

Internet Technologies

Document Object Model

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Course Web Page

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Outline

- 1 Introduction to DOM
- 2 DOM Tree

Document Object Model

- The Document Object Model (DOM) specifies:
 - 1 How browsers should **create a model of an HTML page**
 - 2 How JavaScript can **access and update the contents of a web page** while it is in the browser window.
- The DOM is neither part of HTML, nor part of JavaScript; it is a **separate set of rules.**
- It is implemented by all major browser makers, and covers two primary areas as mentioned above.

Document Object Model

1 Making a model of the HTML page

- *When the browser loads a web page, it creates a model of the page in memory.*
- *The DOM specifies the way in which the browser should structure this model using a **DOM tree**.*
- *The DOM is called an object model because the model (the DOM tree) is made of objects.*
- *Each object represents a different part of the page loaded in the browser window*

Document Object Model

2 Accessing and Changing the HTML page

- *The DOM also defines methods and properties to access and update each object in this model, which in turn updates what the user sees in the browser.*
- *User interfaces let humans interact with programs; **APIs** let programs (and scripts) talk to each other.*
- *The DOM states what your script can ask the browser about the current page, and how to tell the browser to update what is being shown to the user.*

The DOM Tree is a Model of a Web Page

- As a browser loads a web page, it creates a model of that page, called a **DOM tree**, and it is stored in the browser's memory
- It consists of four main types of nodes.
 - 1 The Document Node
 - 2 Elements Node
 - 3 Attribute Node
 - 4 Text Node
- Each node is an object with methods and properties. Scripts access and update this DOM tree (not the source HTML file). Any changes made to the DOM tree are reflected in the browser.

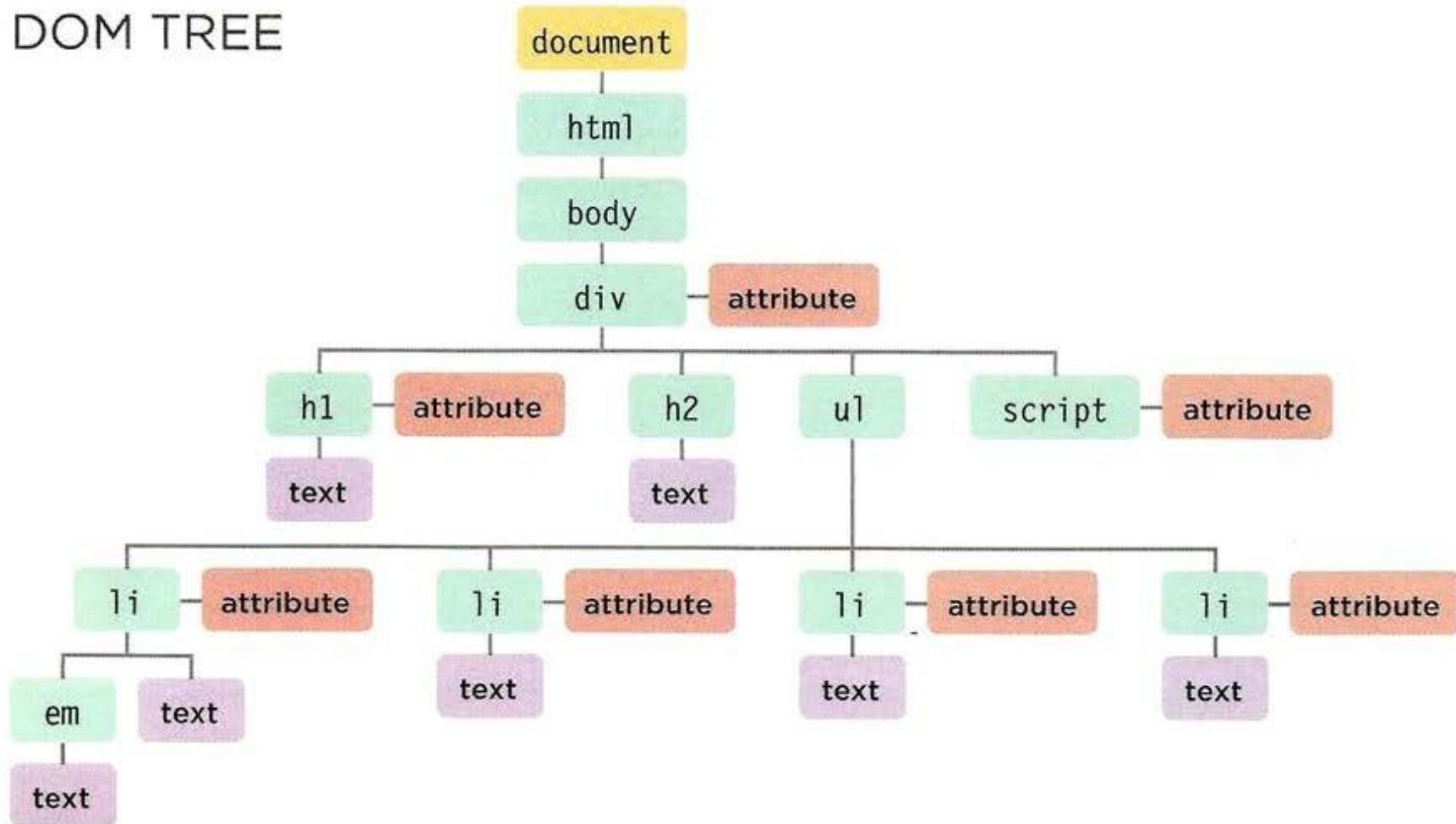
The DOM Tree is a Model of a Web Page

BODY OF HTML PAGE

```
<html>
  <body>
    <div id="page">
      <h1 id="header">List</h1>
      <h2>Buy groceries</h2>
      <ul>
        <li id="one" class="hot"><em>fresh</em> figs</li>
        <li id="two" class="hot">pine nuts</li>
        <li id="three" class="hot">honey</li>
        <li id="four">balsamic vinegar</li>
      </ul>
      <script src="js/list.js"></script>
    </div>
  </body>
</html>
```

The DOM Tree is a Model of a Web Page

DOM TREE



The DOM Tree is a Model of a Web Page

1 The Document Node

- Every element, attribute, and piece of text in the HTML is represented by its own **DOM node**.
- At the top of the tree a **document node** is added; it represents the entire page (and also corresponds to the document object).
- When you access any element, attribute, or text node, you navigate to it via the document node. **It is the starting point for all visits to the DOM tree.**

The DOM Tree is a Model of a Web Page

2 Element Nodes

- *HTML elements describe the structure of an HTML page.*
- *The **<h1>** - **<h6>** elements describe what parts are headings; the **<p>** tags indicate where paragraphs of text start and finish; and so on.*
- *To access the DOM tree, you start by looking for elements. Once you find the element you want, then you can access its text and attribute nodes if you want to.*
- **Note:** *Relationships between the document and all of the element nodes are described using the same terms as a family tree: **parents, children, siblings, ancestors, and descendants.** (Every node is a descendant of the document node.)*

The DOM Tree is a Model of a Web Page

3 Attribute Nodes

- *The opening tags of HTML elements can carry attributes and these are represented by attribute nodes in the DOM tree.*
- *Attribute nodes are not children of the element that carries them; they are part of that element.*
- *Once you access an element, there are specific JavaScript methods and properties to read or change that element's attributes.*
- For example, it is common to change the values of class attributes to trigger new CSS rules that affect their presentation.

The DOM Tree is a Model of a Web Page

4 Text Nodes

- *Once you have accessed an element node, you can then reach the text within that element. This is stored in its own text node.*
- *Text nodes cannot have children. If an element contains text and another child element, the child element is not a child of the text node but rather a child of the containing element. **For example:** the **** element on the first **** item.*
- *The text node is always a new branch of the DOM tree, and no further branches come off of it.*

References

- 1 JavaScript and JQuery – Interactive Front-end Web Development, (Jon Duckett), John Wiley and Sons, Inc.
- 2 <https://developer.mozilla.org/en-US/docs/Web/JavaScript>