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Essential HTML & CSS

ComMouse

Dongyue Studio

2018.4.11

Contents

- Essential HTML
- CSS Intro
- CSS Layout
- Modern CSS

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Essential HTML

What is HTML?

- HyperText Markup Language

- A language to describe text, image, video, …
- Composed of various types of **tags**
  - `html, head, body, meta, title`
  - `p, h1, h2, h3, h4, h5, h6`
  - `img, a, video, canvas`
  - `script, style`

- Latest Standard: **HTML 5**

Three Pieces in Web Development

HTML

Structure

CSS

Style

JS

Behavior

View HTML Everywhere

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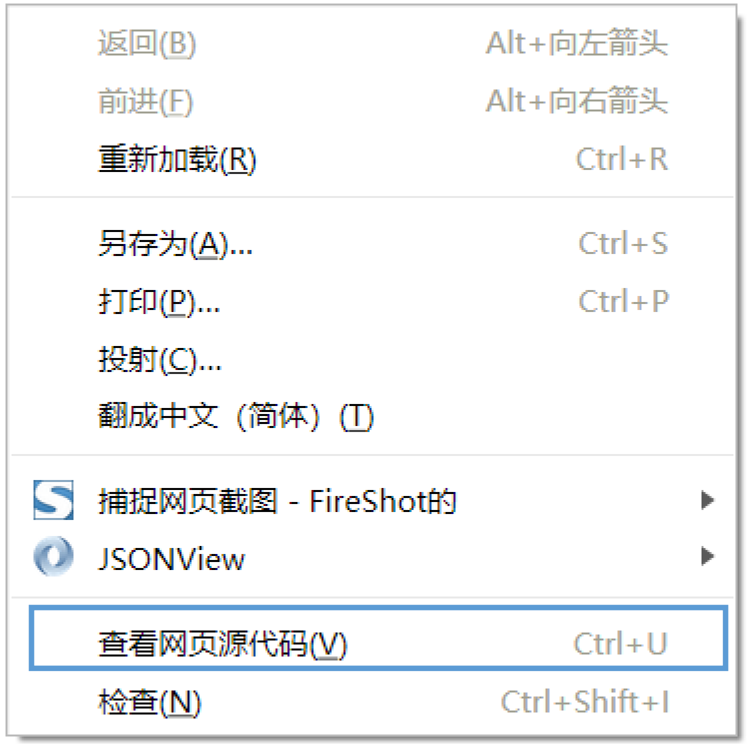
- Open your Chrome browser
- Land on any web page
- Right Click -> View Source Code (Ctrl + U)



View HTML Everywhere (Cont.)

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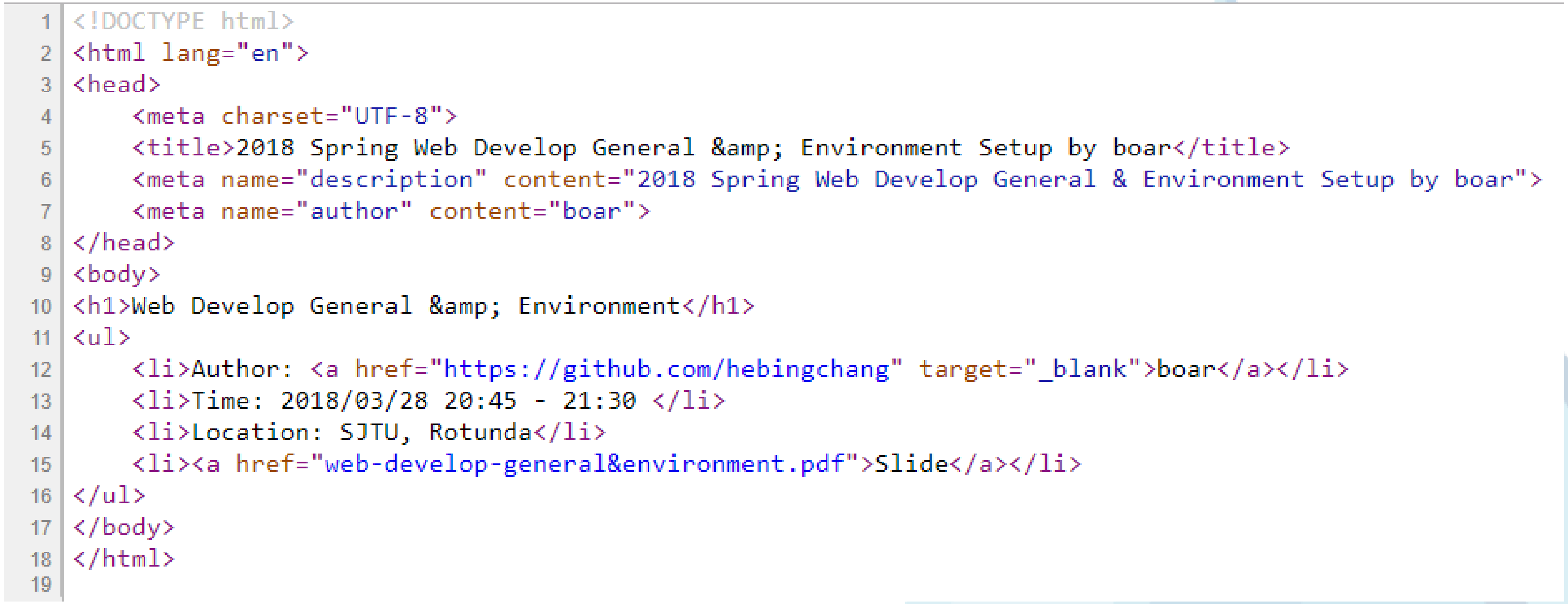


```html
<!DOCTYPE html>
<html lang="en">
<head>
    <meta charset="UTF-8">
    <title>2018 Spring Web Develop General &amp; Environment Setup by boar</title>
    <meta name="description" content="2018 Spring Web Develop General & Environment Setup by boar">
    <meta name="author" content="boar">
</head>
<body>
<h1>Web Develop General &amp; Environment</h1>
<ul>
    <li>Author: <a href="https://github.com/hebingchang" target="_blank">boar</a></li>
    <li>Time: 2018/03/28 20:45 - 21:30 </li>
    <li>Location: SJTU, Rotunda</li>
    <li><a href="web-develop-general&environment.pdf">Slide</a></li>
</ul>
</body>
</html>
```

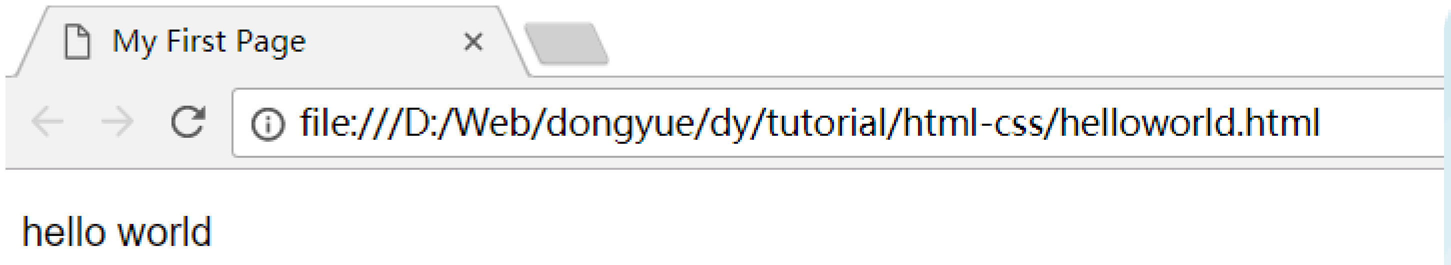
Basic HTML Structure

helloworld.html

```html
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8" />
    <title>My First Page</title>
</head>
<body>
    <p>hello world</p>
</body>
</html>
```

Basic HTML Structure

- Open a text editor (Notepad, Sublime Text, …) and try!
- Save as “helloworld.html”
- https://jsfiddle.net/rue487ry



```
file:///D:/Web/dongyue/dy/tutorial/html-css/helloworld.html
```

```
hello world
```

Basic HTML Structure (Cont.)

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helloworld.html

```
<!DOCTYPE html>  →  HTML 5 Declaration
<html>  →  HTML Tag Enclosing the whole content
    <head>  →  Head Section
        <meta charset="utf-8">  →  UTF-8 Encoding
        <title>My First Page</title>  →  Page Title
    </head>
    <body>  →  Content Section
        <p>hello world</p>  →  A Paragraph
    </body>
</html>  →  Closing Tag
```

Element

tagname must be same

- `<tagname>content</tagname>`

  opening tag closing tag

- `<tagname attr="value">content</tagname>`

  attribute

- `<tagname></tagname>`
- `<tagname />`
- `<tagname>`

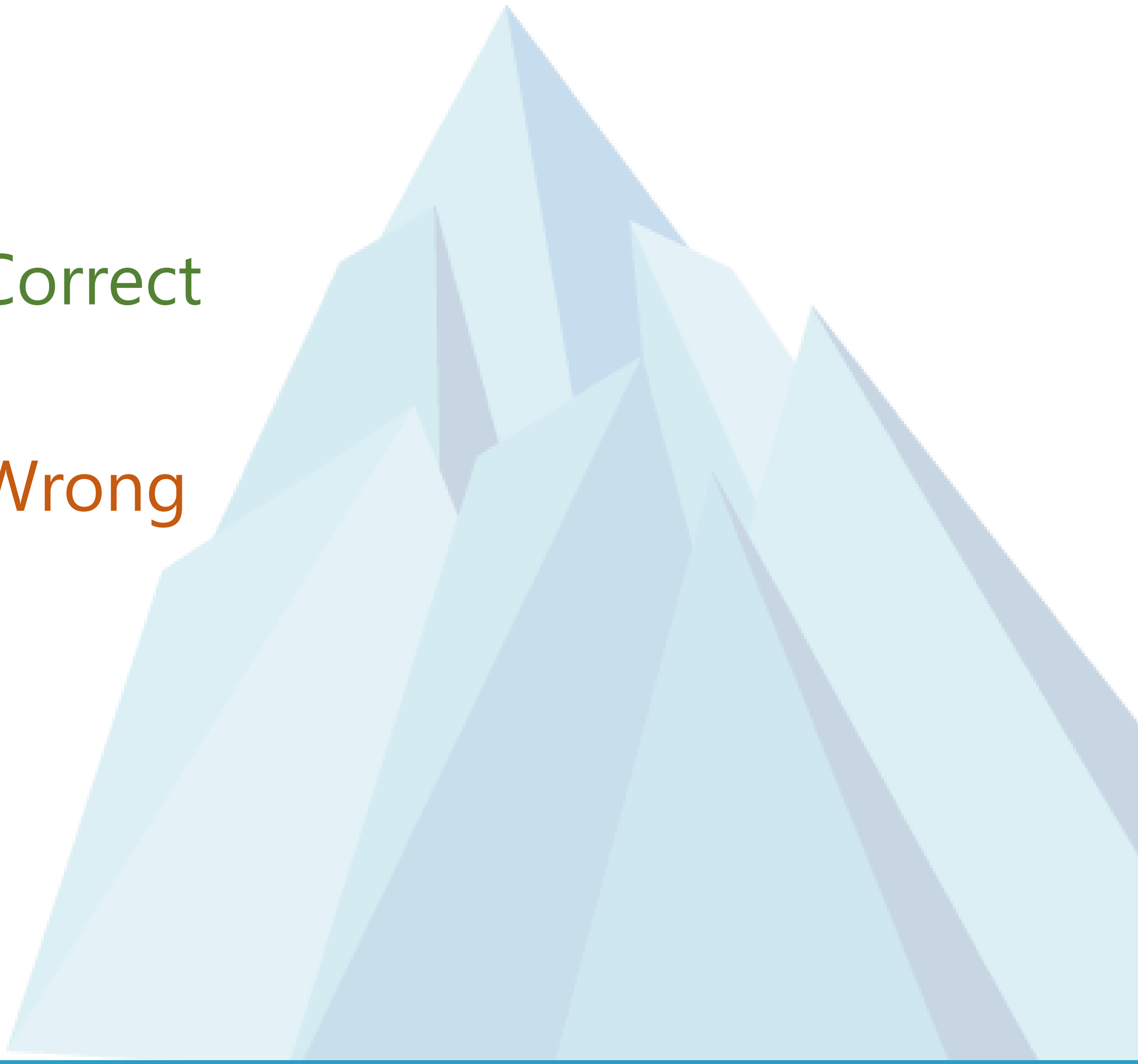
empty tag (no content)

Element (Cont.)

- Wrapped Tags

- `<a><b>text</b></a>` Correct

- `<a><b>text</a></b>` Wrong



Element (Cont.)

- Whitespace Coalesce
- https://jsfiddle.net/ccfef2hx/

whitespace.html

```html
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8" />
    <title>My First Page</title>
</head>
<body>
    <p>white    hello world    space</p>
</body>
</html>
```

HTML Entities

- Format to display specific characters in HTML
- Only available in “content” part and attribute values of a tag

`&nbsp;`	Whitespace
`&amp;`	& (ampersand)
`&lt;`	< (less than)
`&gt;`	> (greater than)
…	

HTML Entities (Cont.)

- Whitespace!
- https://jsfiddle.net/rgp67zom/

whitespace2.html

```html
<!DOCTYPE html>
<html>
<head>
    <meta charset="utf-8" />
    <title>My First Page</title>
</head>
<body>
    <p>white&nbsp;&nbsp;&nbsp;&nbsp;hello world &nbsp;&nbsp;&nbsp;&nbsp;space</p>
</body>
</html>
```

Element Types

- Block Elements

`<h1> ~ <h6>`	Heading 1 ~ 6
`<p>`	Paragraph
`<hr>`	Horizontal Line
`<div>`	Division

- HTML5 Only
  - <header>, <footer>, <nav>, <section>, <article>, <aside>, …
- https://jsfiddle.net/ca06fxbz/

Element Types (Cont.)

- Inline Elements (Available in block elements)

`<strong>`	Strong Importance
`<em>`	Emphasis
`<span>`	Span
`<br>`	Line Break
`<a href="anotherpage.html">`	Anchor (usually used as hyperlinks)
`<img src="photo.png">`	Image
…	

Lists

- `<ul>` or `<ol>`
  - `<li>Item 1</li>`
  - `<li>Item 2</li>`
  - …
- `</ul>` or `</ol>`

- https://jsfiddle.net/whg64cw4/

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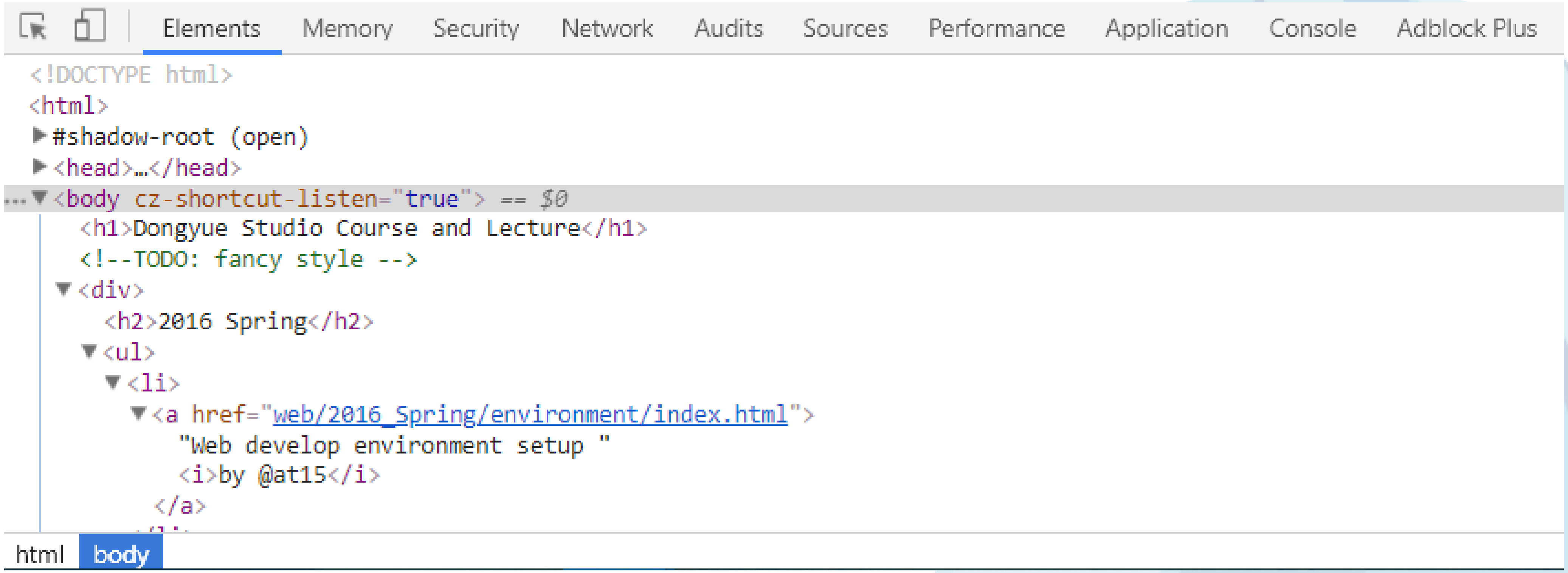
Form

- `<form>`
  - `<input type="text">`
  - `<label>Label</label>`
  - `<button>Click</button>`
  - …
- `</form>`

- https://jsfiddle.net/nL4nnsdu/

Document Tree

- An HTML document can be viewed as a tree
- You may view the tree in developer panel (F12 in Chrome)



```
<!DOCTYPE html>
<html>
 ▶#shadow-root (open)
 ▶<head>…</head>
…▼<body cz-shortcut-listen="true"> == $0
    <h1>Dongyue Studio Course and Lecture</h1>
    <!--TODO: fancy style -->
  ▼<div>
      <h2>2016 Spring</h2>
    ▼<ul>
      ▼<li>
        ▼<a href="web/2016_Spring/environment/index.html">
            "Web develop environment setup "
            <i>by @at15</i>
          </a>
```

More Reading

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- Tutorial
  - W3Schools HTML Tutorial
    - http://www.w3school.com.cn/html/
  - HTML Dog Tutorial
    - http://www.htmldog.com/guides/html/
  - Codecademy HTML Tutorial
    - https://www.codecademy.com/learn/learn-html
  - freeCodeCamp HTML Tutorial
    - https://www.freecodecamp.cn/challenges/say-hello-to-html-element
  - 《Head First HTML and CSS》

- Reference
  - MDN HTML Documentation
    - https://developer.mozilla.org/zh-CN/docs/Web/HTML

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CSS Intro

What is CSS?

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- Cascading Style Sheets
- A **stylesheet** for HTML

CSS Example

- https://jsfiddle.net/dfa38o50/

```css
h1 {
    color: red;
    font-size: 48px;
}

p {
    line-height: 24px;
}
```

Where to put CSS?

- Three methods
  - Add a <style> element anywhere in HTML

```
<style>
    h1 { /* ... */ }
</style>
```

  - Apply styles to a specific element by adding attribute `style="..."`

```
<h1 style="color: red;">Heading</h1>
```

  - Include an external `.css` file by <link> tag

```
<head>
    <meta charset="utf-8">
    <title>My Page</title>
    <link rel="stylesheet" href="mypage.css">
</head>
```

CSS Ruleset

```
selector1 {
   property1: value1;
   property2: value2;
   /* …. */
}


selector2 {
   /* … */
}
```

→ h1, .class-name, #id, ….

→ color, font-size, line-height, …

Selector

- Determine which element to apply one style block

- Three basic selectors

`typename`	Apply to all the “typename” elements
`.classname`	Apply to elements with `class="classname"`
`#idname`	Apply to elements with `id="idname"`

- Advanced selectors

`[attr=value]`	Apply to elements with `attr="value"`
`:pseudo`	Pseudo classes/elements

Selector Combinator

- Child combinator (A > B)
  - https://jsfiddle.net/edr4rbuf/

```
<style>
    p > span {
        color: red;
    }
</style>
<p>
    <span>Style Applied!</span>
    <strong><span>Style Not Applied!</span></strong>
</p>
```

Selector Combinator (Cont.)

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- Descendant combinator (A B)
  - https://jsfiddle.net/bkL8orsy/

```
<style>
    p span {
        color: red;
    }
</style>
<p>
    <span>Style Applied!</span>
    <strong><span>Style Applied!</span></strong>
</p>
```

Selector Combinator (Cont.)

- Adjacent sibling combinator (A + B)
  - https://jsfiddle.net/bwao19fb/

```
<style>
    h1 + p {
        color: red;
    }
</style>
<h1>Heading</h1>
<p>Applied!</p>
<p>Not Applied!</p>
```

Selector Combinator (Cont.)

- General sibling combinator (A ~ B)
  - https://jsfiddle.net/ze2Lguch/

```
<style>
    h1 ~ p {
        color: red;
    }
</style>
<h1>Heading</h1>
<p>Applied!</p>
<p>Applied!</p>
```

Selector List

- Apply the same style to multiple selectors using comma ,
  - https://jsfiddle.net/v034417g/

```
<style>
    .red-text, .focused-text {
        color: red;
    }
</style>
<p class="red-text">I'm red!</p>
<p class="focused-text">I'm also red!</p>
```

Specificity

- What if two blocks both apply the same property to one element?
  - Determine the final style by selector specificity

- The easy way to explain
  - `#id` > `.class` > `type`
  - Inline style (`style="…"`) **>** `<style>` element **>** external stylesheet

Specificity (Cont.)

- What if two blocks both apply the same property to one element?
  - Determine the final style by selector specificity

- The hard way to calculate
  - Compare the tuple (A,B,C) of selectors from left to right
    - A = number of ID selectors (`#id`)
    - B = number of class selectors (`.class`), attributes selectors (`[attr=value]`), and pseudo-classes (`:pseudo-class`)
    - C = number of type selectors (`typename`) and pseudo-elements (`:pseudo-element`)
    - Ignore universal (`*`) selector
  - Inline styles always have the highest specificity

Color

- Different Color Formats
  - Name
    - `red, green, blue, aqua, …`
  - Hex RGB
    - `#ff0000, #f00`
  - RGB/RGBA Value
    - `rgb(255, 0, 0)`
    - `rgba(255, 0, 0, 0.6)`

opacity (alpha)

Font

- Font Family

```
font-family: font1, 'font name2', ...;
```

- Fonts can be:
  - Specified Font
    - Arial
    - 'Microsoft YaHei' （微软雅黑）
    - 'Times New Roman'
    - 'Source San Hans CN' （思源黑体）
    - …
  - Generic Family (differ by OS and browser)
    - serif, sans-serif, monospace, …

- Example
  - https://jsfiddle.net/j973jd2k/

Font (Cont.)

- Font Size
  - https://jsfiddle.net/ct0bqbb7/

```css
.fixed-size {
    font-size: 12px;
}

.parent-based-size {
    font-size: 1.2em; /* 1.2 * parent font size */
}
```

Font (Cont.)

- Font Weight (font-weight)
  - https://jsfiddle.net/857s7xgg/
  - 100
  - 200
  - 300
  - 400 (normal)
  - **500**
  - **600**
  - **700** (bold)
  - **800**
  - **900**

Emmet

- https://www.emmet.io/
- A plugin for quick HTML code writing
  - Preinstalled in most modern code editors
- Type selectors and follow with <Tab> key
  - `h1+p.red*2+p#paragraph>span.highlight`

<Tab> Key

```
<h1></h1>
<p class="red"></p>
<p class="red"></p>
<p id="paragraph"><span class="highlight"></span></p>
```

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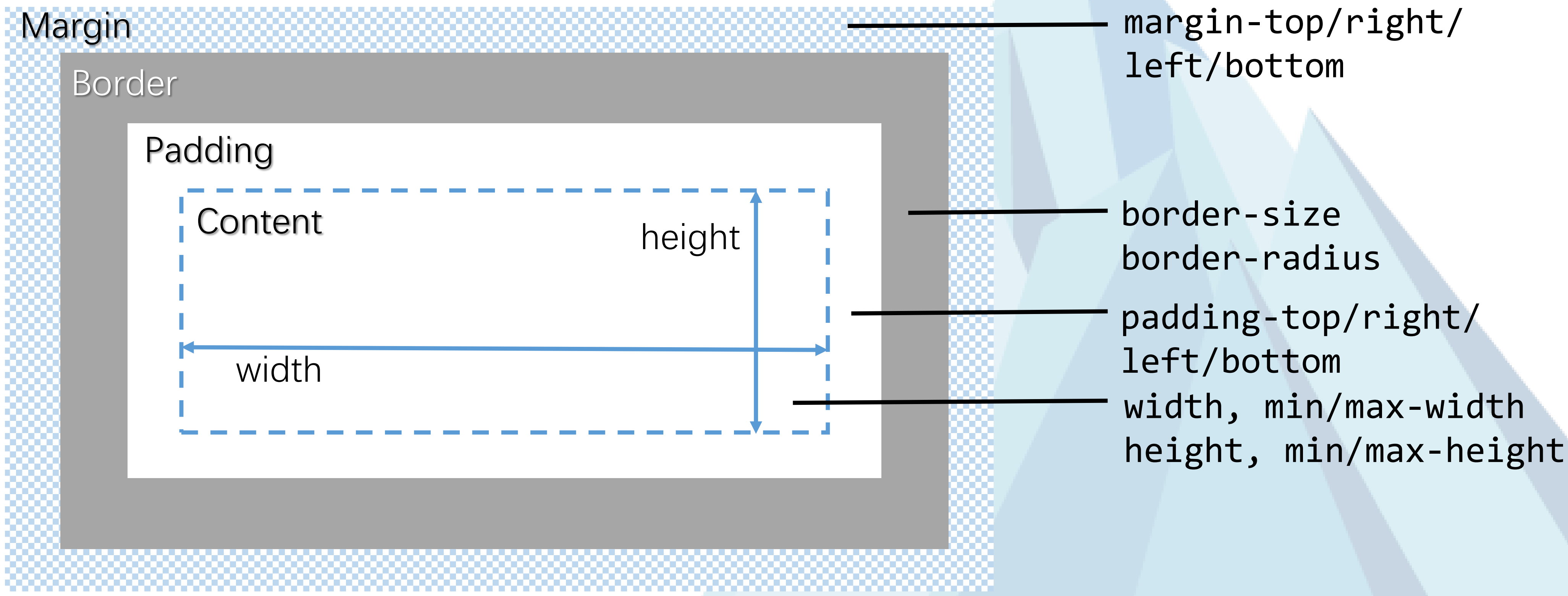
CSS Layout

Box Model

- Core concept of CSS layout system
- Two versions available (controlled by **`box-sizing`** property)

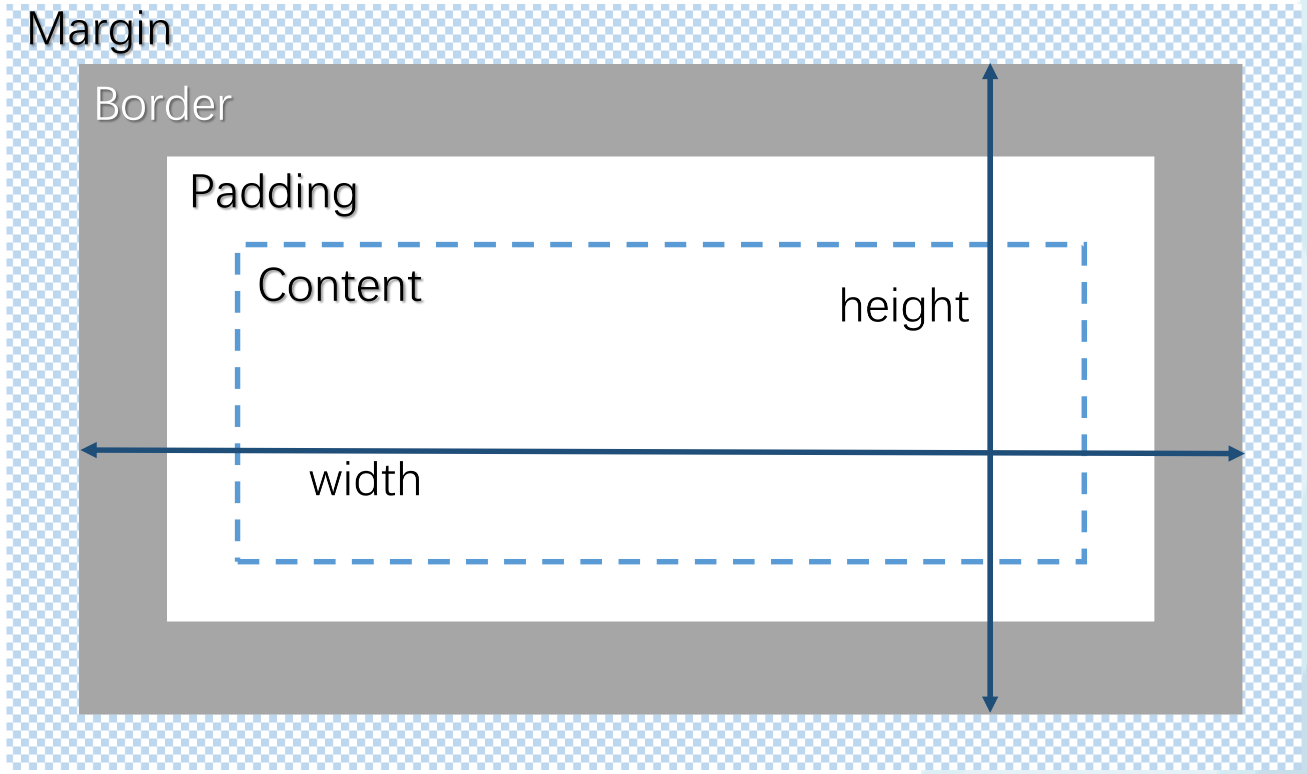
Box Model (Cont.)

- Default Model (**`box-sizing: content-box`**)



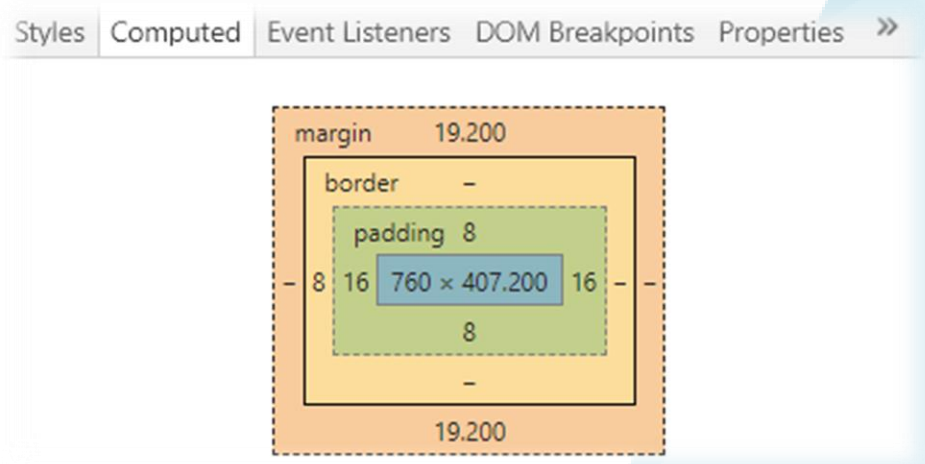
Box Model (Cont.)

- Another Model (**`box-sizing: border-box`**)



Box Model (Cont.)

- Investigate box models in your browser
  - Open your developer panel (F12 in Chrome)
  - Select "Elements" Tab
  - Select any HTML element in the element tree
  - Inspect the box model of the specified element NOW



Margin Collapsing

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- In specific cases, top and bottom margins are combined into single margin
- The combined margin size is the largest of the individual margins
- The behavior is called Margin Collapsing

- Conditions of margin collapsing
  - Adjacent siblings
  - Parent element and its first/last child
  - Empty blocks

- Example
  - https://jsfiddle.net/rq8esLcw/

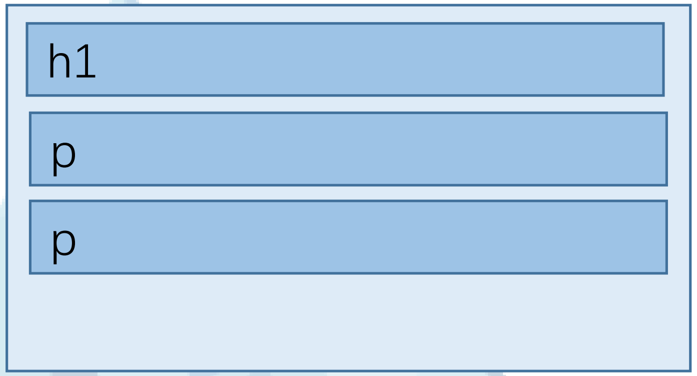
Negative Margin

- Margin size can be negative (both vertically and horizontally)
- Margin collapse also applies to negative margins
  - Combine margin size is the sum of the largest positive margin and the smallest negative margin

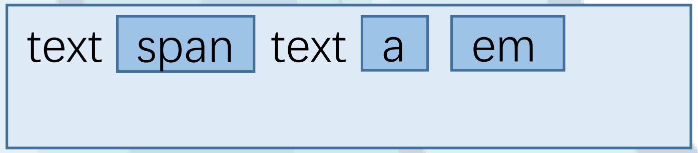
- Example
  - https://jsfiddle.net/3bq4529y/

Block and Inline Elements

- Block Elements (div, p, h1~h6, ul, ol, table, ...)
  - Can contain block/inline elements
  - Vertically aligned by default (normal flow)



- Inline Elements (span, em, a, img, ...)
  - Cannot contain block elements
  - Horizontally aligned by default (normal flow)
  - No vertical margin/padding available



Block and Inline Elements (Cont.)

- How to change the behavior of block and inline elements?
  - The `display` property

`display: block`	view as block element
`display: inline`	view as inline element
`display: inline-block`	view as both block and inline element

Float

- Break the default alignment rule!
    - https://jsfiddle.net/uy3mmtuf/

```
<style>
    .right {
        float: right;
    }
</style>
<div class="right">I’m on the right in the same line!</div>
<p>Normal Text</p>
```

Float (Cont.)

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- The Float Disaster
  - https://jsfiddle.net/dpLouqus/
- Cause
  - The “float” property will rearrange elements and not calculated in the normal webflow
  - The parent element’s height is “zero”
- Solution
  - Use `clear` property (Clearfix)
  - Create a separate **B**lock **F**ormatting **C**ontext (BFC)

Clearfix

- `clear: left/right/both;`
- Move the border edge of the element down to the margin edge of all floating elements
- Margin collapse still applies
- Example
    - https://jsfiddle.net/k0dqkt8r/
    - A better way: https://jsfiddle.net/g7L7L373/

Block Formatting Context

- A separate context to format elements
  - Contrary to Inline Formatting Context (IFC)
  - Elements formatted inside BFC will not affect outside elements
  - The root element has already created a BFC

- BFC can
  - Solve the float disaster
  - Margin collapse won’t happen between different BFCs
  - Create a separate context for globally positioned elements

Block Formatting Context (Cont.)

- Ways to create BFC
  - float: left/right
  - position: absolute/fixed
  - overflow: hidden/auto/scroll
  - display: inline-block/table-cell/flex/grid/…
  - …

- More information
  - https://developer.mozilla.org/en-US/docs/Web/Guide/CSS/Block_formatting_context

Overlay

- Position elements over other elements
- Using `position` and offset properties (`top/right/bottom/left`
-) to achieve the goal

- `position: static`
  - default mode, offset won't apply
- `position: relative`
  - the element will move by offset; the original space is reserved
- `position: absolute`
  - the element will move by offset; the original space is not reserved
- `position: fixed`
  - the element will be moved to the viewport and not affected by window scroll

- Example
  - https://developer.mozilla.org/en-US/docs/Web/CSS/position

Overlap

- Use z-index to adjust rendering order
- Elements with a higher z-index will hide ones with a lower z-index
- z-indexes are compared within one stacking context
- View more detail on MDN
  - https://developer.mozilla.org/en-US/docs/Web/CSS/CSS_Positioning/Understanding_z_index/The_stacking_context

Topics not covered

- Modern layout systems
  - Flexbox
  - Grid Layout
- Modern CSS features
  - Transitions
  - Animations
  - Media Query
  - Webfont
  - …

More Reading

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- Tutorial
  - W3Schools CSS Tutorial
    - http://www.w3school.com.cn/css/index.asp
  - Learn CSS Layout
    - http://zh.learnlayout.com/
- Reference
  - MDN
    - https://developer.mozilla.org/en-US/docs/Web/CSS
  - Can I Use …?
    - https://caniuse.com/

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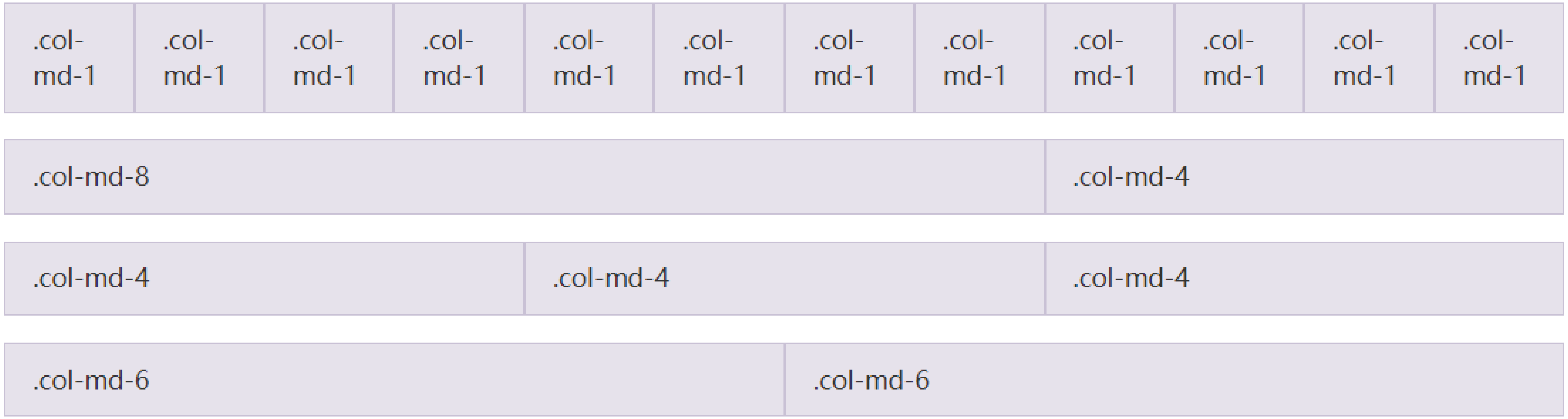
Modern CSS

Grid-based Design

- Proposed as a widely-used standard
- The 12-grid layout



.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1	.col-md-1

.col-md-8	.col-md-4

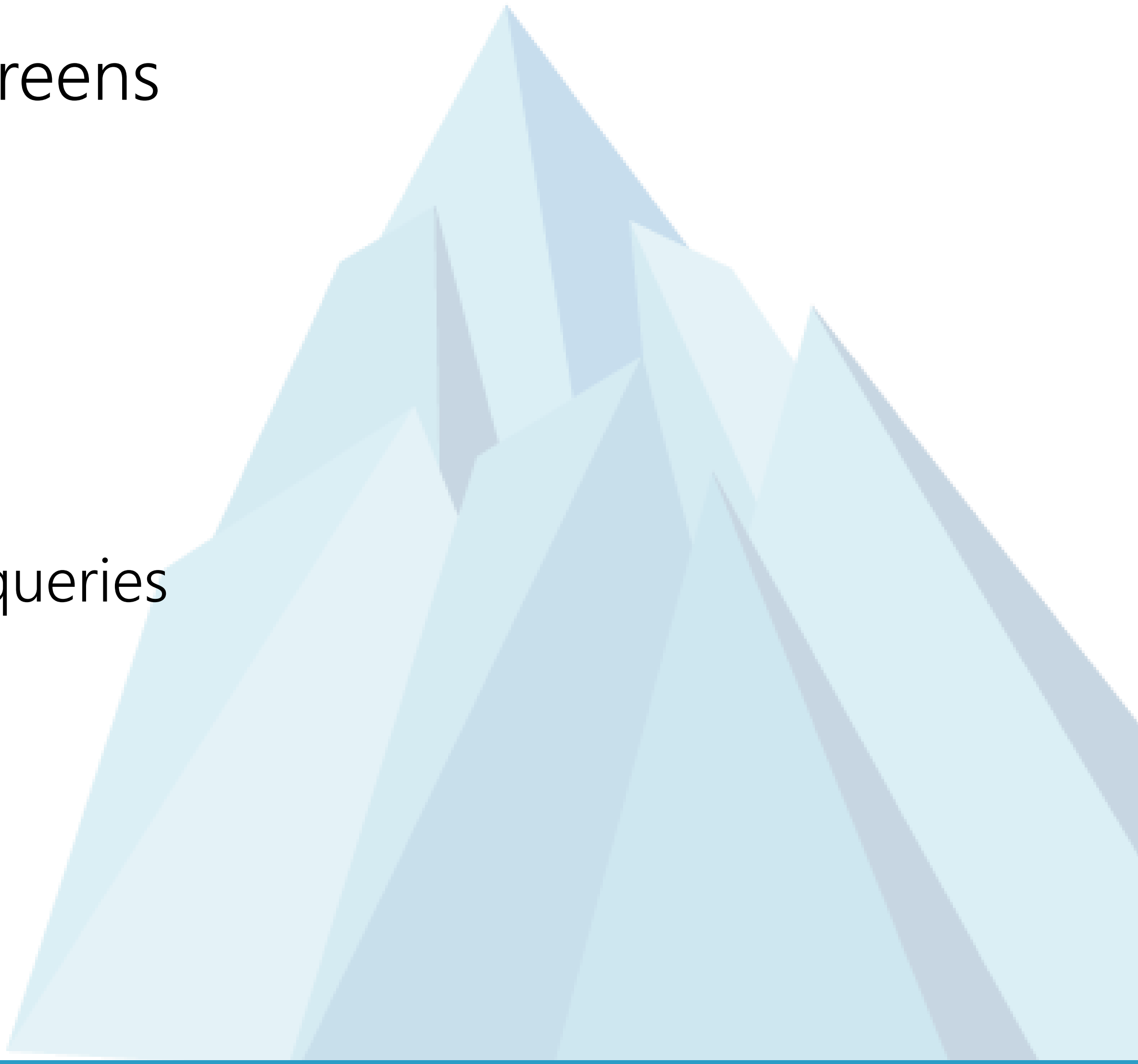
.col-md-4	.col-md-4	.col-md-4

.col-md-6	.col-md-6

Responsive Design

- One layout for all devices and all screens
  - Mobiles, Tablets, PCs

- Methods to achieve this goal
  - Use SVG and high-resolution images
  - Use rem instead of em and px
  - Control the content layout by media queries



CSS Framework

- Frameworks provides a lot of prefined styles and a default theme

- Popular frameworks include
    - Bootstrap 3 & 4
    - Foundation
    - Bulma
    - …

Sass

- Syntactically Awesome Style Sheets
- A CSS extension language which can be compiled into pure CSS
- Support variables, modules, nesting, etc.

```scss
$nav-color: red;

nav {
  ul {
    margin: 0;
    padding: 0;
    list-style: none;
    color: $nav-color;
  }
}
```

Asset Pipeline

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- Autoprefixer
  - Add prefixed CSS properties automatically to solve compatibility problems
- Webpack
  - Bundle front-end assets in a modularized manner
  - A must-to-have tool for front-end assets building at the present

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Thank You