


# JavaScript – DOM

Lecture 19

CS 638 Web Programming



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## Overview of lecture

- DOM
- JavaScript timers

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## Document Object Model

- Describes how the document object can be traversed and modified
  - Represented as tree structure
- Two approaches in use
  - IE-specific more convenient for HTML
  - W3C more verbose, but also applies to XML
- DOM has levels 0-3 and many sub-standards
- The DOM interface used in other contexts with other languages (C++, Java, python, etc.)

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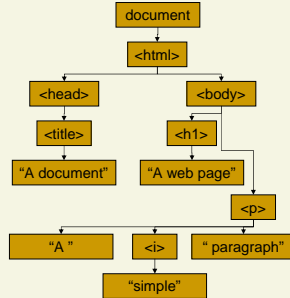
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## The document as a tree



```
<html>
<head>
<title>A Document</title>
</head>
<body>
<h1>A web page</h1>
<p>A <i>simple</i>
paragraph</p>
</body>
</html>
```



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## Manipulating nodes



- ❑ Traversing the element tree
  - ❑ Each node has `childNodes` array
  - ❑ Can use properties `firstChild`, `lastChild`, `nextSibling`, `previousSibling`
  - ❑ Firefox's DOMInspector visualizes the DOM tree
  - ❑ Firebug also allows you to browse DOM
- ❑ `nodeType` property can be 1 (element), 2 (attribute), 3 (text), 8 (comment), 9 (document)
- ❑ Can change structure using `appendChild()`, `removeChild()`, `replaceChild()`, `insertBefore()`

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## Tag attributes



- ❑ Attribute nodes are ignored during traversal
- ❑ Elements have properties for attributes
  - ❑ Words capitalized – e.g. the `body` element has a `bgColor` property corresponding to the HTML attribute `bgcolor`
  - ❑ Can assign strings to these properties
  - ❑ Can also treat `style` attribute as an object with properties of its own
- ❑ Elements have methods `getAttribute()`, `setAttribute()`, `removeAttribute()`

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## More DOM manipulation



- The document object (and element objects) have methods for finding specific elements
  - `getElementsByTagName()` returns an array with all elements with the given tag name
  - `getElementsByTagName()` returns an array with all elements with given name
  - `getElementById()` returns element with given ID
- To build new nodes, use the document object's methods `createElement(tagName)` and `createTextNode(text)`
- Text nodes have `appendData()`, `insertData()`, `deleteData()`, `replaceData()` methods

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## Cha

```
function addItalic(){
  var i=document.createElement("i");
  i.appendChild(document.createTextNode("italic"));
  addParagraph(i);
}
function addBold(){
  var b=document.createElement("b");
  b.appendChild(document.createTextNode("bold"));
  addParagraph(b);
}
function addParagraph(node){
  var p=document.createElement("p");
  p.appendChild(document.createTextNode("Some "));
  p.appendChild(node);
  p.appendChild(document.createTextNode(" text."));
  document.getElementById("playground").appendChild(p);
}
function clearAll(){
  var d=document.getElementById("playground");
  while(d.childNodes.length>0)
    d.removeChild(d.childNodes[0]);
}
```



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## Dyn

```
function changeBGColor(color){
  var p=document.getElementById("para1");
  p.style.backgroundColor=color;
}
function checkColor(){
  var s=document.getElementById("textfield1").value;
  if (s.length!=6){
    alert("Must enter six hex digits");
    return;
  }
  for (var i=0;i<6;i++){
    if(!((s[i]>='A' && s[i]<='F')||
        (s[i]>='a' && s[i]<='f')||
        (s[i]>='0' && s[i]<='9'))){
      alert(" Character "+s[i]+" is not valid");
      return;
    }
  }
  changeBGColor("#"+s);
}
```



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## Overview of lecture



- ❑ DOM
- ❑ JavaScript timers

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## JavaScript timers



- ❑ Used extensively in dynamic pages
- ❑ `setTimeout (code, delay)` tells browser to execute `code` in `delay` milliseconds
- ❑ If you save the return value, you can cancel using `clearTimeout (timeoutID)`
- ❑ `setInterval ()` and `clearInterval ()` work similarly, but code is run periodically instead of just once

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## Ani

```
var pos=0;
function runAway(){
  var image=document.getElementById("bucky");
  if(pos==0){
    image.style.left="250px";
    image.style.top="50px";
    pos=1;vpos=50;
  } else {
    image.style.left="50px";
    image.style.top="50px";
    pos=0;vpos=50;
  }
  setTimeout("shiftImage()",50);
}
var vpos=0;
function shiftImage(){
  var image=document.getElementById("bucky");
  if(vpos<250){
    vpos+=2;
    image.style.top=vpos+"px";
    setTimeout("shiftImage()",50);
  }
}
```



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