

Web Programming

CSS Part I.

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CSS

- Cascading Style Sheets
- Describe the appearance of HTML documents
- Main advantages
 - Separate content from presentation
 - Consistency
 - Easier website maintenance
- Main disadvantage
 - Browser support – cross-browser testing is a must!

Håkon Wium Lie



<http://www.wiumlie.no/>

HÅKON WIUM LIE

HJEM CSS EPLER BØKER PIRAT HAV WAGNER RITUALER BILDER LENKER KONTAKT ENGLISH



Det er omlag 36 personer i Norge som har Håkon som første fornavn og Lie som etternavn. Jeg er en av dem. Det hender [noen av oss](#) treffes. Etternavnet kommer fra [Sotra](#). Mellomnavnet er dansk fra langt tilbake; landsbyen [Vium](#) ligger smukt til på Jylland. Selv vokste jeg opp i [Halden](#), Nordens [Salzburg](#).

Jeg har brukt datamaskiner siden 1980 og er fortsatt fascinert av hvordan de kan forbedre våre liv på interessante måter. Det er viktig at flest mulig har tilgang til mest mulig på nettet. Særlig mener jeg offentlige data skal være offentlige. Noen av oss startet [Piratpartiet](#) i 2012 for å kjempe for dette. Der var jeg partisekretær det første året. Når man heter Håkon Lie er man partisekretær.

I 1994 utviklet jeg et dataspråk som heter [Cascading Style Sheets](#). CSS gjør det mulig å bruke fonter, farger og typografi på nettet – liksom typografer og formgivere har gjort på papir i hundrevis av år. I dag er CSS en av de tekniske grunnpillene på nettet og mange steder arrangeres egne CSS-konferanser. Der synes jeg det er stas å delta og fortelle om hvordan og hvorfor CSS startet. Ofte viser jeg bilder av [Gutenberg trykte bibel](#). Etter mer enn 500 år vet vi fortsatt hvordan vi skal lese den boken, selvom latin er vanskelig og fonten litt rar. Jeg tipper CSS-koden vi skriver i dag også kan leses om 500 år.

I dag leser vi det meste på skjermer, men jeg tror papirbøker også vil være med oss i framtidten. Jeg jobber for at CSS skal bli best på å lage bøker og er styreleder i selskapet [bak Prince](#). Kanskje har du allerede lest [en bok](#) laget av Prince? Hvis ikke kan du se på [en av mine](#).

Fra 1999 til 2016 var jeg teknologisjef i [Opera](#), som lager nettleseere for alle slags dingser. Jeg er stolt over at Opera klarte å få 350 millioner brukere mens jeg var der – mange av dem på enkle telefoner med smal båndbredde. I 2015 testet jeg Opera i krevende omgivelser. [Kon-Tiki-ekspedisjonen](#) seilte balsafåter fra Callao i Peru til Påskeøya. Det ble en [episk tur](#) for håkontiki og resten av [mannskapet](#). Jeg var teknologisjef ombord og sørget for vi hadde nok strøm og lit internett. Mens jeg var på havet ble nettleseren Opera solgt til kinesiske eiere. Det synes jeg er greit – de fleste Opera-brukerne bor lenger øst og de nye eierne jobber hardt for at det skal bli enda flere framover.

Jeg er også glad i opera på scenen. Jeg trives særlig godt i salen med

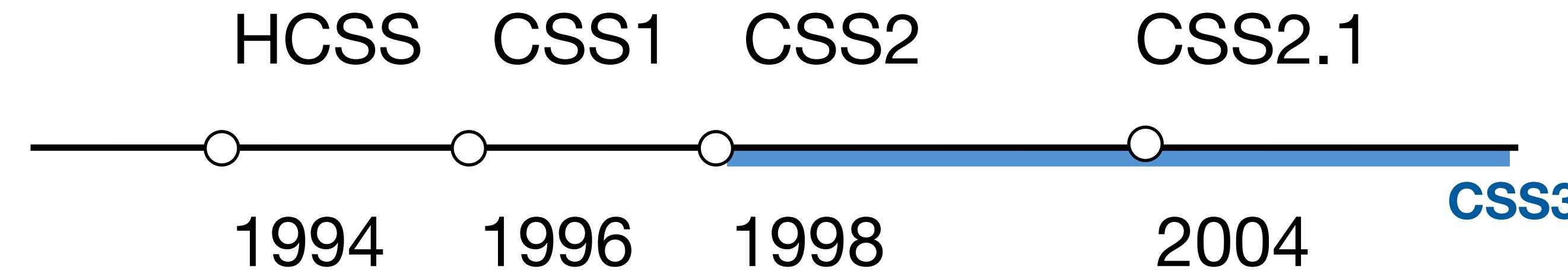
og jeg er også glad i opera på scenen. Jeg trives særlig godt i salen med

Rettspraksis.no er tilbake!

Jeg har kjøpt et orgelbyggeri!



CSS development



- Currently: **CSS3**
 - Specification is maintained by W3C
 - Most properties have already been implemented in modern browsers

CSS syntax (document-level and external)

```
/* comments look like this */  
selector p > h1 {  
  
    font-family: Arial, sans-serif;  
    color: blue;  
    text-align: right;  
}  
  
property   value(s)
```

declaration block

- **Selectors** indicate which element(s) the rule applies to
 - Can be combined with combinators
- **Declarations** describe the styling
 - List of property: value pairs separated by a semicolon

CSS Cascade

- There can be conflicting values on a property for an element from different sources
- The cascade resolves the conflict
- Details
 - https://developer.mozilla.org/en-US/docs/Learn/CSS/Building_blocks/Cascade_and_inheritance

CSS Cascade evaluation

- Three factors decide when a declaration is applied
- Source order (last declaration wins)
 - External
 - Document level
 - Inline
- Specificity
 - Most specific of 2 applicable rules is applied.
- Importance

Inline

- Using the **style** attribute
 - can be used with almost all tags
 - exceptions: **<html>**, **<head>**, **<title>**, **<meta>**, **<param>**, **<style>**, **<script>**
 - property:value pairs separated with ;
 - overrides any style set globally

```
<p style="color:green;font-size:16px;">Large green text</p>
```

Large green text

Document level

- Defined in the `<head>` of the HTML document

```
<head>
  [...]
  <style>
    p {
      color: blue;
      text-align: right;
    }
  </style>
</head>
```

External

- In a separate CSS file, linked from the HTML

HTML file

```
<head>
    <link rel="stylesheet" href="style.css" />
</head>
```

CSS file

```
p {
    color: blue;
    text-align: right;
}

/* you can comment, too */
```

Advantages of having external CSS file(s)

- Separate content and structure from presentation
- Reduce repetition (remember: DRY)
- Enable multiple pages to share the same design
- Maintain site-wide consistency
 - Changes are made in a single place
- Reduce bandwidth
 - CSS file is accessed only once, size of HTML files is reduced

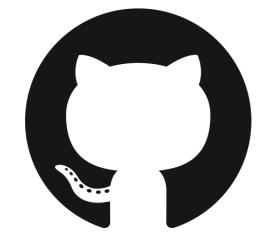
Outline

- **Part I - Properties**
 - To customize the styling of elements
- **Part II - Selectors**
 - To select which elements to apply a style to
- **Part III - Positioning**
 - To set the alignment of elements and layout of a page

Today

- We only use document level and inline css
 - So that both HTML and CSS is in a single file
 - Normally, you should always use an external CSS file
- Some exercises have starting files:
 - Clone info repository to get all starting files and solutions,...
 - Check github howto on how to clone the repository.

Exercise #1



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

Part I

Properties

Properties

- Among other things...
 - Fonts
 - Lists
 - Text alignment
 - Margins
 - Colors
 - Backgrounds
 - Borders

Reference: w3schools

<http://www.w3schools.com/css/>

Browser Support

The numbers in the table specify the first browser version that fully supports the property

Property	Chrome	Edge	Internet Explorer	Firefox
font-style	1.0	12.0	4.0	1.0

CSS Syntax

```
font-style: normal|italic|oblique|initial|inherit;
```

Property Values

Value	Description	Play it »
normal	The browser displays a normal font style. This is default	Play it »
italic	The browser displays an italic font style	Play it »
oblique	The browser displays an oblique font style	Play it »
initial	Sets this property to its default value. Read about initial	Play it »
inherit	Inherits this property from its parent element. Read about inherit	Play it »

CSS Property:

font-style:

- normal
- italic
- oblique
- initial

Result:

Play with different font styles!

Try different font styles by clicking the radio buttons

CSS Code:

```
div {  
    font-style: normal;  
}
```

Click the property values above to see the result

[W3Schools.com - Play it](#)

Text

Text properties

- Font
 - Family, size, weight, style, stretch, spacing, ...
- Alignment
- Color
- Decoration
 - Underline, strike-through, ...

Font families

SERIF

Extra details on the ends of the main strokes of the letters. These details are known as serifs.

im

In print, traditionally used for long passages of text because they are considered easier to read.

SANS-SERIF

Straight ends to letters, therefore have a much cleaner design.

im

Screens have a lower resolution than print. If the text is small, sans-serif fonts can be clearer to read.

MONOSPACE

Every letter in a monospace (or fixed-width) font is the same width.

im

Monospace fonts are commonly used for code because they align nicely, making the text easier to follow.

Examples

SERIF

Times New Roman

Georgia

SANS-SERIF

Arial

Verdana

Helvetica

MONOSPACE

Courier

Courier New

Andale Mono

Setting font family

- Property: **font-family**
- Value: name(s) of the font(s)
- Alternatives can be defined
 - In case the given font is not present on the user's computer, the next in the sequence will be used
 - Put the general font family as last in the list

```
h1 {  
    font-family: "Helvetica Neue", Helvetica, Arial, sans-serif;  
}
```

First choice

Fall-back choice

Importing fonts

- Add at beginning of style file `@import url(address);`
 - Alternative: use `@font-face`
 - See http://www.w3schools.com/css/css3_fonts.asp
- Great font resource: <https://www.google.com/fonts>

```
@import url(https://fonts.googleapis.com/css?family=Roboto);  
  
h2 {  
    font-family: "Roboto", sans-serif;  
}
```

How to use Google Fonts

Roboto
Christian Robertson (12 styles)

1. Select font

All their equipment and instruments are alive.

1 Family Selected

2. Open panel

4. Copy-paste code into CSS

1 Family Selected

Your Selection Clear All

Roboto (−)

EMBED CUSTOMIZE

Load Time: Fast

Embed Font

To embed your selected font in an HTML document:

STANDARD @IMPORT

```
<style>
@import url('https://fonts.googleapis.com/css?family=Roboto');
</style>
```

Specify in CSS

Use the following CSS rules to specify these families:

```
font-family: 'Roboto', sans-serif;
```

For examples of how fonts can be added to webpages, see the [getting started guide](#).

Font size

- Property: **font-size**
- Value: size in one of these units
 - Absolute
 - **cm**, **mm**, **in**
 - **px** pixels
 - **pt** points
 - Relative
 - **em** relative to the current font size (**recommended**)
 - **%** percentage
 - Keywords
 - **xx-small**, **x-small**, **small**, **medium**, **large**, **x-large**, **xx-large**
- https://www.w3schools.com/cssref/css_units.asp

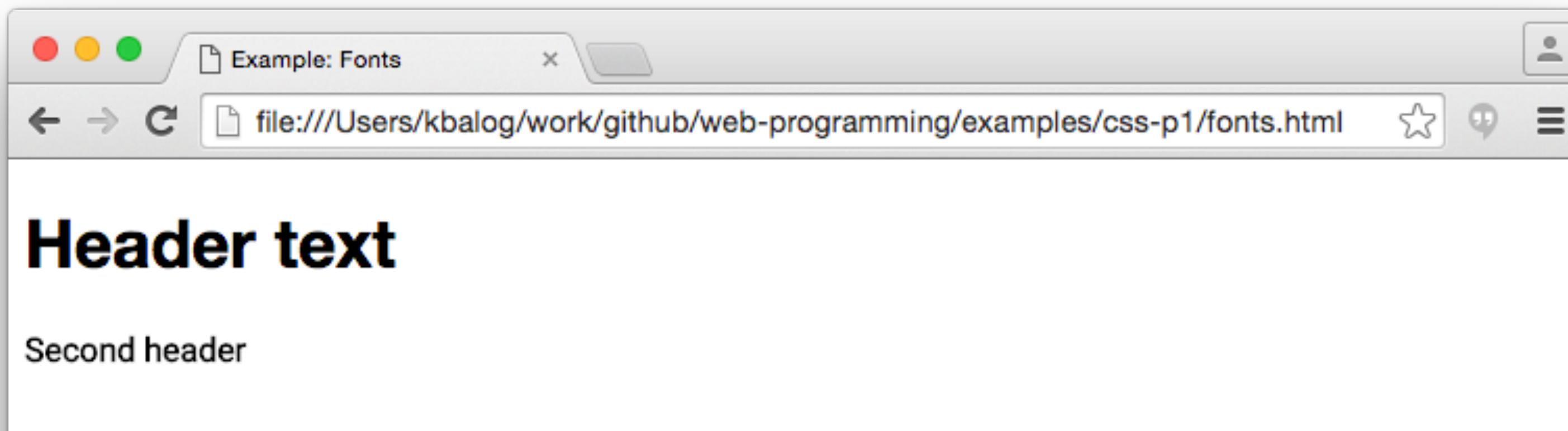
```
h1 {  
    font-size: 2em;  
}  
h2 {  
    font-size: 16pt;  
}  
h3 {  
    font-size: medium;  
}
```

Example

examples/css/properties/fonts.html

```
@import url(https://fonts.googleapis.com/css?family=Roboto);

h1 {
    font-family: "Helvetica Neue", Helvetica, Arial, sans-serif;
    font-size: 2em;
}
h2 {
    font-family: "Roboto", sans-serif;
    font-size: 12pt;
}
```



Weight, style, stretch

WEIGHT

Light
Medium
Bold
Black

The font weight not only adds emphasis but can also affect the amount of white space and contrast on a page.

STYLE

Normal
Italic
Oblique

Italic fonts have a cursive aspect to some of the lettering. Oblique font styles take the normal style and put it on an angle.

STRETCH

Condensed
Regular
Extended

In condensed (or narrow) versions of the font, letters are thinner and closer together. In expanded versions they are thicker and further apart.

Weight, style, stretch

- Weight
 - Property: **font-weight**
 - Values: **normal, bold, ...**
 - http://www.w3schools.com/cssref/pr_font_weight.asp
 - When using non-default font weight, consider importing font with specific weight.

1. Import specific weight

```
@import url(https://fonts.googleapis.com/css?family=Roboto:500);  
body {  
  font-family: "Roboto", sans-serif;  
  font-weight: 500;  
}
```

2. Change for complete body

Weight, style, stretch (2)

- Style
 - Property: **font-style**
 - Values: **normal, italic, oblique**
 - http://www.w3schools.com/cssref/pr_font_font-style.asp
- Stretch
 - Property: **font-stretch**
 - Values: **normal, condensed, expanded, ...**
 - http://www.w3schools.com/cssref/css3_pr_font-stretch.asp

Spacing

- Letter spacing
 - Property: **letter-spacing**
 - Value: length of extra space (px, cm, em, etc); negative values are allowed
 - http://www.w3schools.com/cssref/pr_text_letter-spacing.asp
- Word spacing
 - Property: **word-spacing**
 - Value: length of extra space (px, cm, etc); negative values are allowed
 - http://www.w3schools.com/cssref/pr_text_word-spacing.asp

Text alignment

- Property: **text-align**
- Values: **center, left, right, justify**
- http://www.w3schools.com/cssref/pr_text_text-align.asp

```
<p style="text-align: right;">Right aligned text</p>
```

Right aligned text

Color

- Property: **color**
- Value: color given as
 - A HEX value, e.g., **#ff0000**
 - An rgb value, e.g., **rgb(255, 0, 0)**
 - A color name, e.g., **red**

```
<p style="color: #ff0000;">Red text</p>
```

Red text

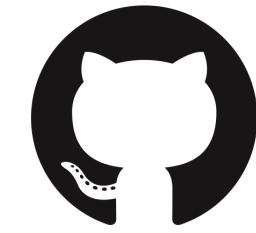
Decoration

- Property: **text-decoration**
- Values: **none, underline, overline, line-through**
- http://www.w3schools.com/cssref/pr_text_text-decoration.asp

```
<p>Lorem ipsum dolor sit amet, consectetur adipiscing elit. Cras  
a <span style="text-decoration: line-through;">maximus</span>  
diam.</p>
```

Lorem ipsum dolor sit amet, consectetur adipiscing elit.
 Cras a ~~maximus~~ diam.

Exercises #2, #2b



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

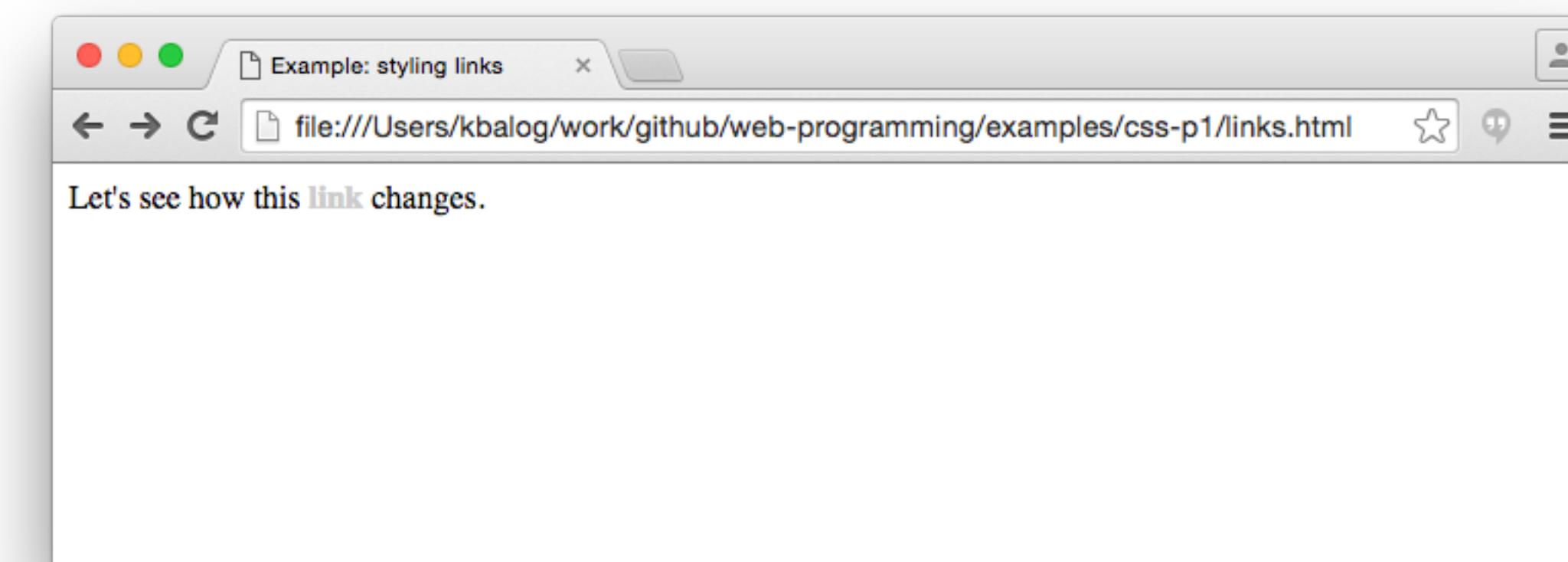
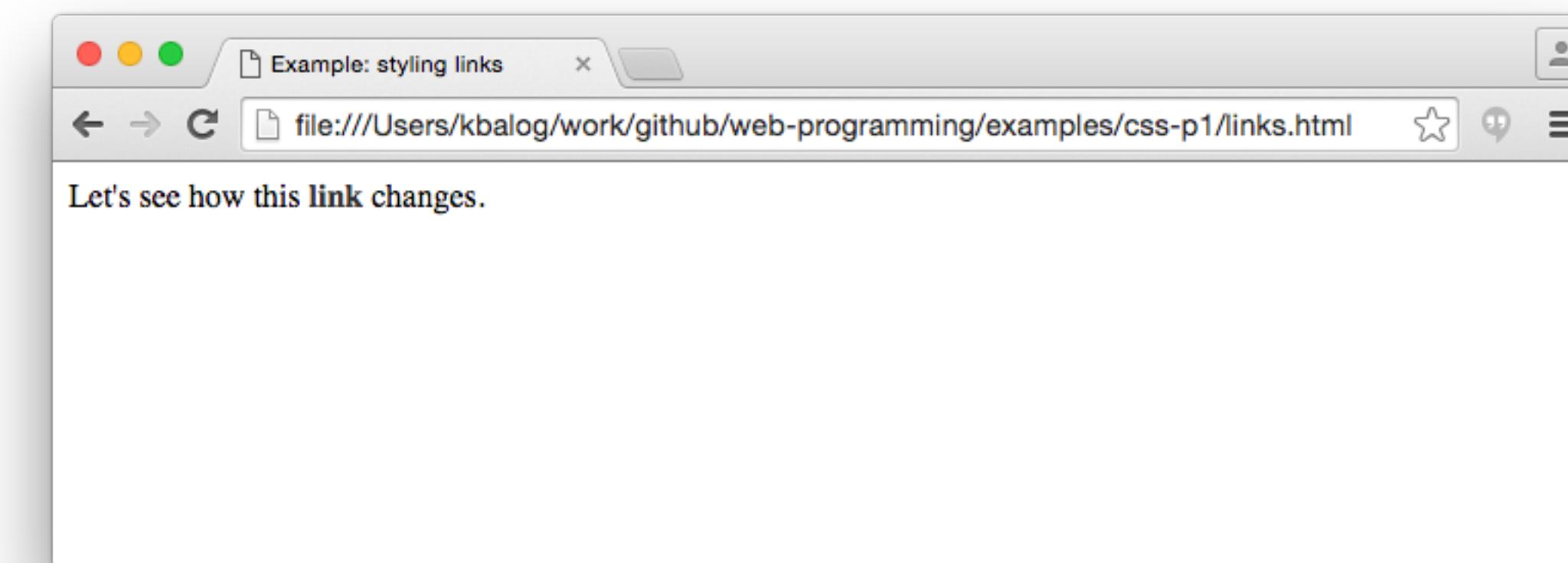
Links

- Links can be styled with any CSS property
- In addition, they can be styled differently based on their **state**
 - **a:link** a normal, unvisited link
 - **a:visited** a link the user has visited
 - **a:hover** a link when the user mouses over it
 - **a:active** a link the moment it is clicked
- Default behavior:
 - normal: blue, underlined [link](#)
 - visited: purple, underlined [link](#)

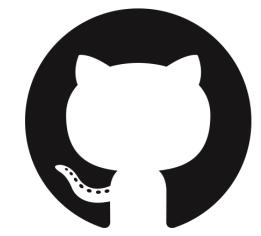
Example

examples/css/properties/links.html

```
<style>
  a {
    color: #333333;
    font-weight: bold;
    text-decoration: none;
  }
  a:hover {
    text-decoration: underline;
  }
  a:visited {
    color: #cccccc;
  }
</style>
```



Exercise #3



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

Colors and Backgrounds

Color

```
/* color name */
h1 {
    color: DarkCyan;
}
/* hex code */
h2 {
    color: #ee3e80;
}
/* rgb value */
p {
    color: rgb(100,100,90);
```

Background color

```
body {  
    background-color: rgb(200,200,200);  
}  
h1 {  
    background-color: DarkCyan;  
}  
p {  
    background-color: #ee3e80;  
}
```

Color values

- by name (**blue**)
- hex RGB code (**#0000FF**)
- see color names
[**http://www.w3.org/TR/css3-color/#svg-color**](http://www.w3.org/TR/css3-color/#svg-color)

Named	Numeric	Color name	Hex rgb	Decimal
		<i>aliceblue</i>	#F0F8FF	240,248,255
		<i>antiquewhite</i>	#FAEBD7	250,235,215
		<i>aqua</i>	#00FFFF	0,255,255
		<i>aquamarine</i>	#7FFFAD	127,255,212
		<i>azure</i>	#F0FFFF	240,255,255
		<i>beige</i>	#F5F5DC	245,245,220
		<i>bisque</i>	#FFE4C4	255,228,196
		<i>black</i>	#000000	0,0,0
		<i>blanchedalmond</i>	#FFEBBC	255,235,205
		<i>blue</i>	#0000FF	0,0,255
		<i>blueviolet</i>	#8A2BE2	138,43,226
		<i>brown</i>	#A52A2A	165,42,42
		<i>burlywood</i>	#DEB887	222,184,135
		<i>cadetblue</i>	#5F9EA0	95,158,160
		<i>chartreuse</i>	#7FFF00	127,255,0
		<i>chocolate</i>	#D2691E	210,105,30
		<i>coral</i>	#FF7F50	255,127,80
		<i>cornflowerblue</i>	#6495ED	100,149,237
		<i>cornsilk</i>	#FFF8DC	255,248,220
		<i>crimson</i>	#DC143C	220,20,60
		<i>cyan</i>	#00FFFF	0,255,255
		<i>darkblue</i>	#00008B	0,0,139
		<i>darkcyan</i>	#008B8B	0,139,139
		<i>darkgoldenrod</i>	#B8860B	184,134,11
		<i>darkgray</i>	#A9A9A9	169,169,169
		<i>darkgreen</i>	#006400	0,100,0
		<i>darkgrey</i>	#A9A9A9	169,169,169
		<i>darkkhaki</i>	#BDB76B	189,183,107
		<i>darkmagenta</i>	#8B008B	139,0,139
		<i>darkolivedrab</i>	#556B2F	95,107,47

CSS3 colors: RGBA

- RGBA allows us to set opacity
 - alpha value between 0.0 and 1.0



result

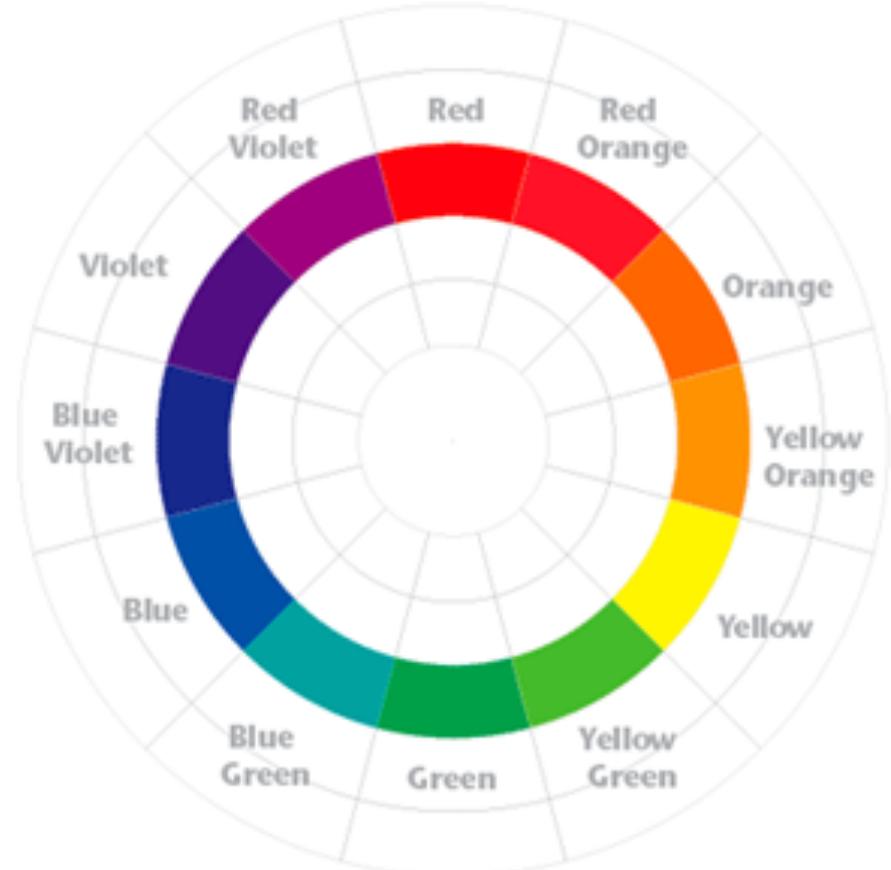
```
.one {  
    background-color: rgb(0,0,0);  
    opacity: 0.5;  
}  
.two {  
    background-color: rgba(0,0,0,0.5);  
}
```



result in older browsers

CSS3 colors: HSL/HSLa

- Specify colors using **Hue**, **Saturation**, and **Lightness** (and **alpha**)



HUE

angle represents the color of grey (in %)

Saturation

amount of grey (in %)



Lightness

white (100%) vs. black (0%)

CSS3 colors: HSL/HSLa

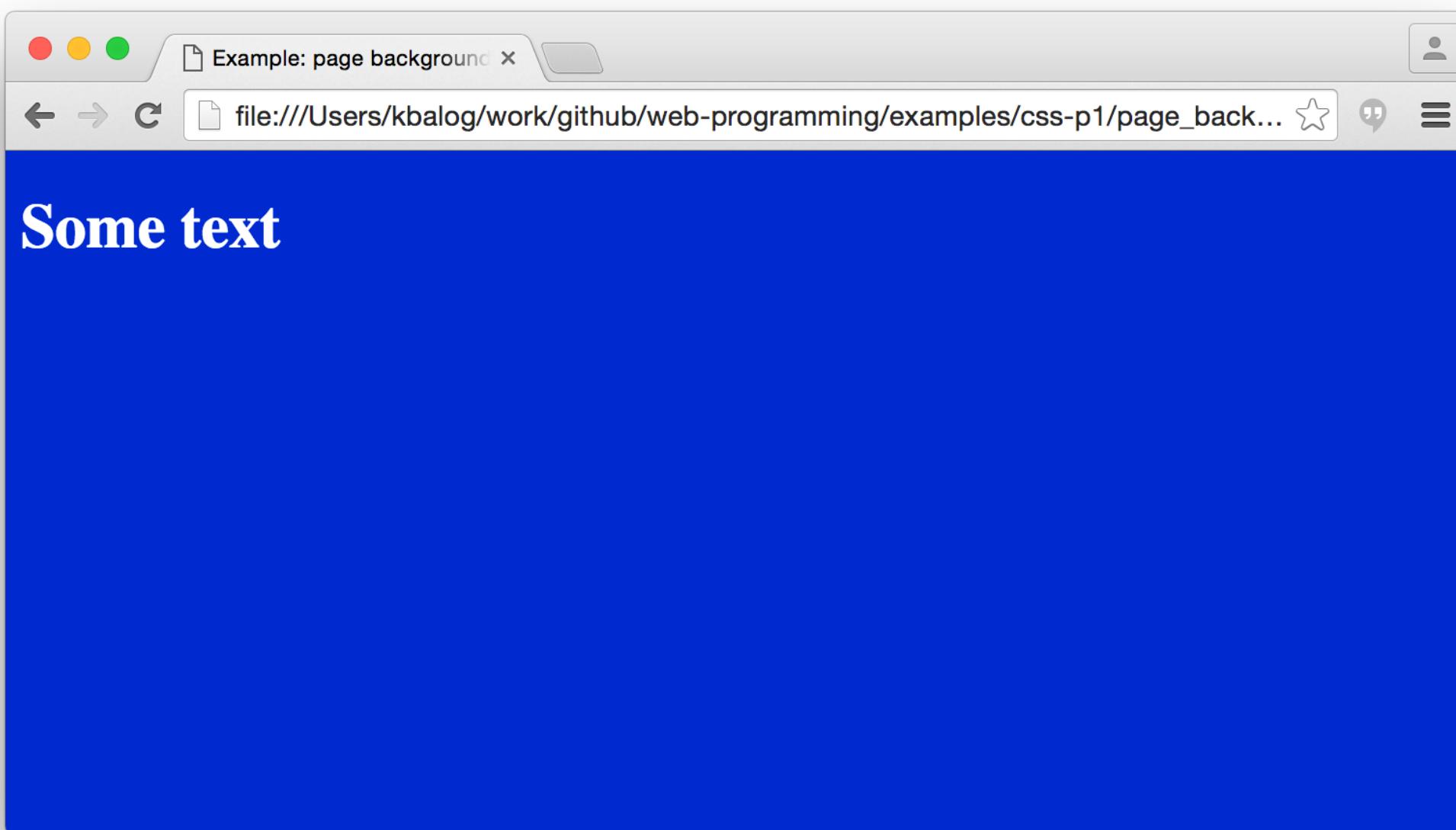
- HSLa allows us to set opacity
 - alpha value between 0.0 and 1.0

```
body {  
    background-color: hsl(0,0%,78%);  
}  
p {  
    background-color: hsla(0,100%,100%,0.5);  
}
```

Page background color

- Set the background-color property of the body tag

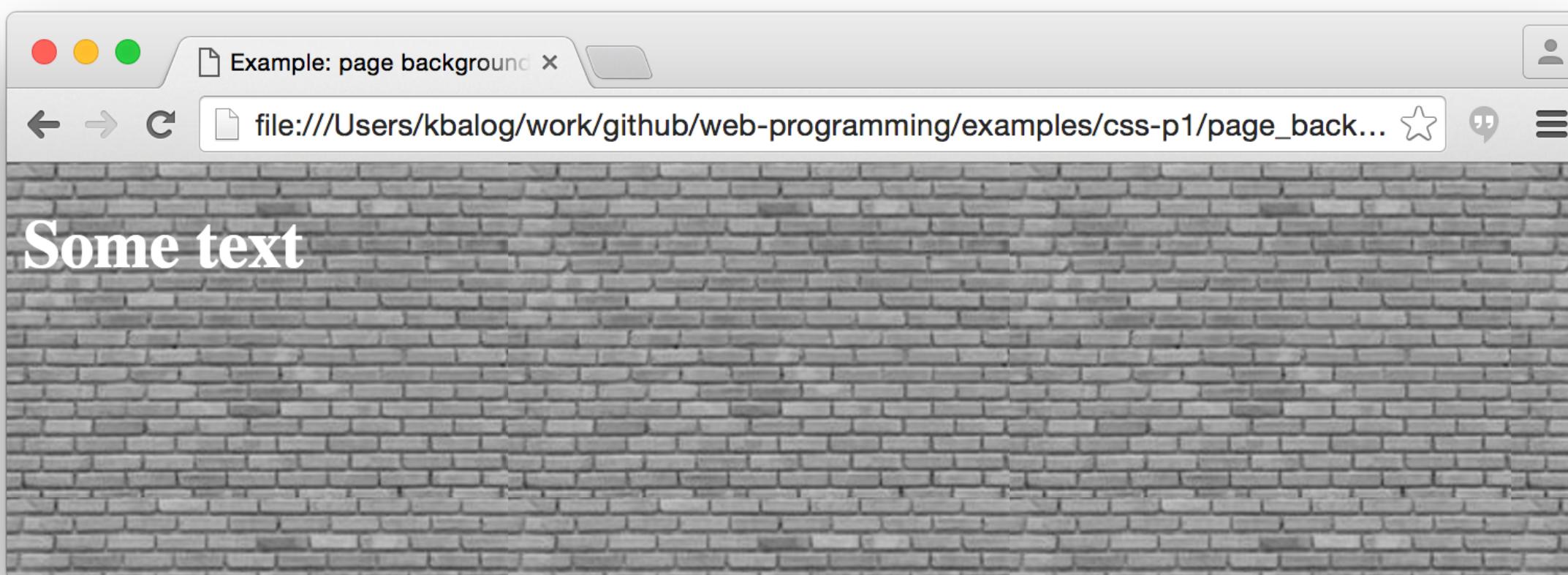
```
<body style="background-color: #0033cc;">
```



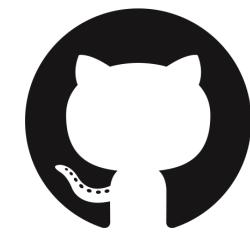
Background image

- Property: background-image
- See also background-repeat
- http://www.w3schools.com/cssref/pr_background-repeat.asp

```
body {  
    background-image: url("images/brick_pattern.jpg");  
}
```



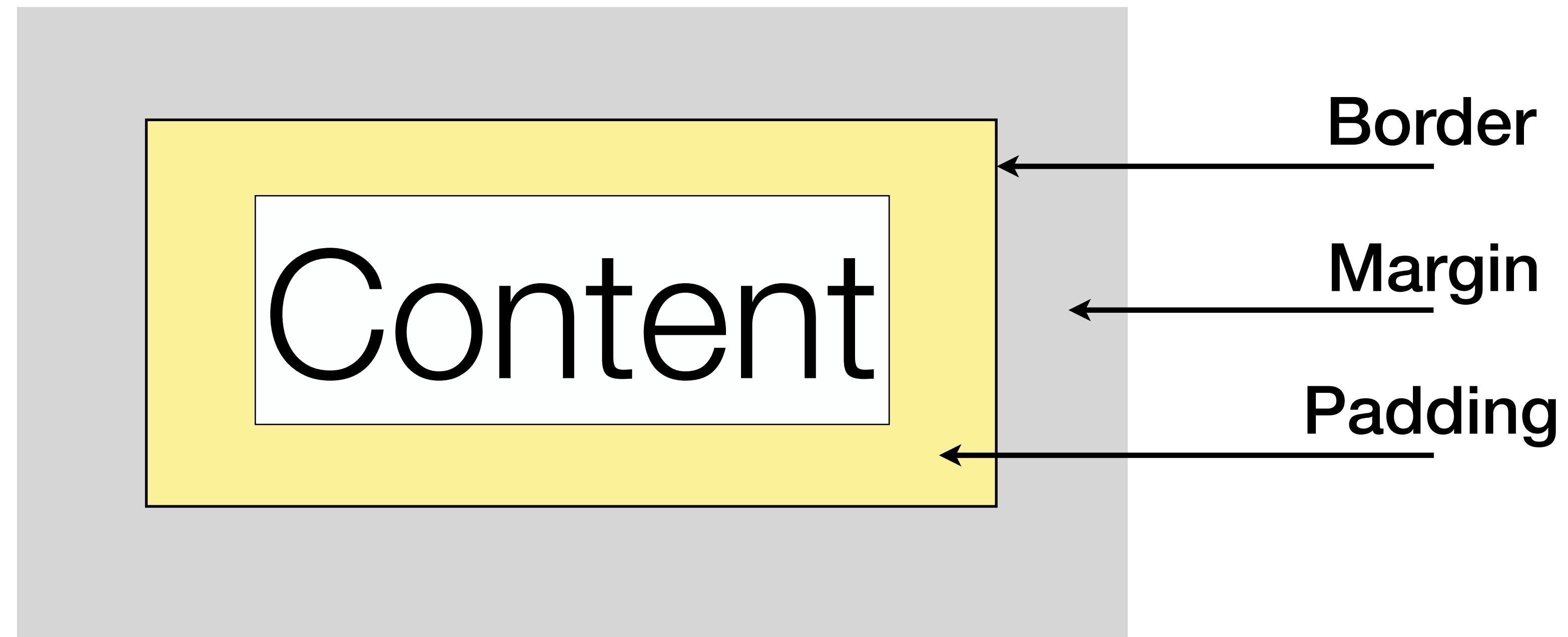
Exercise #4



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

Boxes

The Box Model



What margin and padding values were used here?

**margin: 0px;
padding: 0px;**

Newsitem #1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum non orci quis porta. Integer ac malesuada mauris, ut gravida metus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Newsitem #2

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum non orci quis porta. Integer ac malesuada mauris, ut gravida metus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac

**margin: 0px;
padding: 10px;**

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Newsitem #2

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**margin: 10px;
padding: 0px;**

Newsitem #1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum non orci quis porta. Integer ac malesuada mauris, ut gravida metus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Newsitem #2

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**margin: 10px;
padding: 10px;**

Newsitem #1

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Sed vestibulum non orci quis porta. Integer ac malesuada mauris, ut gravida metus. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas.

Newsitem #2

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Border width

- **border-width**
 - in pixels (**1px**)
 - or **thin**, **medium**, **thick**
- Possible to set values for each side
 - **border-top-width**, **border-right-width**,
border-bottom-width, **border-left-width**
- Shorthand
 - **border-width: 2px 1px 1px 2px;**
 - clockwise order: top, right, bottom, left

Border style

– border-style

solid

dotted

dashed

double

groove

ridge

inset

outset

Borders

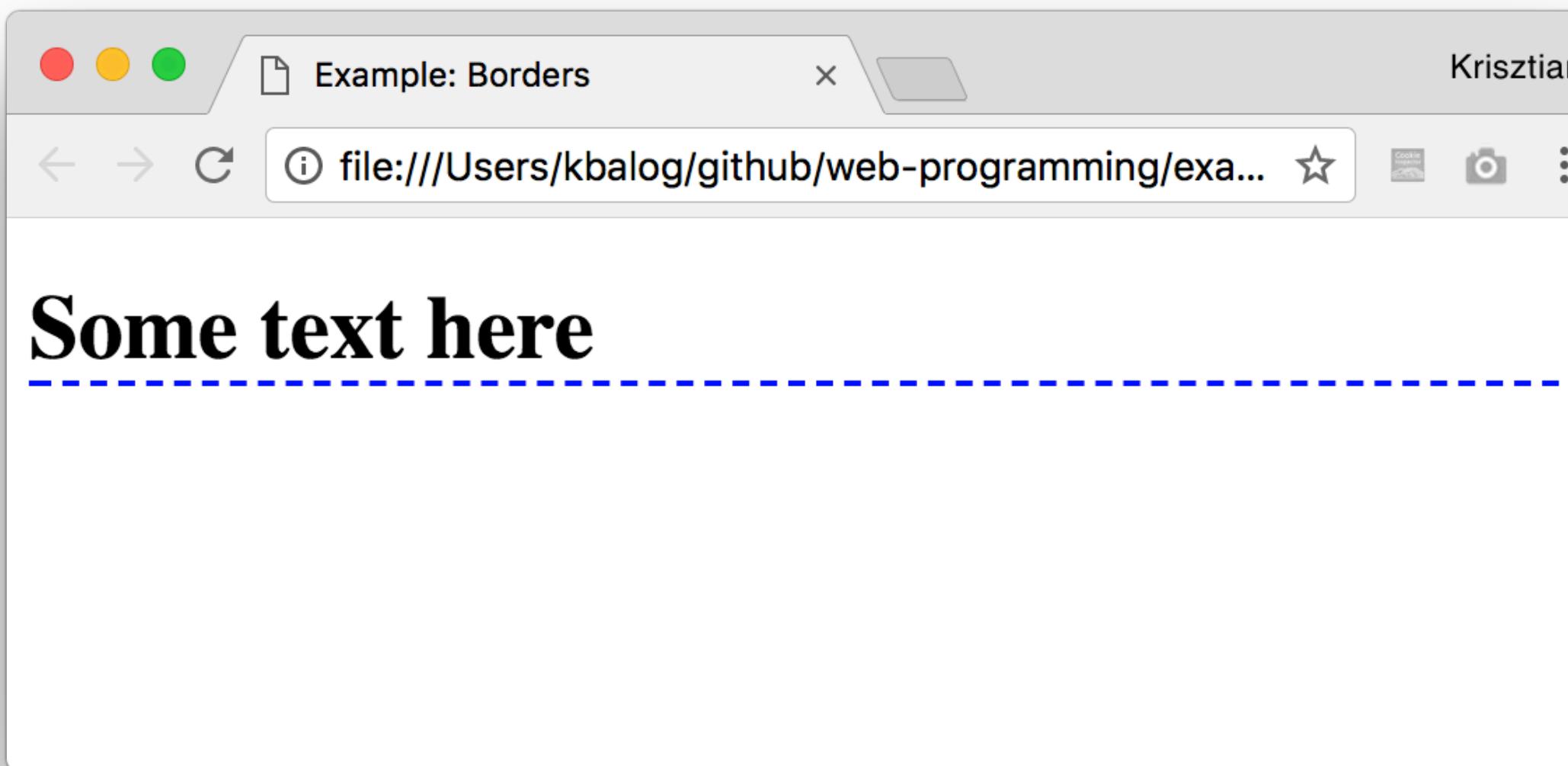
- border-color

- Possible to control the color of each side separately
 - **border-top-color**, **border-right-color**, ...
- Shorthand
 - **border: 3px dotted #0088bb;**

Example

⌚ examples/css/properties/borders.html

```
<h1 style="border-width: 0px 1px 2px 0px; border-style: dashed; border-color: blue;">  
Some text here</h1>
```

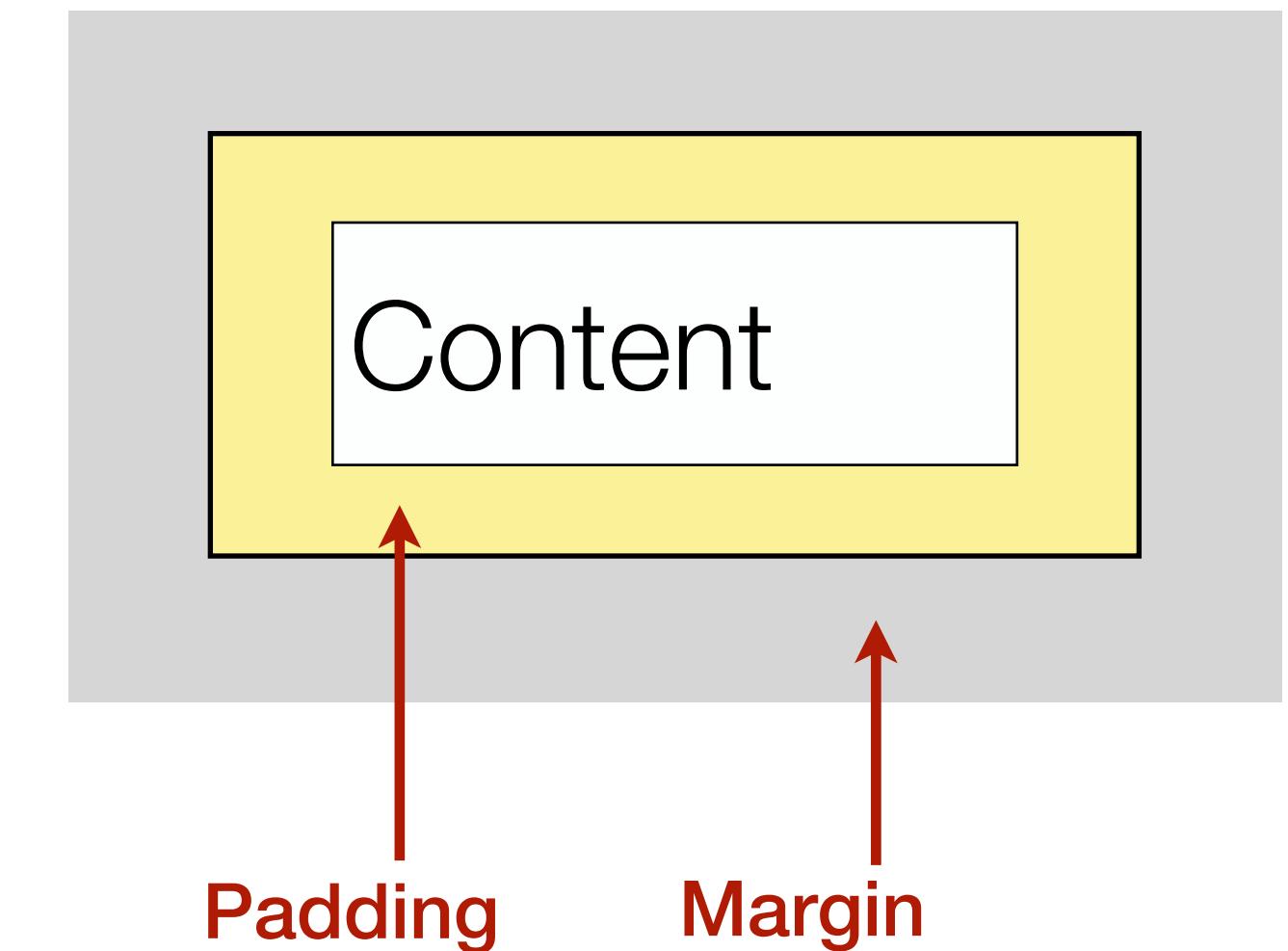


Margin, padding

- margin, padding

- Value specified in px, pt, cm, em, etc.

```
margin: 0.2em;  
padding: 5px;
```



- Possible to set values for each side separately
 - **margin-top**, **margin-right**, ...
 - **padding-top**, **padding-right**, ...
- Shorthand: specify values for each side in a single declaration
 - Clockwise order: top, right, bottom, left

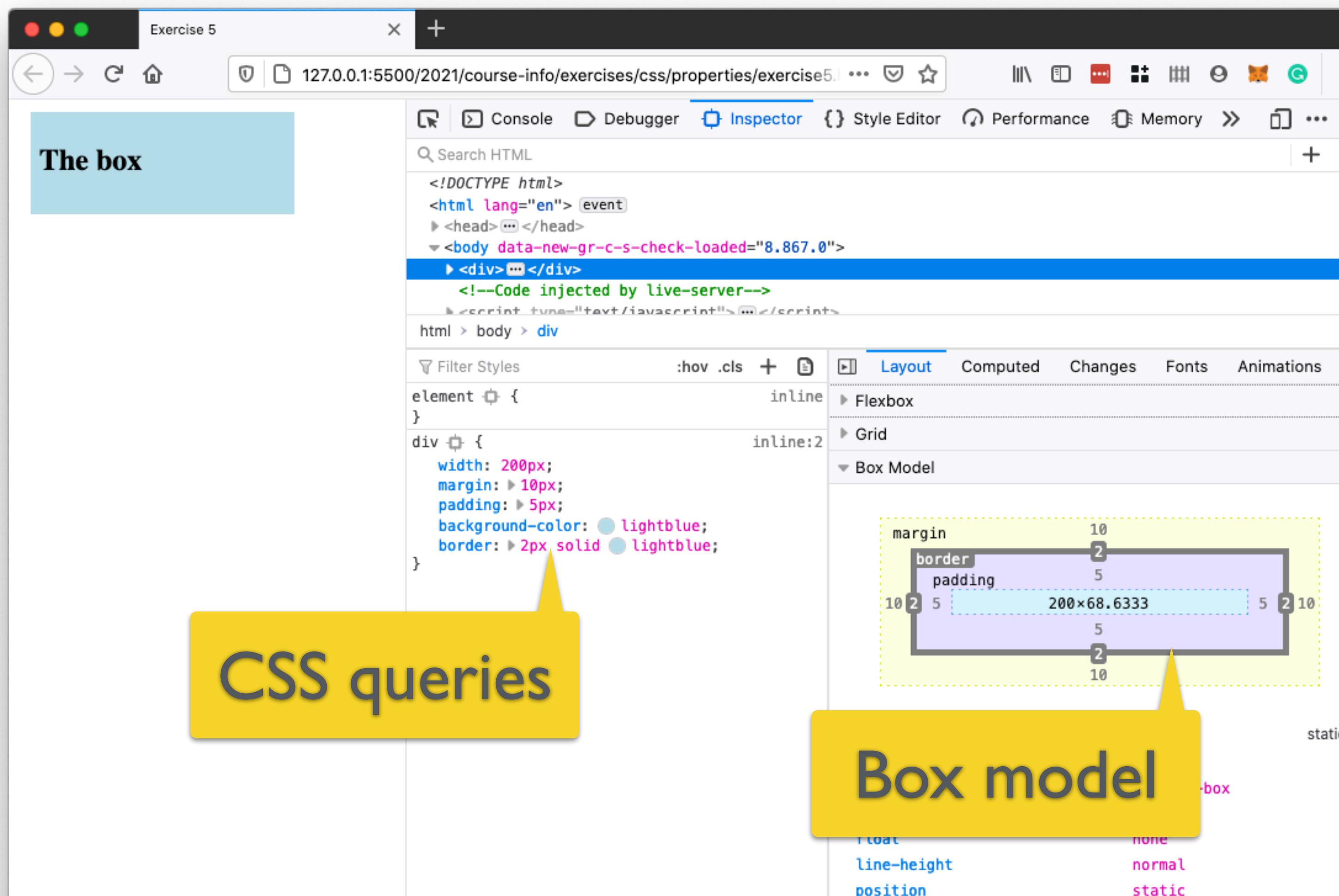
```
padding: 10px 5px 3px 1px;
```

Box dimensions

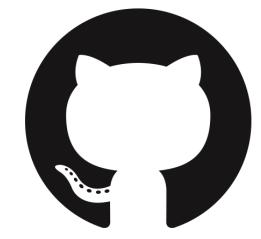
- **width, height**
 - pixels, percentages, or em
- For designs that adjust depending on the size of the browser window
- **min-width, max-width**
 - The smallest/widest a box can stretch
- **min-height, max-height**
 - Limit minimum and maximum height

Browser tools

- Check applied CSS and box model in the browsers development tools!



Exercise #5



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

CSS3: box shadow

- box-shadow: 3px 3px 2px #777777;

- horizontal offset
- vertical offset
- blur distance (optional)
- color

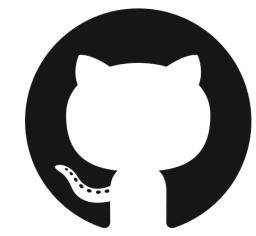


CSS3: rounded corners

- **border-radius: 5px**
 - Size of the radius in pixels



Exercise #6



[github.com/dat310-2022/info/tree/main/
exercises/css/properties](https://github.com/dat310-2022/info/tree/main/exercises/css/properties)

Lists and Tables

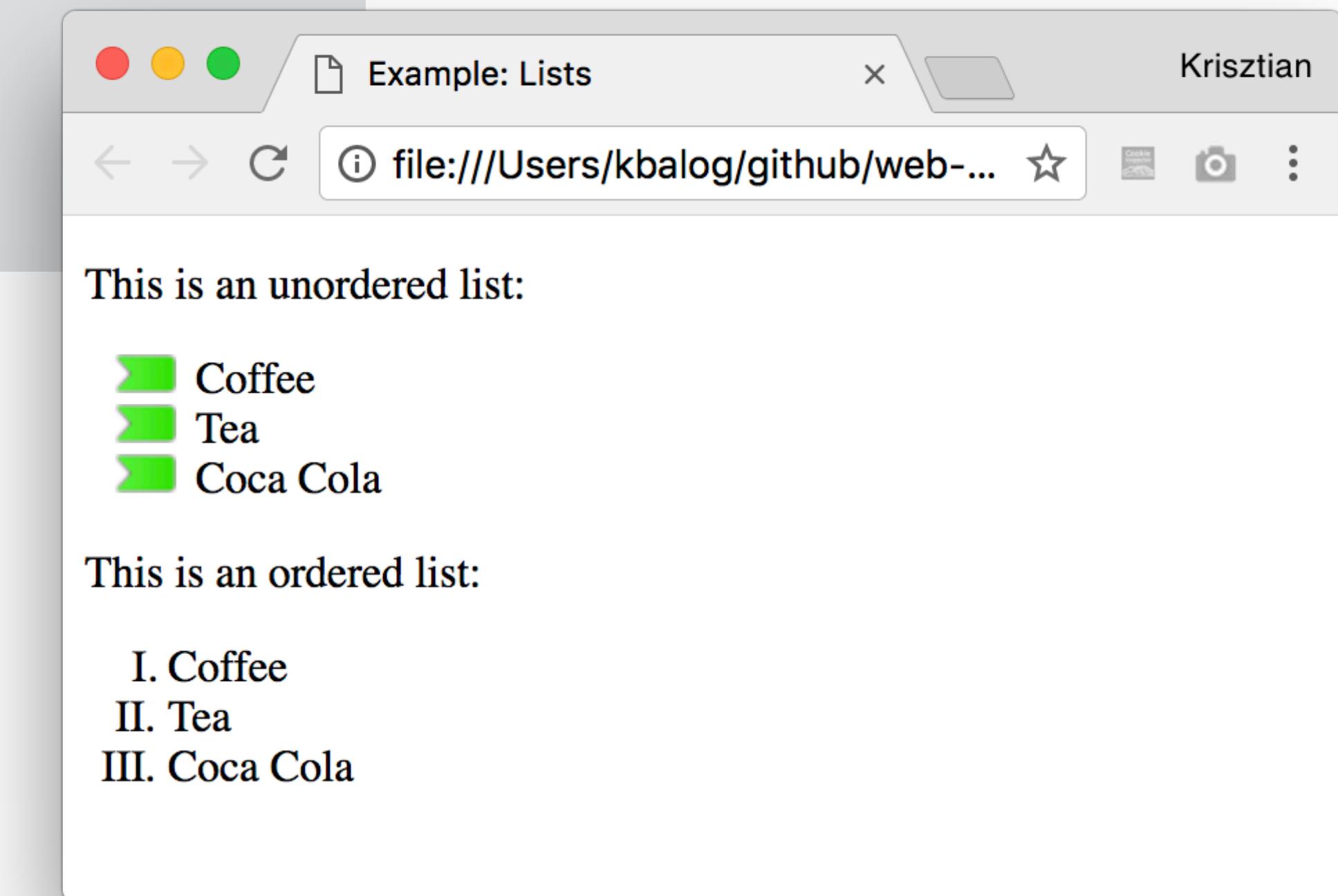
List properties

- Shape of list item markers
 - Property: **list-style-type**
 - Values for unordered lists:
 - **circle**, **square**, ...
 - Values for ordered lists:
 - **upper-roman**, **lower-alpha**, ...
- Remove list markers
 - **list-style-type:none**
- Using an image as the list item marker
 - **list-style-image: url('filename.png')**

Example

⌚ examples/css/properties/lists.html

```
<style>
  ul {
    list-style-image: url('images/img_marker.png');
  }
  ol {
    list-style-type: upper-roman;
  }
</style>
```



Tables

- Borders
 - **border, border-collapse**
- Height, width
 - **height, width**
- Text alignment
 - Horizontally: **text-align**
 - Vertically: **vertical-align**
- Padding
 - **padding**

Tables

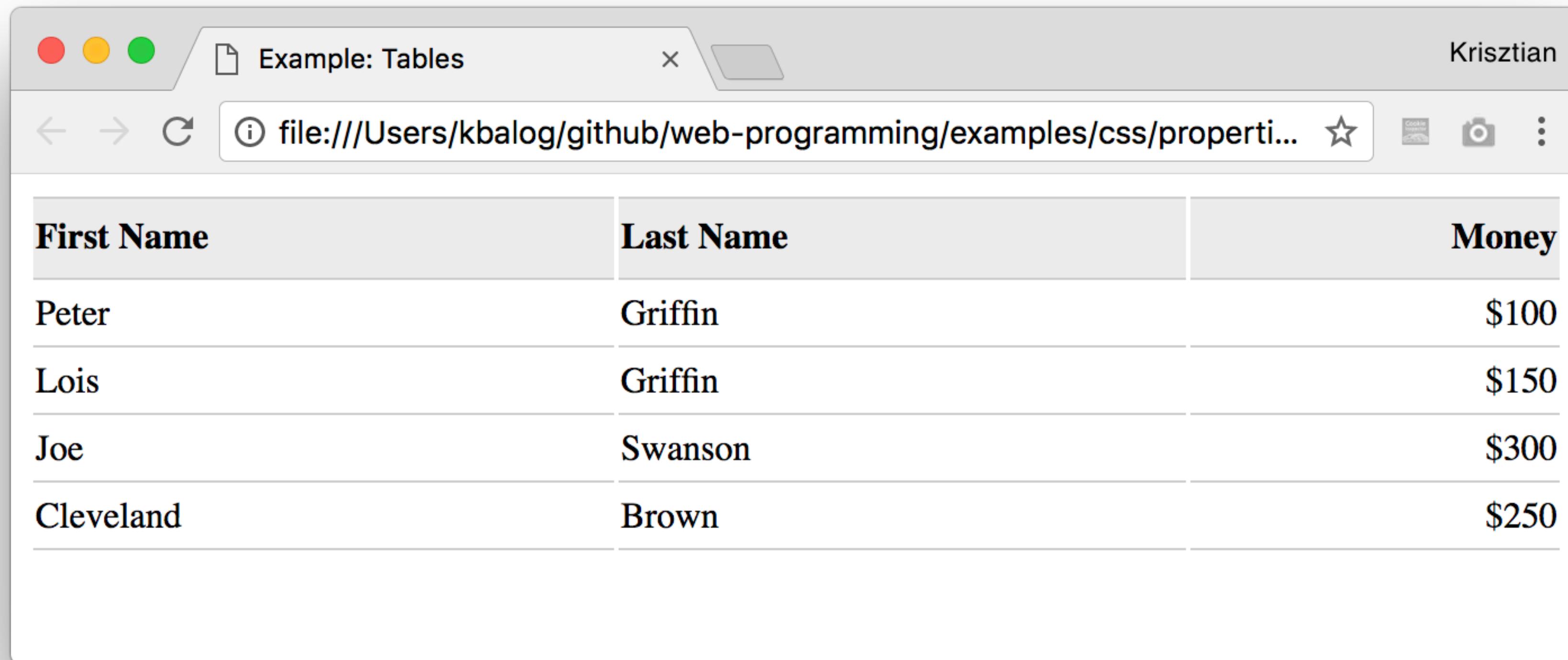
- Hovering
 - Use the **tr:hover** selector to highlight table rows on mouseover

```
tr:hover {  
    background-color: #f5f5f5;  
}
```

- See https://www.w3schools.com/css/css_table.asp

Example

⌚ examples/css/properties/tables.html



A screenshot of a web browser window titled "Example: Tables". The address bar shows the URL "file:///Users/kbalog/github/web-programming/examples/css/properties/tables.html". The browser interface includes standard controls like back, forward, and search, along with a user profile icon for "Krisztian". The main content area displays a table with four rows and three columns. The columns are labeled "First Name", "Last Name", and "Money". The data is as follows:

First Name	Last Name	Money
Peter	Griffin	\$100
Lois	Griffin	\$150
Joe	Swanson	\$300
Cleveland	Brown	\$250

Best practices

- Always use *em* to set font sizes
- Use relative units for lengths (ems and percentages)
- Always fall back on a generic font
- Use numbers, not names, for colors
- Test with multiple browsers
- Know when to stop