

DOM, SPA and jQuery Basics

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ToC

- Document Object Model
- why jQuery
- getting started
- selectors
- event handling

High Level SW Architecture

Web Clients



Browser Engine
HTML5/CSS3/JS



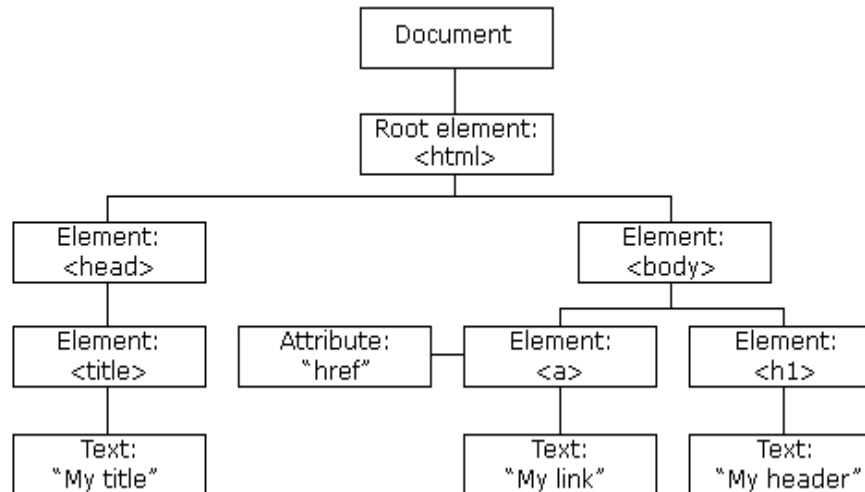
Back-end server

- Web Server (e.g. Apache)
- Storage of browser client files

HTML5/CSS3/JS

HTML DOM

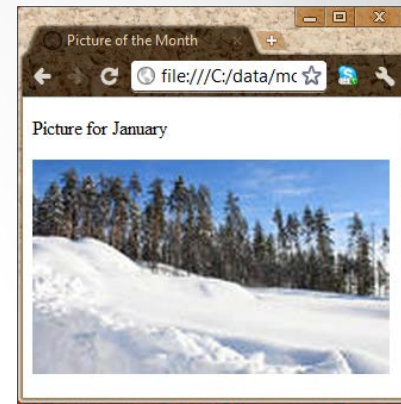
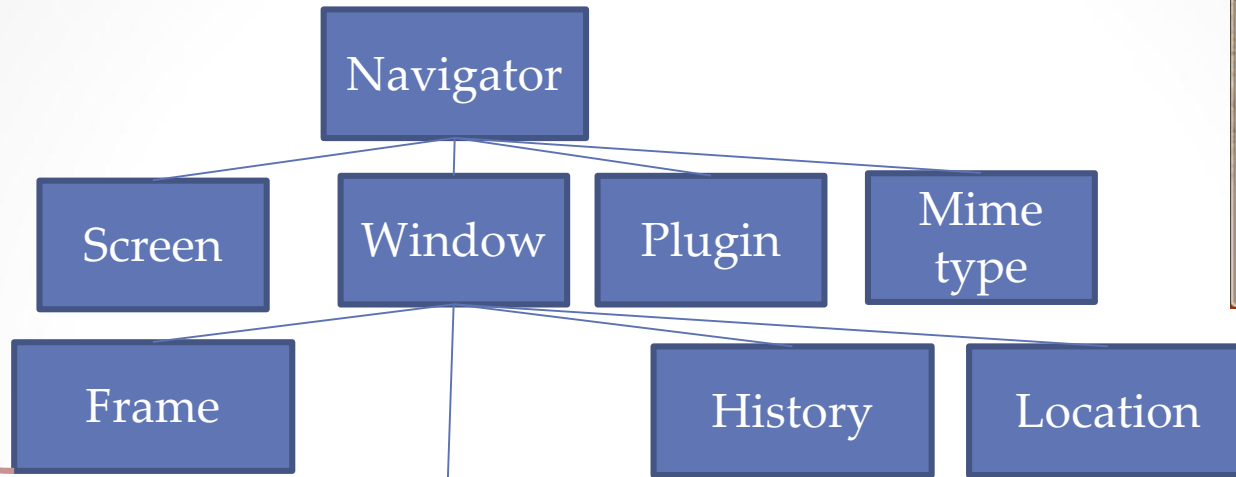
- The DOM is a W3C standard – it defines a standard for accessing documents like HTML and XML:
- *"The W3C Document Object Model (DOM) is a platform and language-neutral interface that allows programs and scripts to dynamically access and update the content, structure, and style of a document."*
- The HTML DOM defines a standard way for accessing and manipulating HTML documents.
- The DOM presents an HTML document as a tree-structure (a node tree), with elements, attributes, and text.



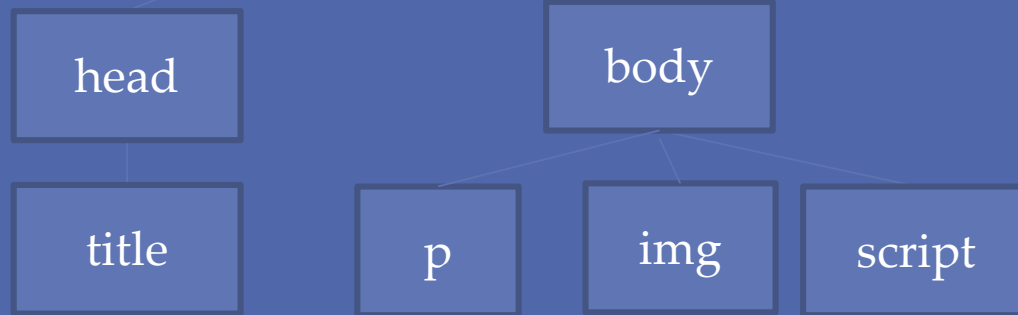
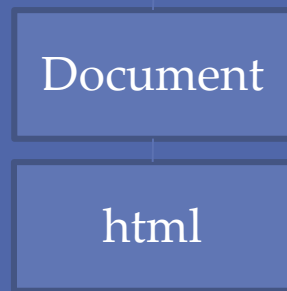
Learn more: <http://www.w3schools.com/html/dom>

Browser Object Model

No
Public
Standard



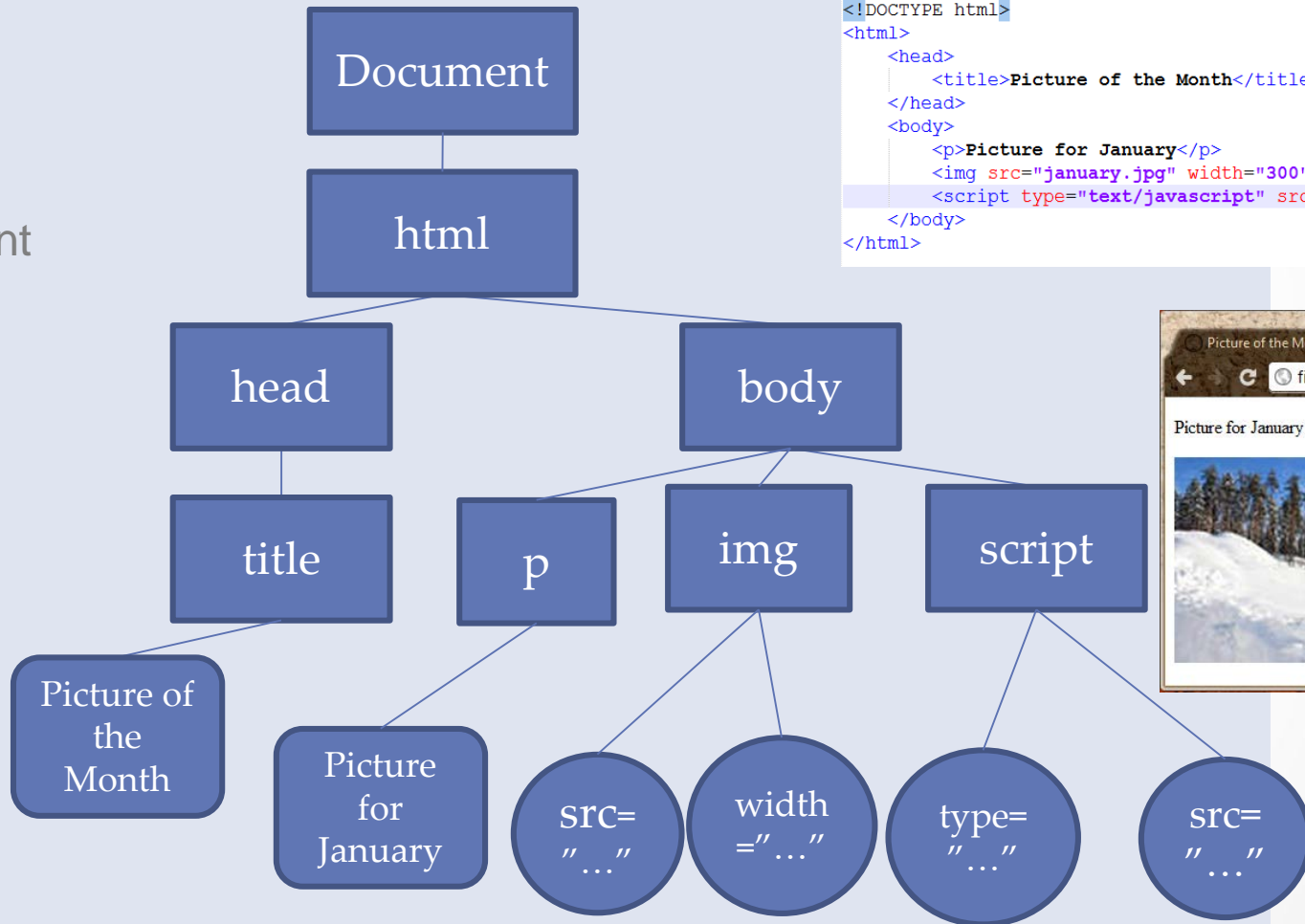
Document
Object
Model (not
complete)



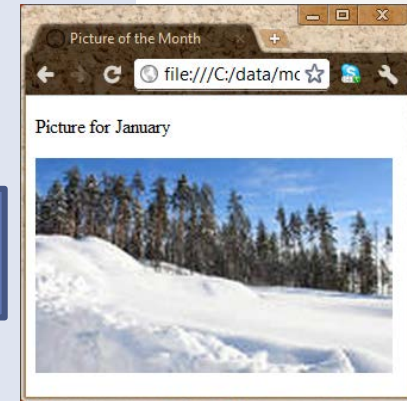
```
<!DOCTYPE html>
<html>
  <head>
    <title>Picture of the Month</title>
  </head>
  <body>
    <p>Picture for January</p>
    
    <script type="text/javascript" src="myscr.js"></script>
  </body>
</html>
```

Document Object Model

Document
object
model



```
<!DOCTYPE html>
<html>
  <head>
    <title>Picture of the Month</title>
  </head>
  <body>
    <p>Picture for January</p>
    
    <script type="text/javascript" src="myscr.js"></script>
  </body>
</html>
```



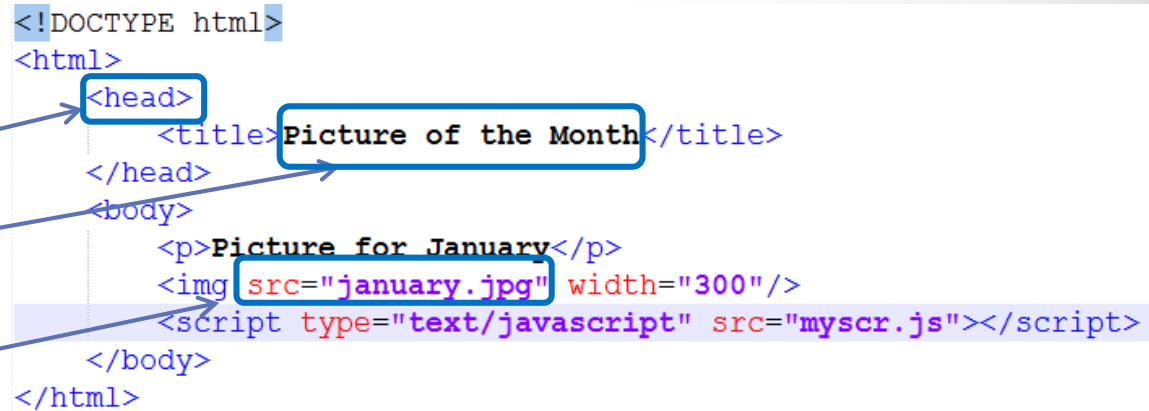
Text nodes

Attribute nodes

Node Types

- Element node
- Text node
- Attribute node

```
<!DOCTYPE html>
<html>
  <head>
    <title>Picture of the Month</title>
  </head>
  <body>
    <p>Picture for January</p>
    
    <script type="text/javascript" src="myscr.js"></script>
  </body>
</html>
```



HTML DOM Objects

- In addition to the built-in JavaScript objects, you can also access and manipulate Browser Objects (like window) and all of the HTML DOM objects with JavaScript
 - Document
 - Body
 - Button
 - Image
 - Table
 - etc.

<http://www.w3schools.com/jsref/default.asp>

Why jQuery

- JQuery simplifies manipulation of DOM, UI and network operations. (<http://jquery.com>)
- There are several JS libraries and frameworks: MooTools, Dojo, jQuery, Prototype (boosted with script.aculo.us), YUI, Sencha Touch, Modernizr, AngularJS, Backbone, Meteor, etc.
- jQuery is one of the most common libraries

Getting Started

- Download jQuery library:
 - The minified versions are generally the best versions to use on production deployments
 - jQuery 1.11.1 or 2.1.1 - jQuery 2.x has the same API as jQuery 1.x, but *does not support Internet Explorer 6, 7, or 8.*
- Include reference to jQuery library in your HTML code:

```
<html>
  <head>
    <title>Test You</title>
    <script src="jquery-2.1.1.min.js"></script>
    <script src="xxxxxxxxxxx.js"></script>
  </head>
  <body>
    <!-- HTML content here -->
  </body>
</html>
```

DOM ready

- jQuery reads or manipulates the document object model (DOM), we need to make sure that the DOM is ready.
- To do this, we register a ready event for the document - `$()` is a short version of `jQuery()` function that returns a jQuery object referencing to selected DOM elements.

```
$(document).ready(function() {  
    // do stuff when DOM is ready  
});
```

or shorter:

```
$(function() {  
    // do stuff when the DOM is ready  
});
```

- Is all page content loaded when the **DOM** is ready?

Source: http://docs.jquery.com/Tutorials:Getting_Started_with_jQuery

Example: DOM ready

```
<html>
  <head>
    <title>Script Ready</title>
    <script src="jquery-2.1.1.min.js"></script>
    <script src="test2.js"></script>
  </head>
  <body>
    <p>What a nice animal</p>
    
    <a id="alink" href="http://www.metropolia.fi">Metropolia</a>
  </body>
</html>
```

test2.js -file

```
$(document).ready(function() {
  $("#alink").click(function() {
    alert("click, click ...");
  });
});
```

Selectors

Examples: please look: http://www.w3schools.com/jquery/jquery_ref_selectors.asp

- **ID Selector** (“#id”) - Selects a single element with the given id attribute. For example: `$("#alink")`
- **Element Selector** (“element”) - Selects all elements with the given tag name. For example: `$("a")`
- **Class Selector** (“.class”) - Selects all elements with the given class. For example: `$(".linkstyle")`

```
...  
<a id="alink" class="linkstyle" href="http://www.metropolia.fi">Metropolia</a>  
...
```

Selector Filters

:first

For example: `$("a:first")` - Metropolia

:last

For example: `$("a:last")` - Google

:eq(index)

For example: `$("a:eq(1)")` - Google

:gt(index)

For example: `$("a:gt(0)")` - Google

:lt(index)

For example: `$("a:lt(1)")` - Metropolia

:contains(text)

For example: `$("a:contains('etro')")` - Metropolia

Look:

<https://api.jquery.com/category/selectors/basic-filter-selectors/>

...

```
<a id="alink" href="http://www.metropolia.fi">Metropolia</a>
```

```
<a id="blink" href="http://www.google.com">Google</a>
```

...

Some DOM Manipulation Methods

- `.hide()`, `.show()`
- `.text()`
- `.append()`, `.prepend()` – insert content inside an existing element
- `.attr()`
- `.removeAttr()`
- `.html()`
- `.after()`, `.before()` – insert content outside an existing element
- `.remove()`

<http://api.jquery.com/category/manipulation/>

Simple Examples

```
<html>
  <head>
    <title>Script Ready</title>
    <script src="jquery-2.1.1.min.js"></script>
    <script src="test2.js"></script>
  </head>
  <body>
    <p>What a nice animal</p>
    
    <a id="alink" href="http://www.metropolia.fi">Metropolia</a>
    <p>If you click on me, I will disappear.</p>
    <p>Click me away!</p>
    <p>Click me too!</p>
  </body>
</html>
```

test.js:

```
$(document).ready(function(){
  $("p").click(function(){
    $(this).hide();
  });
  $('body').css("background-color","yellow");
});
```


Simple Examples, try these


```
$( 'body' ).css( "background-color", "yellow" );  
$( 'p' ).hide();  
$( 'p' ).text( 'Koala' );  
$( 'p' ).attr( 'id', 'txt' );  
$( 'p' ).remove();
```

Lab 2 – Exercise 1

- Download jquery-2.1.1.min.js file from Tuubi
- Download jqbasiclab1.html file from Tuubi
- Add missing script tags into the head part of the html
- Using jQuery:
 - Add id attribute into the second paragraph
 - Remove first paragraph
 - Change the background color of the first div to grey and text color to white

jQuery Example – Add New Element

```
<html>
  <head>
    <title>Script Ready</title>
    <script type="text/javascript" src="jquery-2.1.1.min.js"></script>
    <script type="text/javascript" src="test5.js"></script>
  </head>
  <body>
    <p>What a nice animal</p>
    
    <a id="alink" class="linkstyle" href="http://www.metropolia.fi">Metropolia</a>
  </body>
</html>
```



test5.js:

```
$(document).ready(function() {
    $('img').before('<a href="http://www.google.com">Google</a>');
});
```

Event, Event Method and Event Handler

`.click()` event method binds a function (=click event handler) to the **click event**.

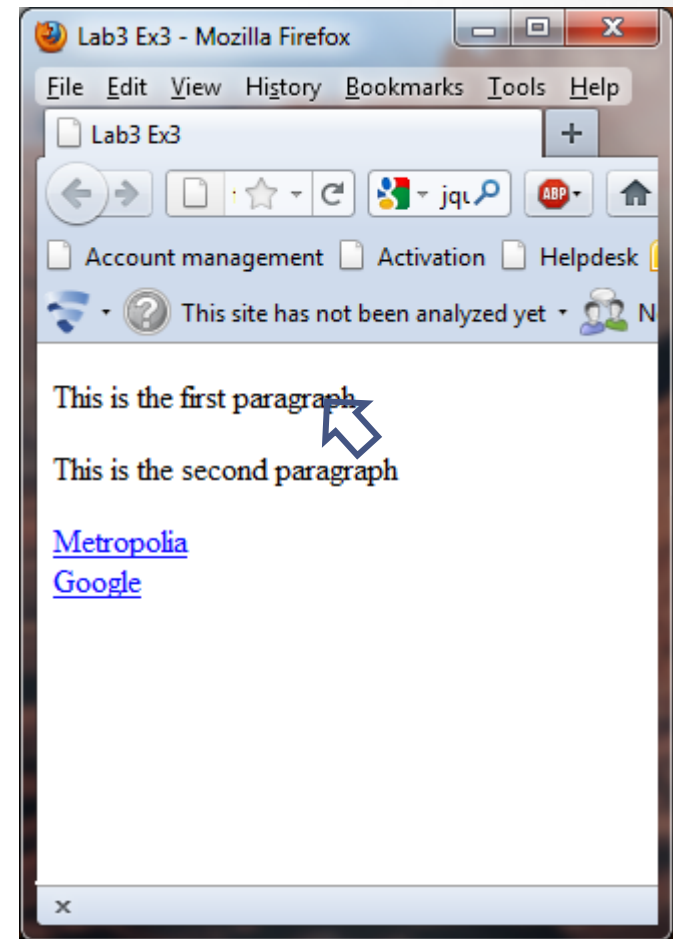
User clicks on browser window and the browser engine generates an event.

object that is
binded to the
event

Click event

```
$("#p").click(function() {  
    alert('paragraph clicked');  
});
```

Click Event Handler



Event Methods

- Document Loading

- .ready() - to be executed after the DOM is ready

```
$(document).ready(function() {  
    //do something  
});
```

- Mouse Events

- .click() – to be executed after mouse pointer is over the element, and the mouse button is pressed and released.

```
$('div').click(function() {  
    // do something  
});
```

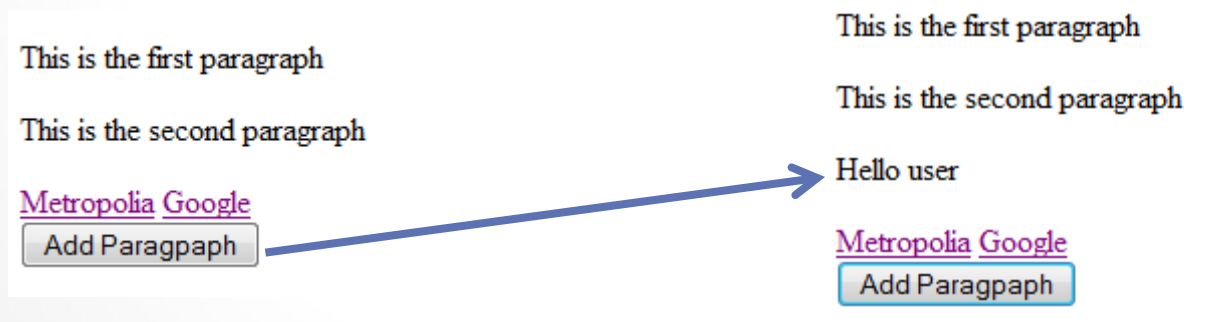
Example

```
$(document).ready(function() {  
    $("div").click(function() {  
        alert('div clicked');  
    });  
});
```

<http://api.jquery.com/click/>

Lab2 – Exercise 2

- Add a button into the jqbasiclab1.html file
- Define click event handler in your JavaScript file
- When the user clicks button then a new paragraph (id = 'tp') with the text 'Hello user' will be added into your HTML-document as a last paragraph inside the first div



Some More Mouse Event Methods

- `.hover()` - apply behavior to an element during the time the mouse is within the element.

```
$("#p").hover(  
    function () { $(this).css('color','red');},  
    function () { $(this).css('color','black');}  
);
```

- `.mouseenter()`

```
$('#p').mouseenter(  
    function () { $(this).css('color','red');}  
);
```

- `.mouseleave()`

```
$('#p').mouseleave(  
    function () { $(this).css('color','black');}  
);
```

<http://api.jquery.com/category/events/mouse-events/>

Lab2 – Exercise 3

- Using JavaScript (jQuery) add a new paragraph into the jqbasiclab1.html file
- Define hover event handler in your JavaScript file
- When the user moves mouse above the last div then the content of the newly added paragraph will be changed to “About to select a link ...”, and when the user moves mouse outside last div then the text of this paragraph will be removed