Vertical Rhythm
(and Alignment)

Elika J. Etemad *aka* fantasai

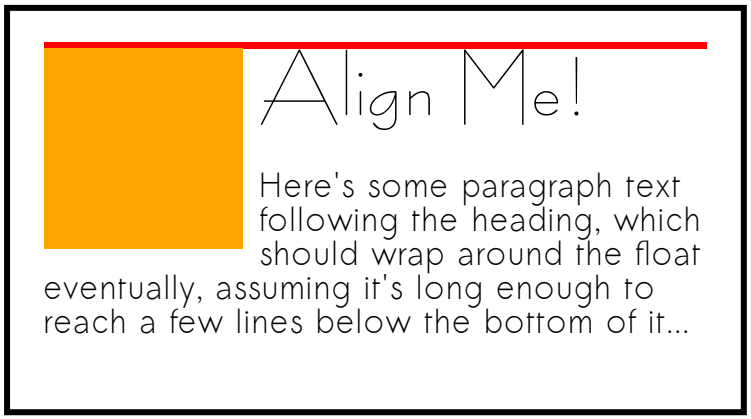
W3C CSS Working Group Invited Expert

Typographer's Line Placement Model

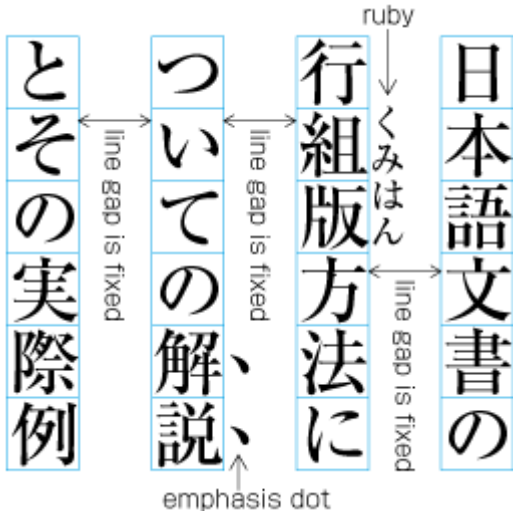
Goal: Look pretty.

Tools: Measure and adjust.

Top line visually aligns with other things.



Space lines for pleasant reading and to accommodate ascenders/descenders/superscripts/subscripts/ruby.



Consistent baseline-to-baseline spacing creates vertical rhythm.

Lorem Ipsum

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If your stuff overlaps it's your fault.

FRANÇOIS RĒMY

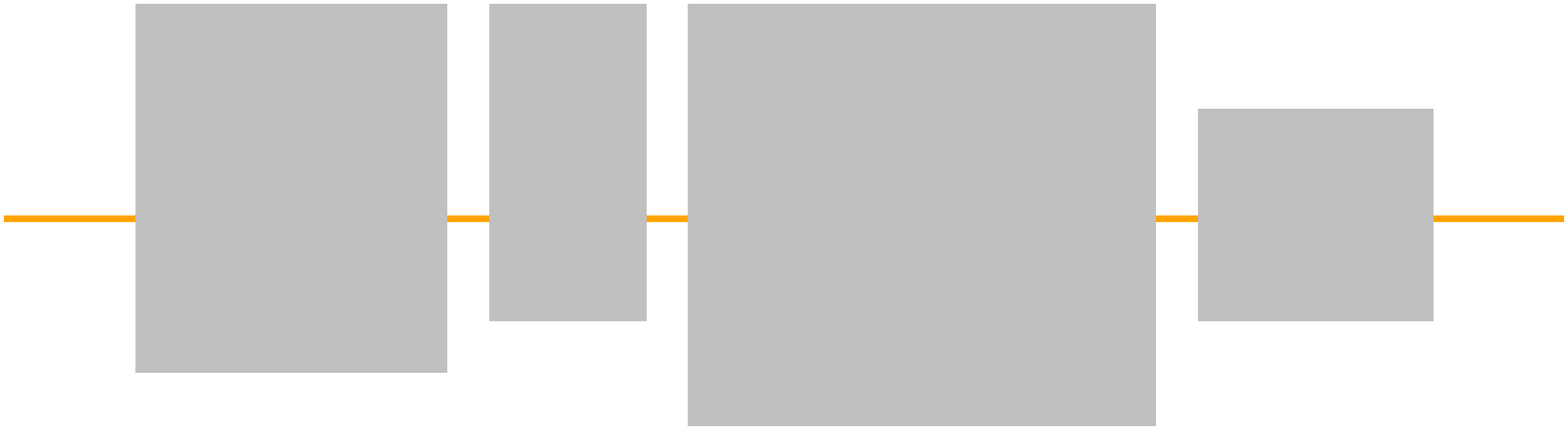
So review and tweak your things before you print them!

CSS Line Box Model

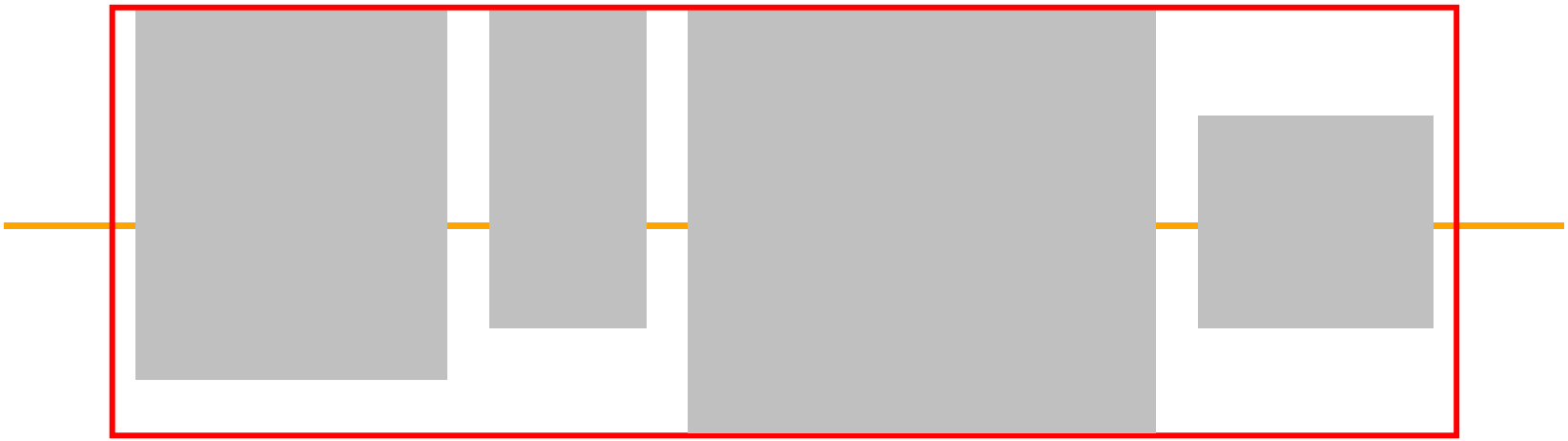
Goal: Don't overlap content.

Tools: Boxes.

1. Put a bunch of stuff on a line.

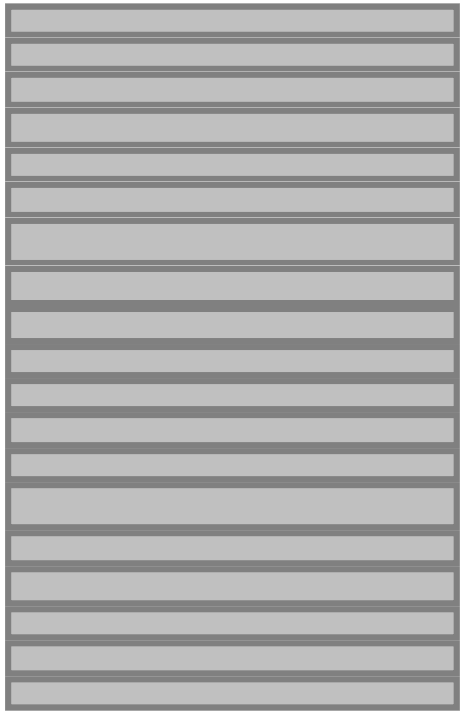


2. Draw a box around it.

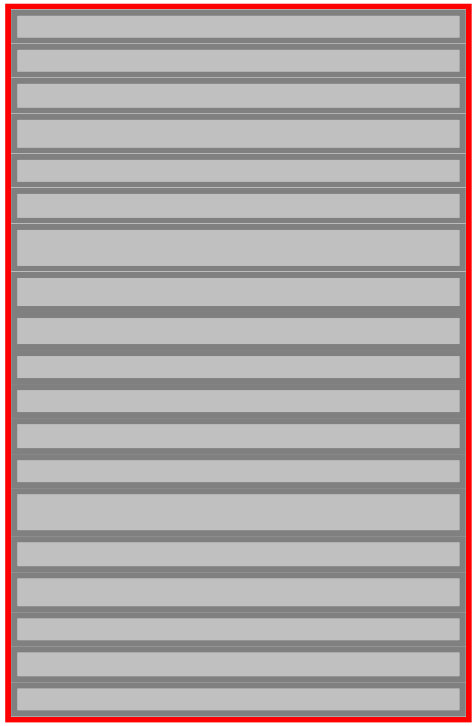


3. Stack up the line boxes.

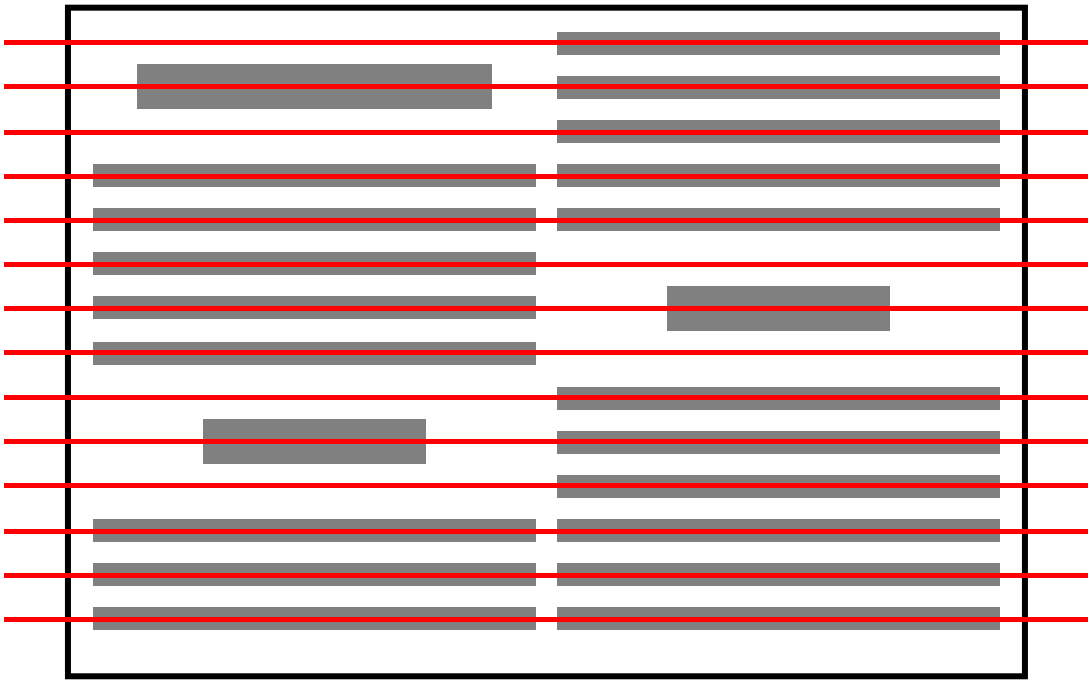
3. Stack up the line boxes.



4. All done!



Vertical Rhythm



Intra-Paragraph + Inter-Paragraph + Interrupts

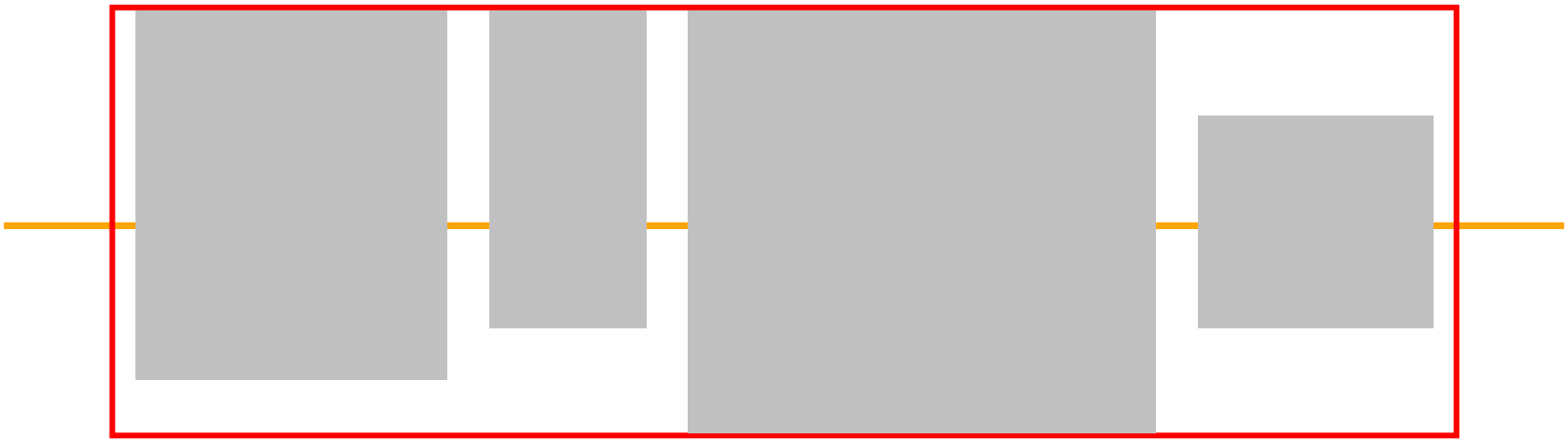
Intra-Paragraph Spacing

Fixing the Line Layout Model

Goal: Make typographers happy. Also, don't overlap the content.

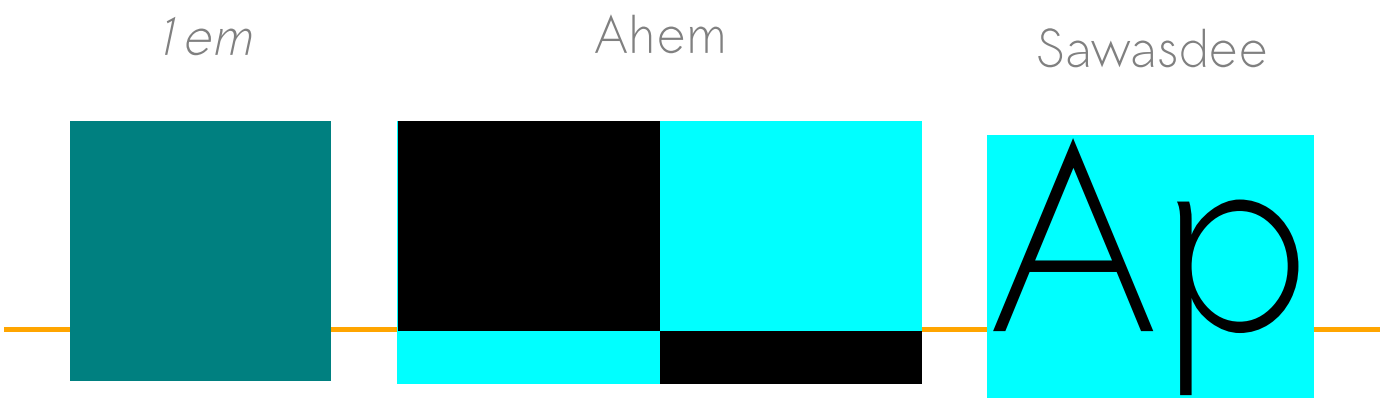
CSS Line Layout Today

What are the sizes?

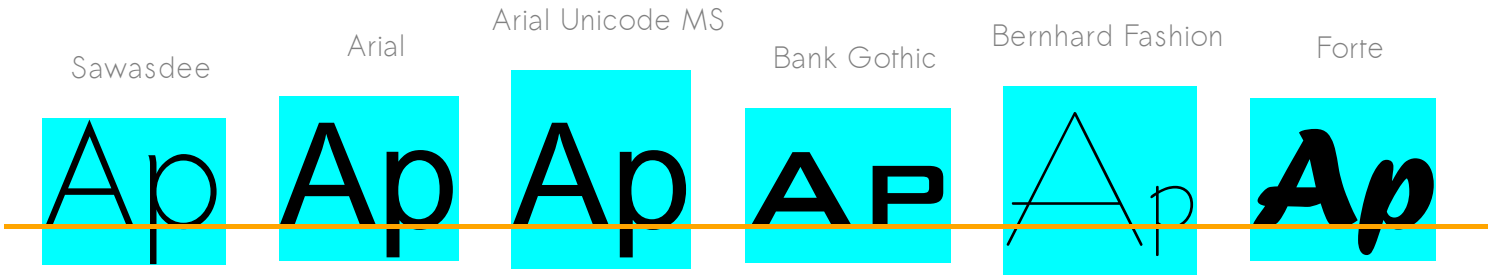


Sizes found from font metrics

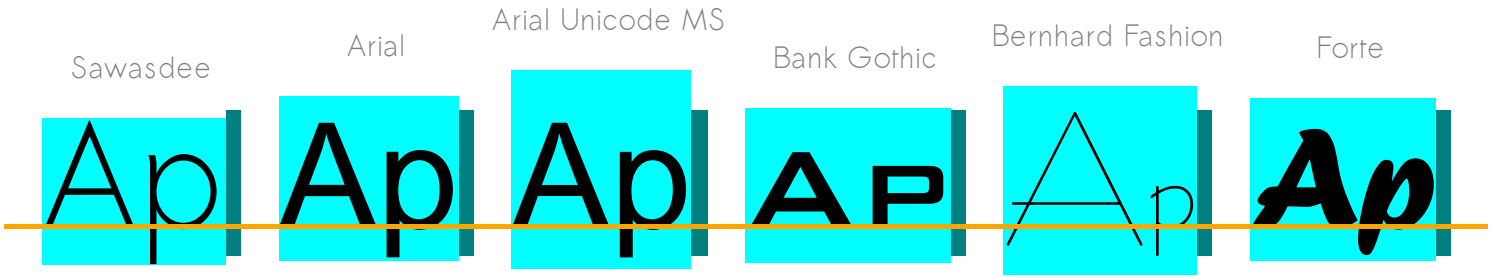
It could be so simple...



Identical **font-size**, varying **font-family**



Identical **font-size**, varying **font-family**

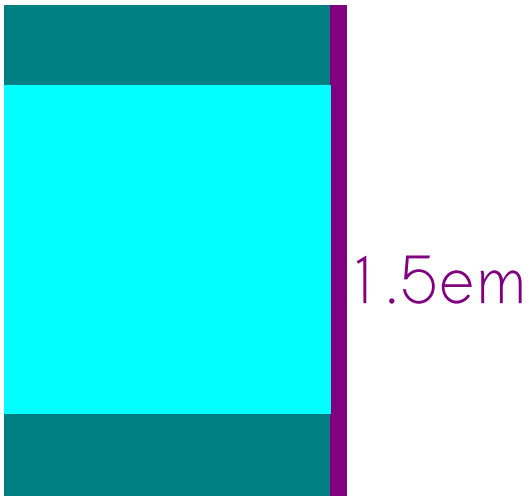


line-height: # | len | % | normal

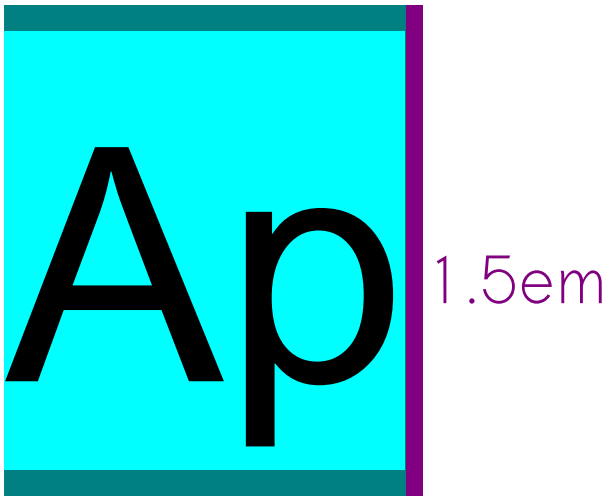
```
line-height: 1.5;
/* 1.5 × font-size */
```

Half-leading

1em + leading



font height + leading



line-height: 1.5

Why half-leading instead of line gaps?

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Base Case: Paragraph of Text, No Font Changes

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line-height: 1.2

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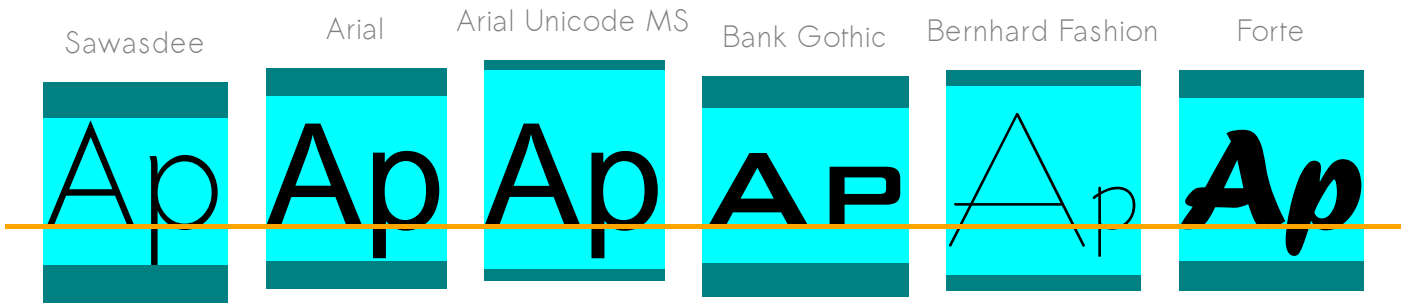
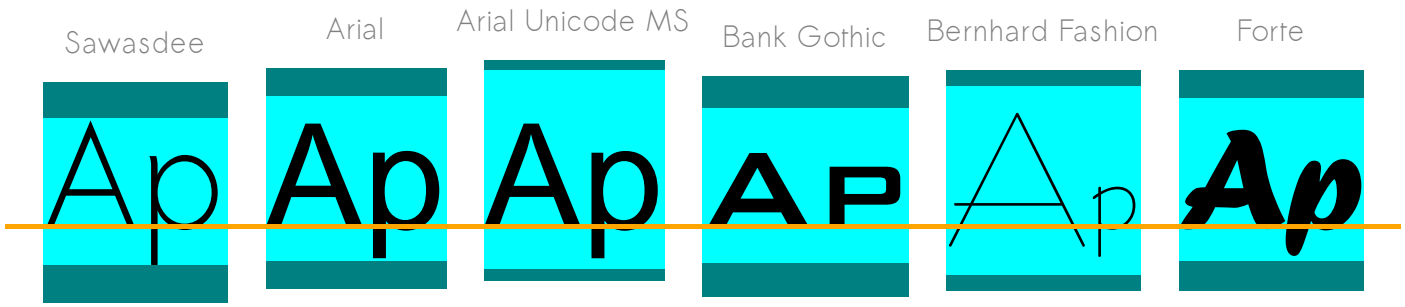
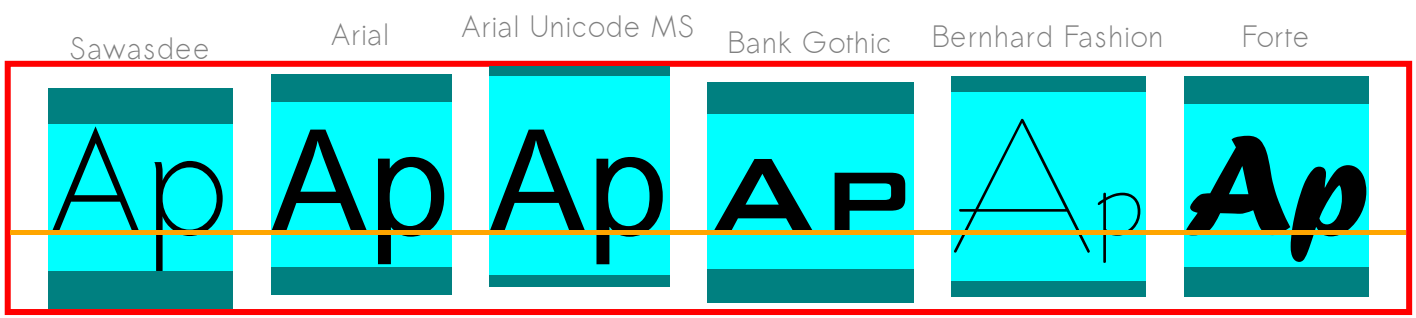
Complication #1: Varying Font Families



line-height: 1.5



line-height: 1.5



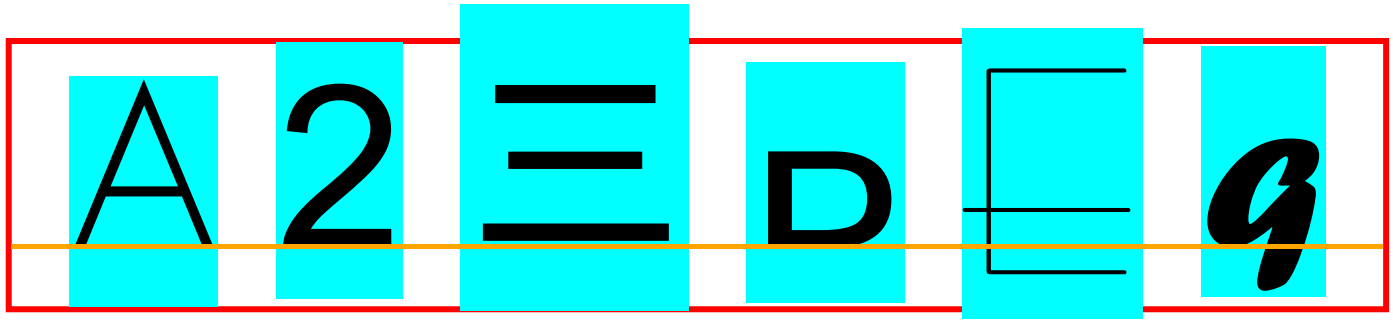
line-height: 1.5

Small Wins: Ignoring Fallback Font Metrics

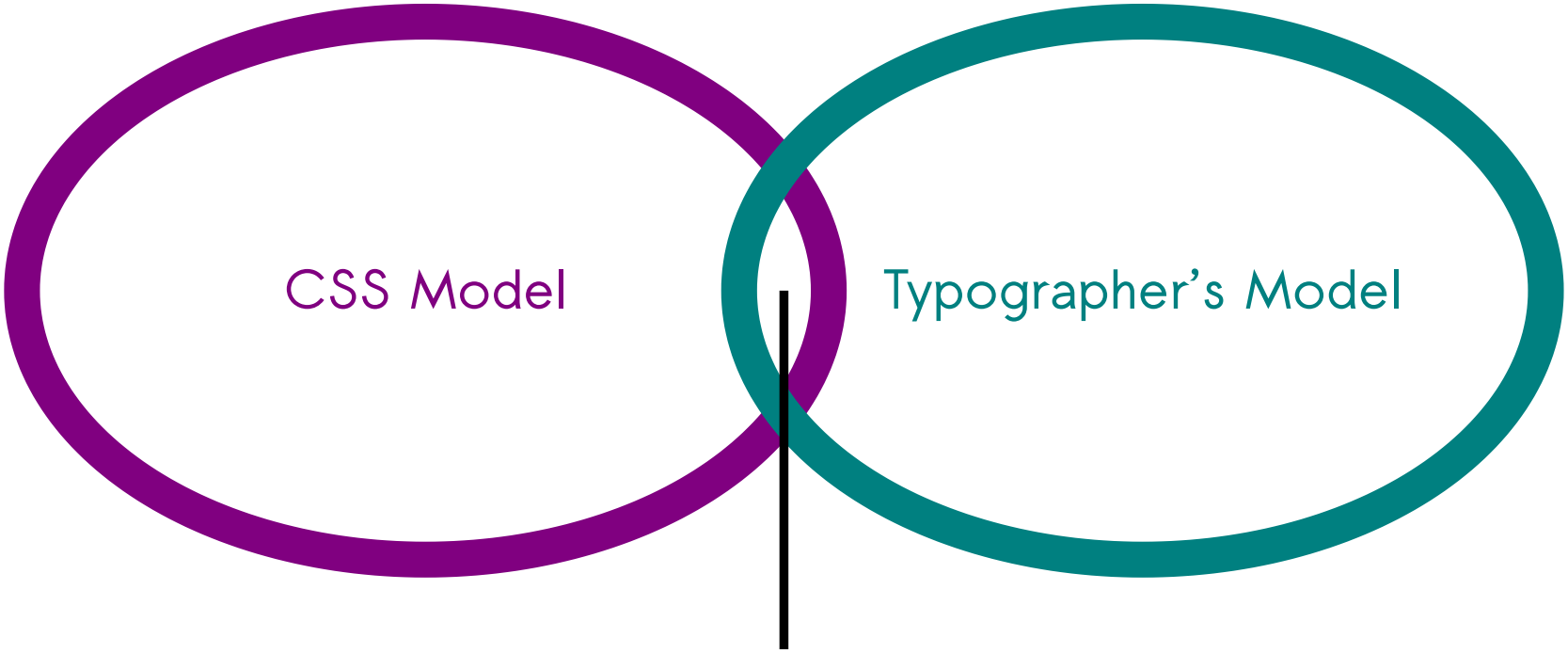
My name is 艾俐俐.

"The *first available font* is defined to be the first available font that would match the U+0020 (space) character."

line-height: normal



Happiness is Rare



(No change in font-size, font-family, or vertical-align)

Fixing Intra-Paragraph Spacing

How to Have Perfect Rhythm

Start with the root inline box.

Ignore all its contents.

Perfect rhythm!

But what about overlap?

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How to Have Perfect Rhythm

Start with the root inline box.

Ignore all its contents.

Perfect rhythm!

But what about overlap?

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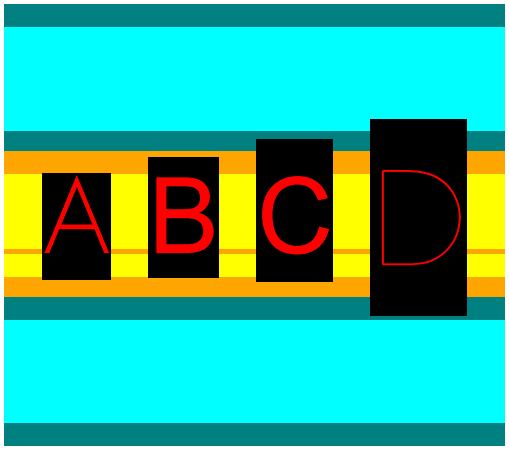
Redefining “fit within a line box”

“fit”

container ← item

Defining the container



Safe Model

Grow if item overflows root line-height.

Sparse Model

Grow if item overflows root line-height + 1/2 line gap.

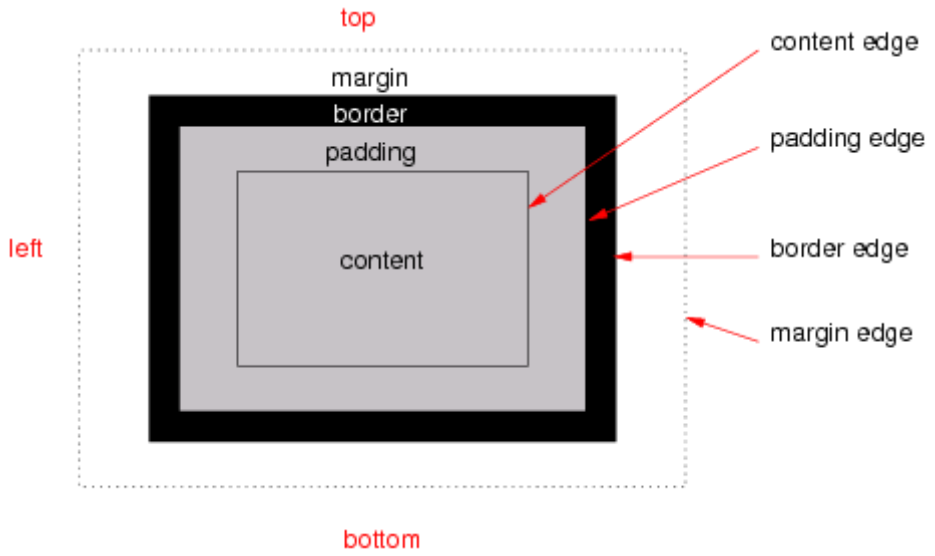
Absolute Model

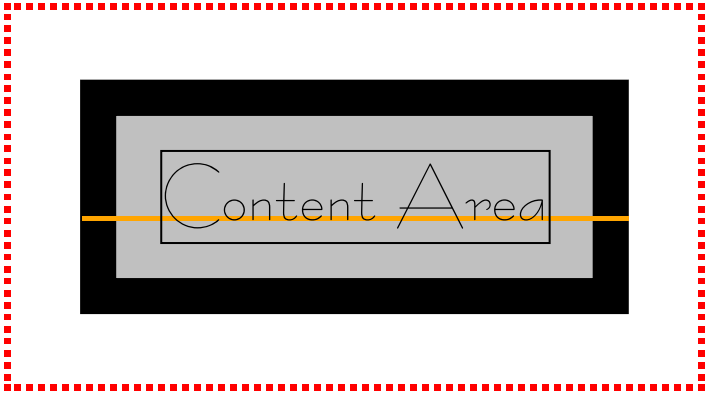
Ignore all inline contents. Bigger items always overflow.

Defining the item

~~Leading Box Model~~

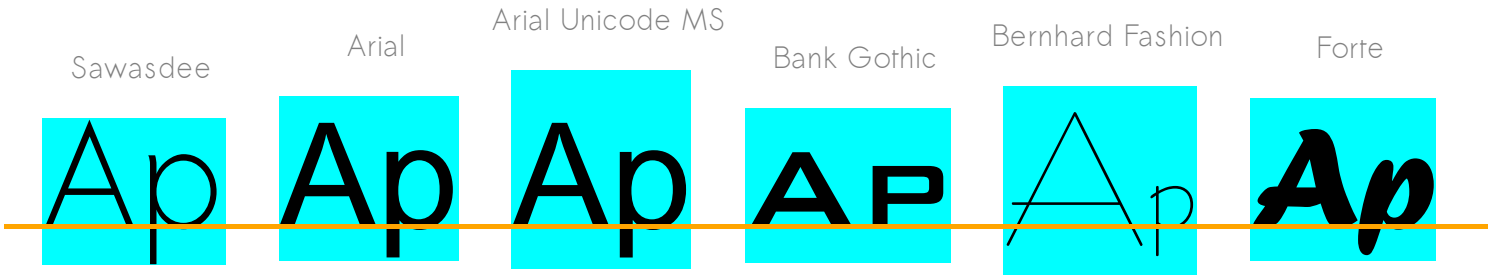
Margin Box Model?


top
margin
border
padding
content
left
content edge
padding edge
border edge
margin edge
bottom

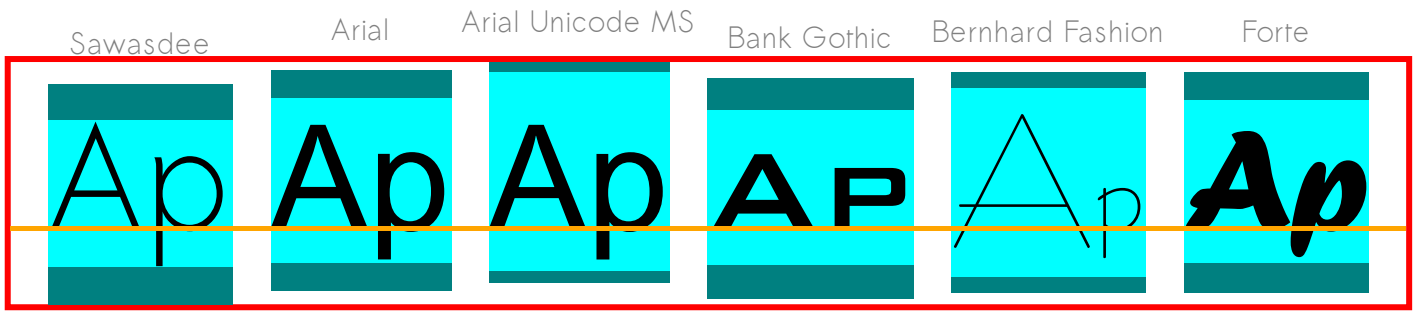

Content Area

Content Area

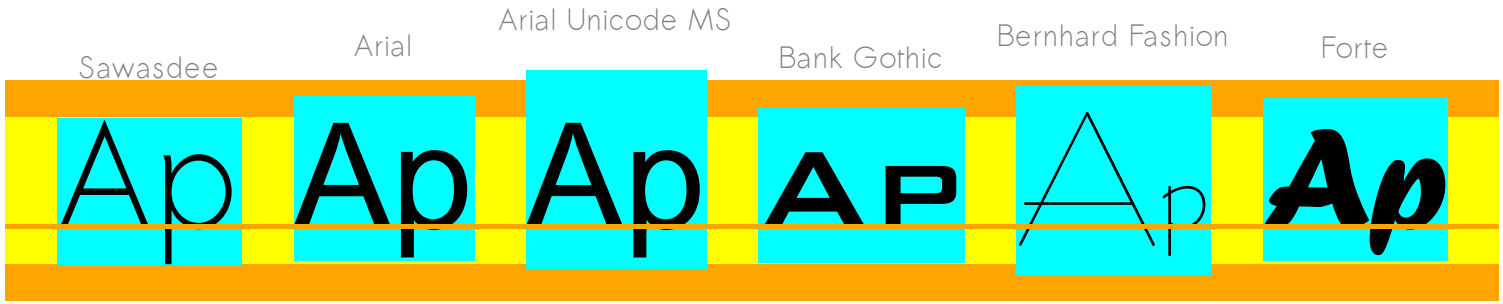
Content Area = Font Height Area



Old Model


Sawasdee
Arial
Arial Unicode MS
Bank Gothic
Bernhard Fashion
Forte
Ap
Ap
Ap
AP
Ap
Ap

New Normal?


Sawasdee
Ap
Arial
Ap
Arial Unicode MS
Ap
Bank Gothic
AP
Bernhard Fashion
Ap
Forte
Ap

line-sizing: legacy | normal

legacy

Do what CSS2.1 says

normal

TBD! (Help us D?)

</Intra-Paragraph Spacing>

Inter-Paragraph Spacing!

Margins!

```
p { margin: 1em 0; }
```

Margins!

```
p { line-height: 1.5em; margin: 1.5em 0; }
```

Margins!

```
p { line-height: 1.5em; margin: 1lh 0; }
```

Interrupting the Rhythm

Strict Rhythm...

Lorem Ipsum

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Strict Rhythm...

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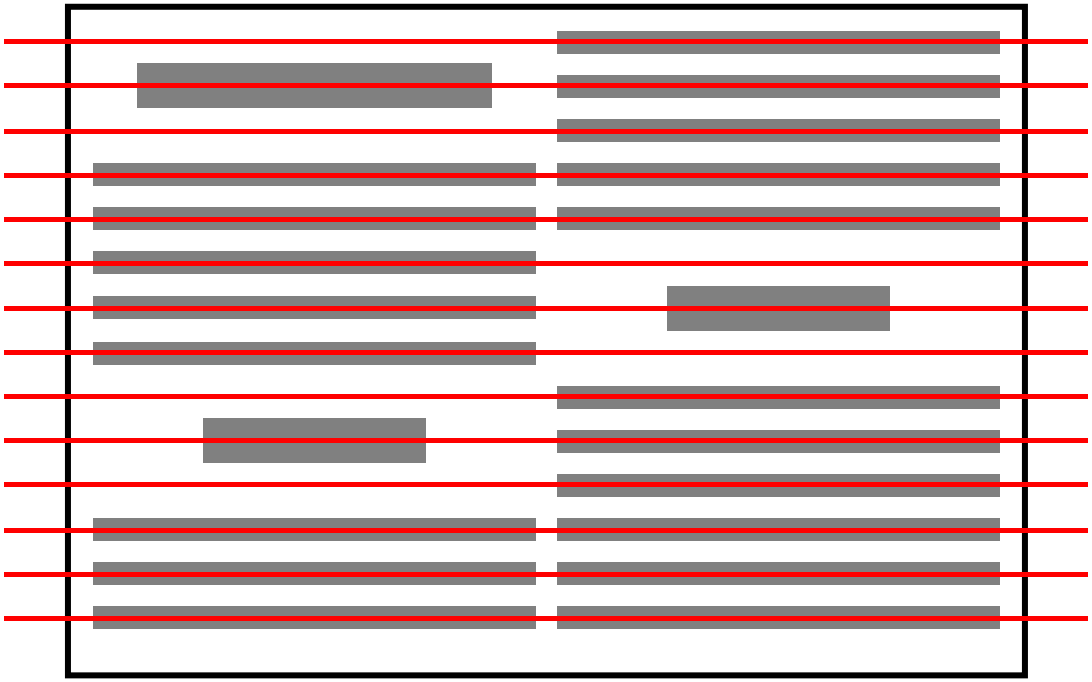
Strict rhythms are important for multicol



Loose Rhythm...

Lorem Ipsum

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Excepteur sint

Excepteur sint occaecat cupidatat non proident, sunt in culpa qui officia deserunt mollit anim id est laborum.

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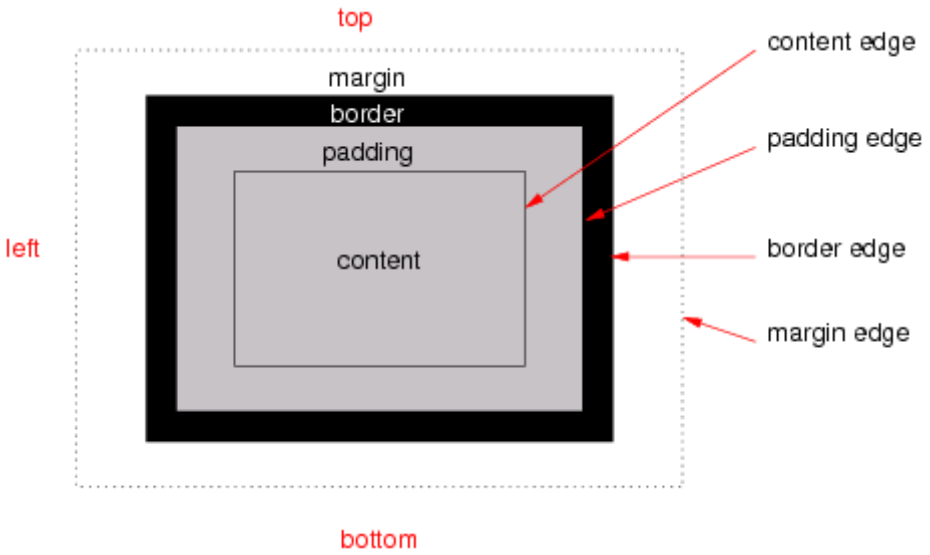
Block Step Sizing

https://www.w3.org/TR/css-rhythm/

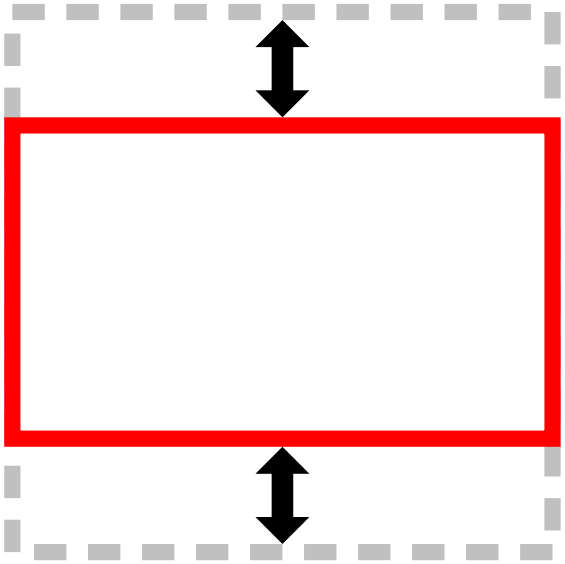
`block-step-size: <length>`

Requires used height = *n* × <length>, for an integer *n*

block-step-insert: margin | padding

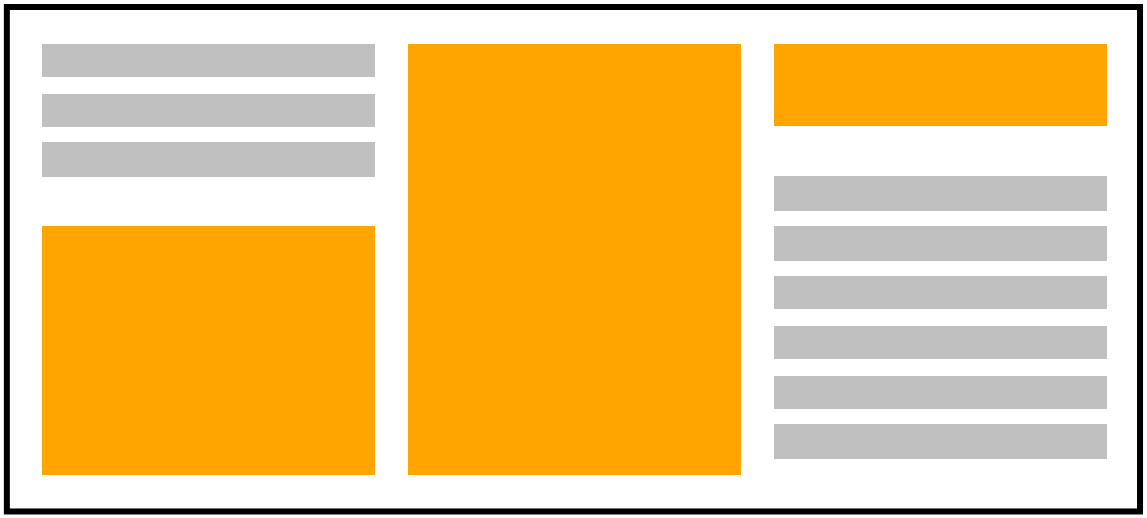


block-step-align: auto | center | start | end



intra

What happens at page/column breaks?



</Inter-Paragraph Spacing>

Trimming Text

Align Me!

Here's some paragraph text following the heading, which should wrap around the float eventually, assuming it's long enough to reach a few lines below the bottom of it...

Delete the top margin...

Align Me!

Here's some paragraph text following the heading, which should wrap around the float eventually, assuming it's long enough to reach a few lines below the bottom of it...

Add negative margin???

Align Me!

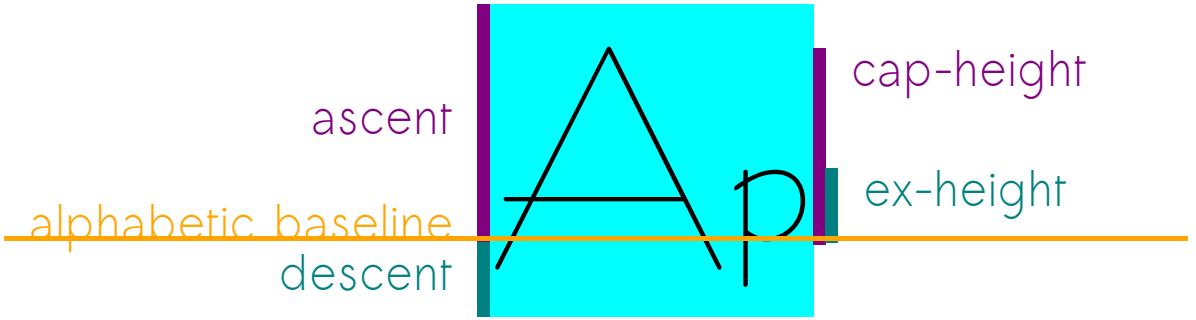
Here's some paragraph text following the heading, which should wrap around the float eventually, assuming it's long enough to reach a few lines below the bottom of it...

>_____<

Align Me!

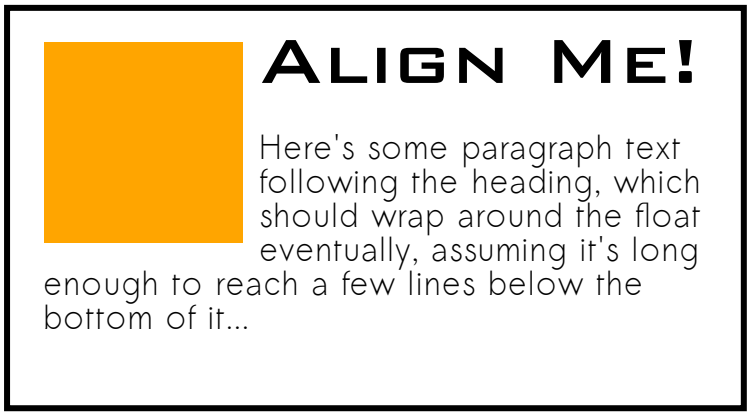
Here's some paragraph text following the heading, which should wrap around the float eventually, assuming it's long enough to reach a few lines below the bottom of it...

OpenType metrics

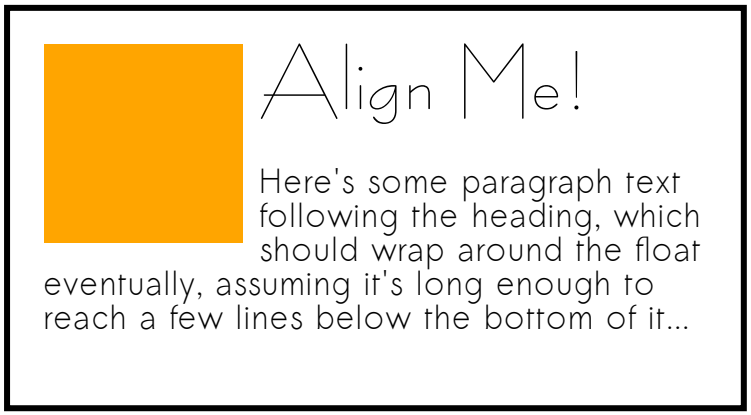


```
leading-trim-over: normal | text | cap | ex | ideographic
leading-trim-under: normal | text | alphabetic | ideographic
```

```
h2 { leading-trim: cap; }
```



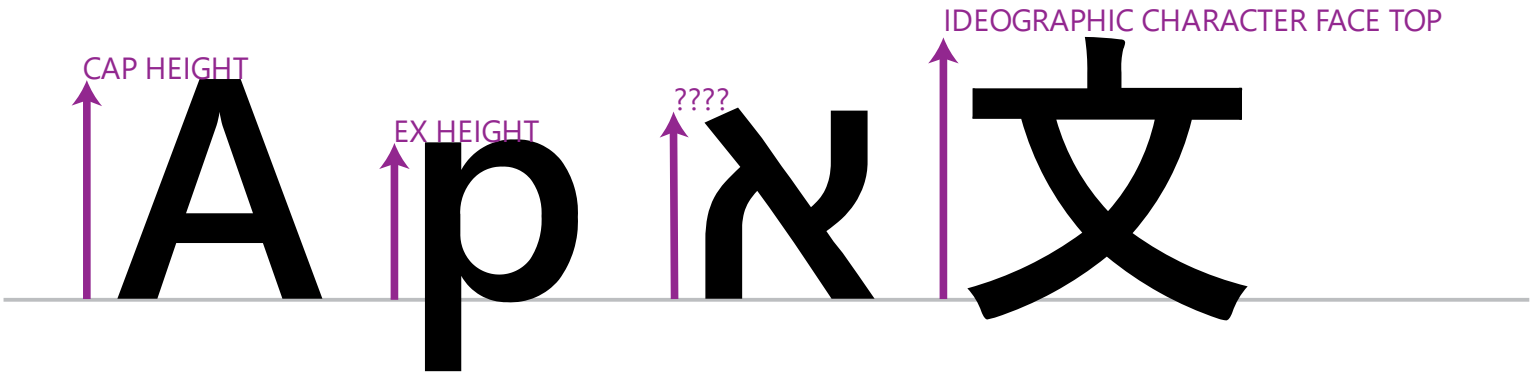
```
h2 { leading-trim: cap; }
```



```
h2 { leading-trim: cap; }
```

```
h2 { leading-trim: cap; }
```

I thought this was a World-Wide Web?



A dropped initial (or “drop cap”) is a larger-than-usual letter at the start of a paragraph, with a baseline at least one line lower than the first baseline of the paragraph.

Open Questions

Behavior at page/column breaks?

Separate cascading/inheritance of metric vs. trigger?

Multiple font sizes on the first/last line?

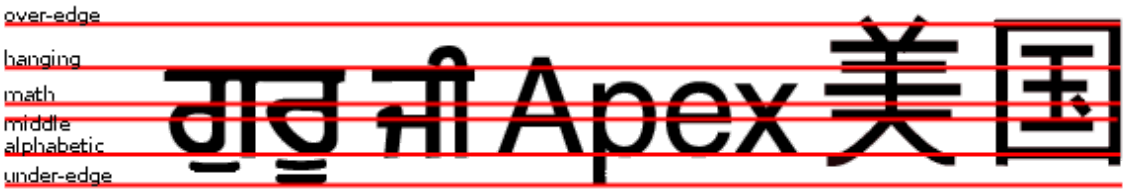
Vertical Alignment

unaligned text

match baselines, then shift

match baselines, then shift

But which baseline?



In a well-designed mixed-script font, the glyphs are positioned in the coordinate space to harmonize with one another when typeset together. The baseline table is then constructed to match the shape of the glyphs, each baseline positioned to match the glyphs from its preferred scripts.

dominant-baseline: auto | alphabetic | ideographic | central | mathematical | …

vertical-align: <'alignment-baseline'> || <'baseline-shift>
└ **alignment-baseline**: baseline | alphabetic | ideographic | central | …
└ **baseline-shift**: sub | super | <length>

initial-letters: 2;

How to Help

Think about / comment on issues.

Bug browser vendors to implement once specced.

Bug font vendors to provide correct metrics.

Bug OpenType to define missing metrics.