

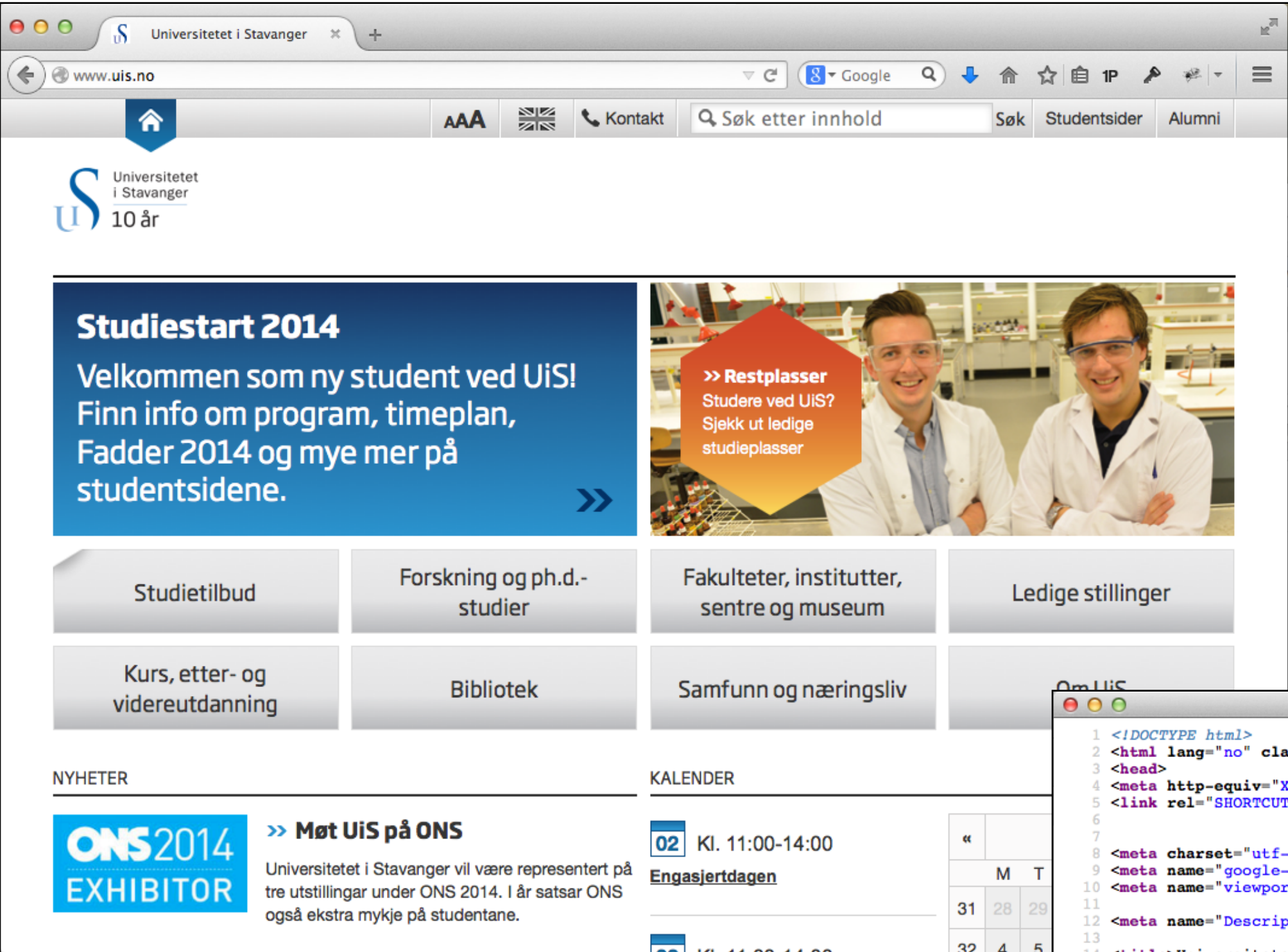
Web Programming

HTML

What is it?

- **HyperText Markup Language**
 - Language for creating web pages
 - Text surrounded by markings that specify the meaning of the content
 - Make the document displayable on different systems (different browsers)
- **Division of responsibilities for a web document**
 - HTML describes the content and structure
 - Style sheets (CSS) describe the appearance
 - Scripts (e.g., JavaScript) describe the behavior

HTML page rendered in the browser



HTML source

```
Source of: http://www.uis.no/

1 <!DOCTYPE html>
2 <html lang="no" class="no-js">
3 <head>
4 <meta http-equiv="X-UA-Compatible" content="IE=edge,chrome=1" />
5 <link rel="SHORTCUT ICON" href="http://www.uis.no/themes/uis-rw/uis_logo.ico"/>
6
7 <meta charset="utf-8" />
8 <meta name="google-site-verification" content="UhS5t0Lh38c-71_fU-9yRjGRrpILuk2ss9RekVfvApw" />
9 <meta name="viewport" content="width=device-width, initial-scale=1.0" />
10
11 <meta name="Description" content="Universitetet i Stavanger" />
12
13 <title>Universitetet i Stavanger </title>
14
15
16
17 <!-- include less css generated css -->
18 <link rel="stylesheet" type="text/css" href="http://www.uis.no/css/uis_common.css">
19 <link rel="stylesheet" type="text/css" media="screen and (min-width: 768px)" href="http://www.uis.no/css/uis_gt_768.css">
20 <link rel="stylesheet" type="text/css" media="screen and (min-width: 980px)" href="http://www.uis.no/css/uis_gt_980.css">
21 <link rel="stylesheet" type="text/css" media="only screen and (-webkit-min-device-pixel-ratio: 2),
22 only screen and (min--moz-device-pixel-ratio: 2),
23 only screen and (-o-min-device-pixel-ratio: 2/1),
24 only screen and (min-device-pixel-ratio: 2),
25 only screen and (min-resolution: 192dpi),
26 only screen and ( min-resolution: 2dppx)" href="http://www.uis.no/css/retina@2.cs
27
28
29 <link rel="stylesheet" type="text/css" media="print" href="http://www.uis.no/css/print.css">
30 <link rel="stylesheet" type="text/css" href="http://www.uis.no/js/jquery.rte/jquery.rte.css">
31 <!--[if lt IE 9]>
32 <link rel="stylesheet" type="text/css" href="http://www.uis.no/css/uis-lt_ie_9.css">
33 <![endif]-->
34
35
36 <script src="http://www.uis.no/js/modernizr-2.6.2.min.js?rev=2014-08-20.1"></script>
37 <!--[if lt IE 9]>
38 <script src="http://www.uis.no/js/selectivizr-min.js?rev=2014-08-20.1"></script>
39 <![endif]-->
40
41
42 <script>document.cookie='resolution='+Math.max(screen.width,screen.height)+'; path=/';</script>
43 </head>
44
45 <body>
46 <div class="hidden">
47 <a title="Hopp til meny" href="#navigation" tabindex="1">Hopp til meny</a>
48 <a title="Hopp til innhold" href="#content" tabindex="2">Hopp til innhold</a>
49 <a title="Hopp til søk" href="#search" tabindex="3">Hopp til søk</a>
50 </div>
51
52 <div class="uis-placeholder uis-placeholder-toolbar">
53
```


First HTML page ever made

World Wide Web

The WorldWideWeb (W3) is a wide-area [hypermedia](#) information retrieval initiative aiming to give universal access to a large universe of documents.

Everything there is online about W3 is linked directly or indirectly to this document, including an [executive summary](#) of the project, [Mailing lists](#) , [Policy](#) , November's [W3 news](#) , [Frequently Asked Questions](#) .

[What's out there?](#)

Pointers to the world's online information, [subjects](#) , [W3 servers](#), etc.

[Help](#)

on the browser you are using

[Software Products](#)

A list of W3 project components and their current state. (e.g. [Line Mode](#) ,X11 [Viola](#) , [NeXTStep](#) , [Servers](#) , [Tools](#) , [Mail robot](#) , [Library](#))

[Technical](#)

Details of protocols, formats, program internals etc

[Bibliography](#)

Paper documentation on W3 and references.

[People](#)

A list of some people involved in the project.

[History](#)

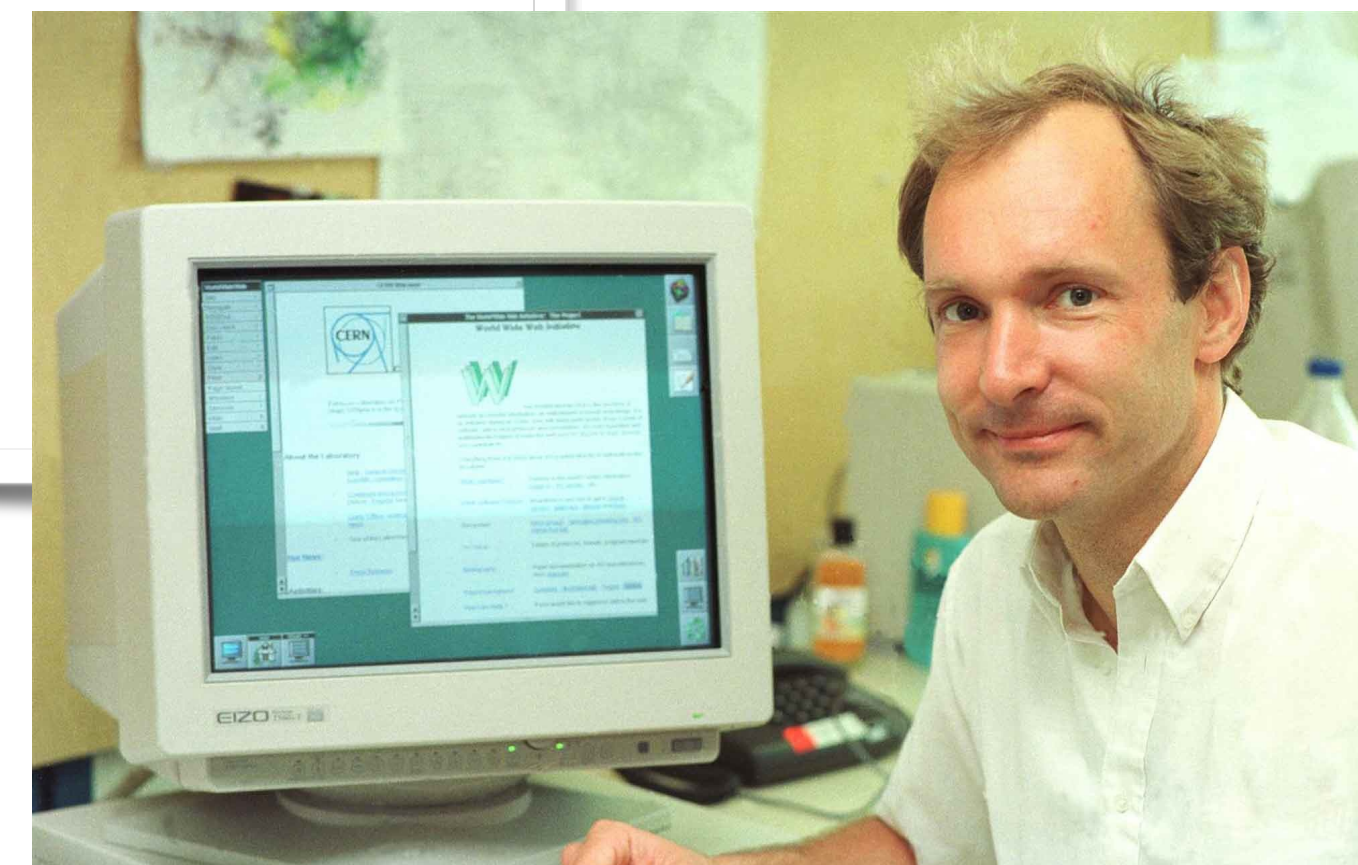
A summary of the history of the project.

[How can I help ?](#)

If you would like to support the web..

[Getting code](#)

Getting the code by [anonymous FTP](#) , etc.



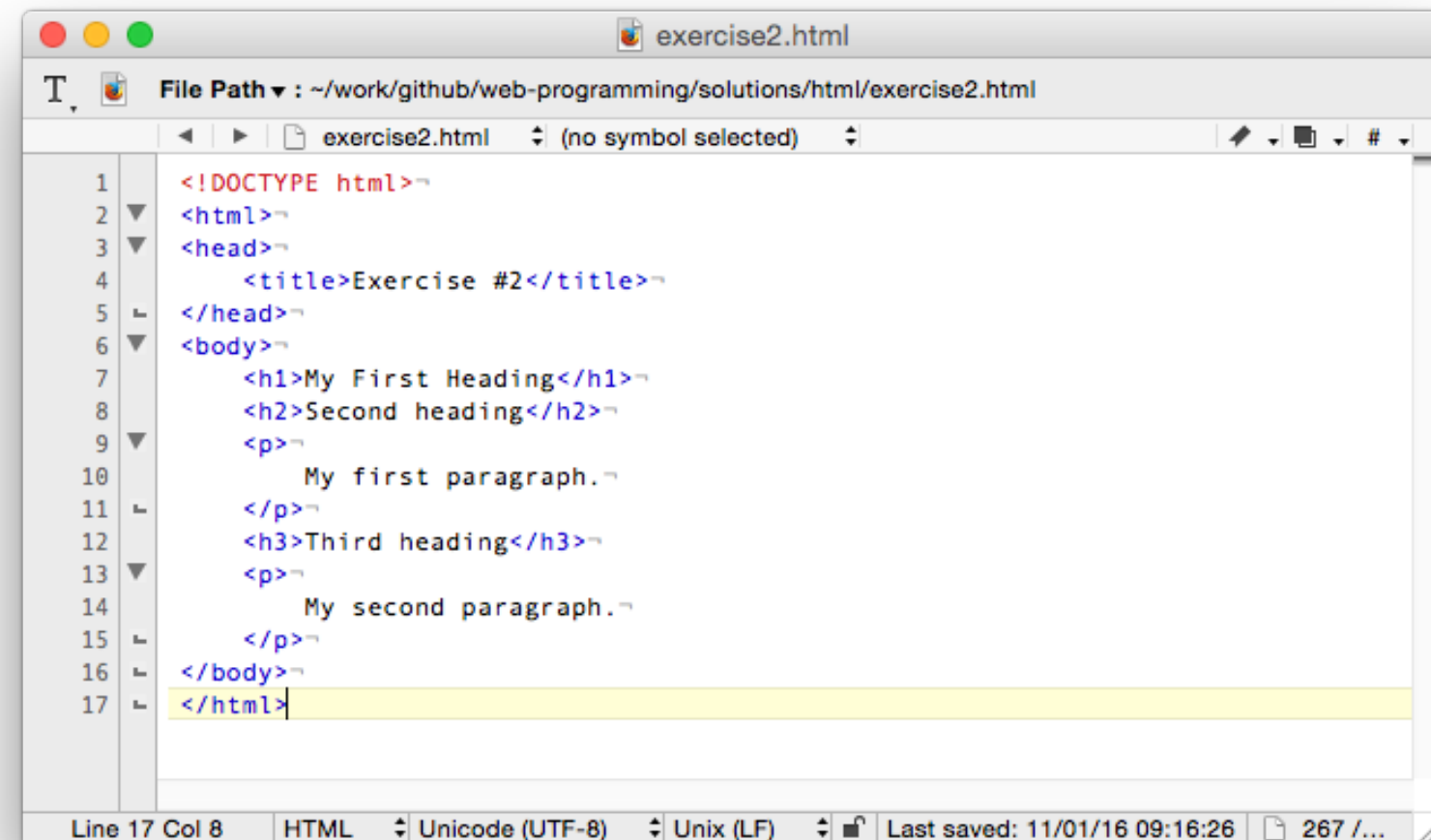
History

- 1991: HTML created by Tim Berners-Lee
- 1993: HTML standardized
- 1997: HTML 3.2
- 1999: HTML 4.01
- 2000-01: XHTML
 - Reformulation of HTML 4.01 using XML
 - No longer being developed
- 2014: HTML5



HTML "programming"

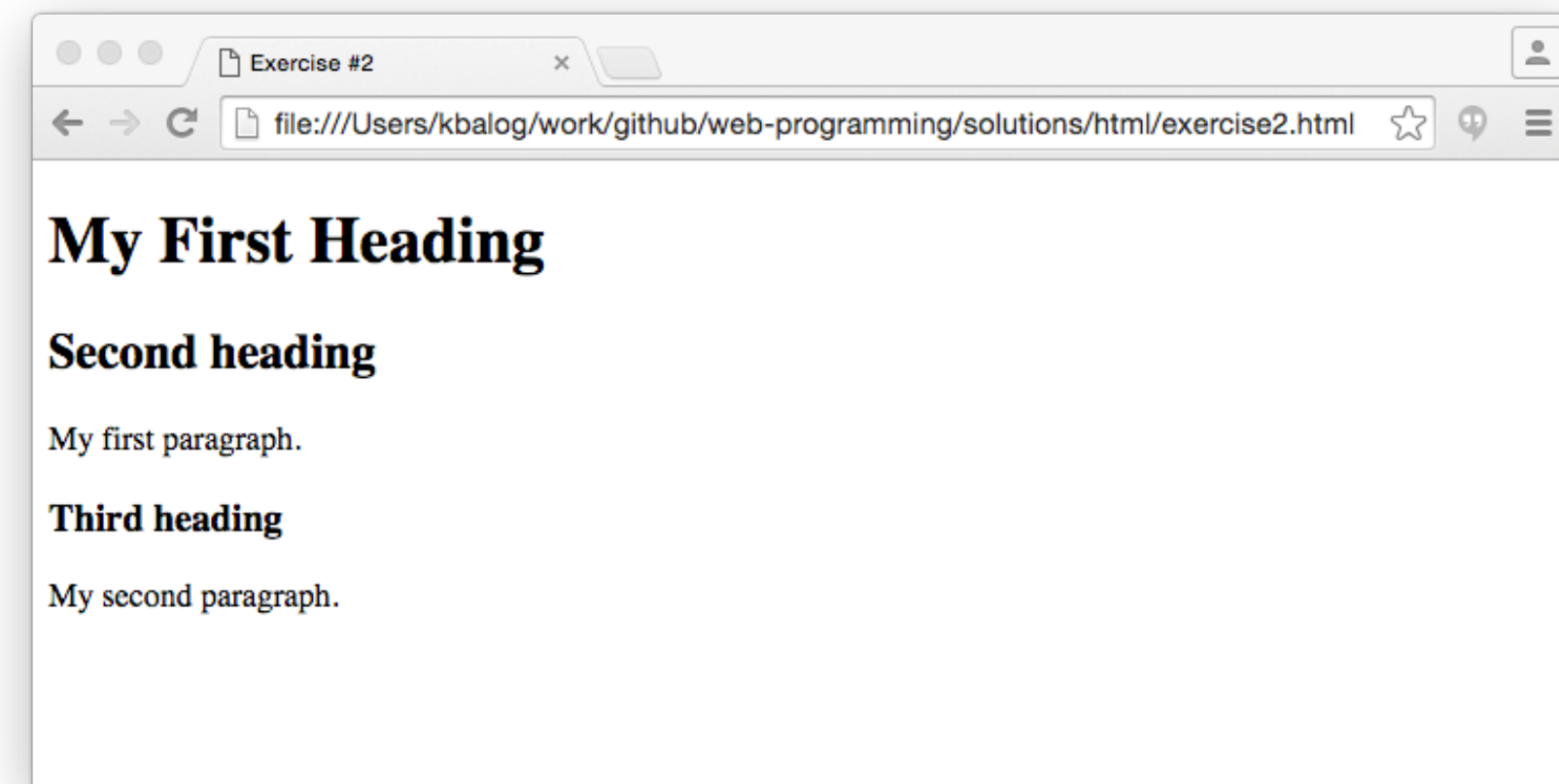
Programming environment
any text editor



```
1 <!DOCTYPE html>
2 <html>
3 <head>
4   <title>Exercise #2</title>
5 </head>
6 <body>
7   <h1>My First Heading</h1>
8   <h2>Second heading</h2>
9   <p>
10     My first paragraph.
11   </p>
12   <h3>Third heading</h3>
13   <p>
14     My second paragraph.
15   </p>
16 </body>
17 </html>
```

The screenshot shows a text editor window titled 'exercise2.html'. The file path is '~/work/github/web-programming/solutions/html/exercise2.html'. The code is HTML, using UTF-8 encoding and Unix line endings. It contains a document type declaration, a head section with a title 'Exercise #2', and a body section with three headings (h1, h2, h3) and two paragraphs. The status bar at the bottom indicates 'Line 17 Col 8', 'HTML', 'Unicode (UTF-8)', 'Unix (LF)', and 'Last saved: 11/01/16 09:16:26'.

Execution environment
any web browser



Syntax

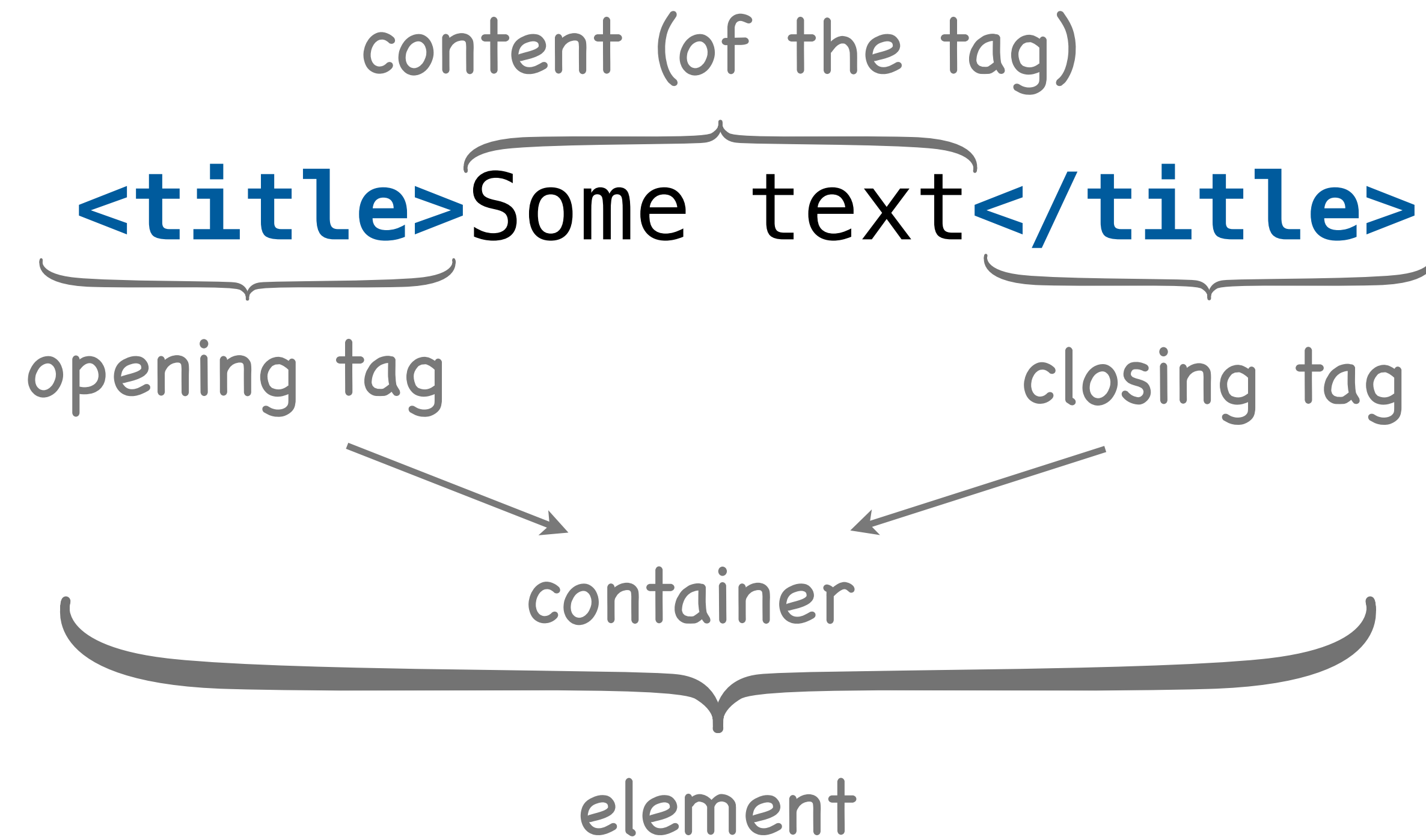
- Fundamental syntactic units are **<tag>**
 - Specify type of content
 - Presentation is specific to the type of the tag
 - Most tags appear in pairs **<tag>...</tag>**
 - A few tags are self-closing **<tag />**
- Case insensitive but lowercase is recommended
- “Error handling” is left to the browser

Syntax (2)

- Tags without a closing pair
<tag> or **<tag />** (preferred)
- Comments are ignored by the browser
<!-- comment text -->
- White spaces are collapsed
- Indentation makes the source more readable

```
<tag1>  
  <tag2>  
    <tag3>...</tag3>  
  </tag2>  
</tag1>
```


Terminology



Terminology

``

attribute
name

attribute
value

HTML Reference

www.w3schools.com/html

HTML Tag

[« Previous](#)

[Complete HTML Reference](#)







[Next »](#)

Definition and Usage

The tag defines an ordered list. An ordered list can be numerical or alphabetical.

Use the [](#) tag to define list items.

Browser Support

Element						
	Yes	Yes	Yes	Yes	Yes	Yes

HTML Reference

www.w3schools.com/html


HTML Tag

[« Previous](#)


[Complete HTML Reference](#)

[Next »](#)

Attributes

 = New in HTML5.

Do not use attributes that are no longer supported in HTML5!

Attribute	Value	Description
<u>compact</u>	compact	Not supported in HTML5. Specifies that the list should render smaller than normal
<u>reversed</u>	 reversed	Specifies that the list order should be descending (9,8,7...)
<u>start</u>	<i>number</i>	Specifies the start value of an ordered list
<u>type</u>	1 A a I i	Specifies the kind of marker to use in the list

Standard HTML document structure

```
<!DOCTYPE html>
```

```
<html>
```

```
  <head>
```

```
    ..
```

```
  </head>
```

```
  <body>
```

```
    ..
```

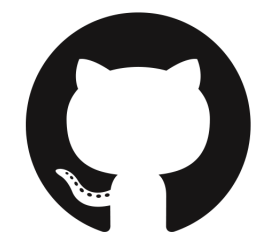
```
  </body>
```

```
</html>
```

} document metadata

} document content

Exercise #1

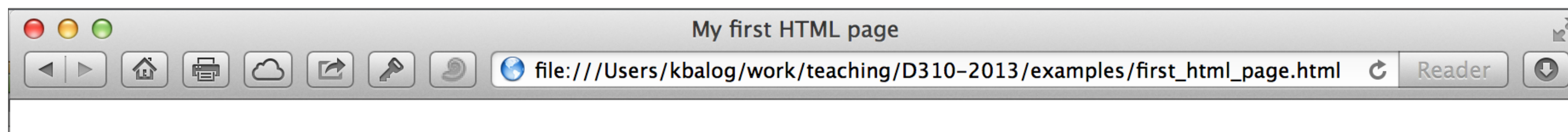


[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

<head> elements

- <title> is required
- <meta> tags are optional
 - Keywords, description, author

```
<head>  
  <title>My first HTML page</title>  
  <meta name="keywords" content="example, html">  
  <meta name="description" content="Just a simple example">  
  <meta name="author" content="Krisztian Balog">  
</head>
```



Character encoding

- Indicate the character encoding used to write the page
- Use UTF-8 by default
- Best is to always include this line in the HTML head section

```
<head>  
  <meta charset="UTF-8">  
  <title>Title</title>  
</head>
```

<body> elements

- Paragraphs
- Headings
- Text formatting
- Lists
- Tables
- Images
- Links

Paragraphs

<p>

- Documents are divided into paragraphs
 - Browsers automatically add an empty line before and after a paragraph
- Use **
** for a line break without starting a new paragraph

```
<p>This is a paragraph</p>  
<p>Second paragraph. We force a linebreak here<br />then  
continue.</p>
```

This is a paragraph

Second paragraph. We force a linebreak here
then continue.

Headings

`<h1>, <h2>, . . . , <h6>`

- Headings reflect document structure
 - **<h1>** is most important, **<h6>** is least important
 - Important for search engines

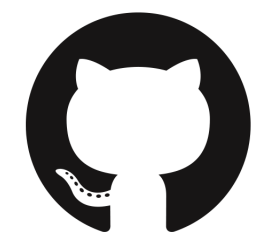
```
<h1>Heading 1</h1>  
<h2>Heading 2</h2>  
<h3>Heading 3</h3>
```

Heading 1

Heading 2

Heading 3

Exercise #2



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Phrase elements

**, **

- **** defines important text and is displayed in **bold** by default
- **** defines emphasized text and is displayed in *italic* by default

```
<p>This is a paragraph. And we can make the text here  
<strong>bold</strong> or <em>emphasized</em>.<br />  
It is also possible to <strong><em>combine these</em>  
</strong> by nesting tags.</p>
```

This is a paragraph. And we can make the text here **bold** or *emphasized*.
It is also possible to *combine these* by nesting the tags.

More text markup

<s>	Strikethrough
<small>	Smaller text
<sub>	Subscripted text
<sup>	Superscripted text
<mark>	Highlighted text

Character entities

&nbsp;	Non-breaking space
&lt;	<
&gt;	>
&euro;	€
&copy;	©
&reg;	®

Lines

<hr>

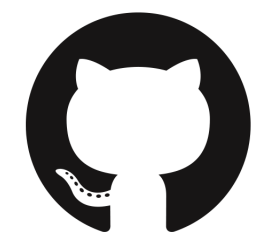
- Draw a horizontal rule
- No closing tag **<hr>** and **<hr />** are both fine

```
<p>There is some text</p>  
<hr />  
<p>There is some more text</p>
```

There is some text

There is some more text

Exercise #3



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Lists

``, ``, ``

Ordered list

```
<ol>  
  <li>Item 1</li>  
  <li>Item 2</li>  
  <li>Item 3</li>  
</ol>
```

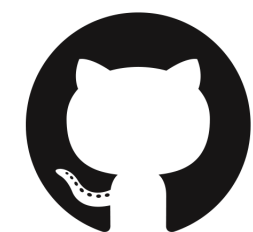
1. Item 1
2. Item 2
3. Item 3

Unordered list

```
<ul>  
  <li>Item 1</li>  
  <li>Item 2</li>  
  <li>Item 3</li>  
</ul>
```

- Item 1
- Item 2
- Item 3

Exercise #4 (#4b)



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Tables

<table>, <thead>, <tbody>, <tr>, <th>, <td>

```
<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>
```

First name	Last name	Points
John	Smith	100
Jack	Jackson	90
John	Doe	75

Merging cells

- Merging columns: **colspan="x"**

```
<td colspan="2">Content in the cell</td>
```

- Merging rows: **rowspan="x"**

```
<td rowspan="2">Content in the cell</td>
```

example

```
<table border="1">
  <tr>
    <td>Row 1, Col 1</td>
    <td>Row 1, Col 2</td>
    <td>Row 1, Col 3</td>
  </tr>
  <tr>
    <td>Row 2, Col 1</td>
    <td>Row 2, Col 2</td>
    <td>Row 2, Col 3</td>
  </tr>
  <tr>
    <td>Row 3, Col 1</td>
    <td>Row 3, Col 2</td>
    <td>Row 3, Col 3</td>
  </tr>
</table>
```

Row 1, Col 1	Row 1, Col 2	Row 1, Col 3
Row 2, Col 1	Row 2, Col 2	Row 2, Col 3
Row 3, Col 1	Row 3, Col 2	Row 3, Col 3

example (colspan)

```
<table border="1">
  <tr>
    <td colspan="2">Row 1,
Col 1-2</td>
    <td>Row 1, Col 2</td>
    <td>Row 1, Col 3</td>
  </tr>
  <tr>
    <td>Row 2, Col 1</td>
    <td>Row 2, Col 2</td>
    <td>Row 2, Col 3</td>
  </tr>
  <tr>
    <td colspan="3">Row 3,
Col 1-3</td>
    <td>Row 3, Col 2</td>
    <td>Row 3, Col 3</td>
  </tr>
</table>
```

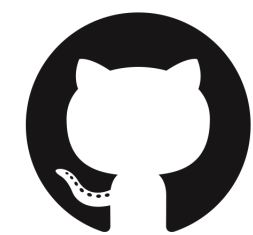
Row 1, Col 1-2		Row 1, Col 3
Row 2, Col 1	Row 2, Col 2	Row 2, Col 3
Row 3, Col 1-3		

example (rowspan)

```
<table border="1">
  <tr>
    <td rowspan="2">Row 1-2,
Col 1</td>
    <td>Row 1, Col 2</td>
    <td rowspan="3">Row 1-3,
Col 3</td>
  </tr>
  <tr>
    <td>Row 2, Col 1</td>
    <td>Row 2, Col 2</td>
    <td>Row 2, Col 3</td>
  </tr>
  <tr>
    <td>Row 3, Col 1</td>
    <td>Row 3, Col 2</td>
    <td>Row 3, Col 3</td>
  </tr>
</table>
```

Row 1-2, Col 1	Row 1, Col 2	Row 1-3, Col 3
	Row 2, Col 2	
Row 3, Col 1	Row 3, Col 2	

Exercise #5



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Links

<a>

- Clickable text to jump to another page
 - Absolute URL **href="http://www.uis.no"**
 - Relative to current page **href="page2.html"**

```
<p>There is some text with a <a href="http://www.uis.no">  
clickable link</a> in it</p>
```

There is some text with a [clickable link](#) in it

Links (2)

<a>

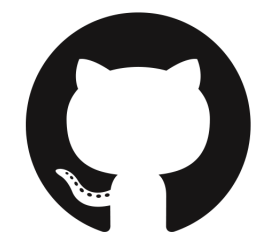
- Link to email address

```
<a href="mailto:info@uis.no">email us</a>
```

- **target="_blank"** makes the browser open the link in a new window

```
<a href="http://www.uis.no" target="_blank">UiS</a>
```


Exercises #6 and #7



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Links within a page

<a>

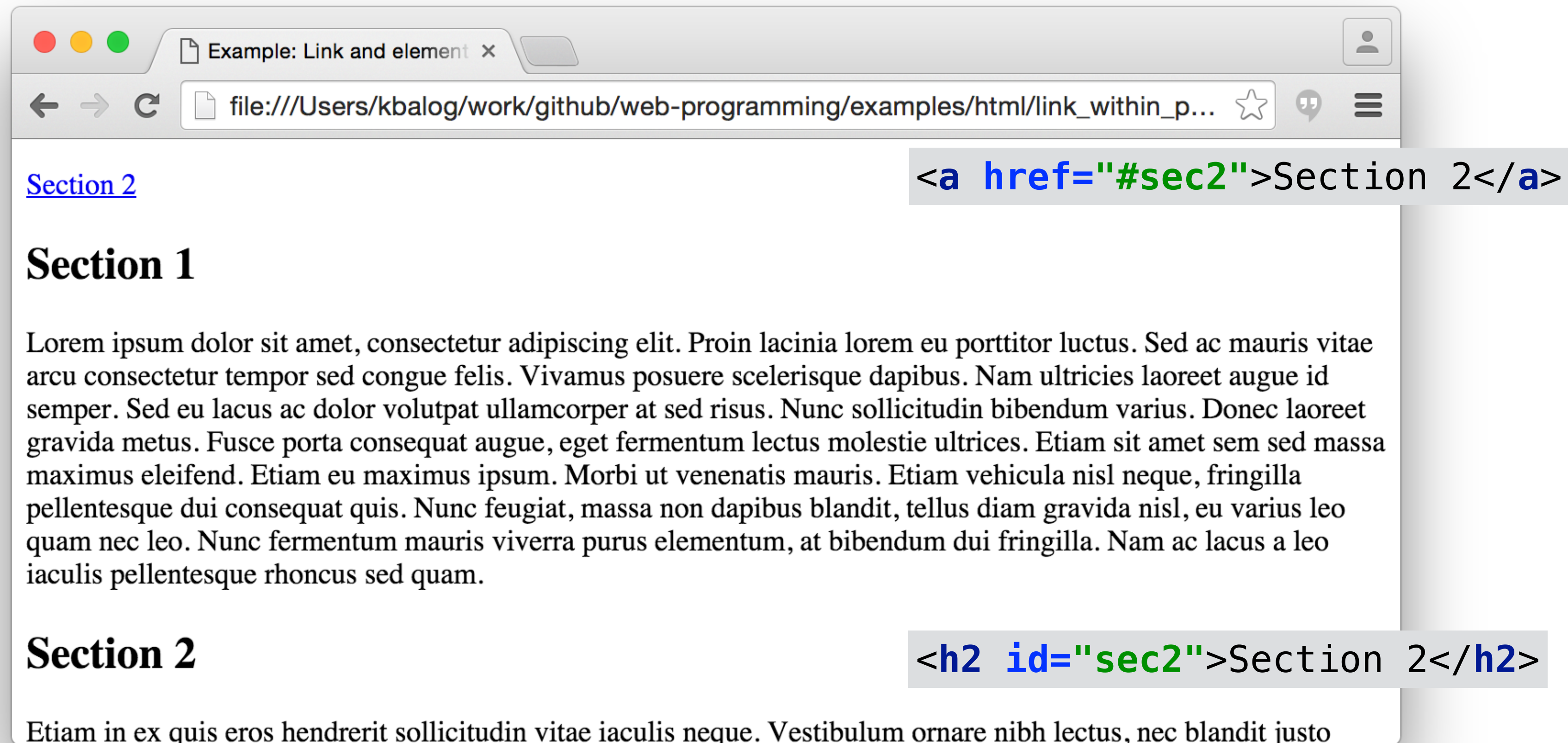
- **id** is a global attribute that can be defined for any HTML element
 - It needs to be unique, i.e., no two HTML elements can have the same id value
- Any element with an id can be linked within the page, e.g.,
 - Element to be linked
- Link to the element

```
<h2 id="sec2">Section 2</h2>
```

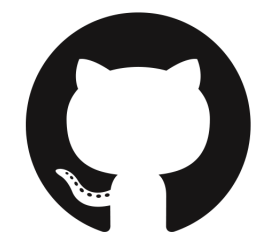
```
<a href="#sec2">Section 2</a>
```

Example

🔗 examples/html/link_within_page.html



Exercise #8



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Images

``

- Only attributes, no closing tag
- **src** can point to local or remote file (http://...)
- **alt** is alternative text if the image cannot be displayed
- **width** and **height** are optional
 - value in default is given in pixels
 - percentages can also be used (e.g., 50%)

```

```

Images - best practices

- Keep all images in a separate folder (e.g., images)
 - You can use further subfolders based on type or size
- Always use an alt tag
 - Screen readers read the alt tags for visually impaired
- Always specify width and height
 - To avoid the page flickering while the image loads

Images - best practices (2)

- Resize image files to the required size (e.g., for thumbnails and previews)
 - This makes your site load faster and reduces bandwidth

original jpg file (1000x1500px), 1MB



```

```

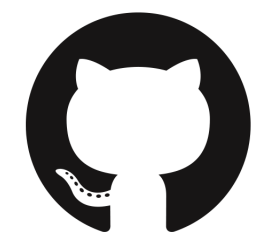
resized jpg file (300x200px), 55KB



```

```

Exercises #9 and #10



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics

Inline vs. block-level elements

- A **block-level element** always starts on a new line and takes up the full width available
 - Examples: `<h1>`,..`<h6>`, `<p>`, `<div>`, `<form>`
- An **inline element** does not start on a new line and only takes up as much width as necessary
 - Examples: `<a>`, ``, ``, ``



block level



inline

Code and preformatted text

`<code>`, `<pre>`

- `<code>` is an *inline* element that designates a short piece of text as being source code

The `<code>`System.out.println`</code>` method produces console output in a Java program.

The `System.out.println` method produces console output in a Java program.

- `<pre>` is a *block-level* element that preserves all the whitespaces in its content exactly as written
 - By default rendered in a fixed-width font, but the content is still interpreted as HTML

Example

<pre>

```
<pre>
    public static void main(String[] args) {
        System.out.println("<b>Hello world</b>");
    }
</pre>
```

```
public static void main(String[] args) {
    System.out.println("Hello world");
}
```

Content inside is still interpreted as HTML!

Container elements

- **<div>** defines a division or section in a page
 - Used to group block-elements to format them with CSS
- **** groups inline elements in a document

div example

```
<div style="width:50px; height:50px; background-color:blue">  
Div 1  
</div>  
  
<div style="width:100px; height:50px; background-color:yellow">  
Div 2  
</div>  
  
<div style="width:150px; height:50px; background-color:red">  
Div 3  
</div>
```



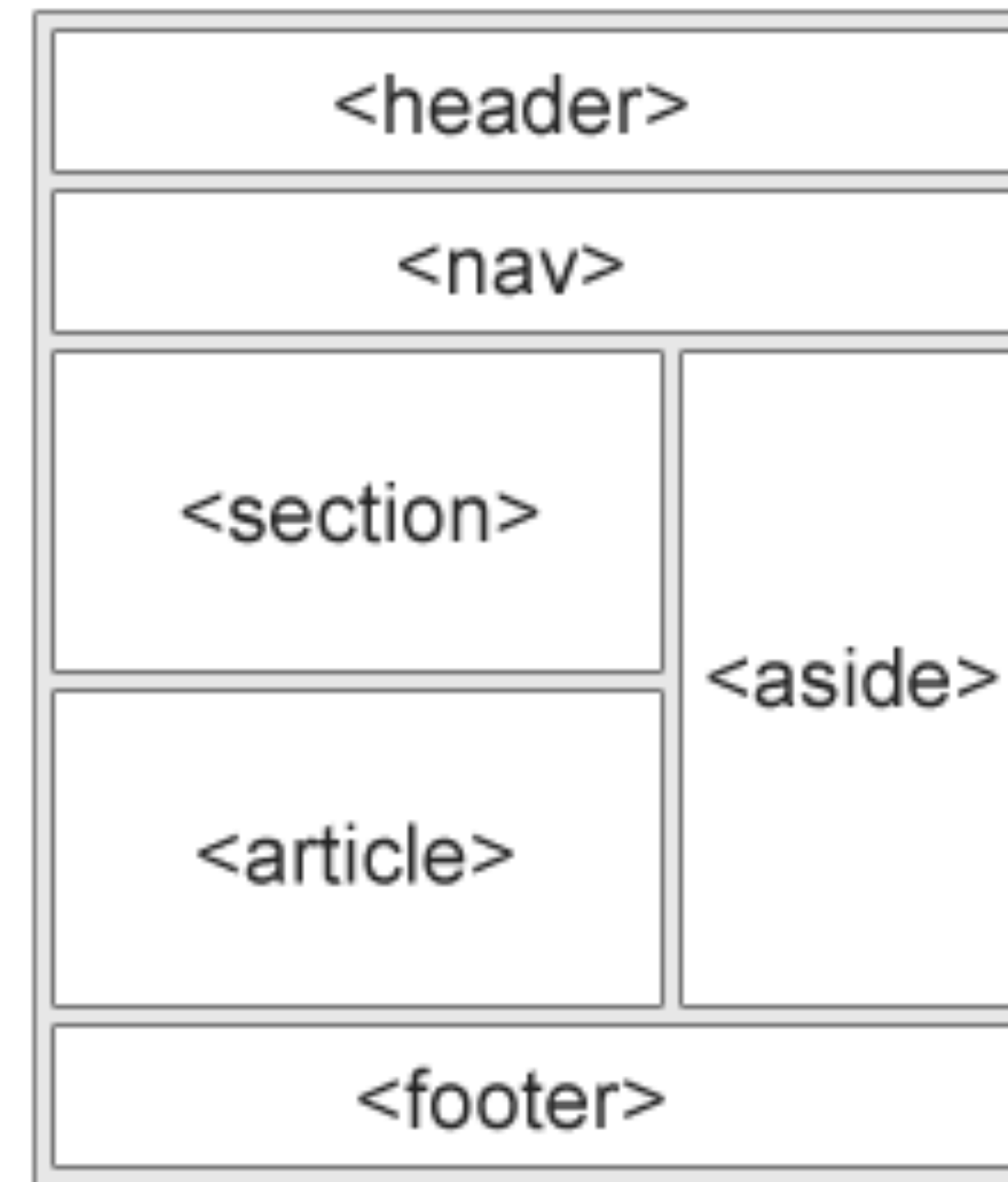
span example

```
<p style="font-family:Verdana;font-size:14px">  
Lorem Ipsum is <span style="font-family:Impact;font-size:  
18px">simply dummy text</span> of the printing and typesetting  
industry.  
</p>
```

Lorem Ipsum is **simply dummy text** of the printing and typesetting industry.

New HTML5 elements for document structure/semantics

- <article>
- <aside>
- <details>
- <figure>
- <footer>
- <header>
- <main>
- <menuitem>
- <nav>
- <section>
- <summary>



Iframe

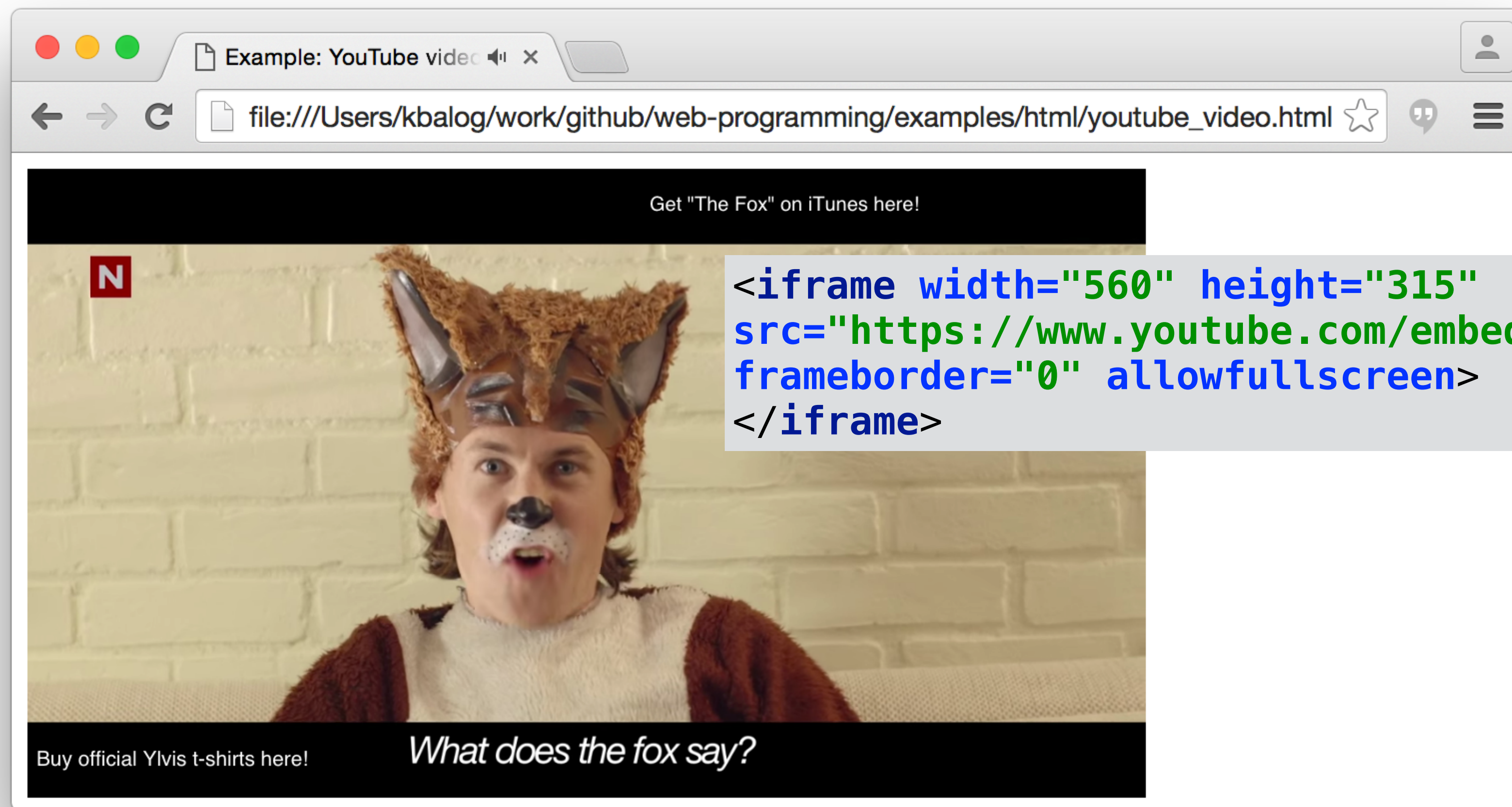
- **<iframe>** is used to display a webpage within a webpage

```
<iframe src="http://address.com"></iframe>
```

- **src** attribute (mandatory) specifies the address of the document to embed
- **height** and **width** attributes specify the size
- Recommended method for embedding YouTube videos

Example

🔗 examples/html/youtube_video.html



```
<iframe width="560" height="315"
src="https://www.youtube.com/embed/jofNR_WkoCE"
frameborder="0" allowfullscreen>
</iframe>
```

HTML5 audio and video

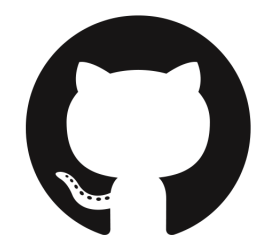
<audio>, <video>

- HTML5 provides standard ways to embed audio and video in web pages
 - Use .mp3 format for audios (supported by all browsers)

```
<audio controls>  
  <source src="horse.mp3" type="audio/mpeg">  
  Your browser does not support the audio element.  
</audio>
```



Exercises #11 and #12



[https://github.com/kbalog/web-programming/tree/master/](https://github.com/kbalog/web-programming/tree/master/exercises/html/basics)
exercises/html/basics