

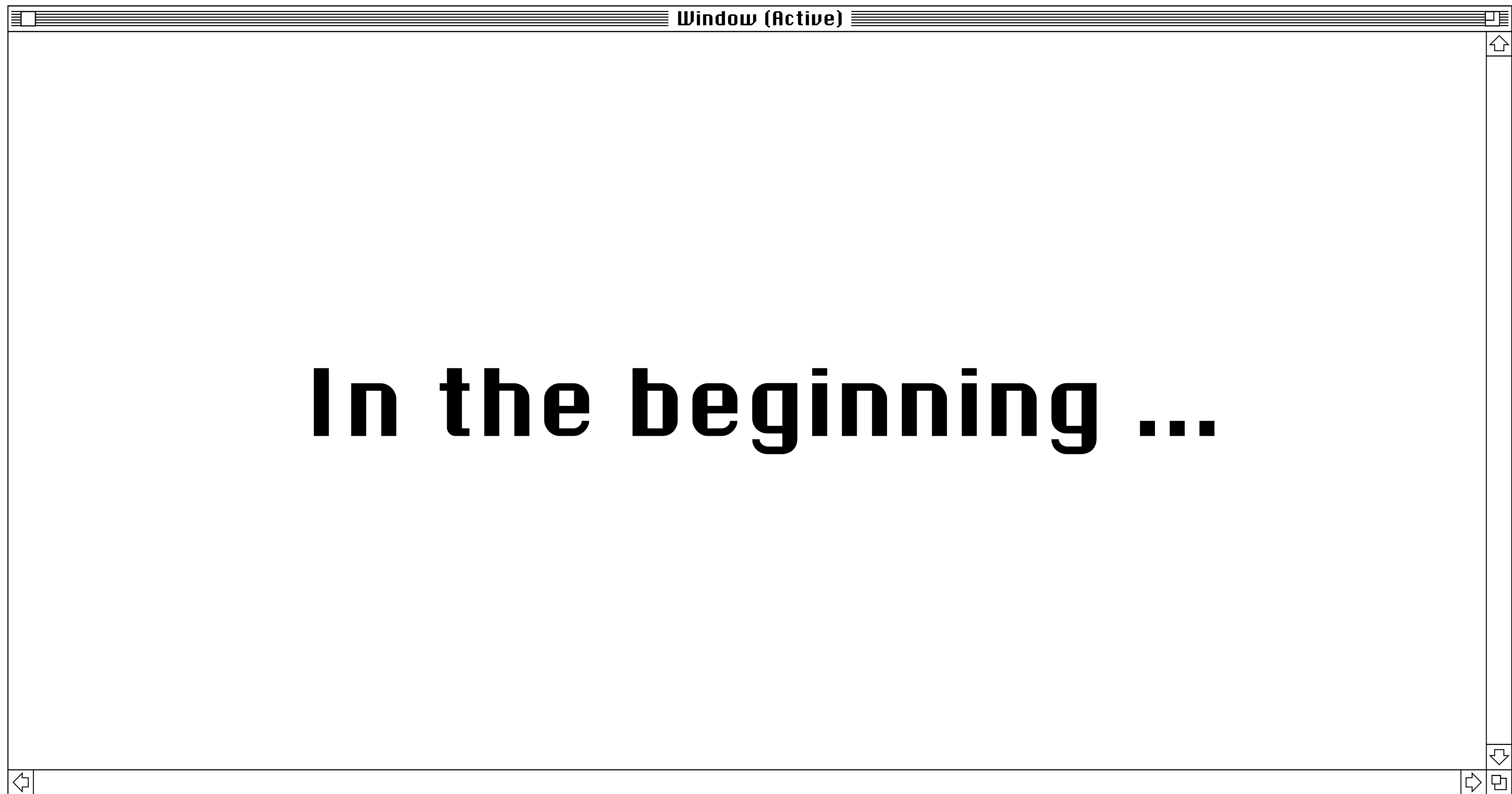
Precise

Text Alignment

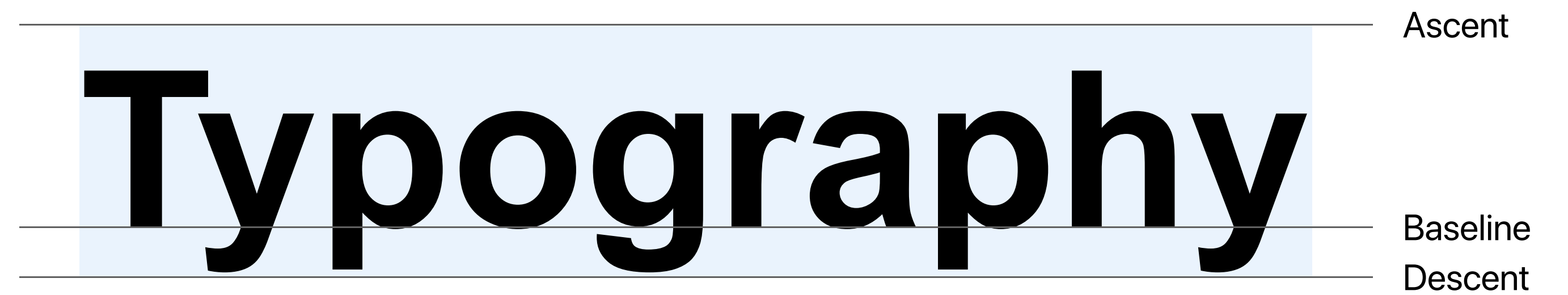
A story about font metrics and CSS

Elika J. Etemad (Invited expert @ W3C CSS Working Group)

Ethan Wang (UX Designer @ Microsoft)



Pre-CSS model of text on the web



Pre-CSS model of text on the web

01 Put a bunch of stuff on a line

Typography is the Art



Pre-CSS model of text on the web

01 Put a bunch of stuff on a line

02 Draw a box around it

Typography is the Art




Pre-CSS model of text on the web

01 Put a bunch of stuff on a line


02 Draw a box around it

03 Stack up the line boxes

Typography is the **Art** 
and *technique* of arranging type
to make written language legible,
readable, and appealing.

Pre-CSS model of text on the web

- 01 Put a bunch of stuff on a line
- 02 Draw a box around it
- 03 Stack up the line boxes
- 04 All done!

Typography is the **Art**  and *technique* of arranging type to make written language legible, readable, and appealing.

CSS introduces leading

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

```
line-height: <length> | <number> | <percentage>;
```

CSS introduces leading

a line of text

leading

or

leading

a line of text

CSS introduces leading

a line of text

leading

a line of text

leading

a line of text

leading

or

leading

a line of text

leading

a line of text

leading

a line of text

→

half-leading

a line of text

half-leading
half-leading

a line of text

half-leading
half-leading

a line of text

half-leading

CSS introduces leading

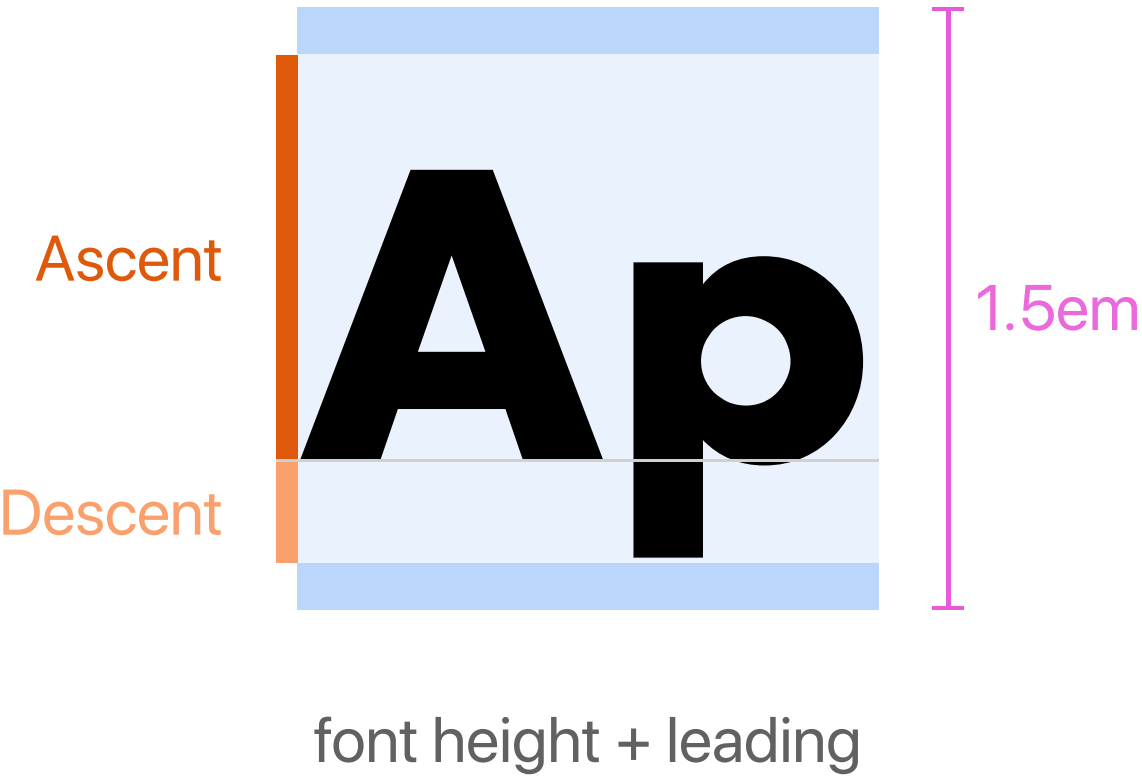
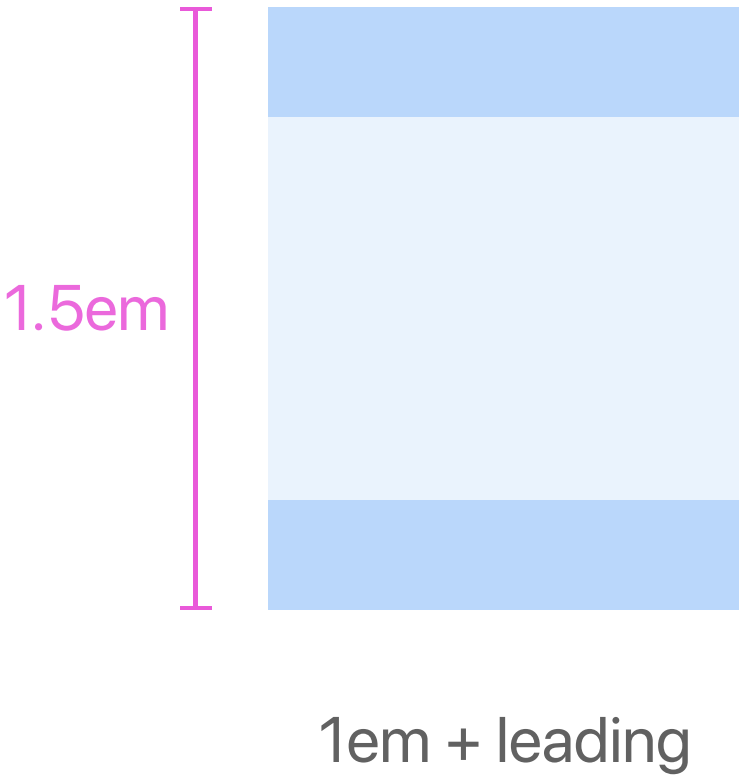
Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

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

CSS introduces leading



PROBLEM 1

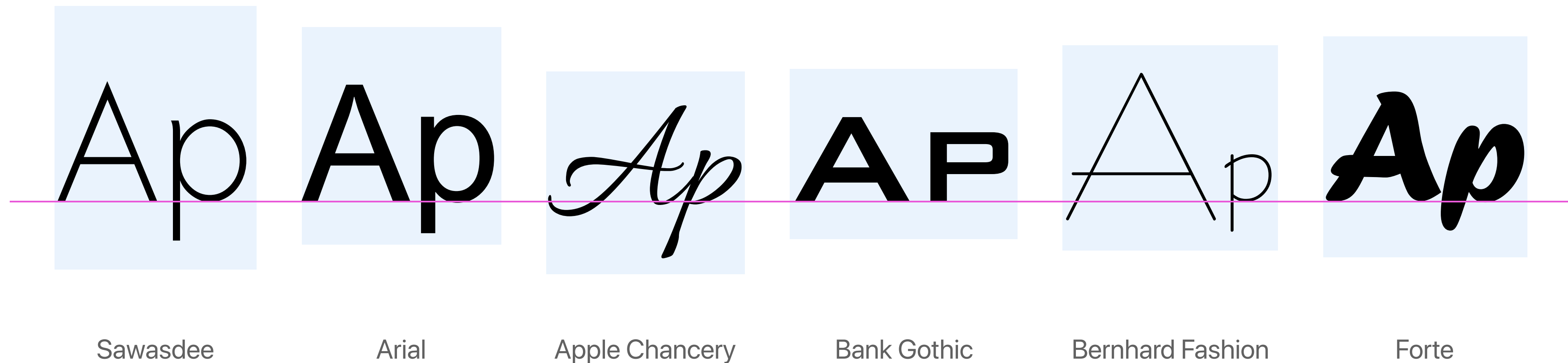
**Inconsistent
line spacing**

Inconsistent line spacing

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



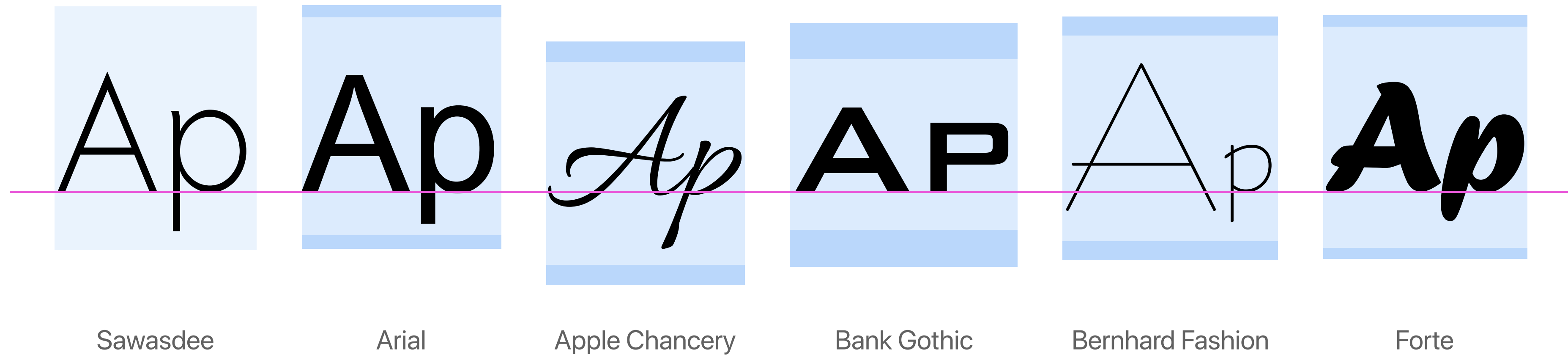
Identical font-size, varying font-family

Inconsistent line spacing

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Identical font-size, varying font-family

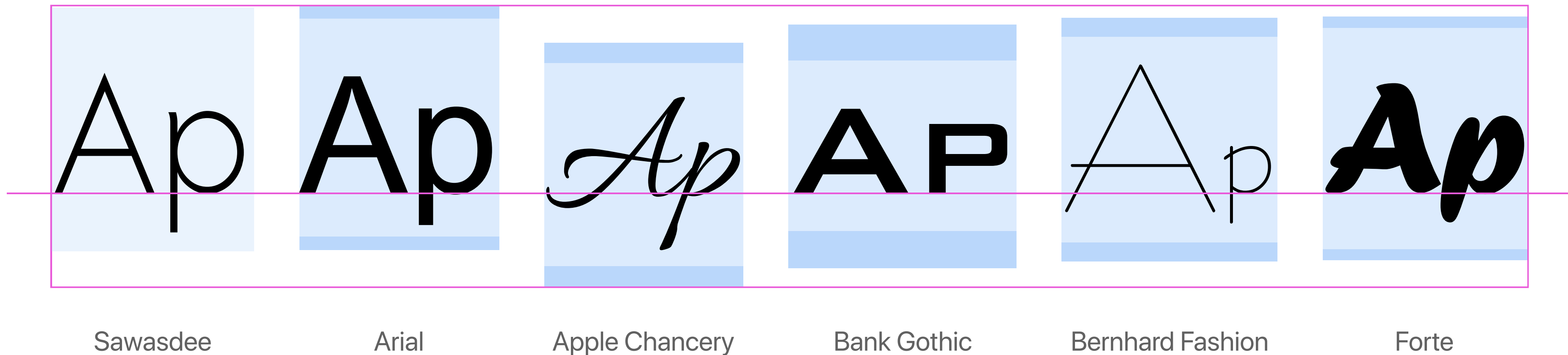
```
line-height: 1.5;
```

Inconsistent line spacing

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Identical font-size, varying font-family

```
line-height: 1.5;
```

PROBLEM 2

Imperfect alignment

Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

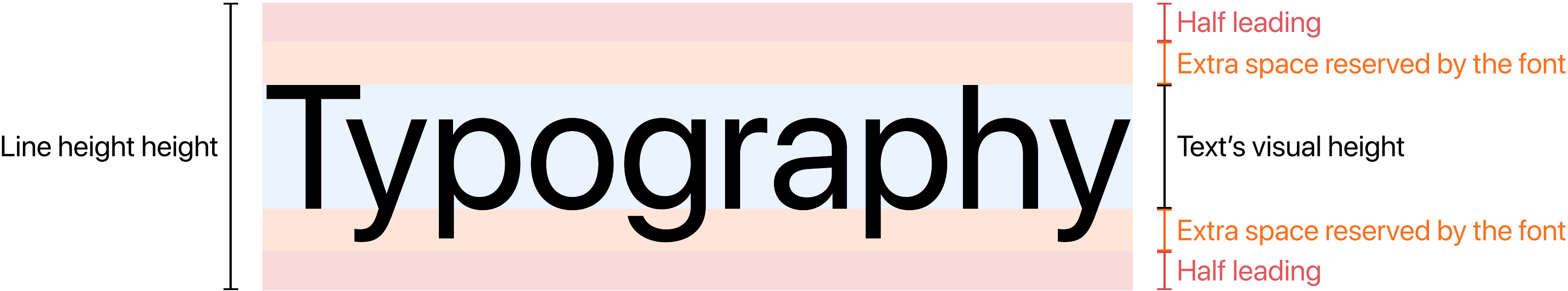
Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

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Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

Imperfect alignment: top edge



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

Imperfect alignment: centering



Imperfect alignment: centering



Imperfect alignment: centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Leslie Alexander

Segoe UI, 40px w/ 60px line height

Imperfect alignment: centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Leslie Alexander

SF Pro Display, 40px w/ 60px line height

Imperfect alignment: centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



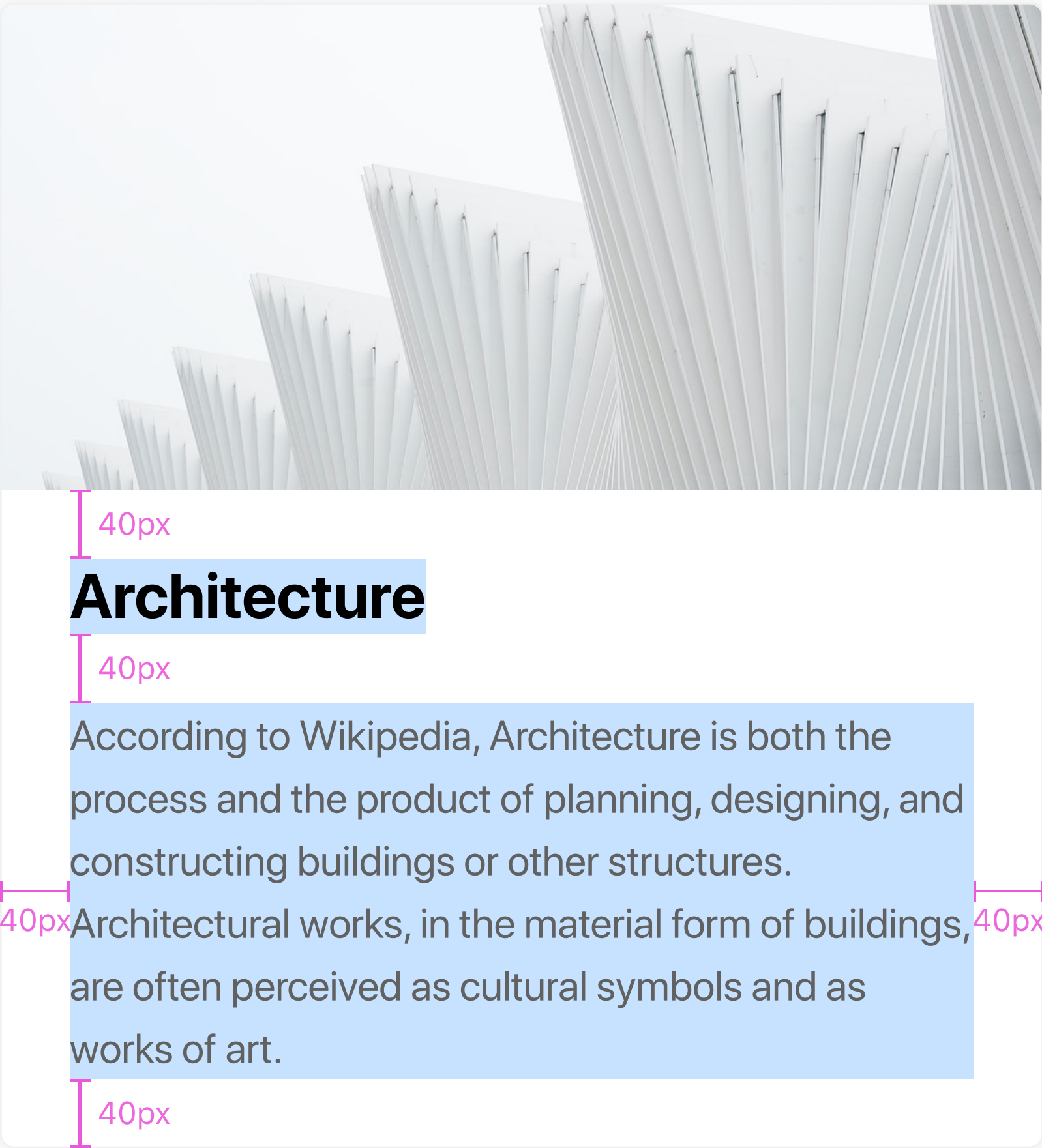
Leslie Alexander

Rockwell, 40px w/ 60px line height

PROBLEM 3

Uncontrollable spacing

Uncontrollable spacing



Equal spacing values

Uncontrollable spacing

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Architecture

According to Wikipedia, Architecture is both the process and the product of planning, designing, and constructing buildings or other structures.

Architectural works, in the material form of buildings, are often perceived as cultural symbols and as works of art.

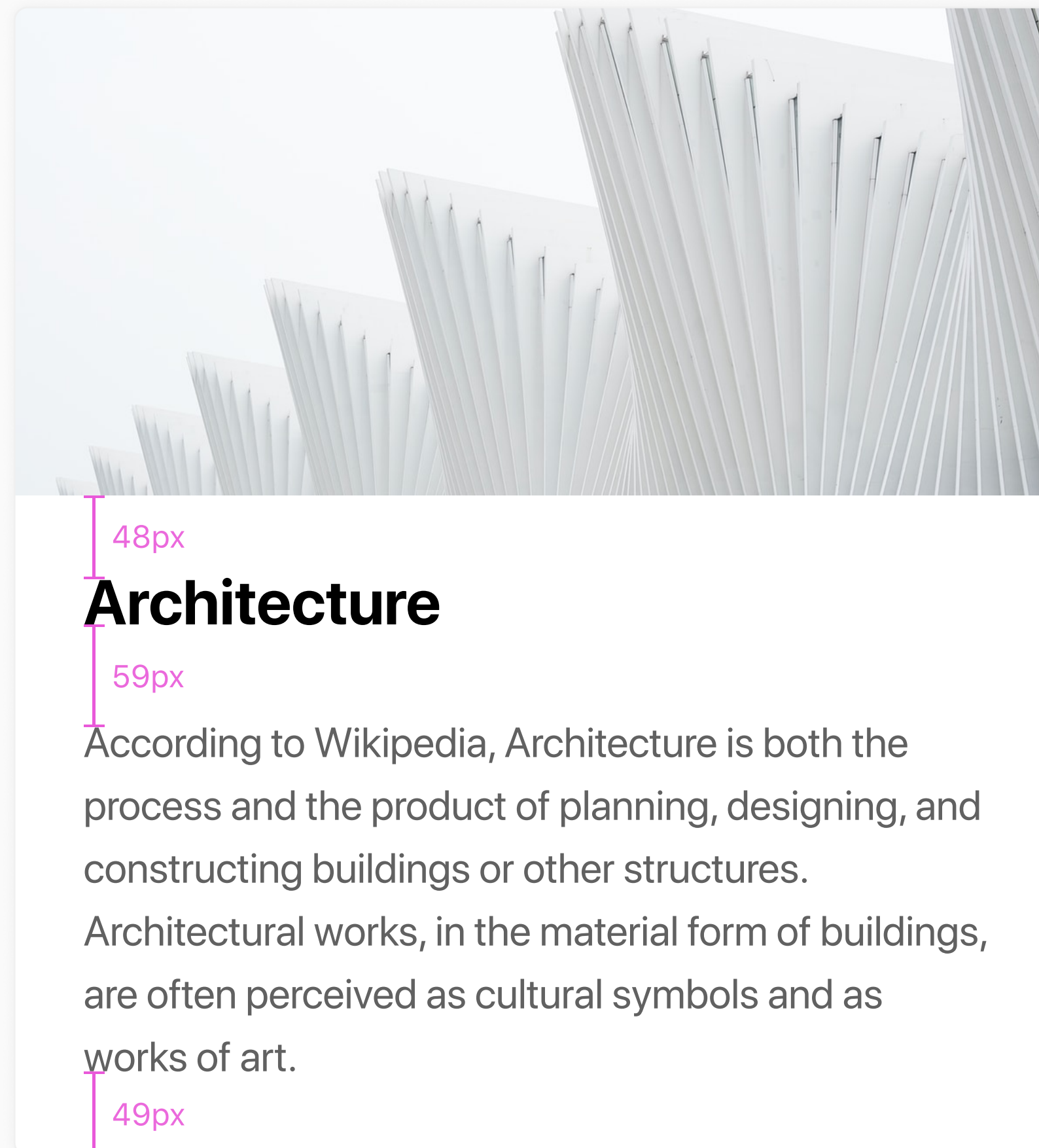
Unequal visual spacing

Uncontrollable spacing

Precise Text Alignment

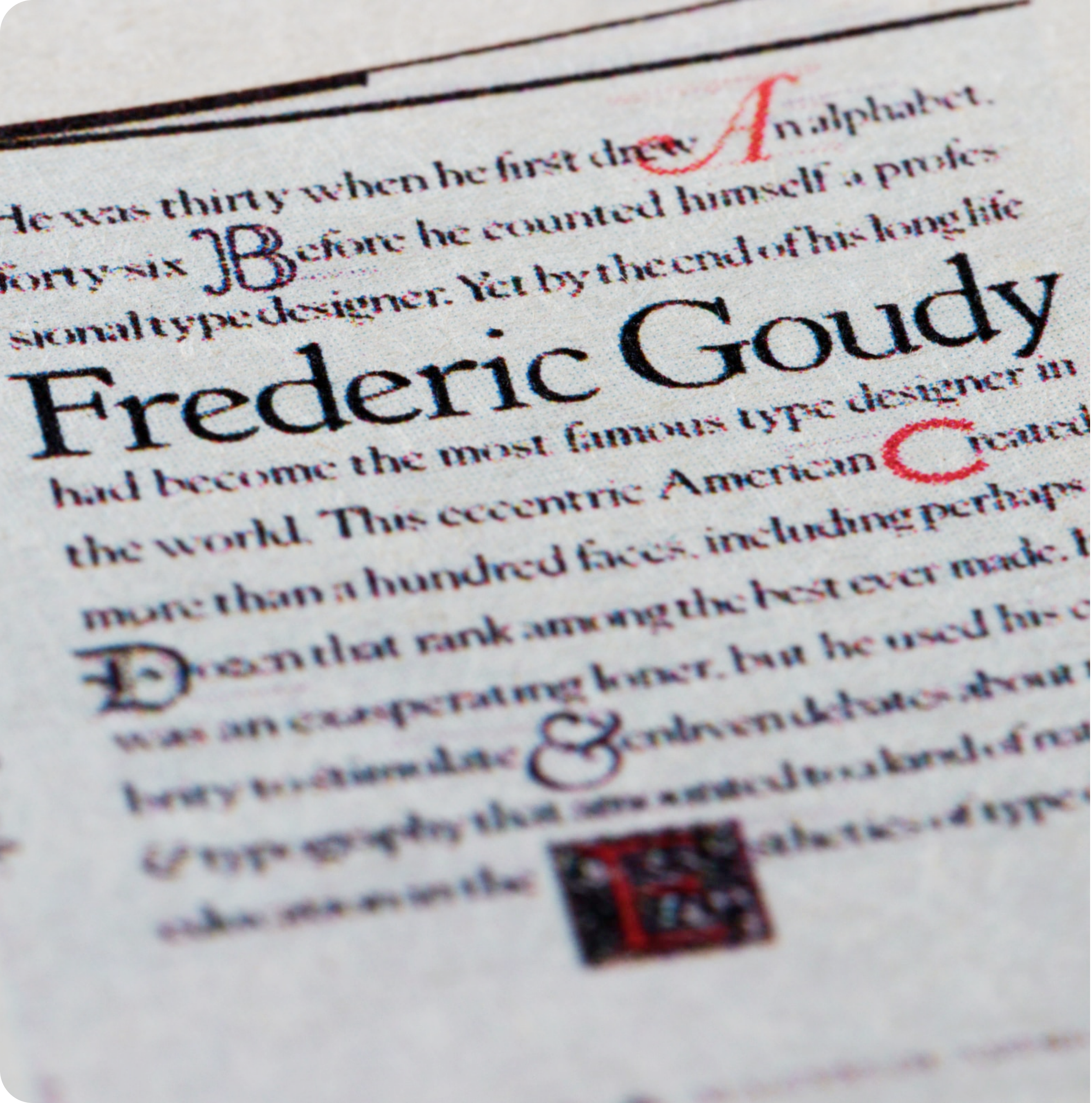
A story about font metrics & CSS

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Unequal visual spacing

Designing a solution



Print workflow

If your stuff overlaps, it's your fault.

So review and tweak your things
before you print them.

CSS design constraints

Unknown

screen size/orientation/resolution

Unknown

font availability

Unknown

content in most cases

Unknown

layout (no post-render visual fiddling!)

Encoding Results vs. Encoding Logic

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Encoding Results vs. Encoding Logic

Precise Text Alignment

A story about font metrics & CSS

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CSS
is
awes

Encoding Results vs. Encoding Logic

Precise Text Alignment

A story about font metrics & CSS

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Encoding Results vs. Encoding Logic

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

CSS
is
awesome.

CSS design principles

Flexible

Be able to adapt to various environments as if the page was originally designed there.

Robust

Handle unexpected fonts/content/media sizes without making the page unreadable.

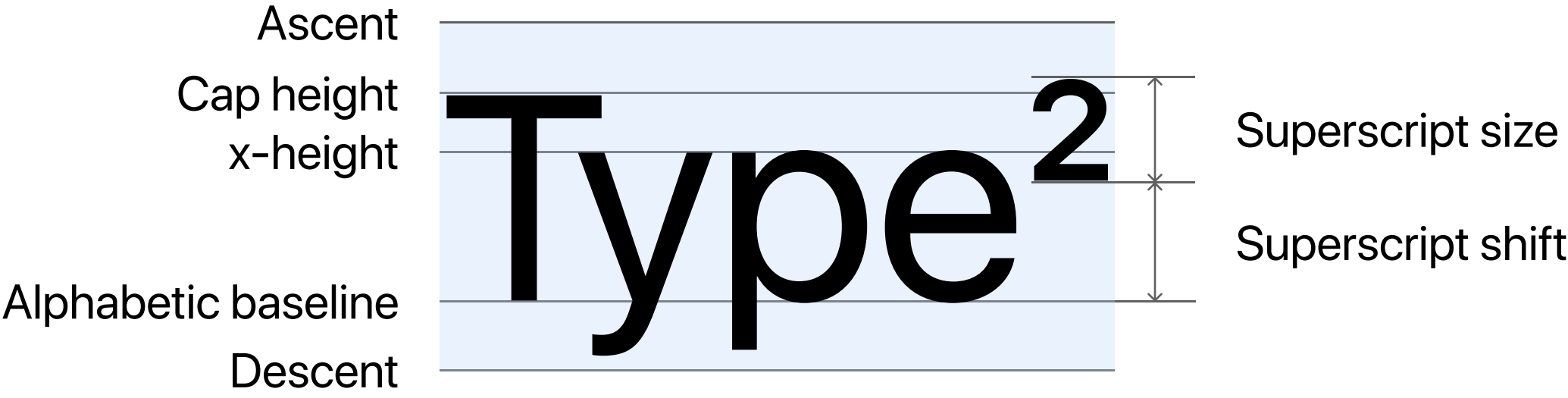
Avoid Dataloss

Don't overlap or clip content by "accident"!

CSS + font metrics

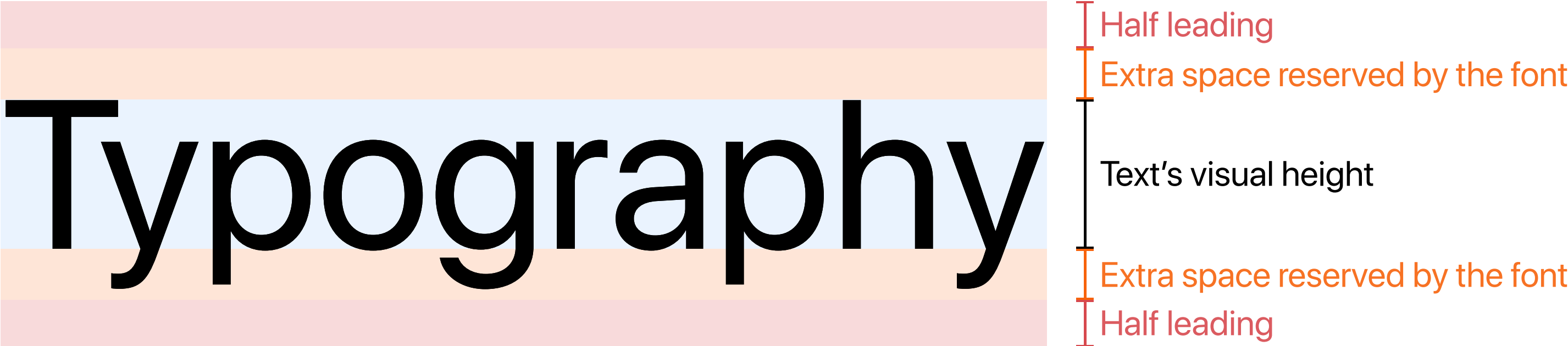
An expanded partnership

OpenType font metrics



NEW CSS FEATURE

leading-trim



leading-trim

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

Think of it as scissors for the bounding box



```
h1 {  
  text-edge: cap alphabetic;  
  leading-trim: both;  
}
```

leading-trim

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

Think of it as scissors for the bounding box



```
h1 {  
  text-edge: cap alphabetic;  
  leading-trim: both;  
}
```

leading-trim

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

Think of it as scissors for the bounding box



```
h1 {  
  text-edge: cap alphabetic;  
  leading-trim: both;  
}
```

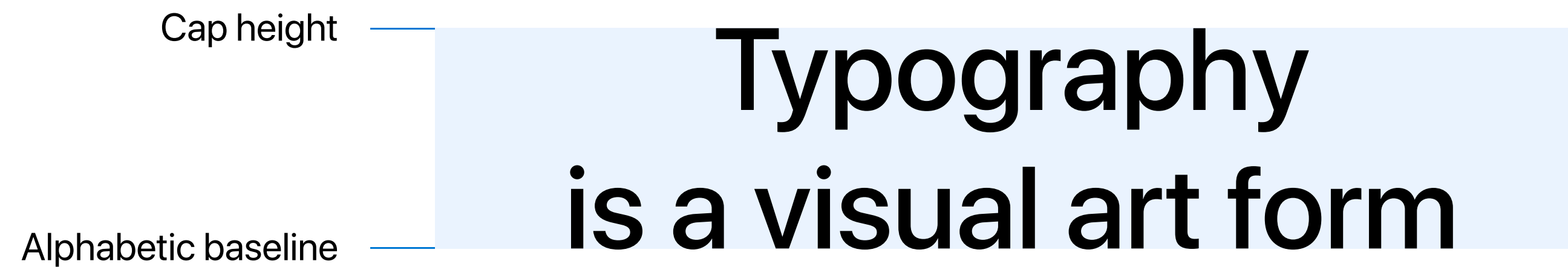
leading-trim

Precise Text Alignment

A story about font metrics & CSS

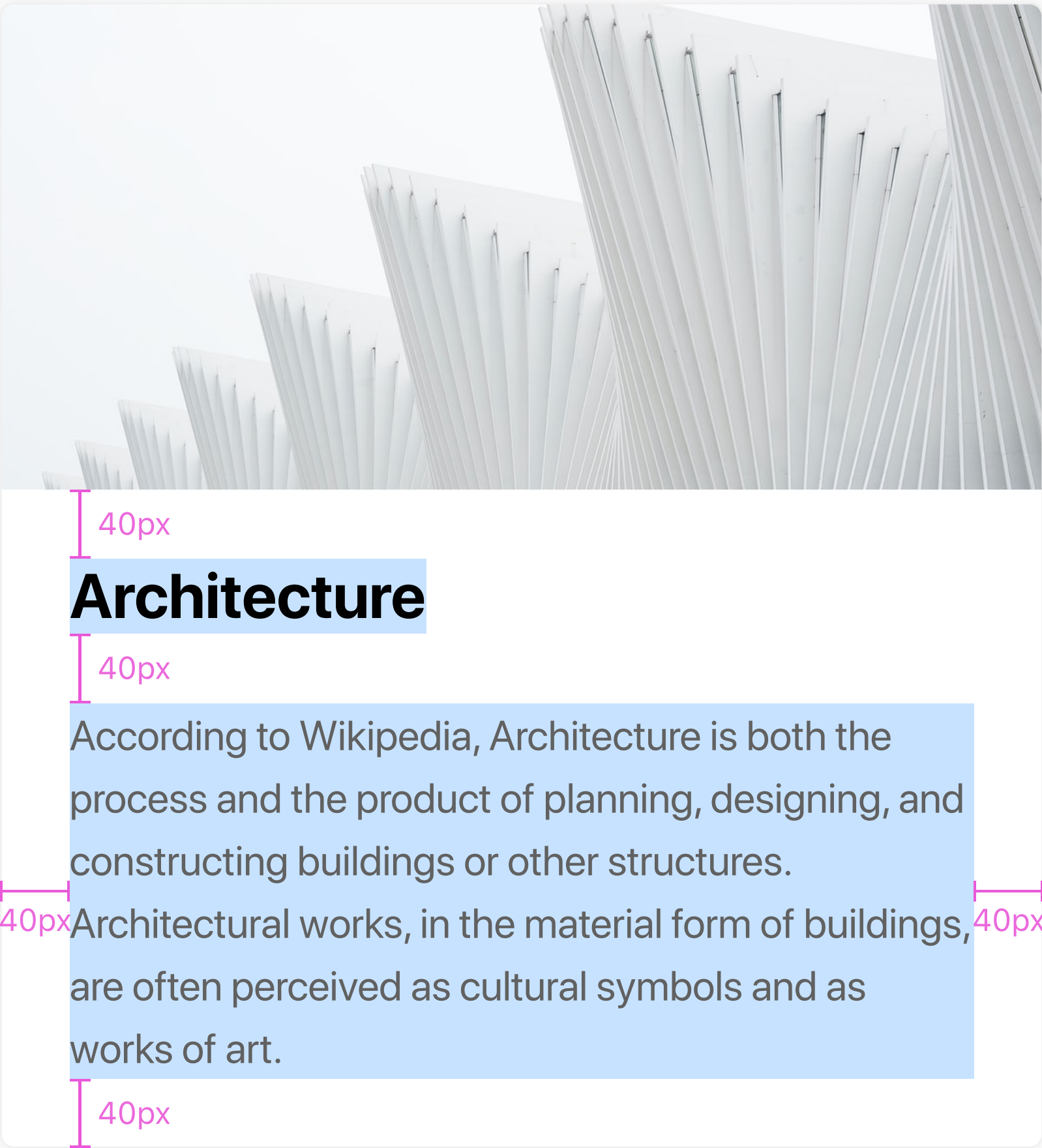
May 3, 2020

Think of it as scissors for the bounding box



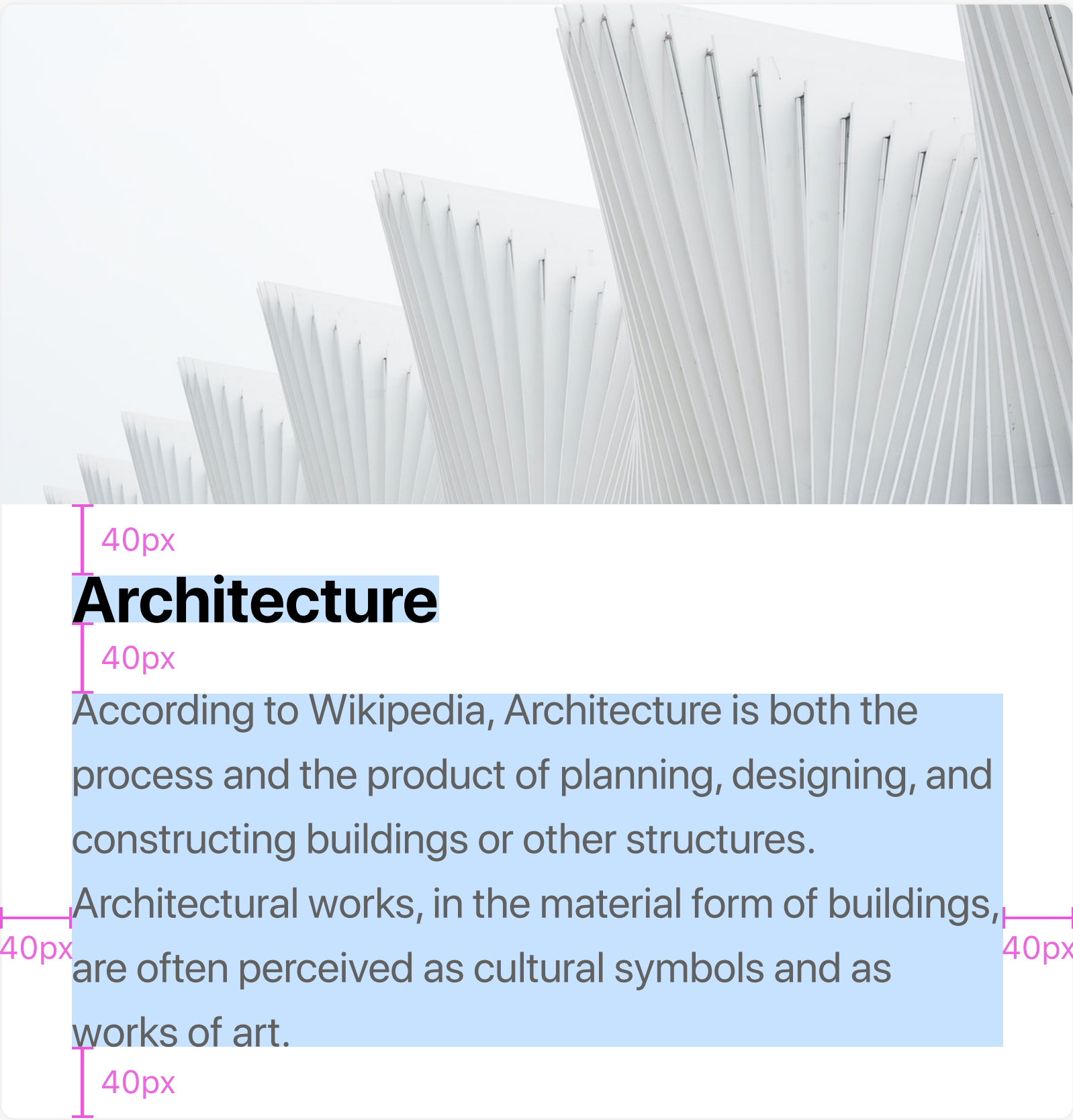
```
h1 {  
  text-edge: cap alphabetic;  
  leading-trim: both;  
}
```

Accurate visual spacing



Before

Accurate visual spacing



After

Accurate visual spacing

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Architecture

According to Wikipedia, Architecture is both the process and the product of planning, designing, and constructing buildings or other structures.

Architectural works, in the material form of buildings, are often perceived as cultural symbols and as works of art.

After

Accurate, automatic alignment



Oscars Spotlight: The 2021 Nominees for Best Picture

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Accurate, automatic alignment



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One film seems likely to win, but this category has plenty of room for surprises.

Accurate, automatic alignment

Precise Text Alignment
A story about font metrics & CSS
May 3, 2020



Oscars Spotlight: The 2021 Nominees for Best Picture

One film seems likely to win, but this category has plenty of room for surprises.

Better centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Before

Better centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Before

Better centering



After

Better centering



After

Segoe UI, 40px w/ 60px line height

Better centering

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



After

SF Pro Display, 40px w/ 60px line height

Better centering



After

Rockwell, 40px w/ 60px line height

NEW CSS FEATURE

Automatic initial letters

Proper drop caps

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

Cap height

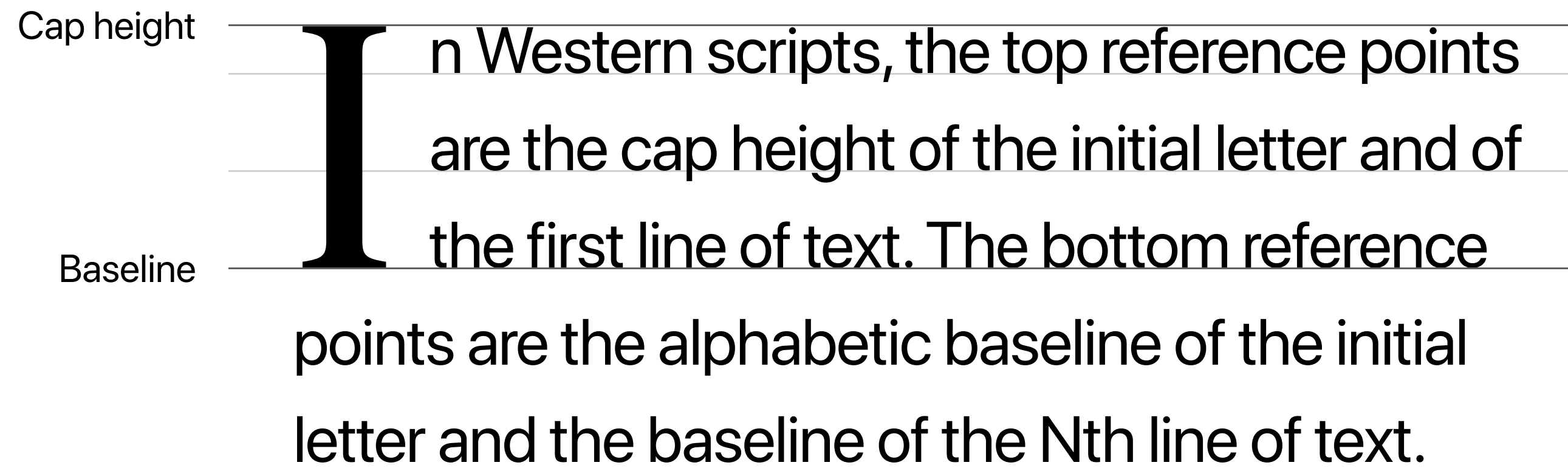
I n Western scripts, the top reference points

are the cap height of the initial letter and of

Baseline the first line of text. The bottom reference

points are the alphabetic baseline of the initial

letter and the baseline of the Nth line of text.



Proper drop caps

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

Cap height
Baseline

In Western scripts, the top reference points are the cap height of the initial letter and of the first line of text. The bottom reference points are the alphabetic baseline of the initial letter and the baseline of the Nth line of text.

```
p:first-letter {  
  initial-letter: 3;  
}
```

NEW CSS FEATURE

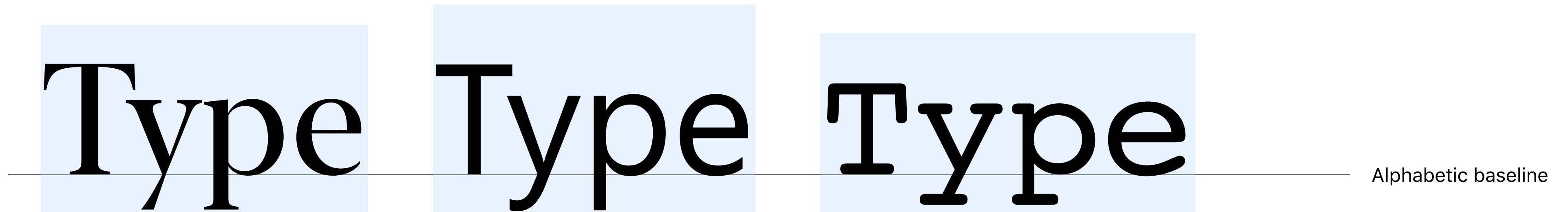
**Additional
baseline options**

Additional baseline options

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Text should be aligned on the baseline

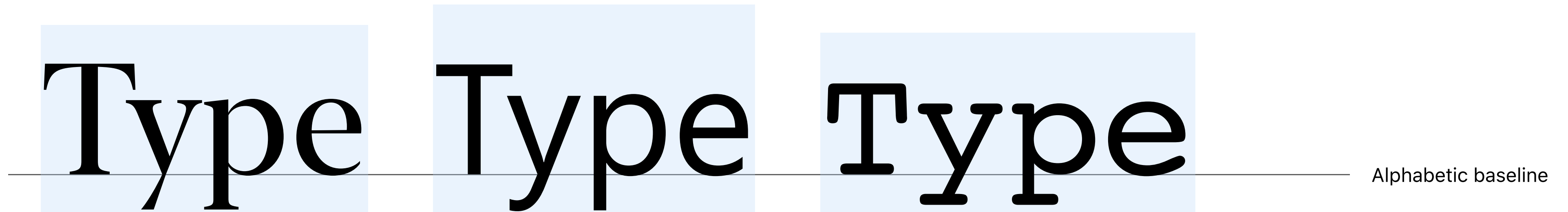
```
vertical-align: baseline;
```

Additional baseline options

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



For latin scripts, text should be aligned on the *alphabetic* baseline

```
vertical-align: baseline;
```

Additional baseline options

Precise Text Alignment

A story about font metrics & CSS

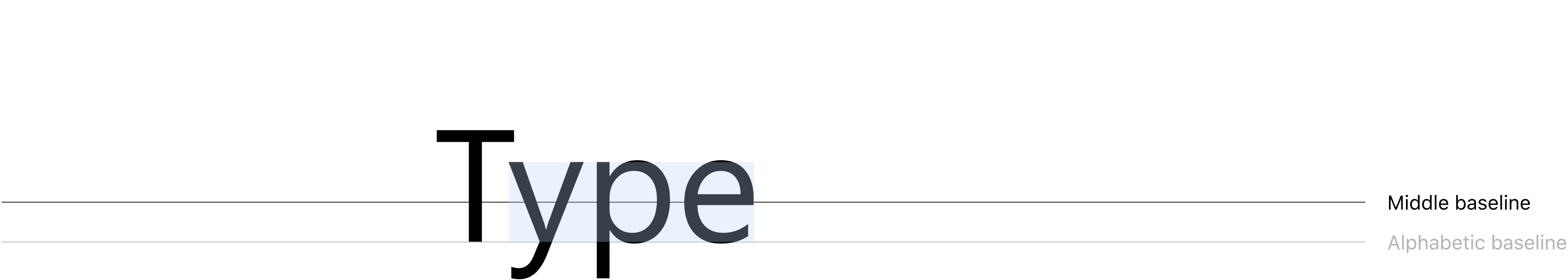
May 3, 2020

Type

Alphabetic baseline

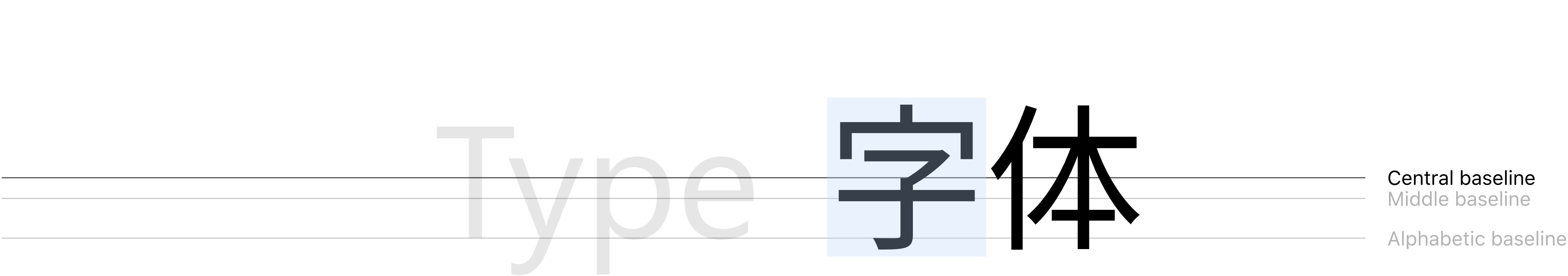
And... there is more than 1 baseline

Additional baseline options



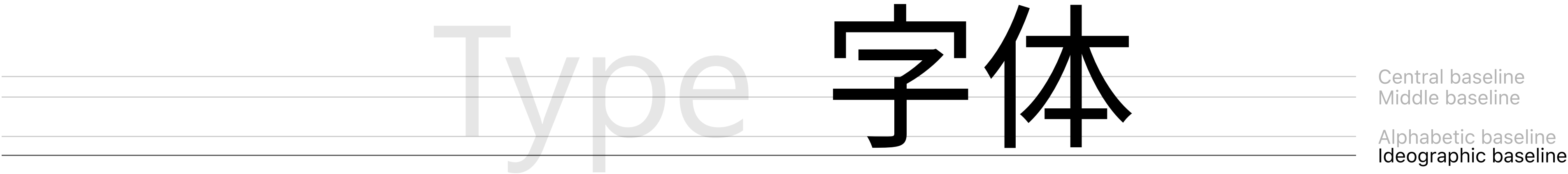
There's the middle baseline

Additional baseline options



Which, depending on the font, can be very close to the central baseline

Additional baseline options



And there's the ideographic baseline for CJK languages

Additional baseline options



For some indic scripts, there's the hanging baseline

Additional baseline options



Lastly, there's the mathematical baseline

Additional baseline options

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



```
dominant-baseline: alphabetic | ideographic | hanging | mathematical | central | middle ...
```

Dominant baseline

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

还没到客栈，一阵**旋风**把我卷入半空。我在空中打转，晕眩得闭上眼睛。我睁开眼睛，我正落在往常变了梦歇宿的三里河卧房的床头。不过三里河的家已经不复是家，只是我的客栈了。

Set a dominant baseline for the document. Instead of:

```
dominant-baseline: alphabetic;
```

Dominant baseline

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

还没到客栈，一阵**旋风**把我卷入半空。我在空中打转，晕眩得闭上眼睛。我睁开眼睛，我正落在往常变了梦歇宿的三里河卧房的床头。不过三里河的家已经不复是家，只是我的客栈了。

Set a dominant baseline for the document. Use:

```
dominant-baseline: ideographic;
```


Dominant baseline

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

एक बार एक कौआ बहुत प्यासा था। उसको कहीं पानी नहीं मिल रहा था। बहुत **ढूँढने** पर उसको एक घड़ा दिखाई दिया। घड़े में बहुत थोड़ा सा पानी था। कौए की चोंच पानी तक नहीं पहुँच पा रही थी।

Set a dominant baseline for the document. Instead of:

```
dominant-baseline: alphabetic;
```

Dominant baseline

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

एक बार एक कौआ बहुत प्यासा था। उसको कहीं पानी नहीं मिल रहा था। बहुत ढूँढने पर उसको एक घड़ा दिखाई दिया। घड़े में बहुत थोड़ा सा पानी था। कौए की चोंच पानी तक नहीं पहुँच पा रही थी।

Set a dominant baseline for the document. Use:

```
dominant-baseline: hanging;
```

More alignment points

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

एक बार एक कौआ बहुत प्यासा था। उसको कहीं पानी नहीं मिल रहा था। बहुत **finding** पर उसको एक घड़ा दिखाई दिया। घड़े में बहुत थोड़ा सा पानी था। कौए की चोंच पानी तक नहीं पहुँच पा रही थी।

Add more alignment points to the vertical-align property to allow for granular control over specific elements

```
.english {  
  vertical-align: alphabetic;  
}
```

More alignment points

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

एक बार एक कौआ बहुत प्यासा था। उसको कहीं पानी नहीं मिल रहा था। बहुत **finding** पर उसको एक घड़ा दिखाई दिया। घड़े में बहुत थोड़ा सा पानी था। कौए की चोंच पानी तक नहीं पहुँच पा रही थी।

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```
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  vertical-align: alphabetic;  
}
```

More alignment points

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

एक बार एक कौआ बहुत प्यासा था। उसको कहीं
पानी नहीं मिल रहा था। बहुत **finding** पर उसको
एक घड़ा दिखाई दिया। घड़े में बहुत थोड़ा सा पानी
था। कौए की चोंच पानी तक नहीं पहुँच पा रही थी।

Add more alignment points to the vertical-align property to allow for granular control over specific elements

```
.english {  
  vertical-align: alphabetic;  
}
```

NEW CSS FEATURE

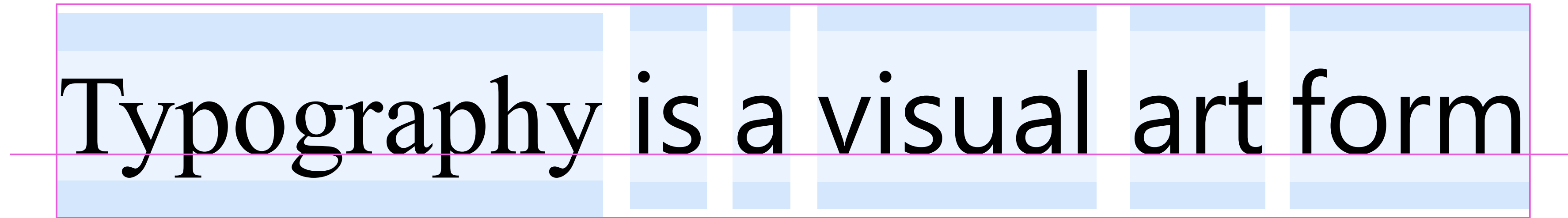
Alternate line box model

Alternate definition of "fit" for a line

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Typography is a visual art form

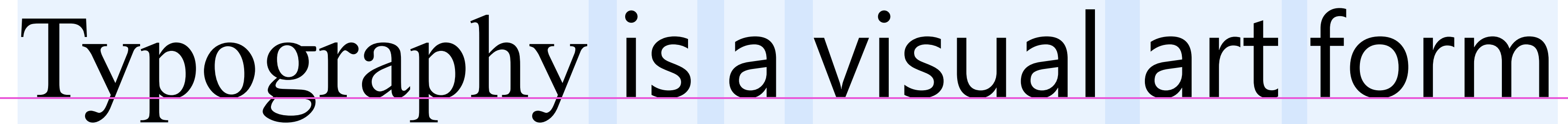
Old model

Alternate definition of "fit" for a line

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020



Typography is a visual art form

New model?

NEW CSS FEATURE

font-variant-position

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2²

```
font-variant-position: super;
```

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2²²

font design vs. reduced side

Superscript glyphs

22

font fallback

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

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2²

browser fallback

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2²x

font design vs. browser synthesis

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2²x

all synthesized

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2².2²x

font design + browser synthesis

Superscript glyphs

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

2².2²x

font design + font-matched synthesis

Problem with font metrics


Problem with font metrics

hhea - Horizontal Header Table	ascender	descender
OS/2 - OS/2 and Windows Metrics Table	sTypoAscender	sTypoDescender
	usWinAscent	usWinDescent

Different platforms use different ascent/descent metrics

Problem with font metrics

Precise Text Alignment
A story about font metrics & CSS
May 3, 2020

The image shows the text 'a²' where the superscript '2' is a distinct, well-proportioned glyph that aligns perfectly with the baseline of the 'a'.

Superscript alternate glyph

The image shows the text 'a²e' where the superscript '2' is synthesized from the regular '2' glyph, resulting in a smaller, less refined appearance that doesn't match the 'a' perfectly.

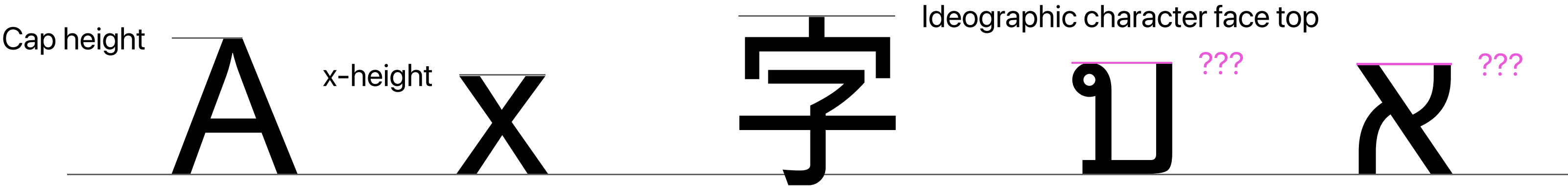
synthesized superscript glyphs

The image shows the text 'a²e' where the superscript '2' is red and the 'e' is black. The '2' is synthesized from the regular '2' glyph, but its color and position are used to illustrate a problem with font metrics.

Incorrect mixture of the two

Some fonts have bad metrics

Problem with font metrics



OpenType lacks metrics for non-Western/CJK writing systems

What CSSWG is doing to compensate

Precise Text Alignment

A story about font metrics & CSS

May 3, 2020

```
@font-face {  
  ...  
  advance-override: ...;  
  descent-override: ...;  
  superscript-size-override: ...;  
  superscript-shift-override: ...;  
  etc.  
}
```

We're adding font metric overrides in CSS, so authors can override bad or missing metrics or opt into good ones.

How you can help

Font designers

Ensure accurate metrics in your fonts!

Font tool vendor?

Facilitate accurate metrics in your output!

Font technologist?

Make font metrics available to layout applications.

Expand OpenType metrics to the rest of the world!

Thank you