

CSS: Cascading Style Sheets

Computer Science and Engineering ■ College of Engineering ■ The Ohio State University

Lecture 16

Evolution of CSS

- ❑ MIME type: text/css
- ❑ CSS 1 ('96): early recognition of value
- ❑ CSS 2 ('98): improvements in language
 - Adding media types (screen vs print)
 - Inconsistent support by browsers
- ❑ CSS 2.1 ('11)
 - In practice since '04
 - Took forever to standardize
- ❑ CSS 3 (informal name)... still under development!
 - Breaks standard into many (50?) modules
 - Modules developed, adopted independently
 - <https://www.w3.org/Style/CSS/current-work>
 - <https://caniuse.com/?cats=CSS>

Key Idea

- Separate content and style
 - Use different languages: HTML vs CSS
 - Can use different files: `mypage.html` vs `clean.css`
- Goal: Single-point-of-control-over-change
 - Change font of every word in paragraph?
 - Change font of every `<em>` element in document?
 - Change font of every `<em>` element in every document across an entire a site?
 - Change font of every `<em>` element which is part of instructions, but not finalized, on site?

CSS Syntax

- CSS is *declarative* (not *procedural*)
 - Describe a thing, not how to compute it
 - Example: matching of regular expressions
- CSS file is a list of *rules* (order can matter)
- Rule consists of a **location** and **styles**
- Basic syntax of a rule

```
selector {  
    property1: style1;  
    property2: style2;  
    . . .  
}      /* comments always help */
```

Example CSS: Basic Selector

```
h2 {  
    /* draconian OSU visual identity */  
    color: darkred;  
    background: gray;  
  
    /* additional gratuitous styling */  
    font-style: italic;  
}
```

Many Properties Are Available

- ❑ See: developer.mozilla.org/en-US/docs/Web/CSS/Properties
- ❑ Background
 - `background-color, background-image`
- ❑ Text, font
 - `line-height, text-align, color, text-decoration`
 - `font-family, font-style, font-size, font-weight`
- ❑ Border, margin, padding
 - `border-width, border-color, border-style, border-radius`
- ❑ Positioning
 - `clear, display, float`
- ❑ Dimension
 - `width, height, max-width`
- ❑ List, table
 - `list-style-type, list-style-position, list-style-image`
 - `border-collapse, caption-side, table-layout`

Shorthand Properties

- Example: Margins have 4 sides

```
margin-top: 3px;  
margin-right: 5px;  
margin-bottom: 7px;  
margin-left: 9px;
```

- Shorthand property: margin

```
margin: 3px 5px 7px 9px; /* TRBL */  
margin: 7px 9px;         /* TB sides */  
margin: 2px 6px 8px;     /* T sides B */
```

- Mnemonic: always "TRouBLe"

- Missing values filled in with provided value(s)

- Other shorthand properties:

- Padding, border-width, font, border, background...

Including CSS: Mechanics

- Embed directly in element with style attribute

```
<p style="color: red; background: gray"> ... </p>
```

- Use a style element in head

```
<head>
```

```
  <style media="screen">
```

```
    p {color: red; background: gray;}
```

```
  </style>
```

```
</head>
```

- Use a link element in head to use a CSS file

```
<head>
```

```
  <link rel="stylesheet"
```

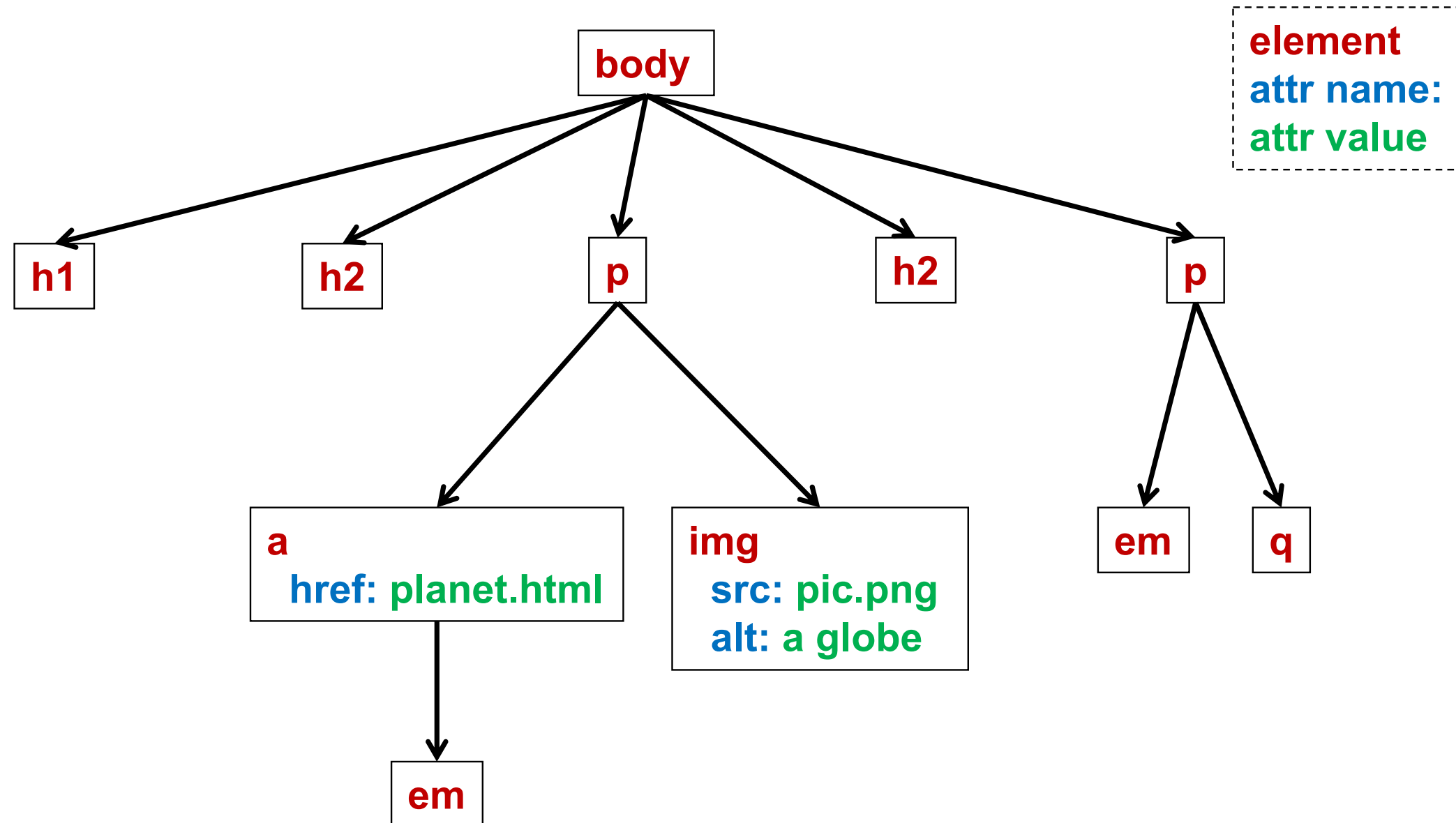
```
    href="3901Style.css" media="screen" />
```

```
</head>
```

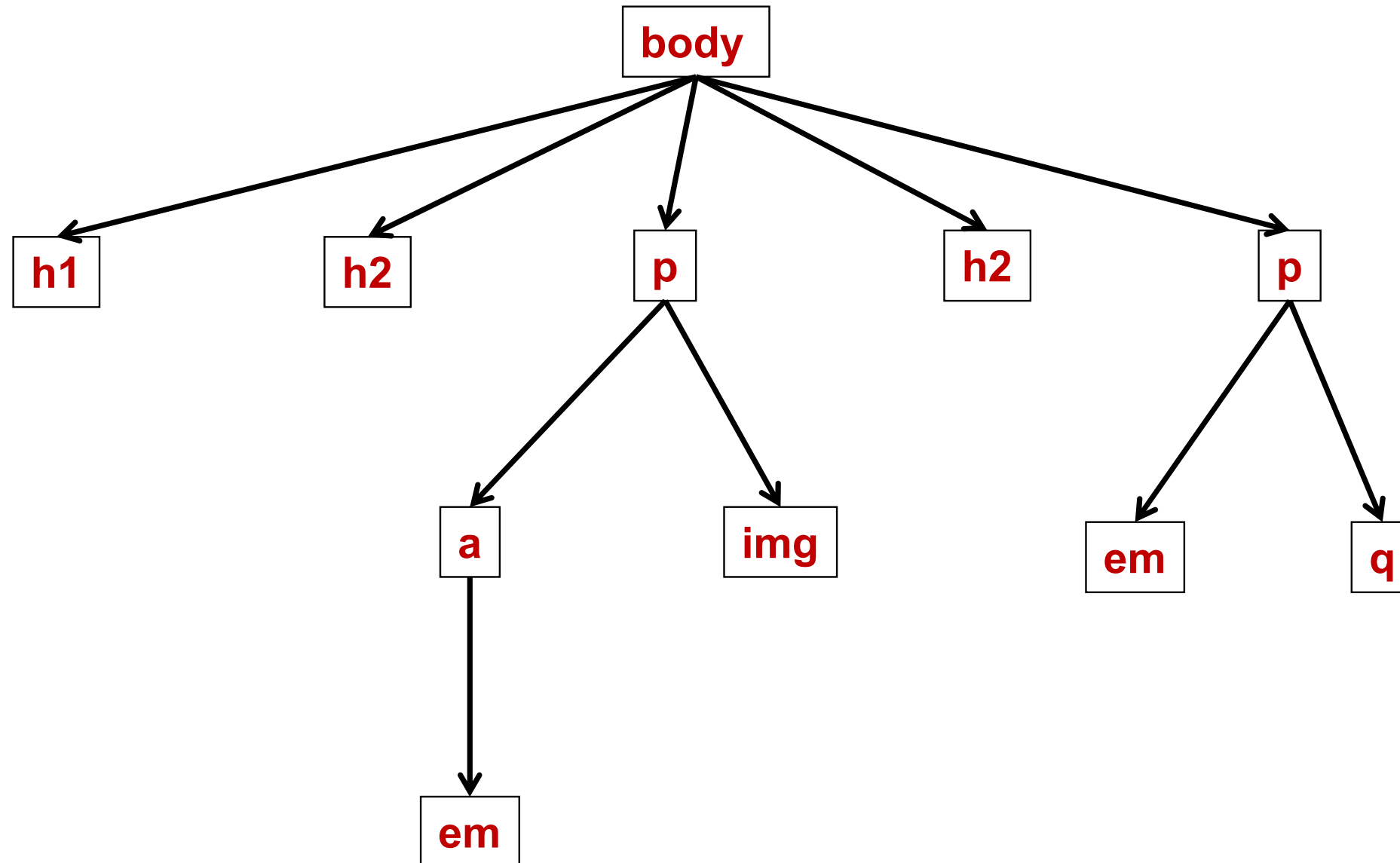
Example CSS: Multiple Selectors

```
h2 {  
    color: darkred;  
    background: gray;  
    font-style: italic;  
}  
  
em {  
    font-style: normal;  
    font-weight: bold;  
}
```

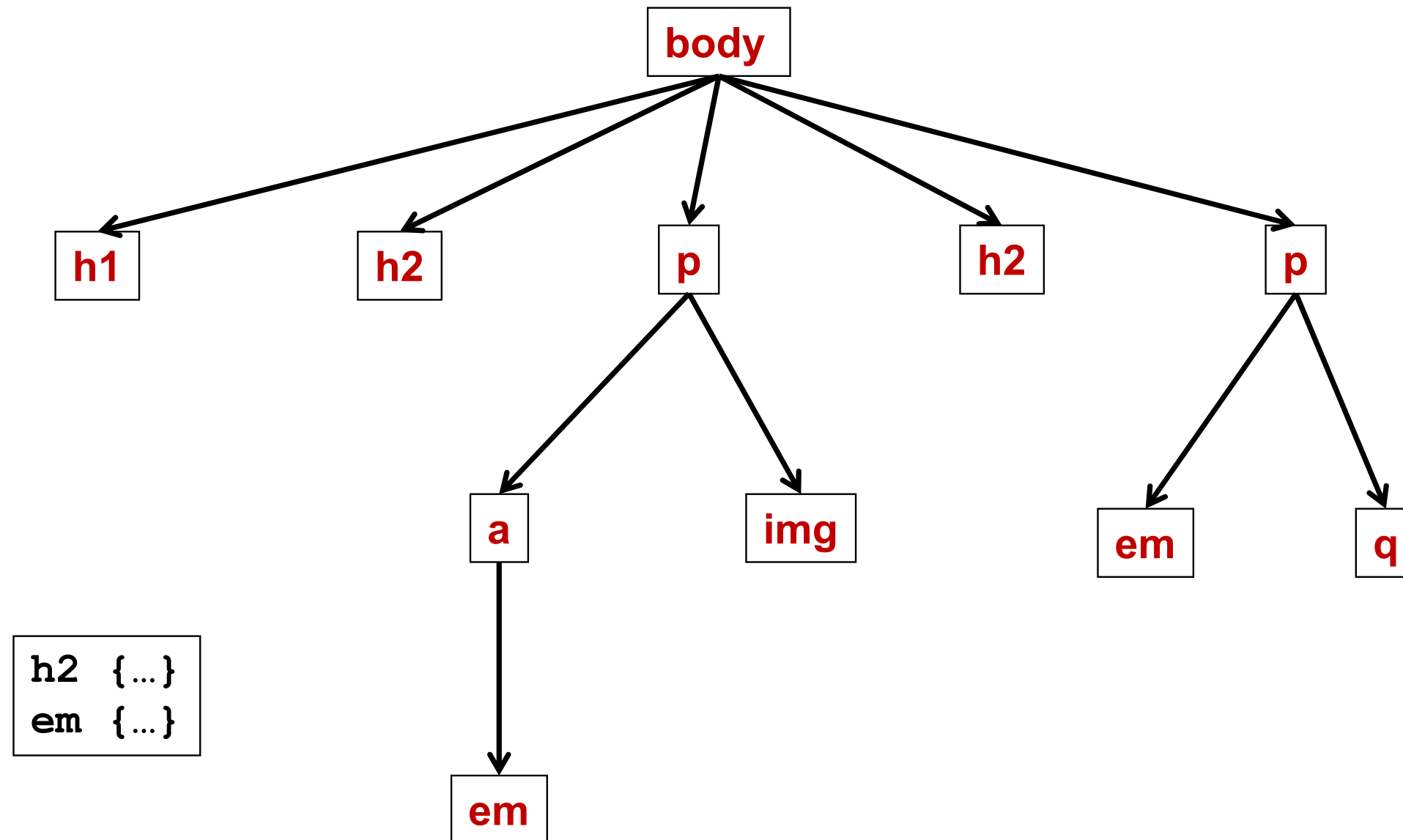
Tree (Rooted at Body)



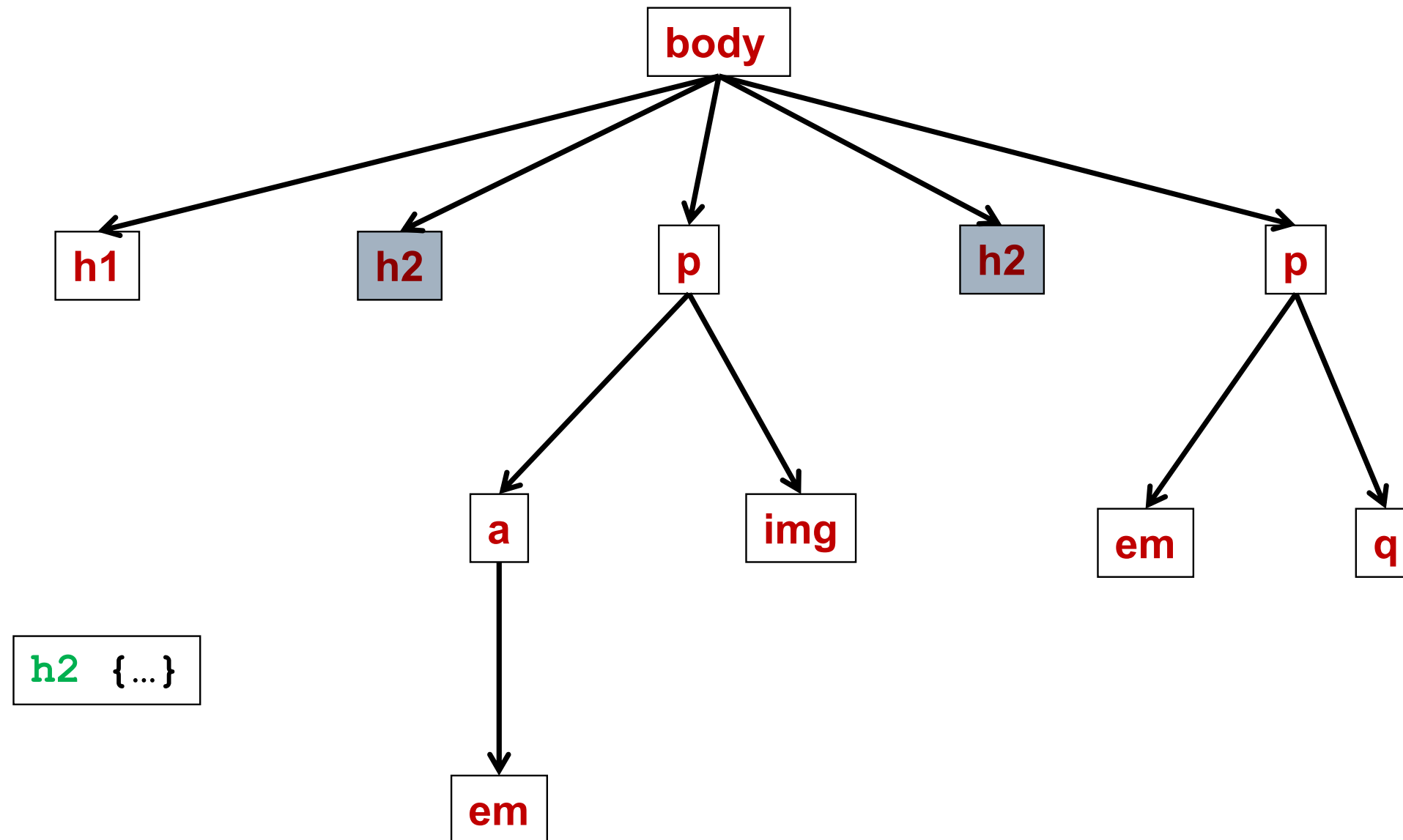
Tree sans Attributes (1)



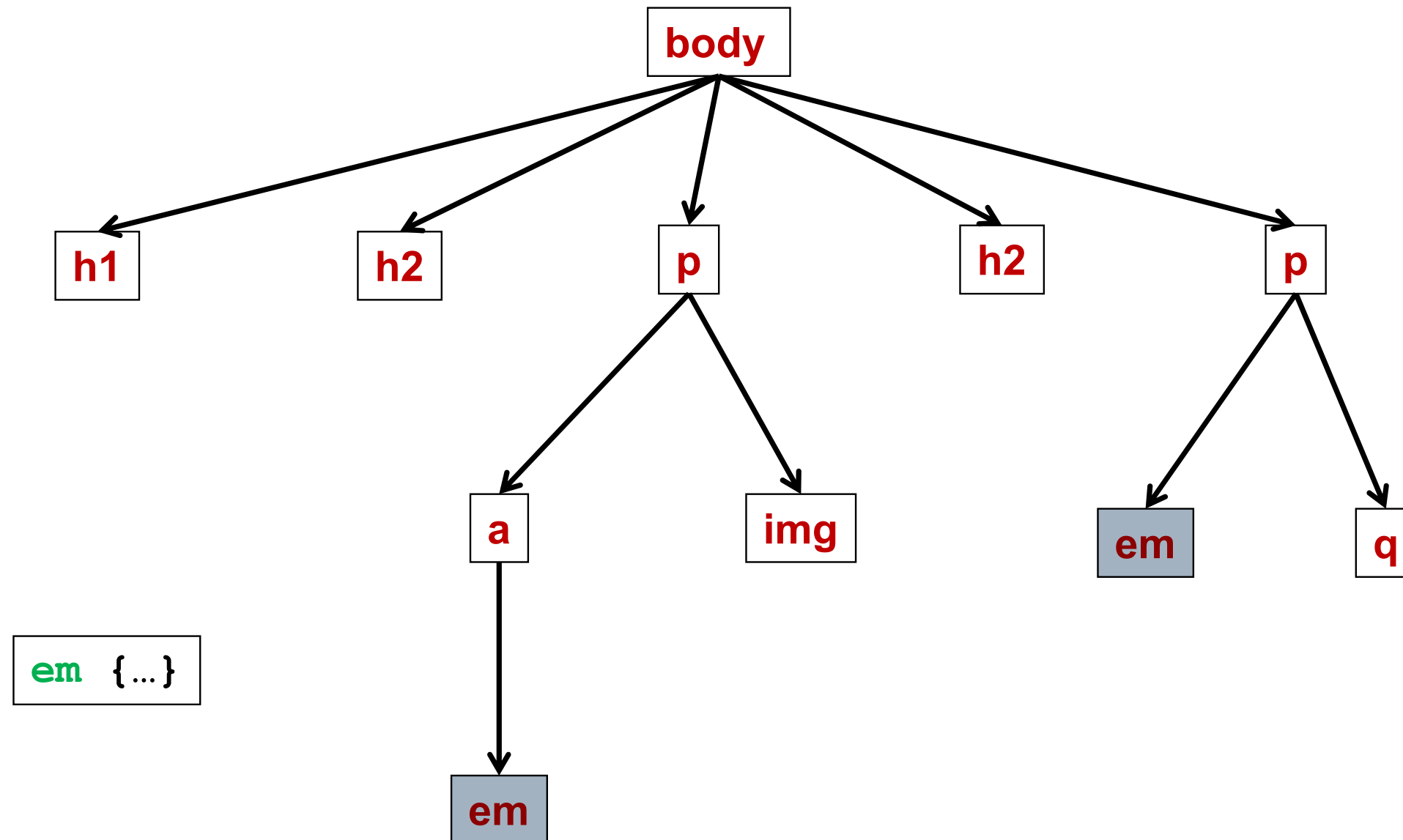
Tree sans Attributes (2)



Selectors Applied to Tree: h2



Selectors Applied to Tree: em



Multiple Selectors

```
h1 {  
    color: darkred;  
    background: gray;  
    font-style: italic;  
    border-bottom-style: solid;  
}  
h2 {  
    color: darkred;  
    background: gray;  
    font-style: italic;  
}
```

Multiple Selectors: SPOCOC

```
h1, h2 {  
    color: darkred;  
    background: gray;  
    font-style: italic;  
}
```

```
h1 {  
    border-bottom-style: solid;  
}
```

Inheritance for SPOCOC

- A child inherits many properties from its parent
 - Color, font weight, font family, line-height, etc
 - Child can override these properties
- Common strategy: Set global styles in root

```
body {  
    font-family: sans-serif;  
}
```

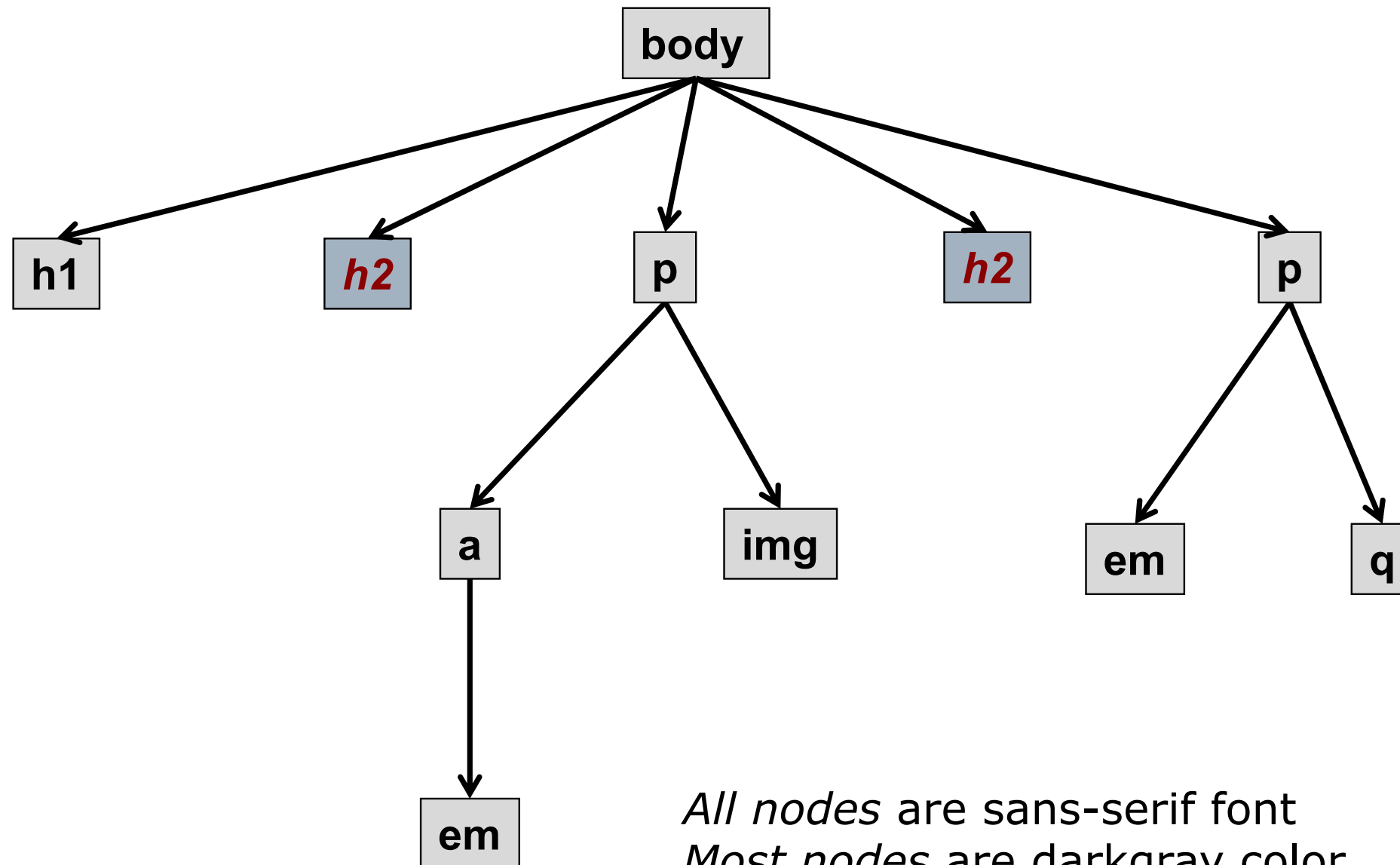
 - Contrast this with having to set property in all possible elements!
- Generally, text properties (eg color) are inherited, box-related (eg border) are not

Example Inheritance

```
body {  
    font-family: sans-serif;  
    color: darkgray;  
}
```

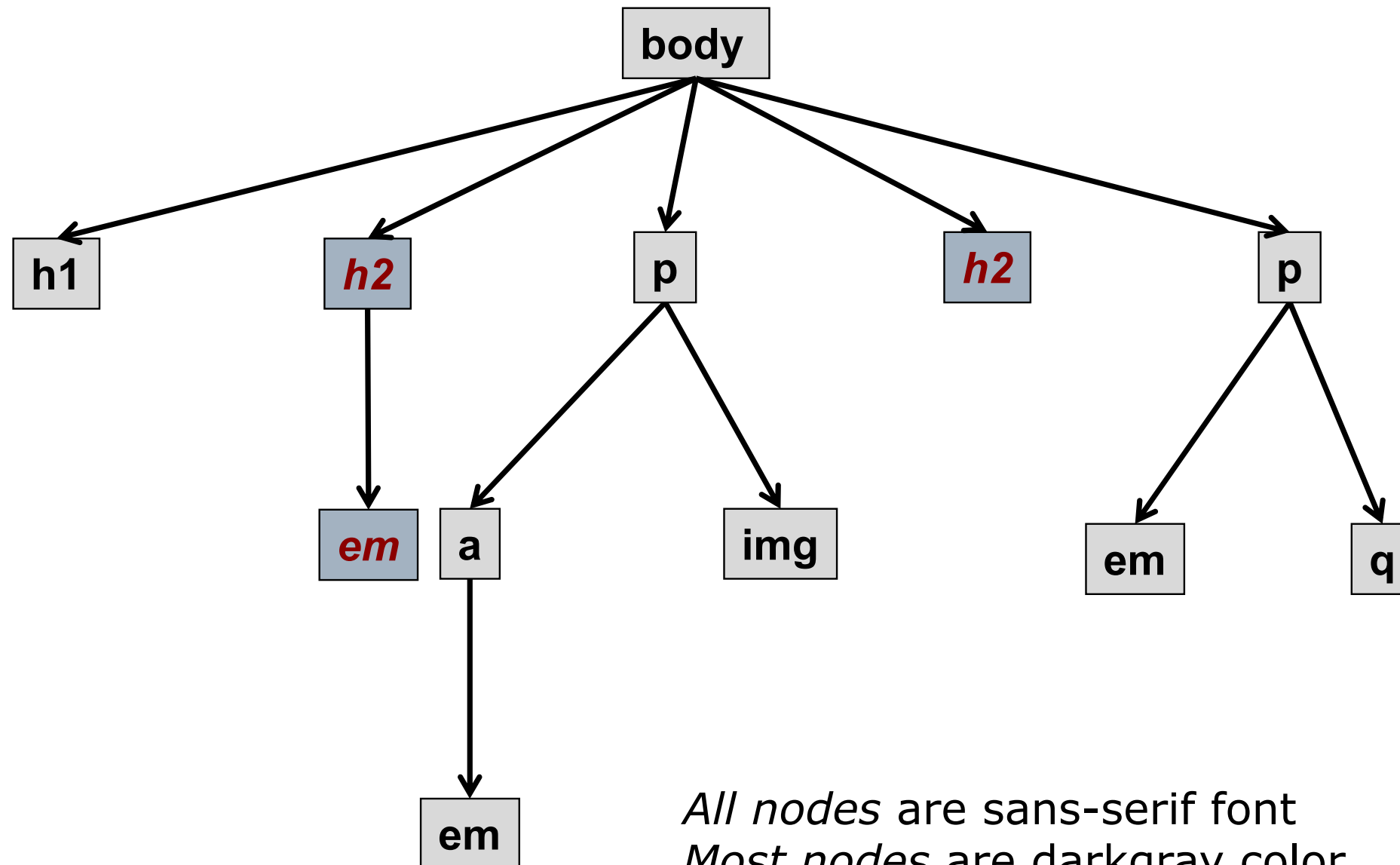
```
h2 {  
    /* inherits font-family, color */  
    color: darkred;    /* new color */  
    font-style: italic;  
}
```

Inherited Properties (1)



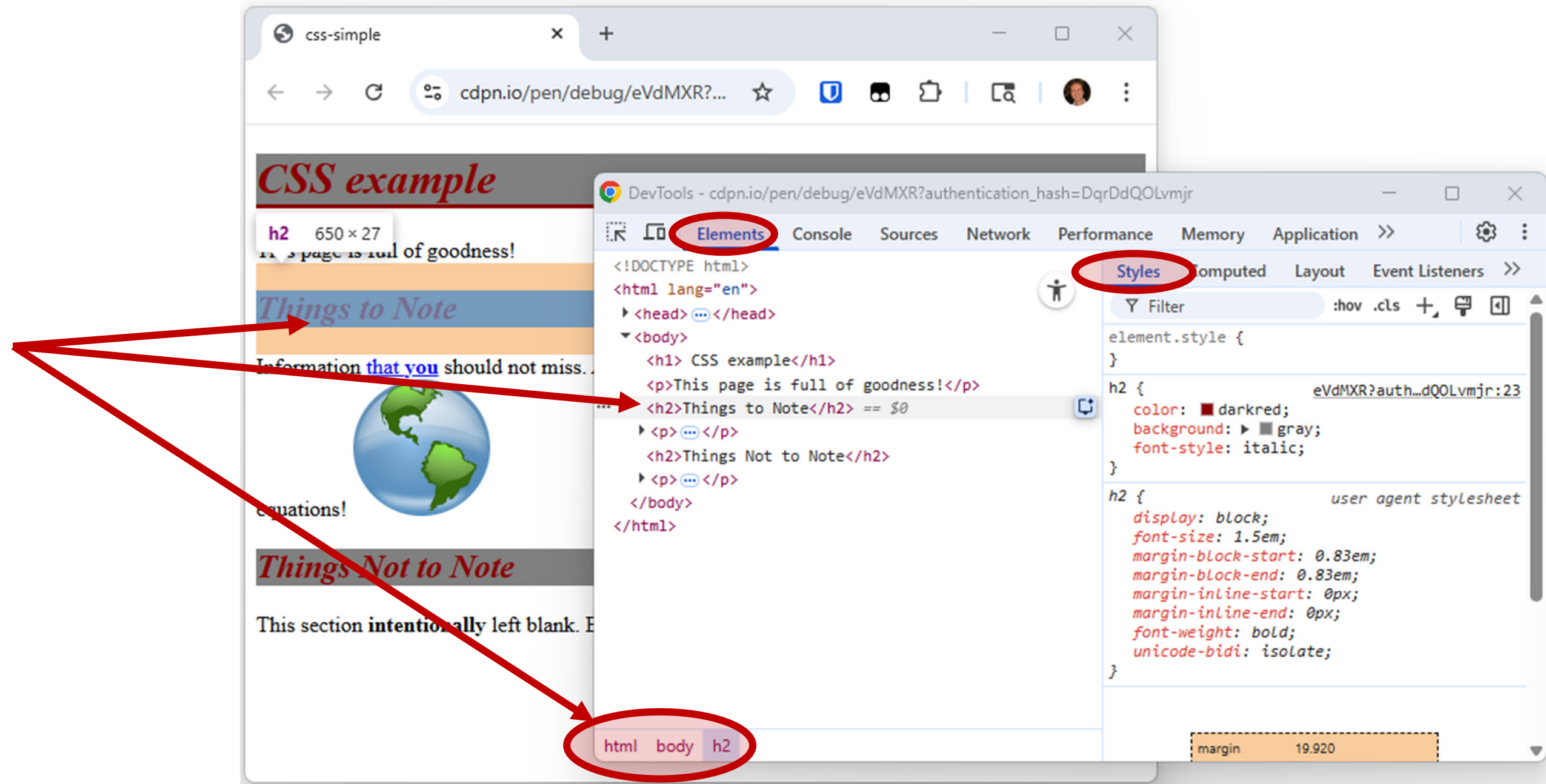
*All nodes are sans-serif font
Most nodes are darkgray color*

Inherited Properties (2)

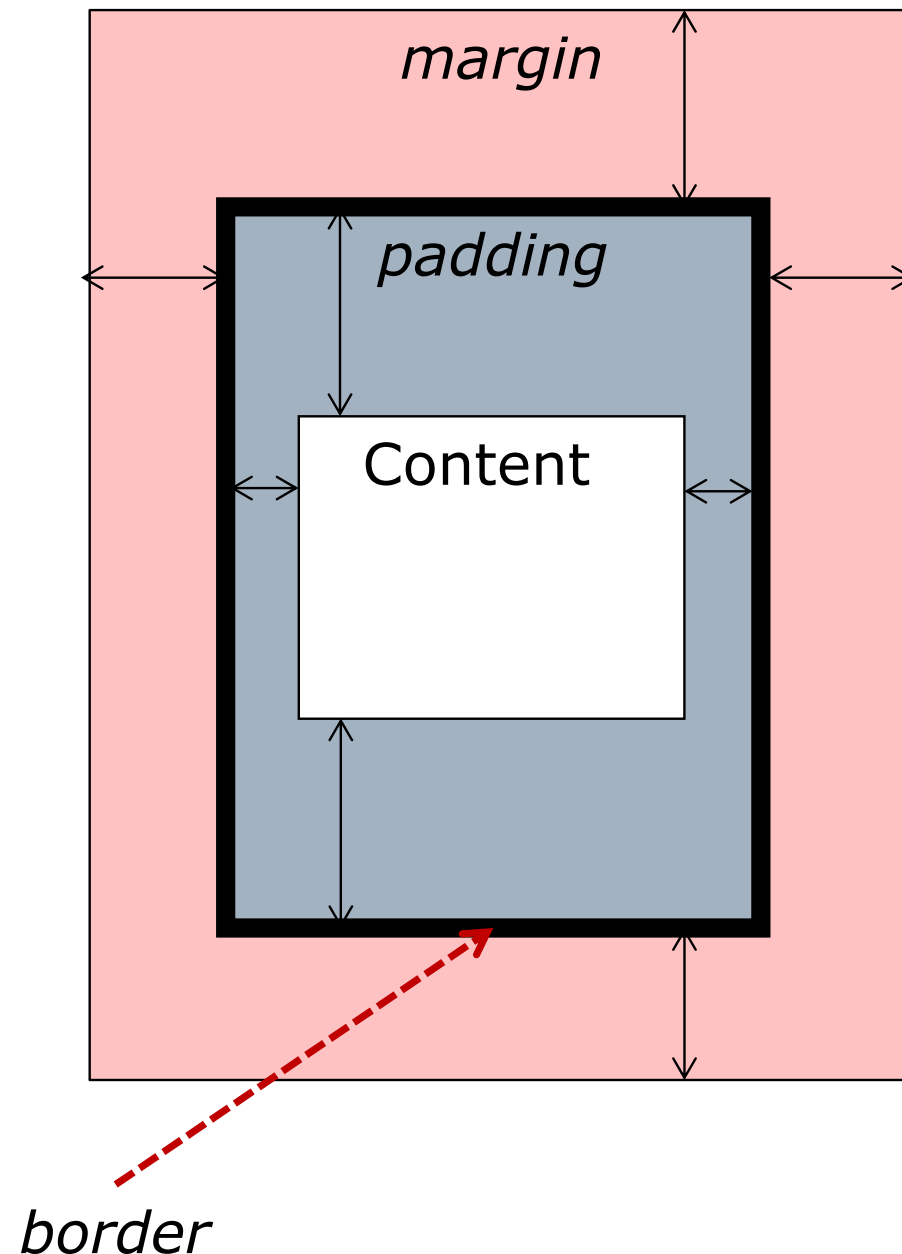


*All nodes are sans-serif font
Most nodes are darkgray color*

Chrome Dev. Tools: Elements Panel

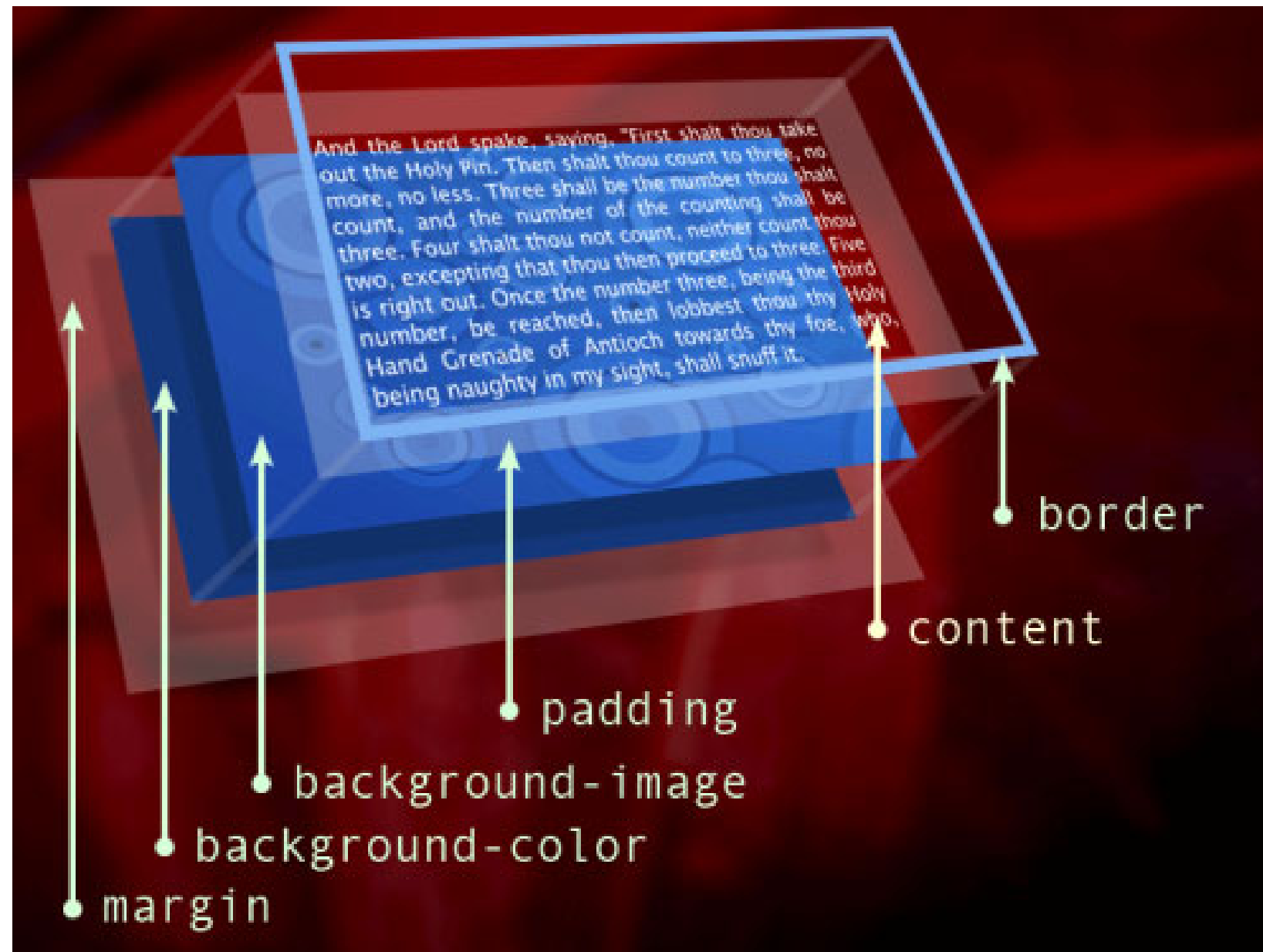


Layout: The Box Model

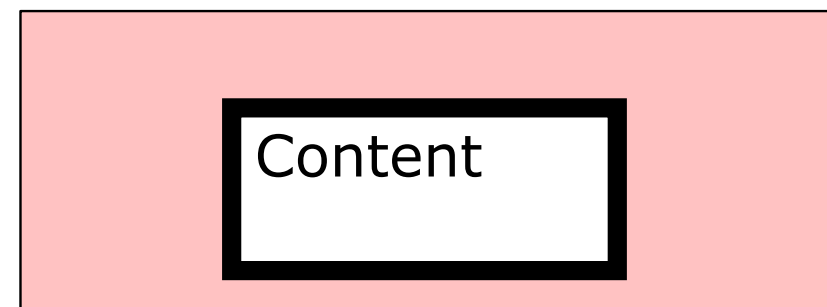
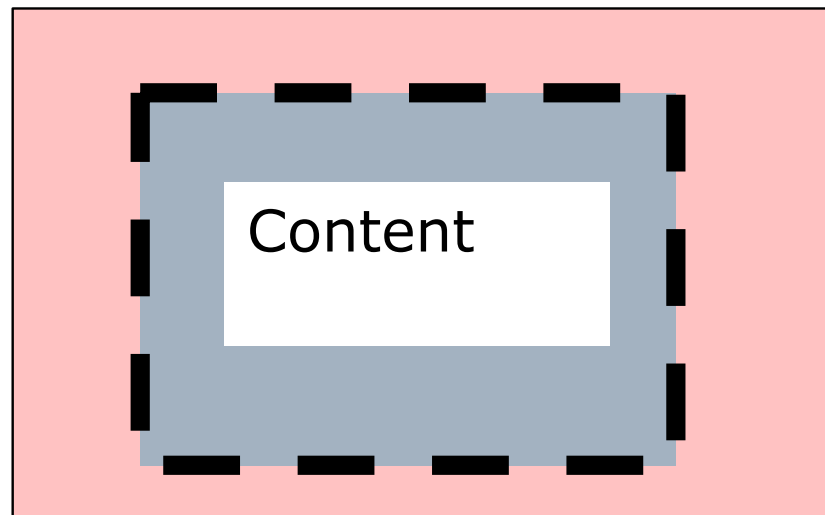
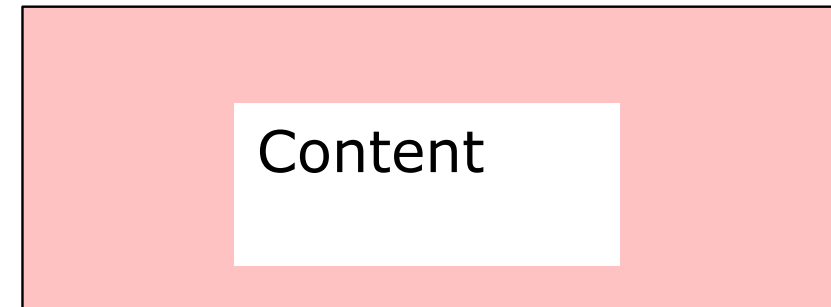
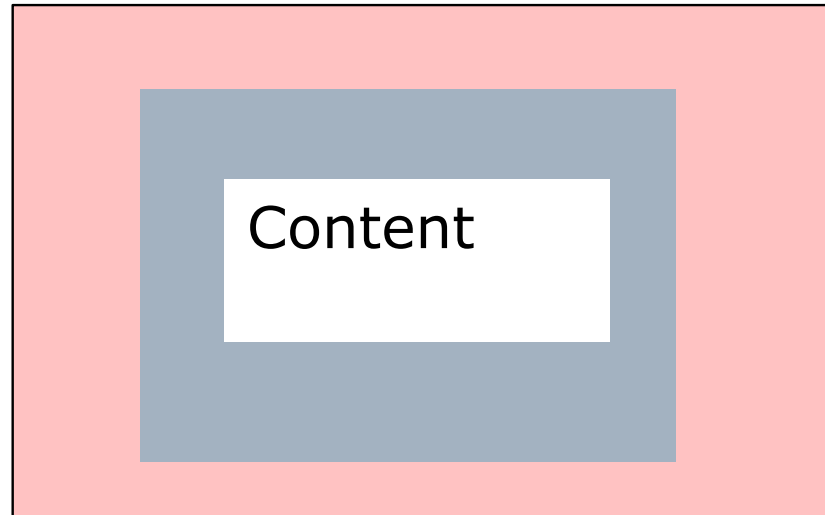


- Applies to block and inline
 - But with minor differences
- Border appearance
 - Style, width, color, radius
- Margins & padding
 - Transparent layers
 - 4 independent sides
- Padding is *part* of element
 - Background shows through
- Margin is space between
 - But some adjacent margins *collapse*

The Box Model As Layers



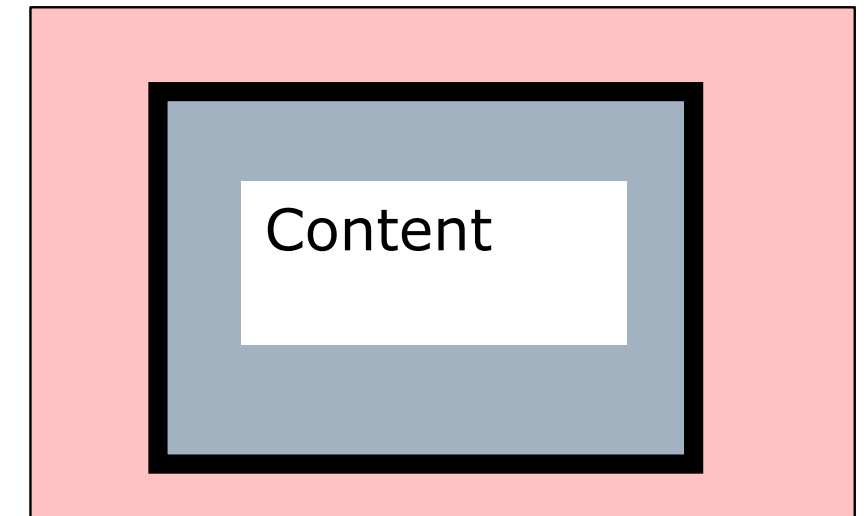
Examples



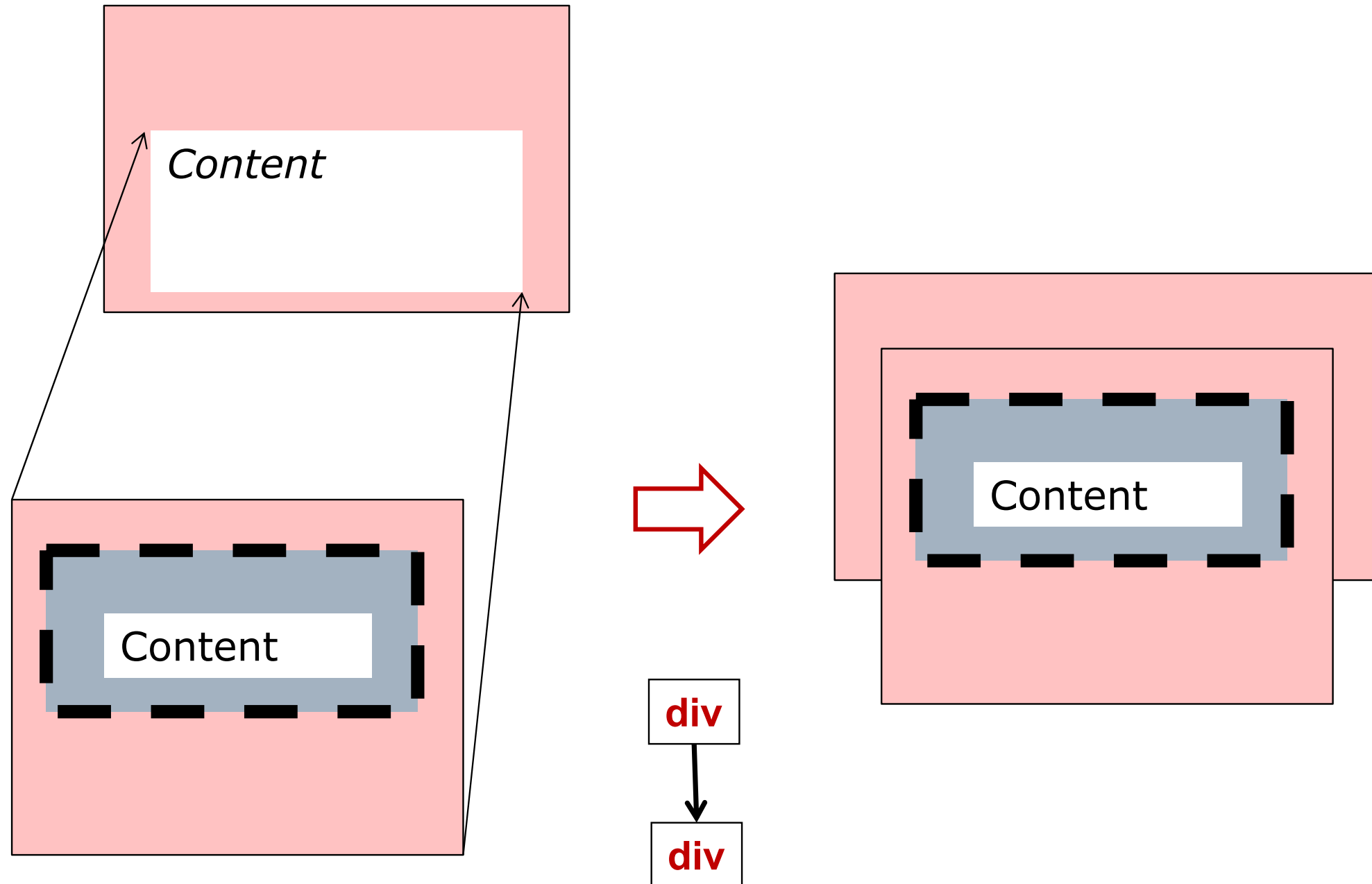
Box Sizing

```
p {  
  margin: 10px 100px 10px 10px;  
  border-width: 5px 1px 5px;  
  width: 200px; /* content */  
  padding: 2px;  
}
```

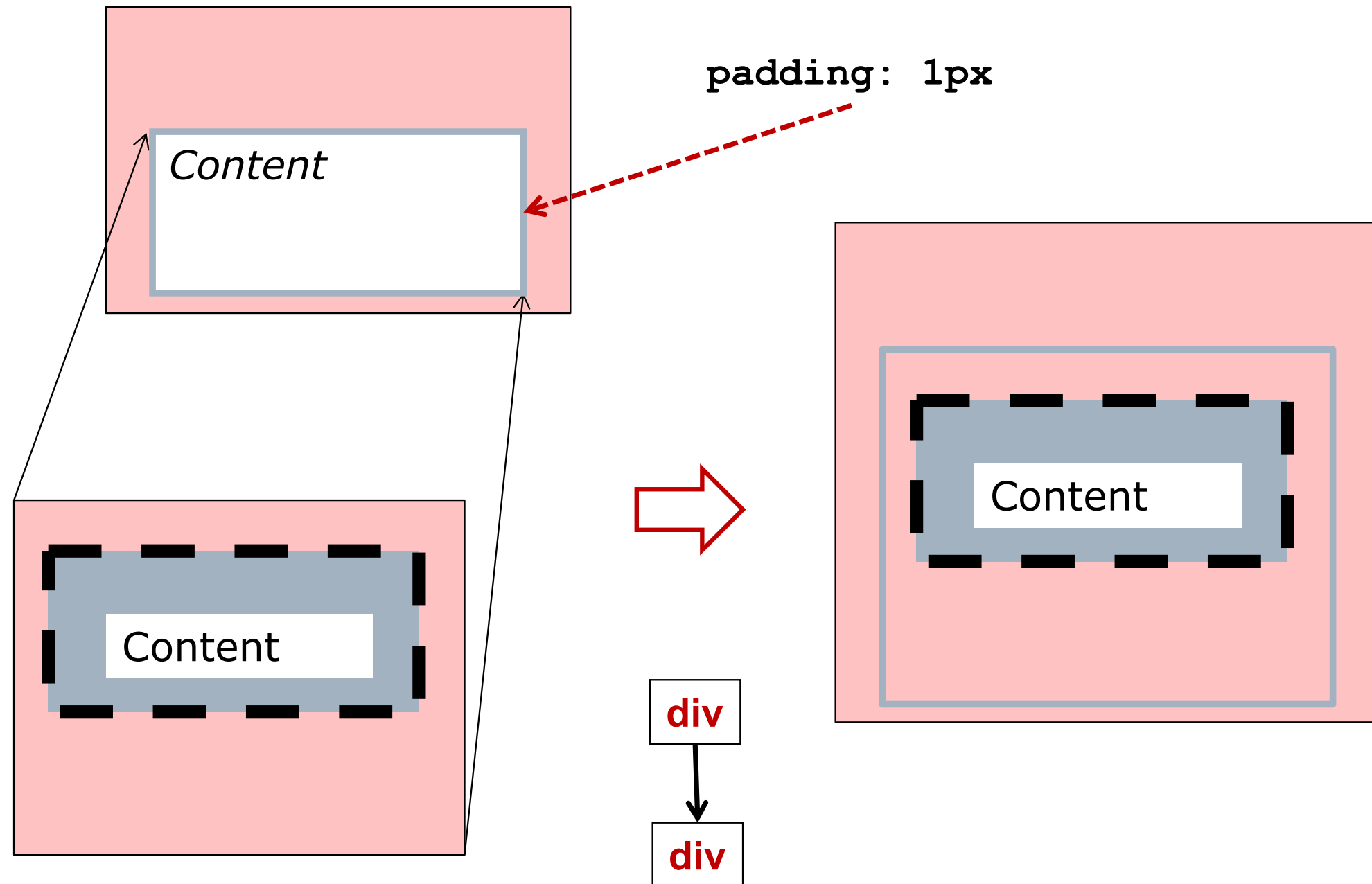
- ❑ Total width = ?
- ❑ CSS3 adds box-sizing property
 - content-box: width/height sizes content (default)
 - border-box: width/height includes border & padding



Collapsing Nested Margins



Preventing Margin Collapse



Chrome Dev. Tools: Box Model

The image shows a browser window with a CSS example page and the Chrome DevTools interface. The page content includes a header "CSS example", a paragraph "This page is full of goodness!", a section "Things to Note" with a globe image, and a section "Things Not to Note" which is blank. The DevTools "Elements" panel shows the HTML structure, with the

Things to Note

 element selected. The "Computed" tab in the Styles panel displays the box model for this element. A red arrow points from the "Things to Note" section on the page to the box model diagram. The box model diagram shows a blue inner box (650x27) with a green padding box, a yellow border box, and an orange margin box. The dimensions are: margin (19.920), border (0), padding (0), and content (650x27). The "Computed" tab also lists various background and border properties.

css-simple

cdpn.io/pen/debug/eVdMXR?...

CSS example

h2 650 × 27

This page is full of goodness!

Things to Note

Information [that you](#) should not miss.

equations!

Things Not to Note

This section **intentionally** left blank. E

DevTools - cdpn.io/pen/debug/eVdMXR?authentication_hash=DqrDdQOLvmjr

Elements Console Sources Network Performance Memory Application >>

Styles **Computed** Layout Event Listeners >>

margin 19.920

border 0

padding 0

650×27

0 0 0 0 0 0 0 0

0 0 0 0 0 0 0 0

19.920

Filter Show all Group

- background-attachment scroll
- background-clip border-box
- background-color rgb(128, 128, 128)
- background-image none
- background-origin padding-box
- background-position-x 0%
- background-position-y 0%

html body h2

Inheritance and Box Sizing

- Recall property inheritance:
 - Box-related properties, such as sizing, **are not** inherited
 - Text-related properties (eg color) **are** inherited
- Box sizing of (content) *width*: top-down
 - Set by **parent**, child “fits” inside
 - Relative, absolute
- Box sizing of (content) *height*: bottom-up
 - Set by **child**, parent “fits” around
 - Relative, absolute
- Parent and child's (vertical) margins collapse (if they touch)

Summary: CSS Basics

- CSS separates style from structure
 - Syntax: Rules with selectors, properties
 - Link to CSS file from HTML document
- Selectors for picking elements in tree
- Box Model
 - Content, padding, border, margin
 - Margins can collapse when overlapping
- Inheritance
 - Parent passes (font) properties to child
 - Box-related properties aren't inherited