'width' | Yes | Yes | <length> \| <percentage> \| auto \| inherit | auto |
| 'word-spacing' | No | No | normal \| <length> \| inherit | normal |
| 'z-index' | No | No | auto \| <integer> \| inherit | auto |

Table Note:

† Only the single identifier "pages" that represents the current page number is required.

* It is recommended that a PP-UA minimally support "serif," "sans-serif," and "monospace" font families.

** The supported values should be appropriate to the fonts available to the PP-UA.

‡ The PP-UA may ignore positioned elements that are placed on the page before the position of the current element in the normal flow.

[1] Vertical alignment is undefined across page boundaries.

[2] The PP-UA may ignore the value landscape if it lacks the memory to support landscape printing.

## 5. CSS Syntax

The CSS Print Profile uses the same syntax as specified in [CSS2]. The CSS Print Profile uses a subset of the values used in CSS2. Specifically:

1. The PP-UA shall support integer and real numbers ([CSS2] Section 4.3.1).
2. The PP-UA shall support the following lengths ([CSS2] Section 4.3.2):
    - px
    - em
    - ex
    - in
    - cm
    - mm
    - pt
    - pc

   The PP-UA may support other lengths.
3. The PP-UA shall support percentage values ([CSS2] Section 4.3.3).
4. The PP-UA shall support URI values ([CSS2] Section 4.3.4).
5. The PP-UA shall support the "pages" counter value that tracks page numbers ([CSS2] Section 4.3.5).
6. The PP-UA shall support the following color values ([CSS2] Section 4.3.6):
    - The 16 colors defined in HTML 4.01 [HTML4]
    - A numerical RGB specification ([CSS2] Section 4.3.6)

   The PP-UA may support other color values. The PP-UA is not required to support user preferences for colors ([CSS2] Section 18.2).
7. The PP-UA is not required to support user preferences for fonts ([CSS2] Section 18.3).

Similarly, the CSS Print Profile requires that conforming user agents support the character encoding mechanisms specified in [CSS2]. Specifically:

1. The PP-UA shall support priorities specified in [CSS2] to determine a document's character encoding.
2. The PP-UA shall support the CSS2 @charset rules. However, if the character set specified by the @charset rule of a external style sheet is not supported by the PP-UA, the style sheet will be ignored.

## 6. Assigning Property Values, Cascading, and Inheritance

In general, the CSS Print Profile uses the same cascading rules as in CSS2. Specifically:

1. The PP-UA shall assign values as described in CSS2 ([CSS2] Section 6.1).
2. The PP-UA shall support inheritance as described in CSS2 ([CSS2] Section 6.2).
3. A PP-UA supporting Enhanced Layout Extension conformance shall support the CSS2 @import rules as specified in CSS2 ([CSS2] Section 6.3).
4. The PP-UA shall support author originating style sheets. The PP-UA may support user or user-agent originating style sheets ([CSS2] Section 6.4).
5. The PP-UA shall support all CSS2 cascading mechanisms ([CSS2] Sections 6.4.1-6.4.4).

# 7. Media Types

A CSS Print Profile conforming user agent shall be able to process media-dependent style sheets as specified in CSS2 ([CSS2] Section 7). Specifically:

1. The PP-UA shall support the CSS2 @media rules as specified in CSS2 ([CSS2] Section 7).
2. The PP-UA shall accept and process style sheets that target the `print` media type.
3. The PP-UA shall accept and process style sheets that target the `all` media type.
4. The PP-UA shall accept style sheets that contain other (non-print) media-dependent style sheets.
5. The PP-UA may process other media types (such as `projection` or `handheld`).

The PP-UA is not required to satisfy unreferenced CSS2 conformance statements pertaining to the `print` media type (see [CSS2] Section 7.3.1); the PP-UA shall satisfy the conformance statements and references in this specification.

# 8. CSS Print Profile Properties and User Agent interactions

## 8.1 Page Breaks

If `page-break-inside: avoid` is specified for a long element and the PP-UA is unable to buffer the entire element before committing it to paper, it should force a page break to occur before the long element and begin the element starting at the top of the next page. If the long element starts at the top of a page and exceeds the page length, the PP-UA shall print as much as possible on the first page and then resume that element on the next and subsequent pages as required to preserve the content. A PP-UA is neither required nor forbidden to perform scaling to fit the long element on a single page.

## 8.2 Page Size and Orientation

Page size and orientation that is provided using the CSS Print Profile Properties will override similar attributes contained within any commands and/or attributes provided by job-submission protocols.

Due to a PP-UA's mechanical limitations, the actual printable area of the page is usually less than the page size. Results are PP-UA-dependent when the CSS size specified does not match the media size being used.

### 8.2.1 Rendering Page Boxes that do not fit a Target Sheet

If a page box does not fit the target sheet dimensions, the PP-UA may choose (in order of preference) to:

- Rotate the page box 90 degrees if this will make the page box fit.
- Scale the page to fit the target. (There is no requirement to maintain the aspect ratio of the page or of any elements on the page when scaling; however, preservation of the aspect ratio is preferred.)
- Reformat the page (including "spilling" onto another sheet)
- Clip (least preferred)

The PP-UA may consult the user before performing these operations. Lacking "access" to the user, it may simply make a decision on its own.

### 8.2.2 Positioning the Page Box on the Sheet

When the page box is smaller than the target size, the PP-UA is free to place the page box anywhere on the sheet. However, it is recommended that the page box be centered on the sheet since this will align double-sided pages and avoid accidental loss of information that is printed near the edge of the sheet

## 8.3 Running Headers and Footers

Page headers and footers are useful in printed documents. Current work in progress by the W3C on paged media defines a method for adding margin boxes to the top, bottom, left and right of the page. (See [PAGEMEDIA].) A reduced set from the CSS3 proposal is employed by the CSS Print Profile, using top and bottom margin boxes to implement running-headers and a running-footers via the @page rules method.

Utilizing the terminology of CSS2 and CSS3, a "margin box" is defined in conjunction with the "page box" and "page area" as shown in Figure 3: Page Areas to create an area into which running-header and running-footer text can be inserted.

CSS3 proposes the ability to left-align, right-align and center the text horizontally as well as methods to top-align, bottom-align and center the text vertically within the margin boxes. However, conforming PP-UA implementations should not support vertical alignment within top and bottom margin boxes. Instead, conforming PP-UA implementations, shall top aligned the running-header text in the margin box and the running-footer text shall be bottom aligned in the margin box.

CSS3 proposes methods for the printing device to automatically include:

- page number
- total pages in the document

- date
- time
- file name

into the running-header and running-footer. However, conforming PP-UA implementations are only required to support inserting a page number. Therefore, the sending appliance shall provide the other information within the text string to be printed in the margin box.

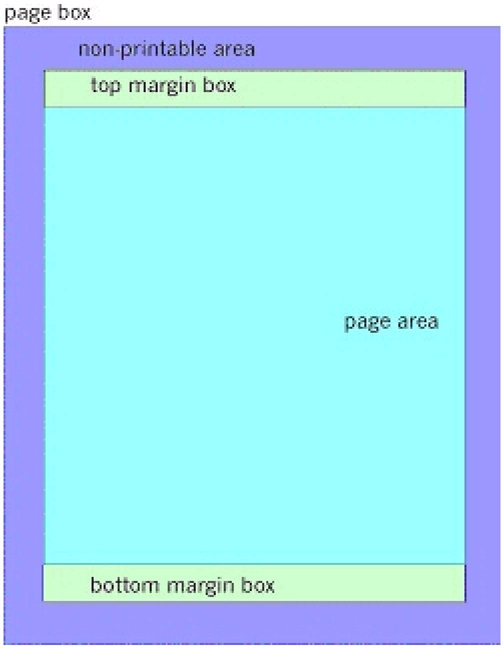

Figure 3: Page Areas

The following are sample XHTML/CSS fragments used to create running-headers and running-footers.

```
<style>
@page {
       @top{font-family: Helvetica, Arial, sans-serif;
               font-size: 150%;
               font-weight: bolder;
               text-align: left;
               content: "XHTML-Print: A Proposal --- August 25, 2000";
           }
      }
</style>
```

The above example creates a running header that is left aligned at 150% of normal font size, with respect to the body's font, and bold in Helvetica, Arial or the default sans-serif font whichever is available.

```
<style>
@page {
     counter-increment: pages;
     @bottom{font-family: Times, Palatino, serif;
                font-size: 80%;
                font-weight: normal;
                text-align: center;
                content: "Page " counter(pages);
            }
      }
</style>
```

The above example creates a running footer such as "Page 14" centered on the page in a font 80% of normal size in Times, Palatino or the default serif font whichever is available. Note that since the counter named "pages" is both incremented and used by the @page rule, it will first be incremented and then used; so the footer on the first page will be "Page 1".

## 8.4 Default Style Sheets

This section is informative.

[CSS2] provides a sample style sheet in its Appendix A. This sheet uses several properties that are not required of a conforming PP-UA, even ones supporting the enhanced layout extensions (section 2.1).

### 8.4.1 Default Style Sheet Guidelines for PP-UAs

Developers of PP-UAs that do not implement the enhanced layout facilities are encouraged but not required to adhere to the following implementation guidelines that address unsupported properties. These guidelines are presented to promote consistency between PP-UA implementations.

> The guidelines below are annotated to show derivation of the guideline from the [CSS2] style sheet.

1. The **`address, blockquote, body, dd, div, dl, dt, h1, h2, h3, h4, h5, h6, hr, object, ol, p, pre,`** and **`ul`** elements should be treated as if their display property were set to **`block`**.

2. The `li` element should be treated as if its display property were set to `list-items`.
3. The table elements, `table, tr, td, th,` and `caption`, should have their standard meaning and display treatments: `table, table-row, table-cell,` and `table-caption`.
4. The elements `base, br, html, head, link, meta, param, style` and `title` should be treated as if their display property were set to `none`.
5. The remaining elements, `a, abbr, acronym, b, big, cite, code, dfn, em, form, i, img, input, kbd, option, samp, small, select, strong, sub, sup, textarea, tt,` and `var`, should be treated as if their display property were set to `inline`. A display property of `inline` for the elements `img, input, select,` and `textarea` allows document authors a flexibility not available if their display property were `block`.

   The above guidelines come from the following portion of the CSS2 default style sheet:

   ```
   ADDRESS, BLOCKQUOTE, BODY, DD, DIV, DL, DT, FIELDSET, FORM,
   FRAME, FRAMESET, H1, H2, H3, H4, H5, H6, IFRAME, NOFRAMES,
   OBJECT, OL, P, UL, APPLET, CENTER, DIR, HR, MENU,
                 { display: block }
   LI            { display: list-item }
   HEAD          { display: none }
   TABLE         { display: table }
   TR            { display: table-row }
   THEAD         { display: table-header-group }
   TBODY         { display: table-row-group }
   TFOOT         { display: table-footer-group }
   COL           { display: table-column }
   COLGROUP      { display: table-column-group }
   TD, TH        { display: table-cell }
   CAPTION       { display: table-caption }
   ```

6. The edges of the content of `body` element should have 0.1 inch wide inset from the left, top, right, and bottom of the printable area of the page. Margin calculations will start from these offsets.

   The .1 inch figure comes from the calculation that 8 px divided by 75px/inch ( a normal display resolution) is about .1 inches.

   ```
   BODY          { padding: 8px;
                   line-height: 1.33 }
   ```

7. The content of the `sub` element should be treated as if its vertical-align property were set to `sub`. Similarly, the content of the `sup` element should be treated as if its vertical-align property were set to `sup`.

   ```
   SUB             { vertical-align: sub }
   SUP             { vertical-align: super }
   ```

8. The `hr` element should be treated as if its area, as defined by its height and width, were outlined by a one pixel wide, solid line. The default line should be one pixel high and the width of the containing box.

   ```
   HR              { border: 1px inset }
   ```

9. The lower case letters of the content of the `abbr` and `acronym` elements should be rendered as scaled capital letters, at approximately 75% of their size at the current font size. Upper case letters will be unchanged. PP-UA may also choose to simply render lower case letters as upper case letters without scaling.

   The 75% figure above is only one way to approximate small-caps.
   The PP-UA is free to use its own rendering of small-caps.

   ```
   ABBR, ACRONYM   { font-variant: small-caps;
                     letter-spacing: 0.1em }
   ```

10. Page break avoidance both inside and after is removed for the elements `h1, h2, h3, h4, h5,` and `h6`. Therefore, the PP-UA need not be concerned with moving the content of these elements from the bottom of one page to the top of the next.

    ```
    H1, H2, H3,
    H4, H5, H6    { page-break-after: avoid;
                    page-break-inside: avoid }
    ```

11. The PP-UA need not avoid page breaks before the `ul, ol,` and `dl` elements.

    ```
    UL, OL, DL    { page-break-before: avoid }
    ```

12. The PP-UA may choose its own, fixed value for the padding properties of elements where the [CSS2] box model ([CSS2], section 8) applies.
13. The content of all elements, except `hr`, should be treated as if the element's border-style property were set to `none`.
14. The content of all elements may be treated as if the element's overflow property were set to `visible` and the clip property set to `auto`.

    This guideline suggests consistent behavior among implementations.

15. The content of all elements may be treated as if the element's positioning property were set to `static`.

    Elements should be treated as if they are in the normal flow.

16. Tables should be treated as if the table-layout property were set to `fixed`.

    This guideline promotes consistency since

    - the table-layout property is not mandated
    - There isn't a CSS default style sheet rule for this property

The following style sheet is a modification of the sample sheet in Appendix A of [CSS2] and depends on the above guidelines.

```
th              { font-weight: bolder; text-align: center }
caption         { text-align: center }
body            { line-height: 1.33 }
h1              { font-size: 2em; margin: .67em 0 }
```

```
h2               { font-size: 1.5em; margin: .83em 0 }
h3               { font-size: 1.17em; margin: 1em 0 }
h4, p,
blockquote, ul,
form,
ol, dl           { margin: 1.33em 0 }
h5               { font-size: .83em; line-height: 1.17em; margin: 1.67em 0
h6               { font-size: .67em; margin: 2.33em 0 }
h1, h2, h3, h4,
h5, h6, b,
strong           { font-weight: bolder }
blockquote       { margin-left: 40px; margin-right: 40px }
i, cite, em,
var, address     { font-style: italic }
pre, tt, code,
kbd, samp        { font-family: monospace }
pre              { white-space: pre }
big              { font-size: 1.17em }
small, sub, sup  { font-size: .83em }
ol, ul, dd       { margin-left: 40px }
ol               { list-style-type: decimal }
ol ul, ul ol,
ul ul, ol ol     { margin-top: 0; margin-bottom: 0 }
br       { content: "\A" }

@media print {
  @page          { margin: 10% }
  blockquote,
  pre            { page-break-inside: avoid }
}
```

### 8.4.2 Default Style Sheet Guidelines for Enhanced Layout PP-UAs

Developers of PP-UAs conforming to the enhanced layout extensions (section 2.1) must implement more of [CSS2] than conforming PP-UAs, although the set of properties and their values is still less than those defined in [CSS2].

Developers of PP-UAs are encouraged but not required to adhere to the following implementation guidelines that address unsupported properties.

1. The table elements, **`table, tr, td, th,`** and **`caption`**, should have their standard meaning and display treatments: **`table, table-row, table-cell,`** and **`table-caption`**.
2. The content of the **`sub`** element should be treated as if its vertical-align property were set to **`sub`**. Similarly, the content of the **`sup`** element should be treated as it its vertical-align property were set to **`sup`**.
3. The lower case letters of the content of the **`abbr`** and **`acronym`** elements should be rendered as scaled capital letters, at approximately 75% of their size at the current font size. Upper case letters will be unchanged. PP-UA may also choose to simply render lower case letters as upper case letters without scaling.

4. Page break avoidance both inside and after is removed for the elements `h1, h2, h3, h4, h5,` and `h6`. Therefore, the PP-UA need not be concerned with moving the content of these elements from the bottom of one page to the top of the next.
5. The PP-UA need not avoid page breaks before the `ul, ol,` and `dl` elements.

The following style sheet is a modification of the sample sheet in Appendix A of [CSS2] and depends on the above guidelines.

```
address,
blockquote,
body, dd, div,
dl, dt,
form,
h1, h2, h3, h4,
h5, h6,
object, ol, p,
ul,
hr, pr e        { display: block }
li              { display: list-item }
head            { display: none }
th              { font-weight: bolder; text-align: center }
caption         { text-align: center }
body            { padding: 8px; line-height: 1.33 }
h1              { font-size: 2em; margin: .67em 0 }
h2              { font-size: 1.5em; margin: .83em 0 }
h3              { font-size: 1.17em; margin: 1em 0 }
h4, p,
blockquote, ul,
form,
ol, dl,         { margin: 1.33em 0 }
h5              { font-size: .83em; line-height: 1.17em; margin: 1.67em (
h6              { font-size: .67em; margin: 2.33em 0 }
h1, h2, h3, h4,
h5, h6, b,
strong          { font-weight: bolder }
blockquote      { margin-left: 40px; margin-right: 40px }
i, cite, em,
var, address    { font-style: italic }
pre, tt, code,
kbd, samp       { font-family: monospace }
pre             { white-space: pre }
big             { font-size: 1.17em }
small, sub, sup { font-size: .83em }
hr              { border: 1px  }
```

inset is not support, representation of the rule is implementation dependant.

```
ol, ul, dd      { margin-left: 40px }
ol              { list-style-type: decimal }
ol ul, ul ol,
ul ul, ol ol    { margin-top: 0; margin-bottom: 0 }
```

```
br       { content: "\A" }

@media print {
  @page         { margin: 10% }
  blockquote,
  pre           { page-break-inside: avoid }
}
```

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