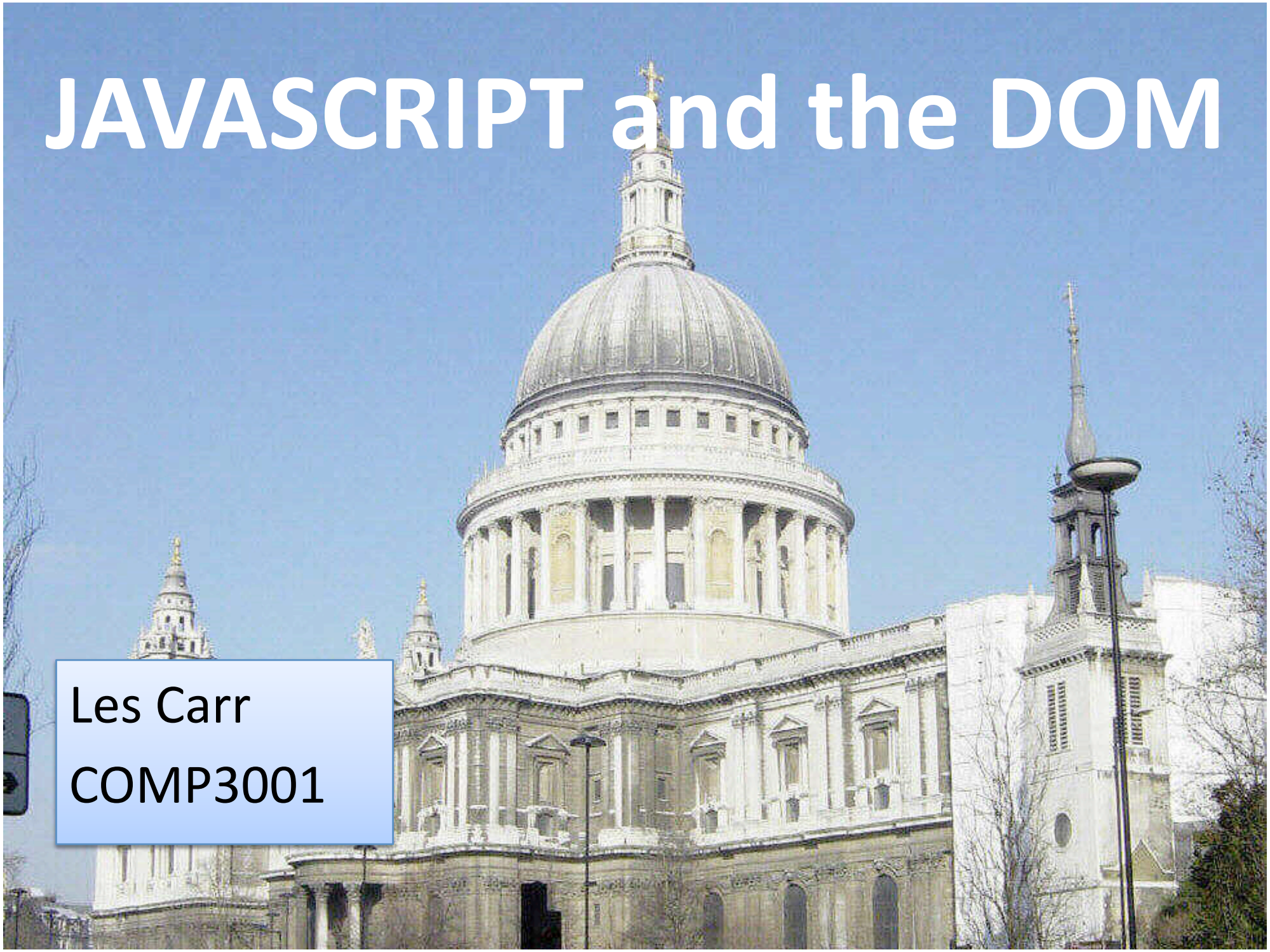
JAVASCRIPT and the DOM



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COMP3001

JavaScript and the DOM

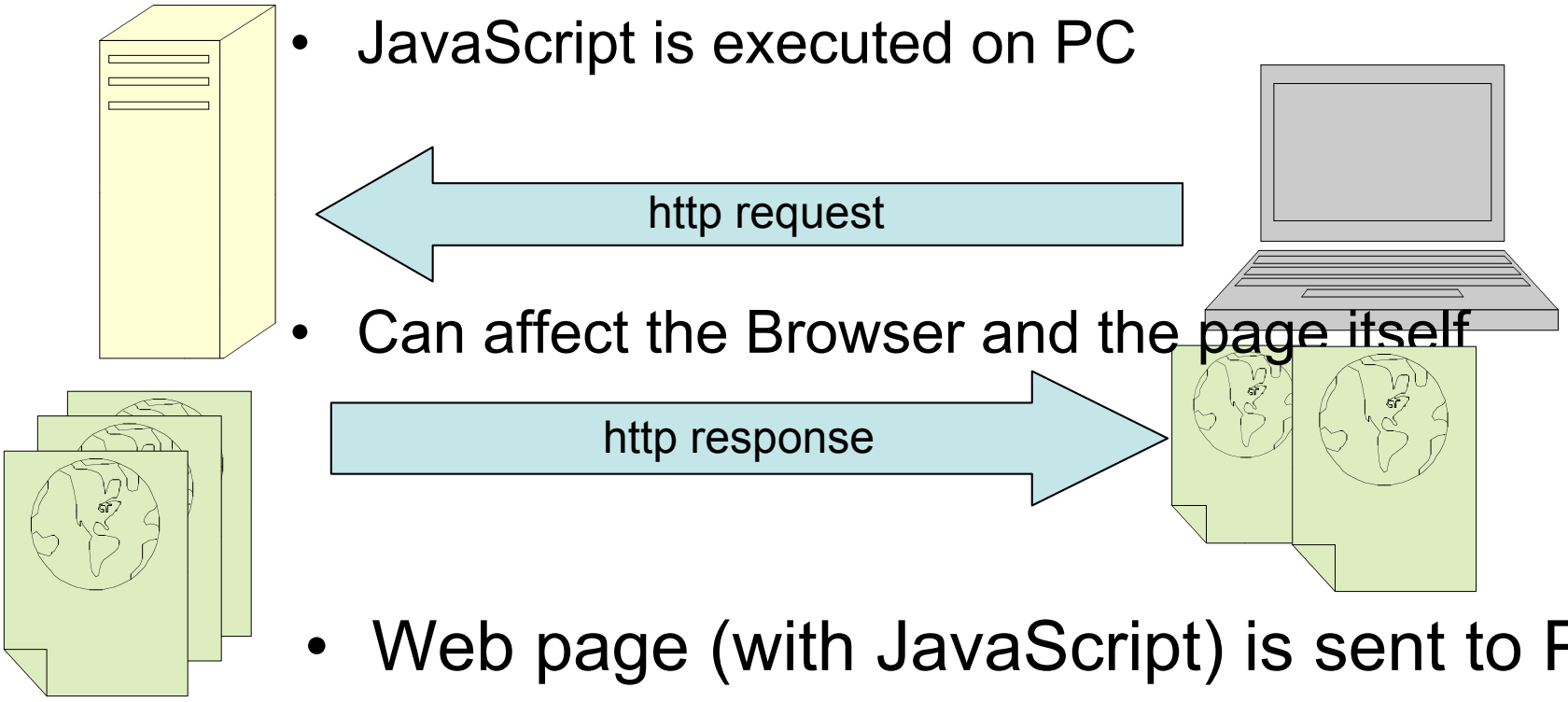
Behavioral Layer

Web pages have 3 layers…

- **Structural/Content Layer** (XHTML)
  - The meat and potatoes
- **Presentational Layer** (CSS)
  - How things look; garnishing the meat and potatoes on a pretty plate
- **Behavioral Layer** (JavaScript and DOM)
  - How websites behave; the meat can jump off the plate if you want it to.

Client-side Languages

- User-agent (web browser) requests a web page



- JavaScript is executed on PC
- Can affect the Browser and the page itself
- Web page (with JavaScript) is sent to PC

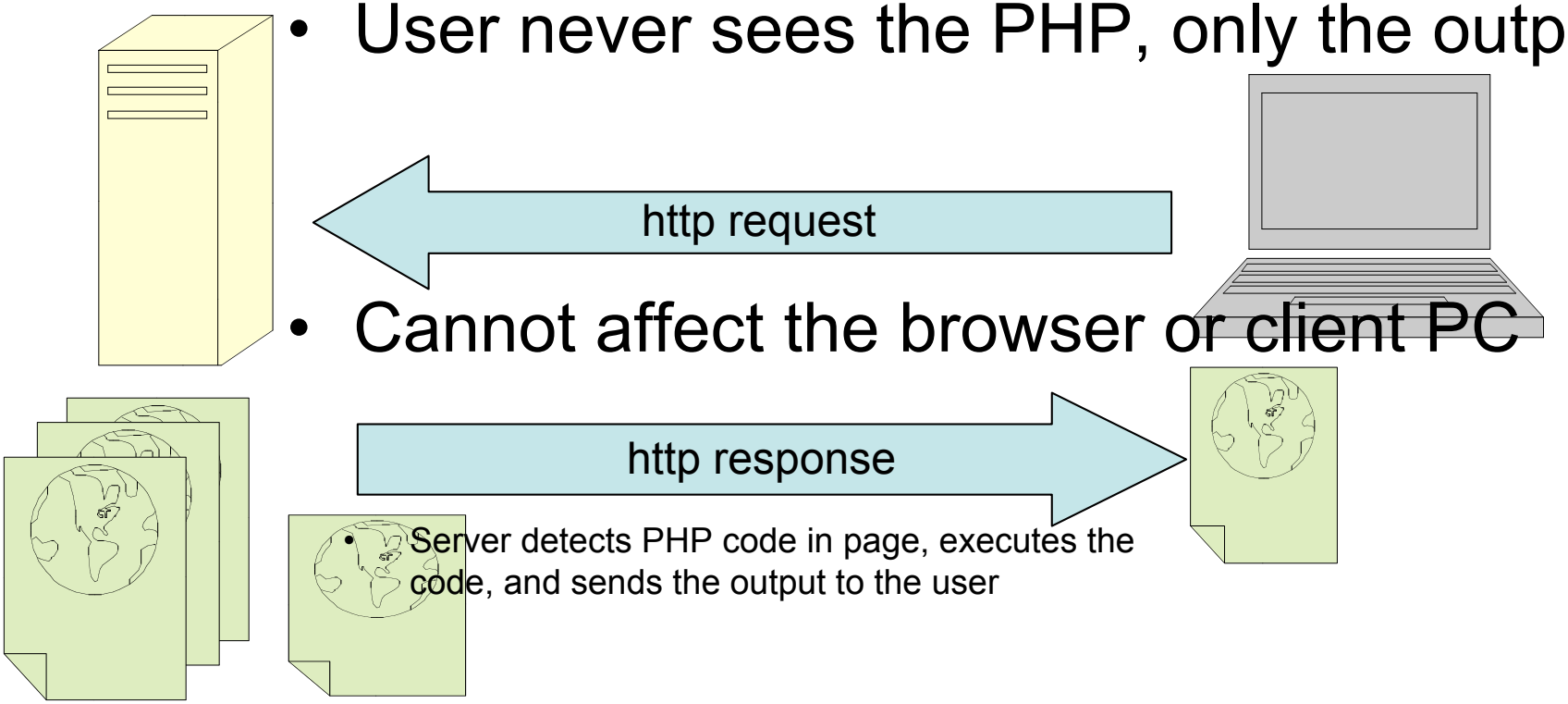
Client-side

What kind of things can you do with JavaScript?

- Validating Form information,
  - i.e., making sure all the fields are complete before submitting data back to the server
- Modifying a web page based on Mouse Events.
  - Can turn a web page into a user interface with interactive buttons and controls

Server-side Languages

- User-agent (web browser) requests a web page
  - User never sees the PHP, only the output



  - Cannot affect the browser or client PC
  - Web page (with PHP Output) sent to PC

JavaScript

- Java Functions definitions are embedded in the **<head>**
- Function calls are placed in the **<body>**

```
<html>
<head>

<script language="javascript">
    function myfun() {
      do something;
    }
</script>

</head>
<body>

<script language="javascript">
   myfun();
</script>

</body>
</html>
```

DOM Scripting

Key Topics:

- Event Handling
- The Browser Object
- Document Object Model
  - the document structure

Event Handling

- JavaScript code can be initiated by browser events
  - HTML 4.0 supports lots of events.
  - onclick, onchange, onmousedown, onmousemove, etc.

Browser Events

- **onblur** – an element loses focus, i.e., click on a text box, but then you click on something else; the text box is blurred
- **onchange** – contents of an element is changed, i.e., changing the selection in a drop down menu
- **onfocus** – an element is clicked or selected
- **onload** – when the web page is initially loaded
- **onsubmit** – when a form's submit button is clicked

More Browser Events

- **onkeydown** – immediately when a key is pressed down
- **onkeypress** – if the key is held down, i.e., not immediately released
- **onkeyup** – immediately when a key is released.
  - Sometimes, you want something to happen when the key goes down vs. goes up
  - Sometimes, you want to detect a long key press SHIFT, CTRL, or ALT

Even More Browser Events

- **onmousedown** – a mouse button is pressed down
- **onmouseup** – a mouse button is released
- **onmousemove** – a mouse is moved
- **onmouseout** – mouse is moved off an element (blur)*
- **onmouseover** – mouse is moved on an element (focus, hover)*

  * Used for hover effects.

Example

```
<html>
<body>
<h1>Example Javascript Event Handler</h1>
<p>Here is some text with a
   <span onClick="alert('Do not click here')">
   sensitive patch</span>
  in it</p>
</body>
</html>
```

Example 2

```
<html>
<head><script language="JavaScript">
function log(s){window.status=s}
</script></head>
<body>
<h1>Example Javascript Event Handler</h1>
<p>Here is some text with a
    <span onMouseOver="log('Do not click here')"
    onMouseOut="log(' ')" > sensitive patch</span>
  in it</p>
</body>
</html>
```

Example 3

```
<html>
<head><script language="JavaScript">
function log(s){window.status=s}
</script></head>
<body>
<h1>Example Javascript Event Handler</h1>
<p>Here is some text with an
    <a href="javascript:log('Flip off out of here')"> insensitive
    patch</a>
  in it</p>
</body>
</html>
```

DOM Scripting

First a summary:

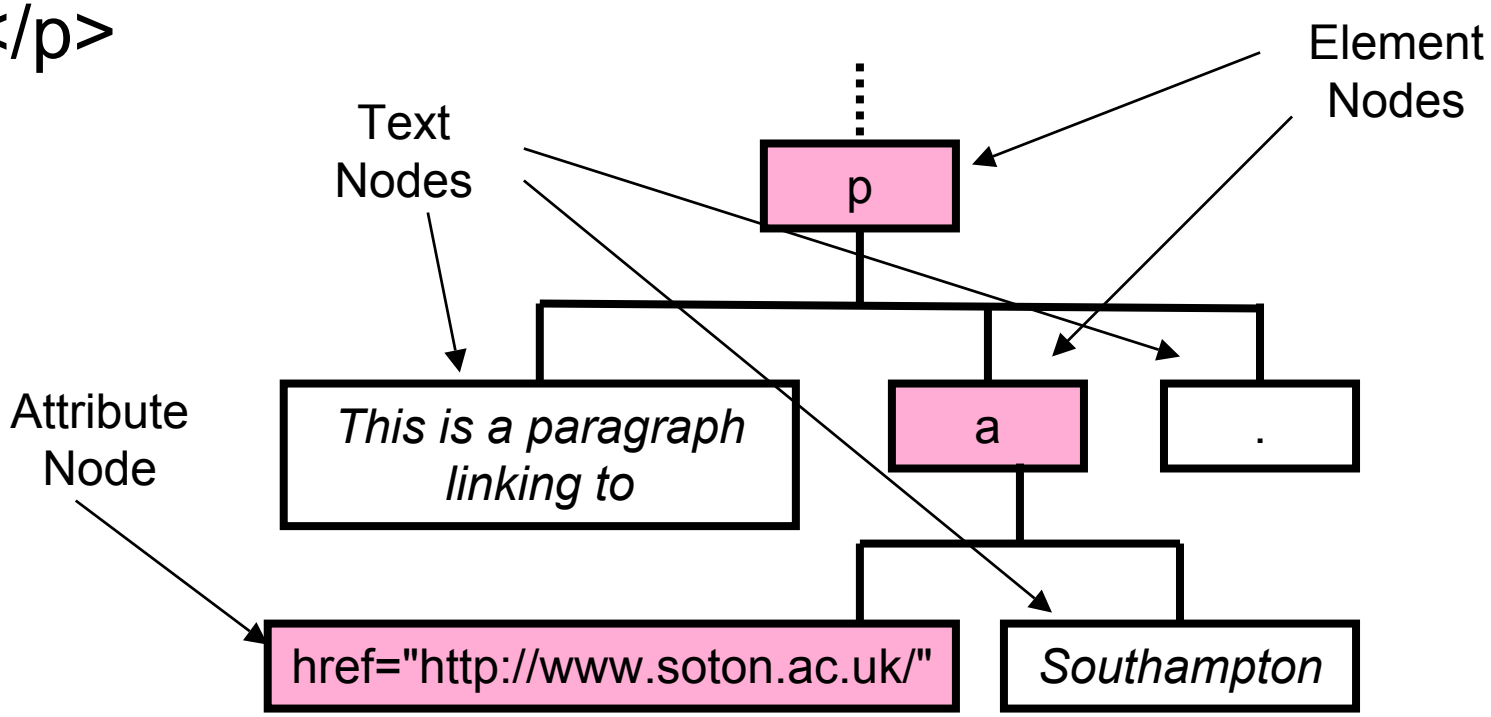
1. JavaScript can be initiated by browser events.
2. JavaScript can access and manipulate the browser object.

What's Next

- JavaScript can access the document structure.

DOM Example

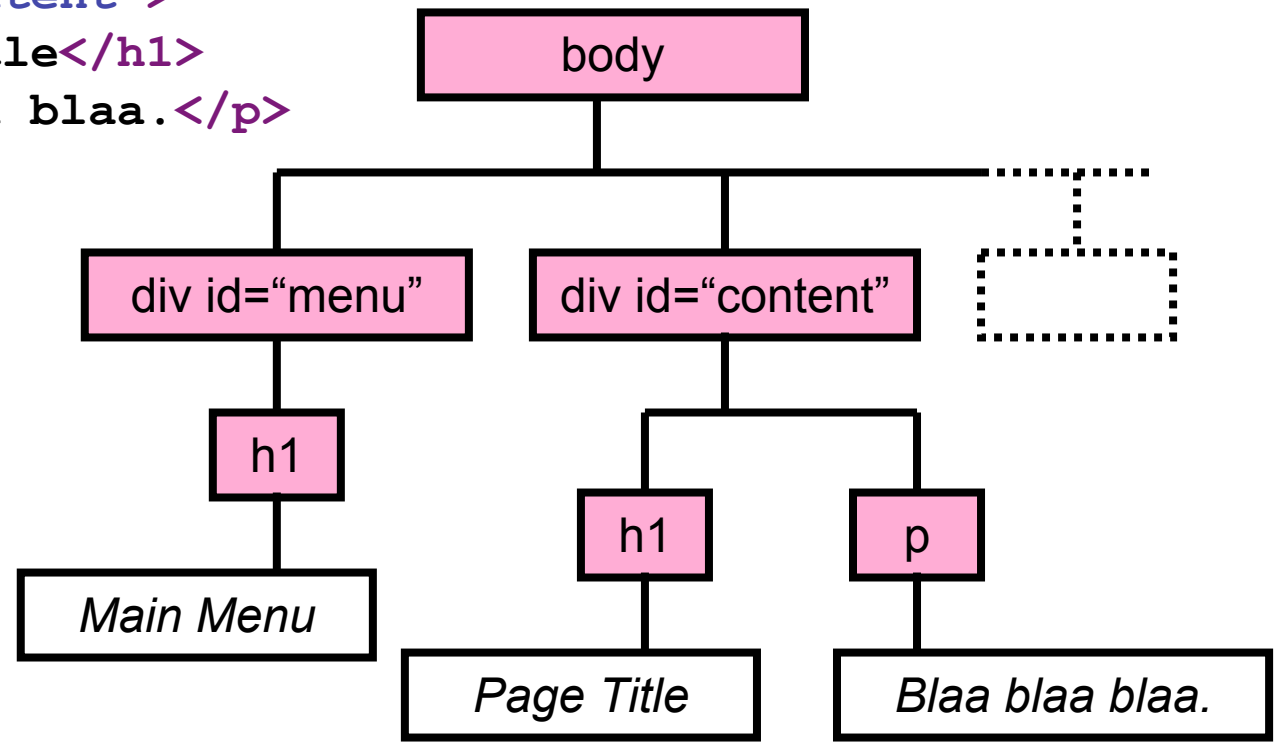
 This is a paragraph linking to
Southampton.



DOM Script Example

```
<body>
<div id="menu">
<h1>Main Menu</h1>
</div>

<div id="content">
<h1>Page Title</h1>
<p>Blaa blaa blaa.</p>
</div>
...
```



DOM Script Example

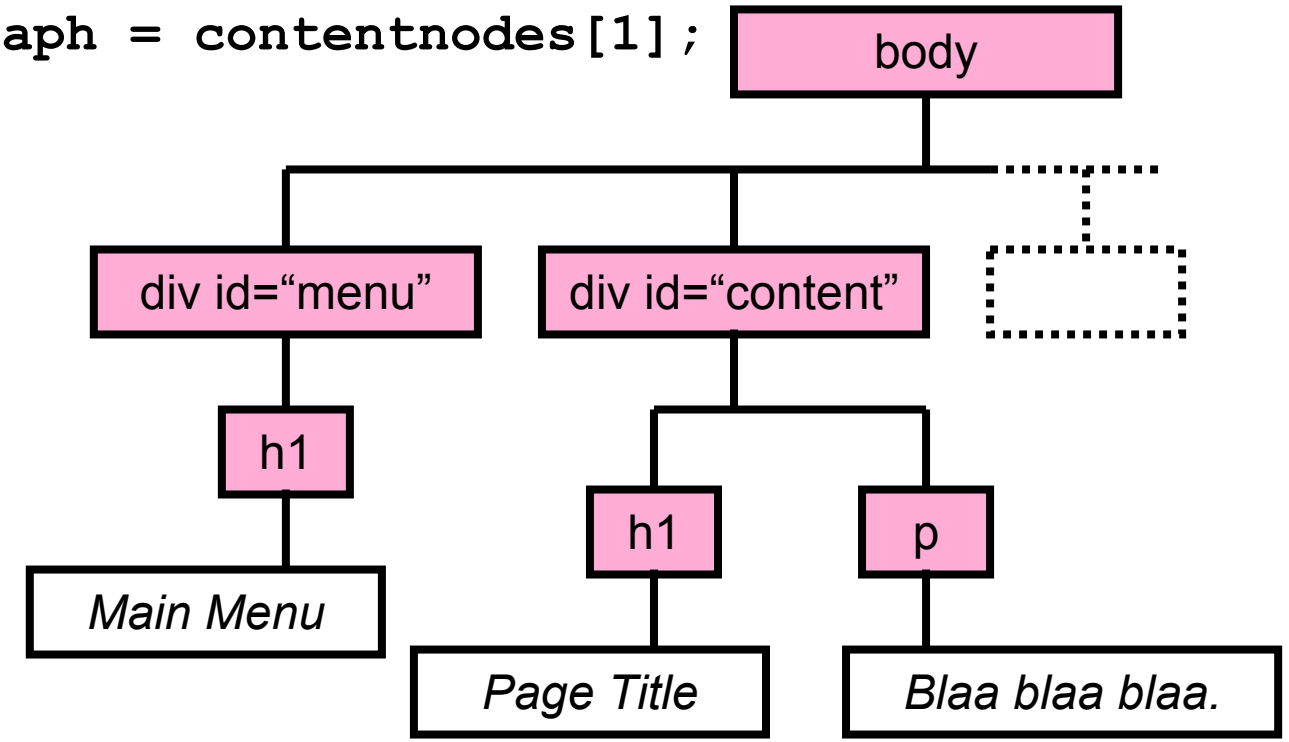
```
<html>
<div id="menu">
<h1>Main Menu</h1>
</div>

<div id="content">
<h1>Page Title</h1>
<p>Blaa blaa blaa.</p>
</div>
<script language="JavaScript">
var contentdiv = document.getElementById('content');
var pagetitle = contentdiv.getElementsByTagName('h1')[0];

pagetitle.setAttribute("style","color:red");
pagetitle.firstChild.nodeValue="The Red Page Title";
</script></html>
```

DOM Script Example

```
var themenu = document.getElementById('menu');
var thebody = menu.parent;
var thecontent = menu.nextSibling;
var contentnodes = thecontent.childNodes;
var theh1 = contentnodes[0];
var firstparagraph = contentnodes[1];
```



DOM Scripting Functions

Modifying Structure

- insertBefore()
- appendChild()
- replaceChild()
- removeChild()
- cloneNode()

Creating Elements

- createElement()
- createTextNode()

Modifying Attributes

- getAttribute() / setAttribute()

DOM and Forms

- Every form in a page is held in an array
  - document.forms[0] is the first form
- Every component (input, select or textarea element) is held in a subarray
  - document.forms[0].elements[0] is the first field

```
<form name="personal">
 <input type="text" name="name">
 <input type="text" name="address">
 <input type="text" name="city">
</form>
```

either document.forms[0].elements[1]

or document.forms["personal"].elements["address"]

or document.personal.address

DOM and Forms

- Every component of the form has a value
  - document.personal.address.value
- The value can be used in expressions or stored in an assignment statement
- Specific components have specific methods or properties
  - a menu (ie a select) has property ‘selectedIndex’
  - a checkbox has property ‘checked’
- An *onsubmit* event handler can check its form’s components and halt the submission by returning *false*

DOM and Forms

```
<form name="personal" onSubmit="validate()">
 <input type="text" name="name"/>
 <input type="text" name="address"/>
 <input type="text" name="city"/>
 <input type="submit" value="Submit!"/>
</form>
<script lang="JavaScript">
function validate(){
   if(document.personal.name.value.length==0){
        alert("Missing name");
        return false;
        }
   return true;
   }
</script>
```