Web Programming
CSS Part II.

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Part II

Selectors

Recap

selector

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

declaration

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

Element selector

- Using single element as a selector:

```
body {
    background-color: #f0f8ff;
}
```

- Multiple elements can be listed by commas.
  - The individual elements can also have their own styles (like **p** below)

```
h1, h2, h3, p {
    font-family: Verdana, Arial, sans-serif;
}
p {
    margin: 1em;
    padding: 0.5em;
}
```

Exercise #1 (#1b)

github.com/dat310-spring21/course-info/tree/master/
exercises/css/selectors

IDs and classes

- **ID** specifies a single unique element
  - HTML: **`id`** attribute with a unique value
  - CSS: id value prefixed by **#**

```
HTML  <p id="firstpar">...</p>
```

```
CSS   #firstpar {...}
```

- **Class** can be assigned to a number of elements.
- An element can have multiple classes assigned to it.
  - HTML: **`class`** attribute with one or more values separated by space
  - CSS: class value prefixed by **.**

```
HTML  <p class="red">...</p>
      <p class="red justified">...</p>
```

```
CSS   .red {...}
      .justified {...}
```

Selectors so far

element

ID

class

```
h1, h2, h3, p {
    font-family: Verdana, Arial, sans-serif;
}
p {
    width: 500px;
    border: 1px solid black;
    margin: 1em;
    padding: 0.5em;
}
#firstpar {
    font-weight: bold;
}
.red {
    color: red;
}
.justified {
    text-align: justify;
}
```

ID selector vs. inline CSS

- With the ID selector inline CSS can be avoided
- That also means that it is possible from now on to move all style sheets to an external CSS file
- Best practice: **avoid inline CSS**
  - style sheets provide more maintainability
  - better separation of HTML data/structure and style/layout

Exercise #2

github.com/dat310-spring21/course-info/tree/master/
exercises/css/selectors

Exercise #3

github.com/dat310-spring21/course-info/tree/master/
exercises/css/selectors

Elements tree

```
<table border="1">
    <thead>
    <tr>
        <th>First name</th>
        <th>Last name</th>
        <th>Points</th>
    </tr>
    </thead>
    <tbody>
    <tr>
        <td>John</td>
        <td>Smith</td>
        <td>100</td>
    </tr>
    [...]
    </tbody>
</table>
```

Child: td elements are Childs of the tr element.

Siblings: td elements in same row are siblings.

Descendant: all td and tr elements are descendants of table

Selectors

Selector	Meaning	Example
Universal	Matches all elements in the document	`* {}` All elements on the page
Type	Matches element name	`h1, h2, h3 {}` <h1>, <h2>, <h3> elements

Class	Matches element class	`.note {}`
		Any elements whose class attribute has a value of `note`
		`p.note {}`
		Only <p> elements whose class attribute has a value of `note`

ID	Matches element ID	`#introduction {}` Element with an id attribute that has the value `introduction`

Selectors (2)

Selectors combinators

Descendant	Element that is descrendent of another (not just direct child)	`p a {}` Any <a> inside an <p> (even if there are other elements nested in between them)
Child	Element that is a direct child of another	`li>a {}` Any <a> elements that are children of an element
Adjacent sibling	Element that is the next sibling of another	`h1+p {}` First <p> element after any <h1> element (but not other <p> elements)
General sibling	Element that is a sibling of another, but does not have to be directly preceding	`h1~p {}` If there are two <p> elements that are siblings of an <h1> element, this applies to both

Example: adjacent vs. general sibling

examples/css/selectors/siblings.html

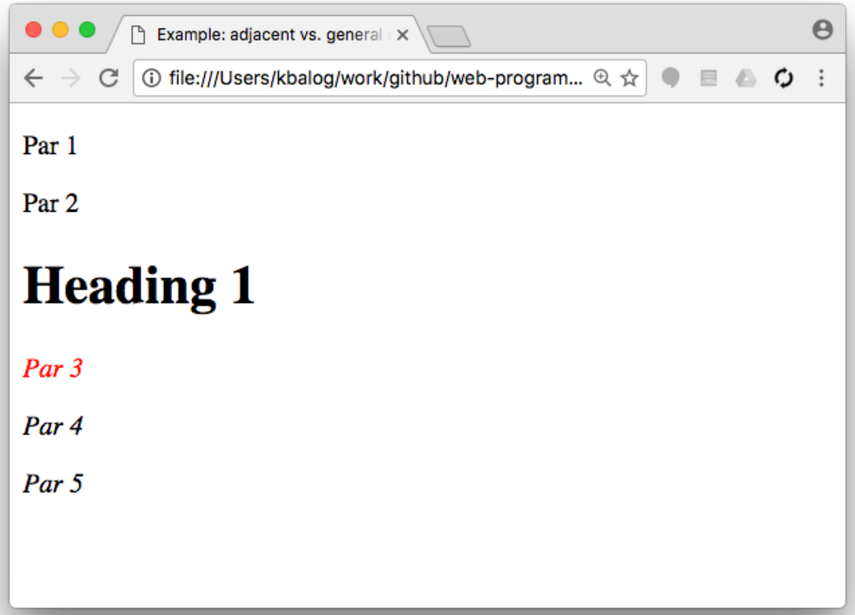
CSS

```css
h1 + p {
    color: red;
}

h1 ~ p {
    font-style: italic;
}
```

HTML

```html
<p>Par 1</p>
<p>Par 2</p>
<h1>Heading 1</h1>
<p>Par 3</p>
<p>Par 4</p>
<p>Par 5</p>
```



Selectors (3)

Attribute selector	Element that has a specific attribute	`p[title] {}` Any <p> elements that have a `title` attribute
★ **Pseudo-classes**	Add special effects to some selectors, which are applied automatically in certain states	`a:visited {}` Any visited link
Pseudo-elements	Assign style to content that does not exist in the source document	`p::first-line {}` First line inside a <p> element

Question

- What’s the difference?

```
.intro a {...}
```

a element inside an element that have the **intro** class

```
a.intro {...}
```

only **a** elements that have the **intro** class

Question

- What's the difference?

```
#header.callout {...}
```

element that has ID **`header`** as well as class **`callout`**

```
#header .callout {...}
```

all elements with the class name **`callout`** that are descendants of the element with ID **`header`**

Exercise #4

github.com/dat310-spring21/course-info/tree/master/
exercises/css/selectors

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')`

CSS Priority Scheme

- This is the “cascading” part...
  - Many properties might affect the same element
  - Some of these might conflict with each other
  - Cascading decides which to apply

CSS priority scheme

#	CSS source type	Description
1	User defined	User-defined CSS in the browser
2	Inline	HTML element’s style property
3	Media type	Media-specific CSS
4	Importance	!important overwrites previous types
5	Selector specificity	More specific selector over generic ones
6	Rule order	Last rule of declaration
7	Parent inheritance	Not specified is inherited from parent
8	CSS definition	Any CSS definition
9	Browser default	Initial values

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Inheritance

- Some properties are **inherited** by child elements
  - Font-family, color, etc.
- Others are **not inherited** by child elements
  - Background-color, border, etc.
- Inheritance can be forced using **`inherit`**

```
body {...}
.page {
    background-color: #efefef;
    padding: inherit;
}
```

CSS priority scheme

#	CSS source type	Description
1	User defined	User-defined CSS in the browser
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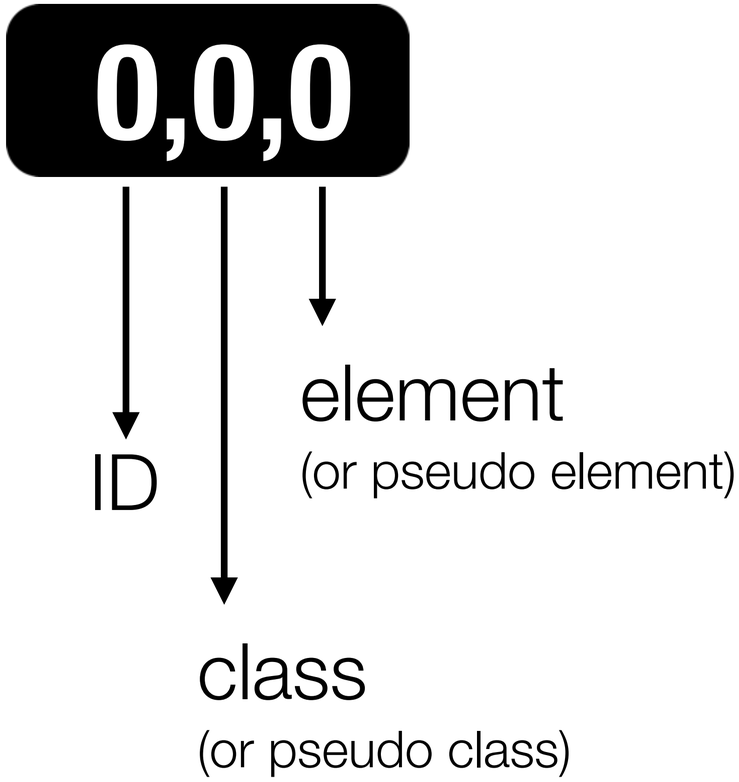
Specificity hierarchy

- If multiple selectors apply to the same element, the one with **higher specificity** wins
- Every selector has its place in the *specificity hierarcy*
  1. IDs
     `#div`
  2. Classes, attributes, pseudo-classes
     `.classes, [attributes], :hover`
  3. Elements (types) and pseudo-elements
     `p, :after`

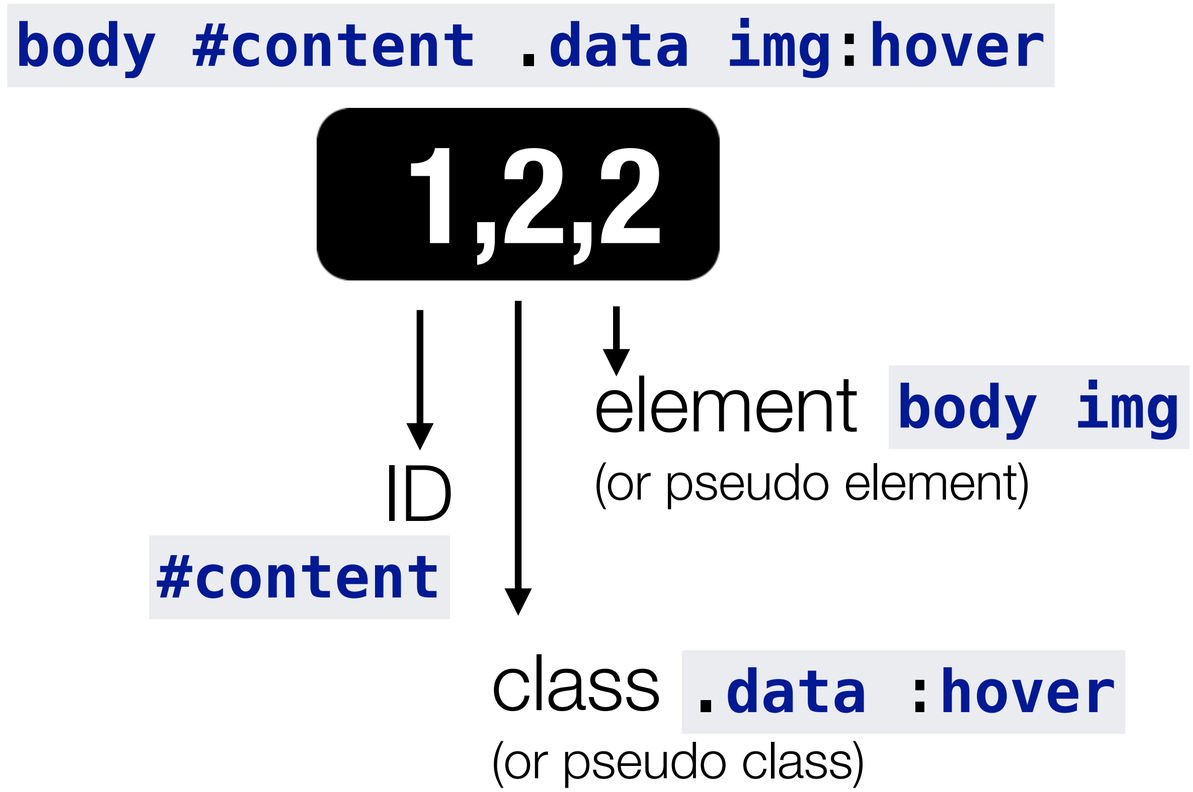
Computing specificity

- Think in a number system (with a large base)



Computing specificity

- Think in a number system (with a large base)



Specificity wars

- http://www.stuffandnonsense.co.uk/archives/css_specificity_wars.html

Vader

1,0,0

ID

Maul

0,1,0

class

Storm trooper

0,0,1

element

a

1 x element selector

Sith power: 0,0,1

p a

2 x element selectors

Sith power: 0,0,2

.foo

1 x class selector *

Sith power: 0,1,0

a.foo

1 x element selector
1 x class selector

Sith power: 0,1,1

p a.foo

2 x element selectors
1 x class selector

Sith power: 0,1,2

.foo .bar

2 x class selectors

Sith power: 0,2,0

p.foo a.bar

2 x element selectors
2 x class selectors

Sith power: 0,2,2

#foo

1 x id selector

Sith power: 1,0,0

a#foo

1 x element selector
1 x id selector

Sith power: 1,0,1

.foo a#bar

1 x element selector
1 x class selector
1 x id selector

Sith power: 1,1,1

.foo .foo #foo

2 x class selectors
1 x id selector

Sith power: 1,2,0

style

1 x style attribute

Sith power: 1,0,0,0

Exercise #5

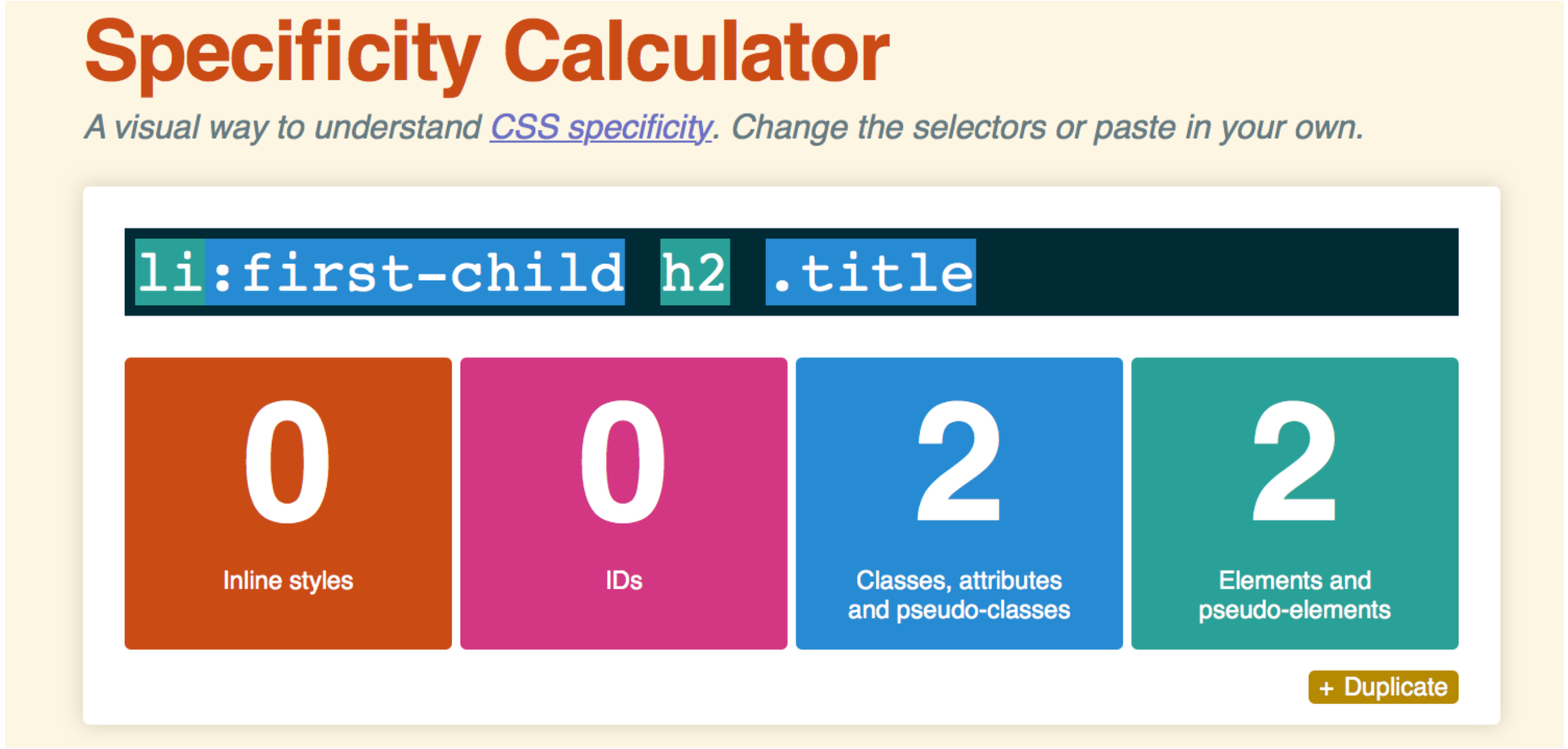
github.com/dat310-spring21/course-info/tree/master/
exercises/css/selectors

Solutions

#	CSS	Score	Explanation
1	`* { }`	0	
2	`li { }`	1	one element
3	`li:first-line { }`	2	element + pseudo-element
4	`ul li { }`	2	two elements
5	`ul ol+li { }`	3	three elements
6	`h1 + *[rel=up] { }`	11	one attribute, one element
7	`ul ol li.red { }`	13	one class, three elements
8	`li.red.level { }`	21	two classes, one element
9	`style=""`	1000	one inline styling
10	`p { }`	1	one element
11	`div p { }`	2	two elements
12	`.sith`	10	one class
13	`div p.sith { }`	12	two elements and a class
14	`#sith`	100	one id
15	`body #darkside .sith p { }`	112	element, ID, class, element (1+100+10+1)

Online specificity calculator

http://specificity.keegan.st



Quiz

- The answer is the color of the text after CSS is applied
  - I.e., the HTML part is always the same

```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

Keep in mind

- The color property is **inherited** by child elements
- However, any style declaration (even with the lowest specificity) overwrites the inherited value
- Specificity is to be computed only when there are multiple declarations that apply to the same element

#1

HTML
```html
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```css
body {color: red;}
p {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#1 Solution

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
body {color: red;}
p {color: blue;}
```

- The answer is the color of the text after CSS is applied

- ☐ red
- ■ blue
- ☐ black

Explanation:
The red color is inherited from body. The explicit style declaration for the p element overwrites it.

#2

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
p.bar {color: red;}
p.boo {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#2 Solution

HTML

```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS

```
p.bar {color: red;}
p.boo {color: blue;}
```

- The answer is the color of the text after CSS is applied

- ☐ red
- ■ blue
- ☐ black

Explanation:
p.bar and p.boo have the same specificity. The last rule of declaration decides.

#3

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
p {color: red;}
.container {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#3 Solution

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
p {color: red;}
.container {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [x] red
- [ ] blue
- [ ] black

Explanation:
The blue color is inherited from div.container. The explicit style declaration for the p element overwrites it.

#4

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
#main {color: red;}
body .container {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#4 Solution

HTML

```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS

```
#main {color: red;}
body .container {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [x] red
- [ ] blue
- [ ] black

Explanation:
The color is inherited from the parent div. For that div, the ID #main has a higher specificity (1-0-0) than "body .container" (0-1-1).

#5

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
#foo {color: red;}
#main {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#5 Solution

HTML

```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS

```
#foo {color: red;}
#main {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [x] red
- [ ] blue
- [ ] black

Explanation:
The color inherited from the parent div (blue) is overwritten by the declaration for the ID #foo.

#6

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
.container p {color: red;}
div .boo {color: blue;}
```

- The answer is the color of the text after CSS is applied

- [ ] red
- [ ] blue
- [ ] black

#6 Solution

HTML
```
<div id="main" class="container">
    <p id="foo" class="bar boo">Something clever goes here</p>
</div>
```

CSS
```
.container p {color: red;}
div .boo {color: blue;}
```

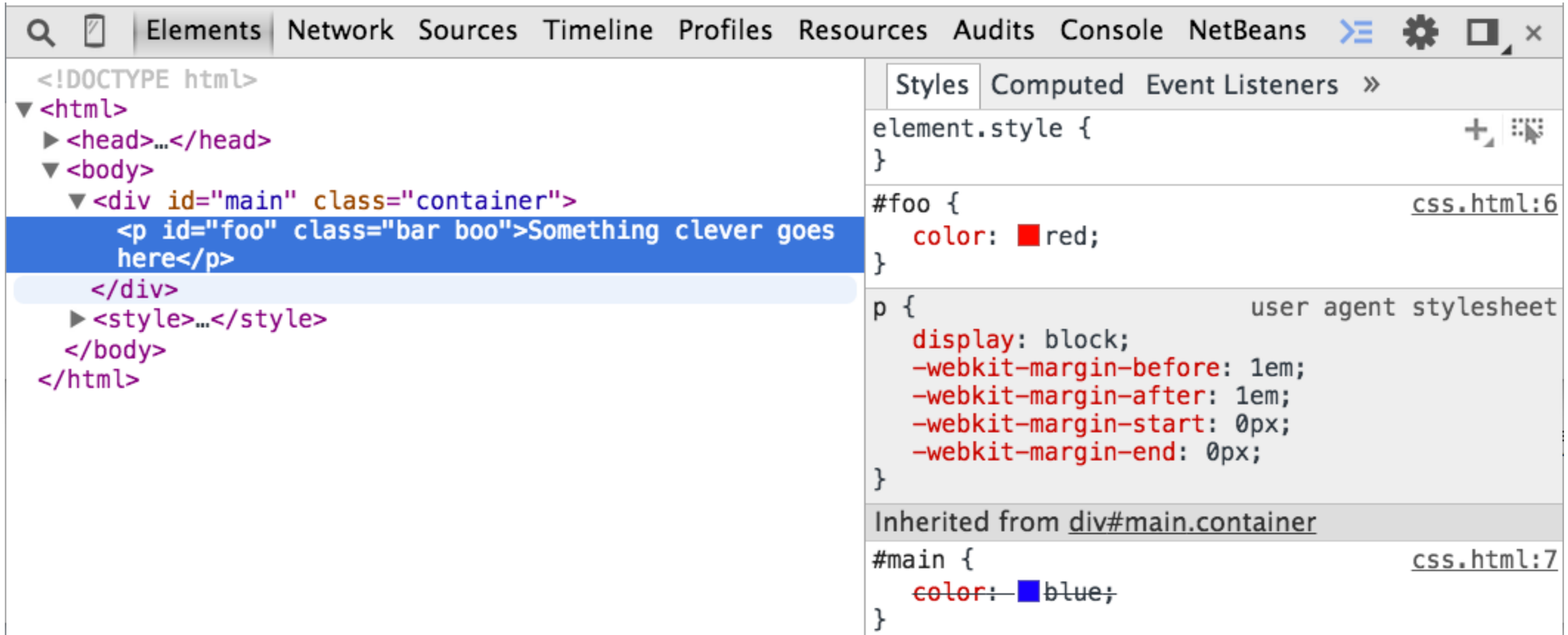
- The answer is the color of the text after CSS is applied

- ☐ red
- ■ blue
- ☐ black

Explanation:
Both declarations apply to the <p> element (the first because p the second because .boo).
They have the same specificity (0-1-1), therefore the last rule of declaration decides.

When in doubt

- Use the browser’s developer functions



Best practices

- Minimize the number of selectors
- Use ID to make a rule more specific
- Never use `!important`