CSS

MPRI 2.26.2: Web Data Management

Antoine Amarilli

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Overview

- Cascading Style Sheets
- W3C standard:

  CSS 1 1996

  CSS 2 1998

  CSS 2.1 2011, 487 pages

  CSS 3.0 Ongoing (various modules), snapshots:
  `https://www.w3.org/Style/CSS/`

  → Cf `caniuse.com` and `cssdb.org`
- HTML describes content/structure, CSS describes presentation
  → Several designs for the same website
  → In particular for different media
  (screen, phone, printing, screen readers, bots…)
  → Reuse a design across pages of a website or across websites

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Integrating to HTML (solution 1)

- Property/value pairs, e.g.:

```
color: red;
font-weight: bold;
```

- Can apply directly to HTML elements with the `style` attribute:

```
This is <em style="color: red;">red</em>
```

- If you need a dummy element, use `<span>` or `<div>` (inline/block)

```
This text is <span style="font-weight: bold">bold</span>
```

→ Problem:

  - Mixes style and content
  - Only works on a single element

Integrating to HTML (solution 2)

- Selectors to indicate to which elements a property applies
- `<style>` tag in `<head>`:

```
<!DOCTYPE html>
<html>
  <head>
    <style type="text/css">
      em { color: red; }
    </style>
  </head>
  <body>
    This is <em>red</em>
  </body>
</html>
```

Integrating to HTML (solution 3)

- Put the rules in a **separate** `.css` file
- Point to the file with the `<link>` **tag**
- Can be **filtered** with the `media` attribute:

```
<!DOCTYPE html>
<html>
  <head>
    <link rel="stylesheet" type="text/css"
      href="style.css" media="screen">
  </head>
  <body>
    This is <em>red</em>
  </body>
</html>
```

→ **Modular** and **reusable** styles

HTML and selectors

- How can we select **elements** to apply the style?

→ `id` attributes (**unique**) and `class` (**non-unique**)

```
<p id="thanks">
  Hello <span class="person">Pierre</span>!
</p>
```

- An element can have **multiple classes** separated by spaces

→ We can use `id` and `class` in CSS to select the right elements

General syntax

```
/* Comments */

@charset "UTF-8";
@import url(other.css);
@media screen {
  /* ... specific rules ... */
}

selector1, selector2 {
  property: value;
  property: value;
}
```

Conflicts and defaults

- If no selector applies, default style (browser-dependent)
  - CSS reset to align the defaults across browsers
- If multiple selectors apply to an element, complicated conflict resolution rules to choose the value of each property
  - Depends on counter-intuitive specificity heuristics: `#a` vs `#b c`
  - Can use `!important` to give more weight to a rule

Best practices

- Some style guides describe choices of how to use CSS
  - → e.g., `https://github.com/airbnb/css`
- Various philosophies for large projects: OOCSS, BEM, etc.

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Elements, classes, IDs

```
strong {
  /* Put important stuff in red */
  color: red;
}
.person {
  /* Underline names */
  text-decoration: underline;
}
p.important {
  /* Put important paragraphs in bold */
  font-weight: bold;
}
```

Combinations

```
#menu li {
  /* All li elements in the element with id="menu" */
}
header > img {
  /* All img which are immediate children of a header */
}
h2 + p {
  /* The first paragraph after a h2 */
  /* Also: ~ for successor elements */
}
img[src*=".svg"] {
  /* All .svg images */
}
ul > li:first-child {
  /* The first li which is an immediate child of a ul */
}
```

Pseudo-elements and pseudo-classes

```
h2::first-letter { /* First letter of an h2 title */ }

p::before { /* Before a paragraph */ }
p::after { /* After a paragraph */ }

a:link { /* a elements which are links */ }
a:visited { /* a links that have been visited */ }
a:hover { /* a links which are hovered */ }

* { /* Universal selector */ }
```

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Measurements

`%` Percentage of the current value

`em` **Line height** of the current **font**

`px` Absolute size in **pixels**

→ Depends on the **screen resolution**

Text

```
font-size: 70%;
line-height: 150%;

font-weight: bold;
font-style: italic;
font-variant: small-caps;

text-align: justify;
```

Fonts

- Not all users have the same **fonts** installed
  → give a **list** with font names and fallback families

```
font-family: "DejaVu Sans Mono", monospace;
```

- With **CSS3**, fonts can be **downloaded** on-demand:

```
@font-face {
  font-family: myFont;
  src: url('myFont.woff');
}
body {
  font-family: myFont;
}
```

- **Web Open Font Format**, W3C, 2012. (Other formats.)

Colors and fill

Color	Css name	RGB	Hexa
	`black`	`rgb(0, 0, 0)`	`#000000`
	`blue`	`rgb(0, 0, 255)`	`#0000FF`
	`red`	`rgb(255, 0, 0)`	`#FF0000`
	`teal`	`rgb(0, 128, 128)`	`#008080`
	`-`	`rgb(32, 64, 96)`	`#204060`

Other possible fills:

Images `url("image.jpg")`

Gradients
```
linear-gradient(to right,
    red,orange,yellow,green,blue,indigo,violet);
```

Transitions

With CSS3 we can transition between attribute values:

```
div {
  background: green;
  /* background changes should be a transition over 2 seconds
  -webkit-transition: background 2s;
  transition: background 2s;
}
div:hover {
  /* Change the background when hovered */
  background: red;
}
```

→ animate.css: library of animations

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Inline and blocks

- Two element types in CSS:
  - Blocks : `<div>`, `<p>`, `<h1>`, `<ul>`...
  - Inline : `<span>`, `<a>`, `<img>`, `<em>`...
- The display mode in CSS can be changed with `display`:

`none`	Invisible element
	→ Still available to robots
	→ Compare to `visibility: hidden`
`block`	Displayed as block
`inline`	Display as inline
`inline-block`	Displayed as inline, behaves as block (`inline block` in CSS3)
`contents`	Only display the children

Borders

```
/* red border of 1 pixel */
border: 1px solid red;

/* 3d outset border of 2 pixels */
border: 2px outset black;

/* round corners by 10 pixels */
border-radius: 10px;

/* Add some shading */
box-shadow: 5px 5px 1px black;
/* Required for compatibility */
-webkit-box-shadow: 5px 5px 1px black;
```

Width and height

- `height` and `width`
- By default, `auto`: elements are as wide as possible and as high as necessary
- `min-width` and `max-width` to specify limits
  - → e.g., ensure that text is not too wide (legibility)

Overflow

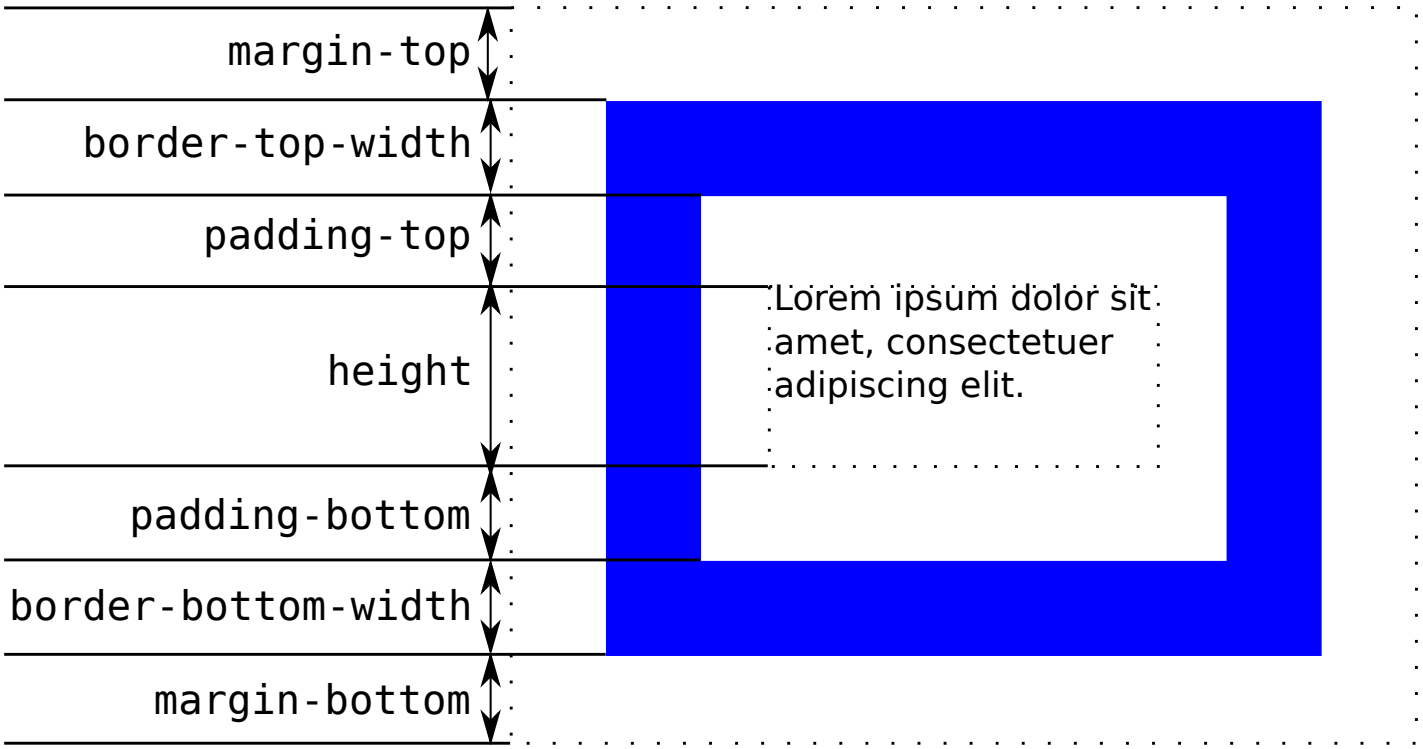
- If the size is limited, the content may **overflow**
- `overflow` property:

`visible`	The overflowing content is **visible** (outside of the element)
`hidden`	The overflowing content is **hidden**
`auto`	**Scrollbars** are added if necessary

- `word-wrap:` `break-word` to ensure that long words can be **cut**

Margins and spacing

- Properties `margin` and `padding`



- `box-sizing: border-box` makes width and height include **borders** and **padding**
- Special case: `margin: auto` to **center** an element
  → Only works if `width` was set

Positioning

- `position` property to position the element…
  - `static` … in the **flow** (default)
  - `relative` … **relatively** to its default position (offset)
  - `absolute` … relative to the **origin** of the closest non-static **parent** (by default, `<html>`)
  - `fixed` … relative to the **window**
- For non-`static`, use the `top` `bottom` `left` `right` properties
- `z-index` describes the **vertical order** in case of overlap

Floats and clearing

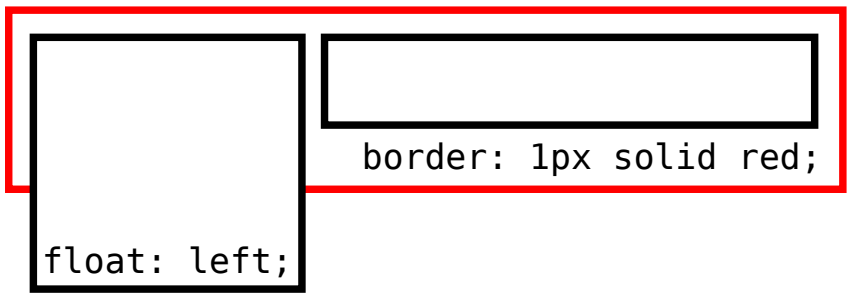
- `float` to position elements outside the flow

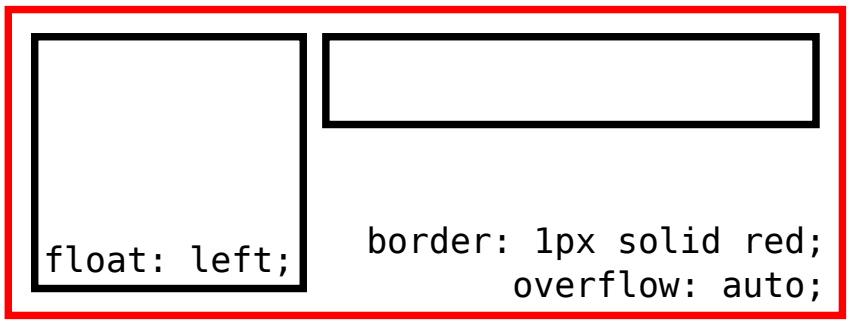
```
div#menu {
  float: right; /* also: left */
}
```

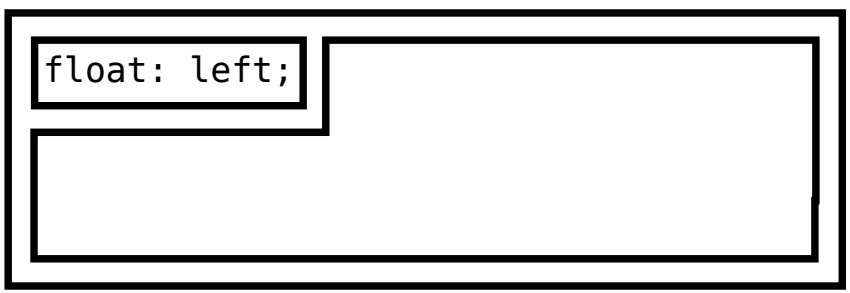
- `clear` to clear all floating elements

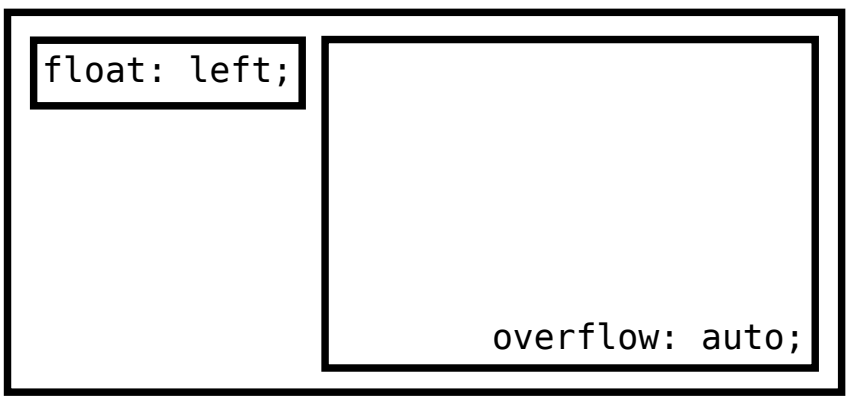
```
footer {
  clear: both; /* also: left, right */
}
```

Float subtleties









Columns

- CSS3 supports **columns** for text:

```
p {
  /* Minimal width and maximal number of columns */
  columns: 300px 3;
  /* Separation between columns */
  column-gap: 20px;
  /* Rule between columns */
  column-rule: 1px solid black;
}
```

→ Vendor-specific prefixes:

`-webkit-` for Safari and Chrome

`-moz-` for Firefox

→ Tools to **automatically** put the required prefixes: **autoprefixer**

Grids and flexbox

- CSS3 makes it possible to position elements in two dimensions using CSS Grid
  - Use `display: grid` on the element which will serve as a grid
  - Use `grid-template-columns` and `grid-template-rows` to describe the grid
  - Use `grid-column: span 4` to describe how many columns an element should fill

  → Very similar to table-based design!
- Also possible to position elements in one dimension using `display: flex`

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`:before` and `:after`

- Insert text before or after an element

```
p.reminder::before {
  content: "Do not forget:";
}
```

- Subtle: is this text presentation or content?
- Can be used to insert an attribute value:

```
content:  attr(src url)
```

Counters

Examples to number sections and subsections

```
article {
  counter-reset: section subsection;
}
article h2 {
  counter-increment: section;
  counter-reset: subsection;
}
article h2::before {
  content: counter(section) ". ";
}
article h3 {
  counter-increment: subsection;
}
article h3::before {
  content: counter(section) "." counter(subsection) ". ";
}
```

Variables and calc

- With CSS3 we can do calculations for attribute values:

```
width: calc(100% - 80px);
```

- We can also define variables to be reused:

```
:root {
  --my-color: red;
}
h1 {
  background-color: var(--my-color);
}
```

- These variables can be changed with JavaScript

Feature queries (not in IE)

We can test with `@supports` if the browser supports a feature

```
@supports (display: grid) {
  div {
    display: grid;
  }
}

@supports not (display: grid) {
  div {
    float: right;
  }
}
```

https://developer.mozilla.org/en-US/docs/Web/CSS/@supports

Media queries

- Specify different stylesheets depending on the media
- `media` attribute for `<link>` (avoids loading useless stylesheets) or `@media` in CSS
- Testing the rendering size: `max-width: 1024px` (displays less than 1024 pixels wide), etc.
- Orientation (for smartphones) : `orientation: portrait`

```
/* Printable version */
@media print
/* Vision-impaired */
@media aural
/* Screens of less than 1024px wide */
@media screen and (max-width: 1024px)
```

Mobile refinements

- Some mobiles have HiDPI displays with a scaling factor between the small physical pixels and CSS pixels
- By default, mobile browsers pretend to have a large viewport
  - → This allows them to display websites from before the mobile era
  - → The user can zoom in and scroll
- Mobile-aware browsers should ask mobile browsers to render them in their actual width by adding to `head`:

```
<meta name="viewport" content="width=device-width">
```

- Check mobile best practices, e.g.,
  `search.google.com/test/mobile-friendly`

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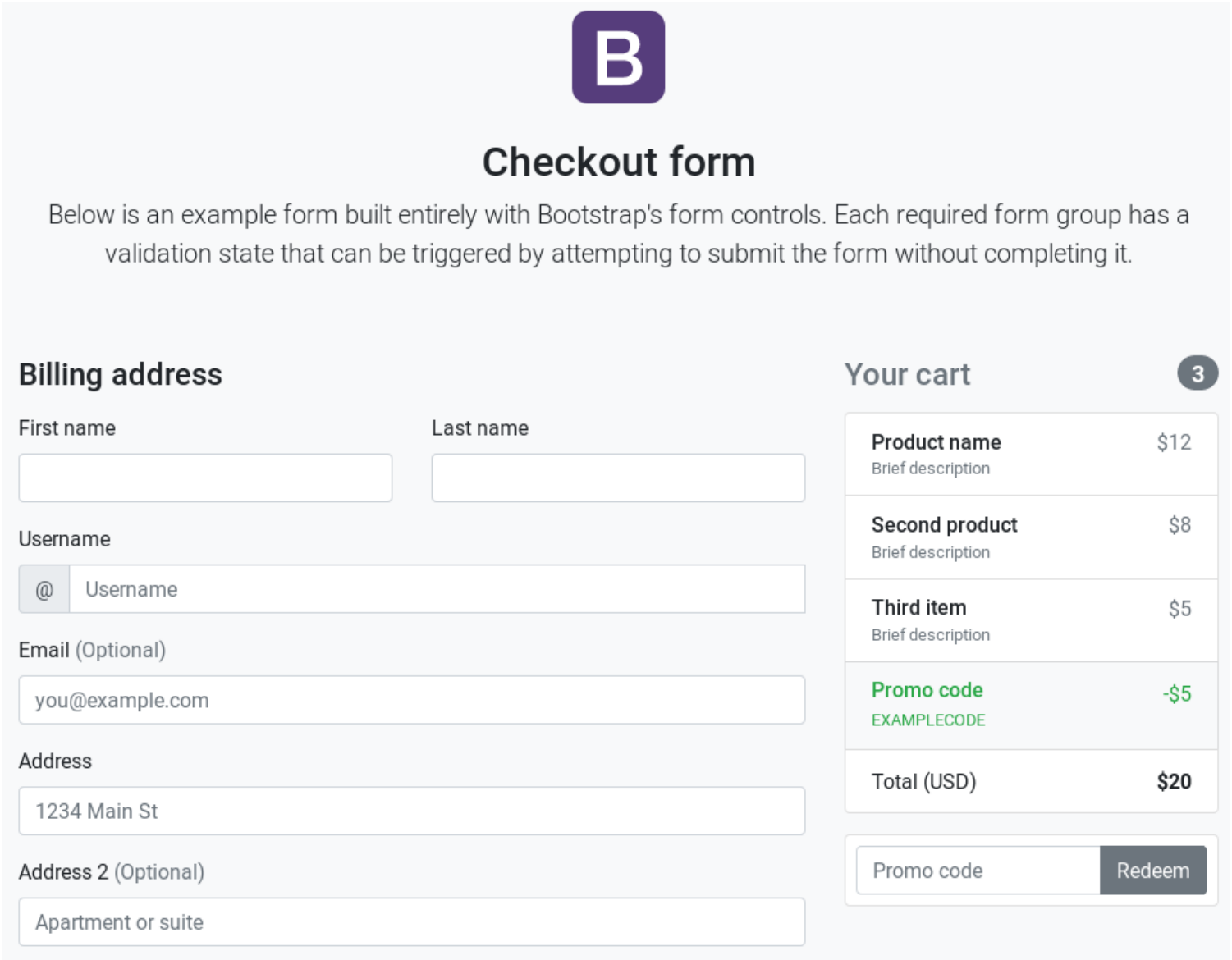
Bootstrap

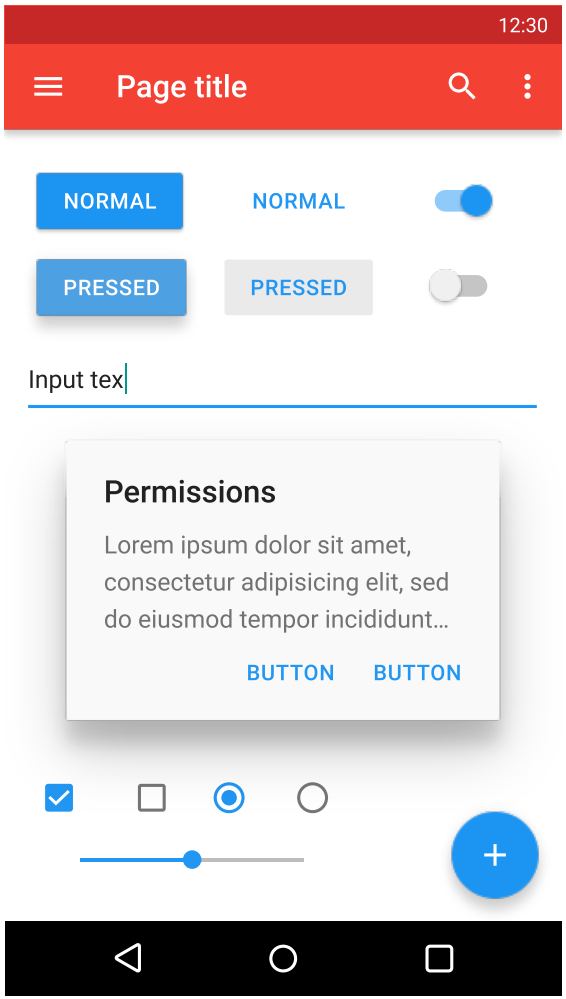
Bootstrap is a toolkit of HTML, CSS and JavaScript templates



Design philosophies

A topic for an **entire class**! Common philosophies:

Material design:



Flat design:

Skeuomorphism: imitating the real world in Web design

CSS preprocessors and other tools

- **Preprocessors:** Add features to CSS. Main ones: **Less** and **Sass**
  - E.g., **variable** declarations, **loops**, reusable **mixins**, selector **nesting**...
  - **Sass** is more commonly used
  - **Less** is just JavaScript, **Sass** uses Ruby
  - **Less** has better error reporting
  - **Sass** is more powerful, **Less** is more minimalistic
  - **Bootstrap** uses Sass (v4) and used Less (v3)
  - Other options: **PostCSS**, **Stylus**, etc.
- **linters** for CSS: **stylelint**, also `validator.w3.org`
- Also **CSS minifiers**

Crédits

- Matériel de cours inspiré de notes par Pierre Senellart et de code par Pablo Rauzy
- Merci à Pierre Senellart et Pablo Rauzy pour leur relecture