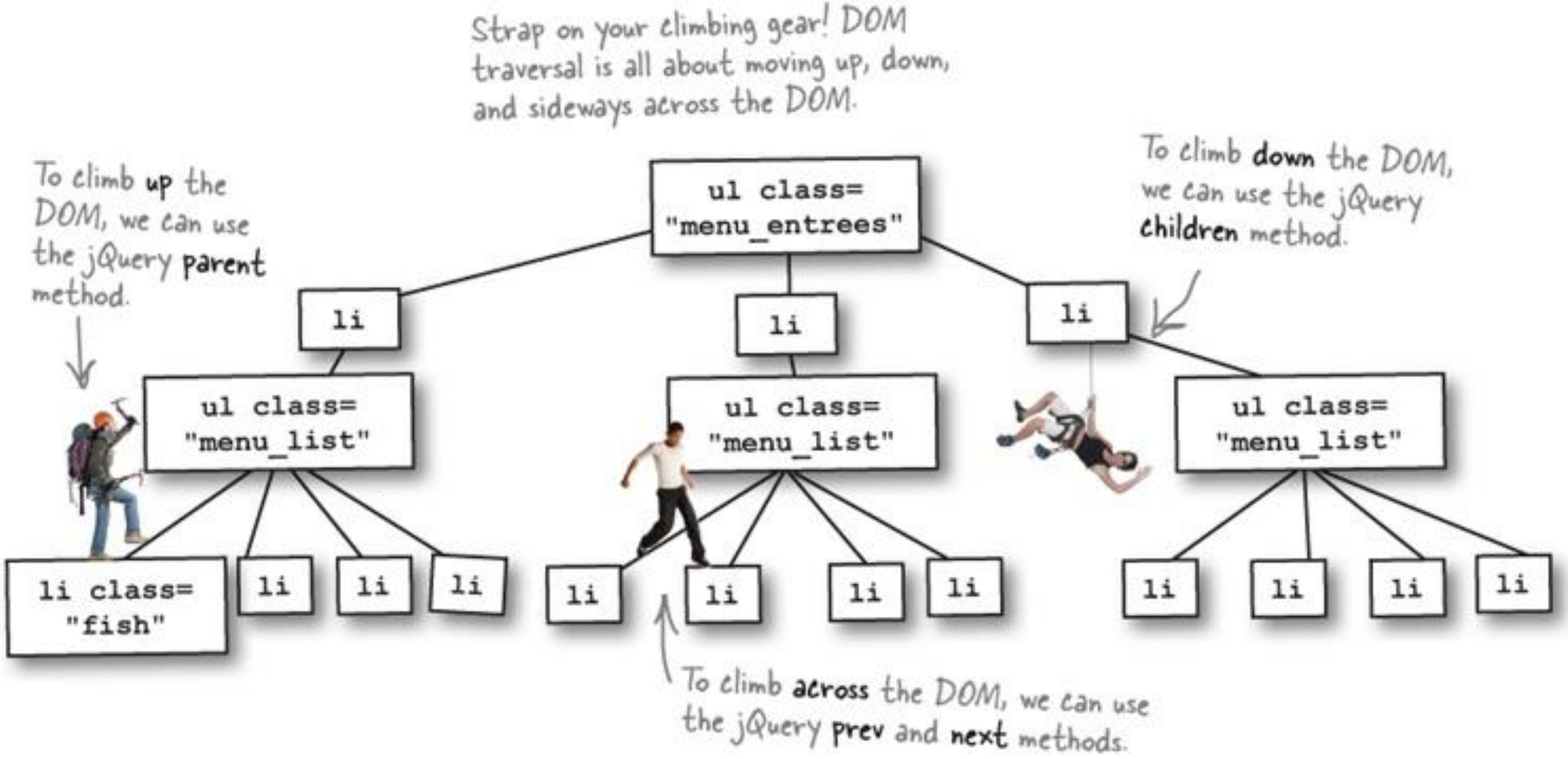
CSC 337


Strap on your climbing gear! DOM traversal is all about moving up, down, and sideways across the DOM.
To climb up the DOM, we can use the jQuery parent method.
To climb down the DOM, we can use the jQuery children method.
To climb across the DOM, we can use the jQuery prev and next methods.
ul class= "menu_entrees"
li
li
li
ul class= "menu_list"
ul class= "menu_list"
ul class= "menu_list"
li class= "fish"
li
li
li
li
li
li
li
li
li
li
li

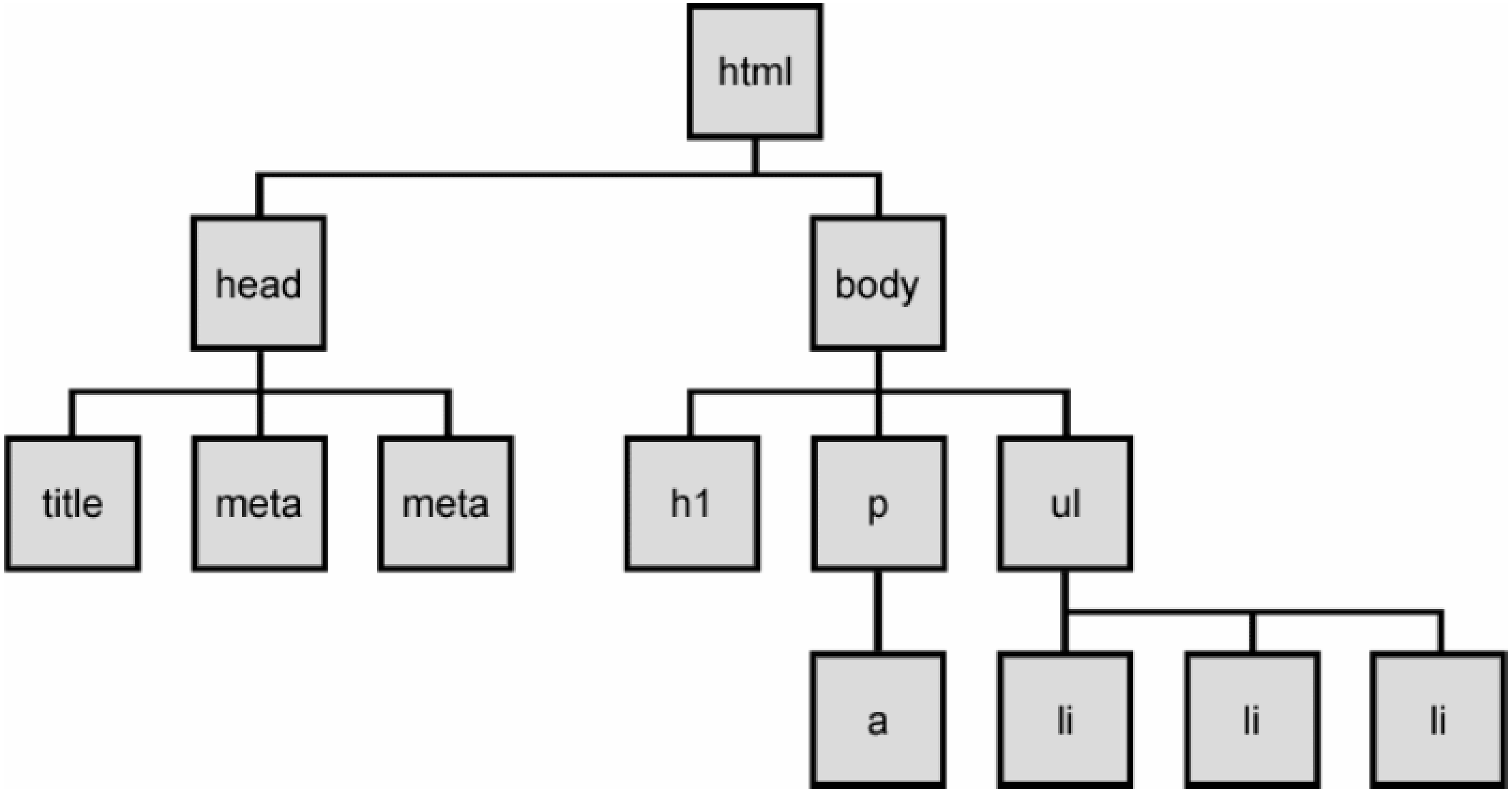
The DOM Tree

Rick Mercer

Document Object Model (DOM)

- The Document Object Model is an API for HTML documents
  - Provides a structure representation of the document
  - Enables developers to modify the content and visual presentation of a web page
  - Used by the browser to render the page

The DOM tree



<head>

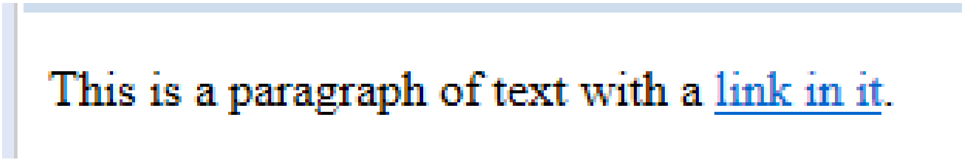
- The <head> element contains metadata elements
- Most common are `<title>`, `<style>`, and `<script>`
- `<title>` is the only required element in `<head>`

Types of DOM nodes

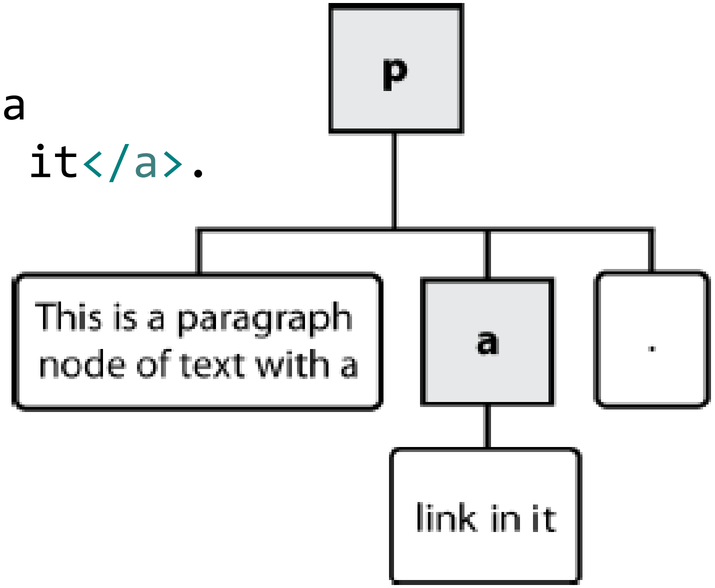
- Element nodes (HTML tag)
  - can have children and/or attributes
- Text nodes (text in a block element)
- Attribute nodes (attribute/value pair)
  - text/attributes are children in an element node
  - cannot have children or attributes
  - not usually shown when drawing the DOM tree

One Way to Draw a DOM tree

```
<p>
This is a paragraph of text with a
<a href="/path/page.html">link in it</a>.
</p>
```



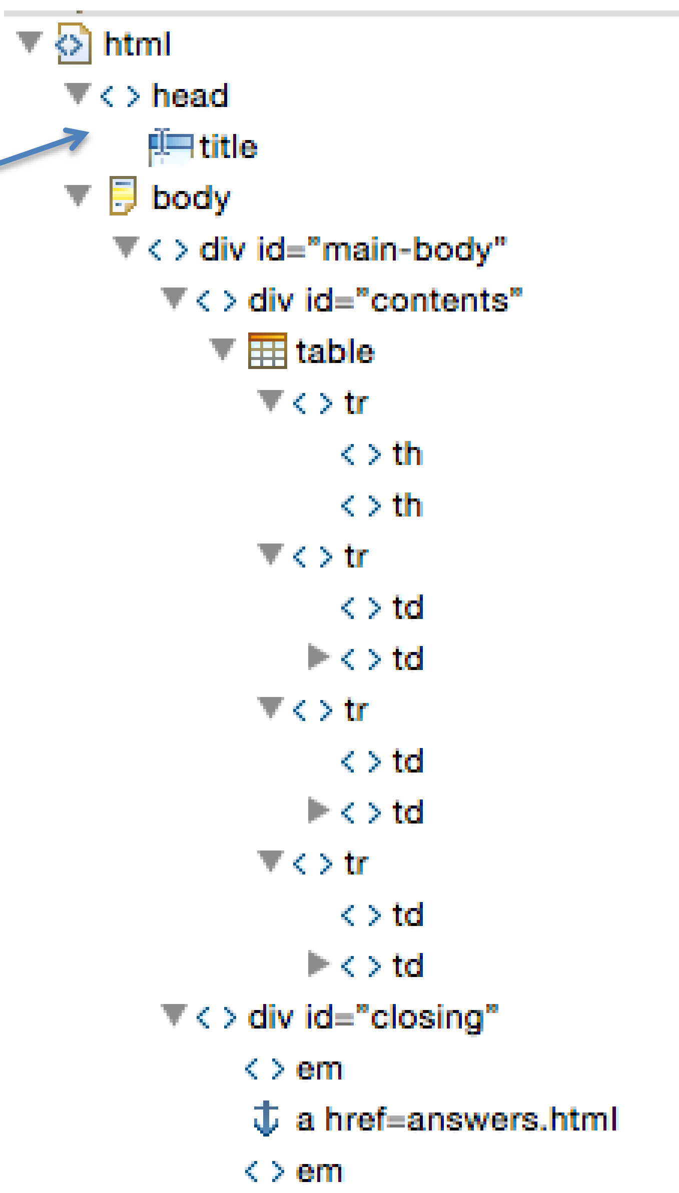
This is a paragraph of text with a link in it.



- Two other views on the next slide
- Then show Eclipse "draws" the DOM with
  - Window > Show View > Outline

```
<!DOCTYPE html>
<html>
<head>
<title>Trickier nesting, still</title>
</head>
<body>
  <div id=”main-body”>
    <div id=”contents”>
      <table>
        <tr>
          <th>Steps</th>
          <th>Process</th>
        </tr>
        <tr>
          <td>1</td>
          <td>Figure out the <em>root element</em>.
          </td>
        </tr>
        <tr>
          <td>2</td>
          <td>Deal with the <span id=”code”>head</span> first, as
            it’s usually easy.
          </td>
        </tr>
        <tr>
          <td>3</td>
          <td>Work through the <span id=”code”>body</span>. Just <em>take
              your time</em>.
          </td>
        </tr>
      </table>
    </div>
    <div id=”closing”>
      This link is <em>not</em> active, but if it were, the answers to
      this <a href="answers.html"></a> would be thre
      there. But <em>do the exercise anyway!</em>
    </div>
  </div>
</body>
</html>
```

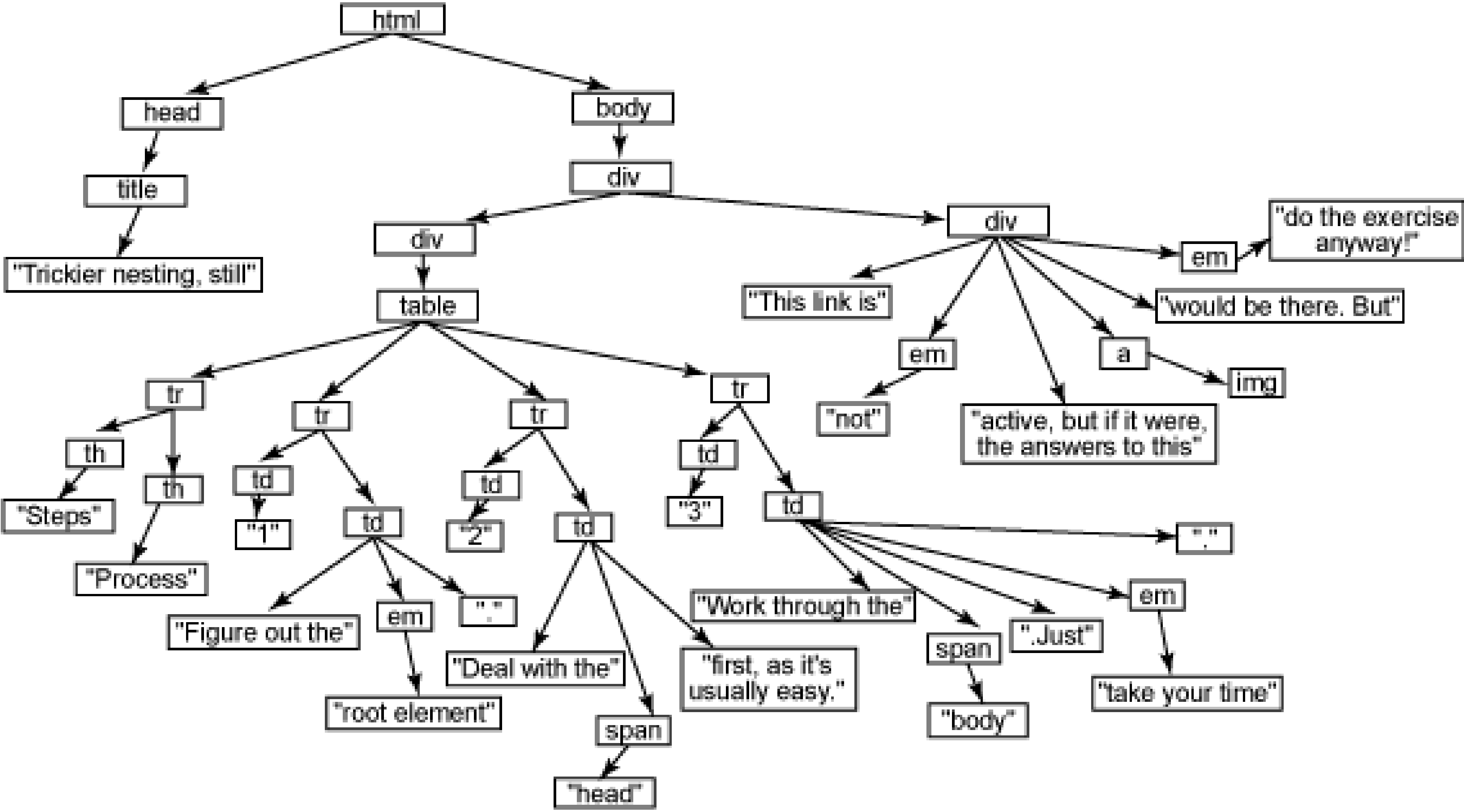
Eclipse view

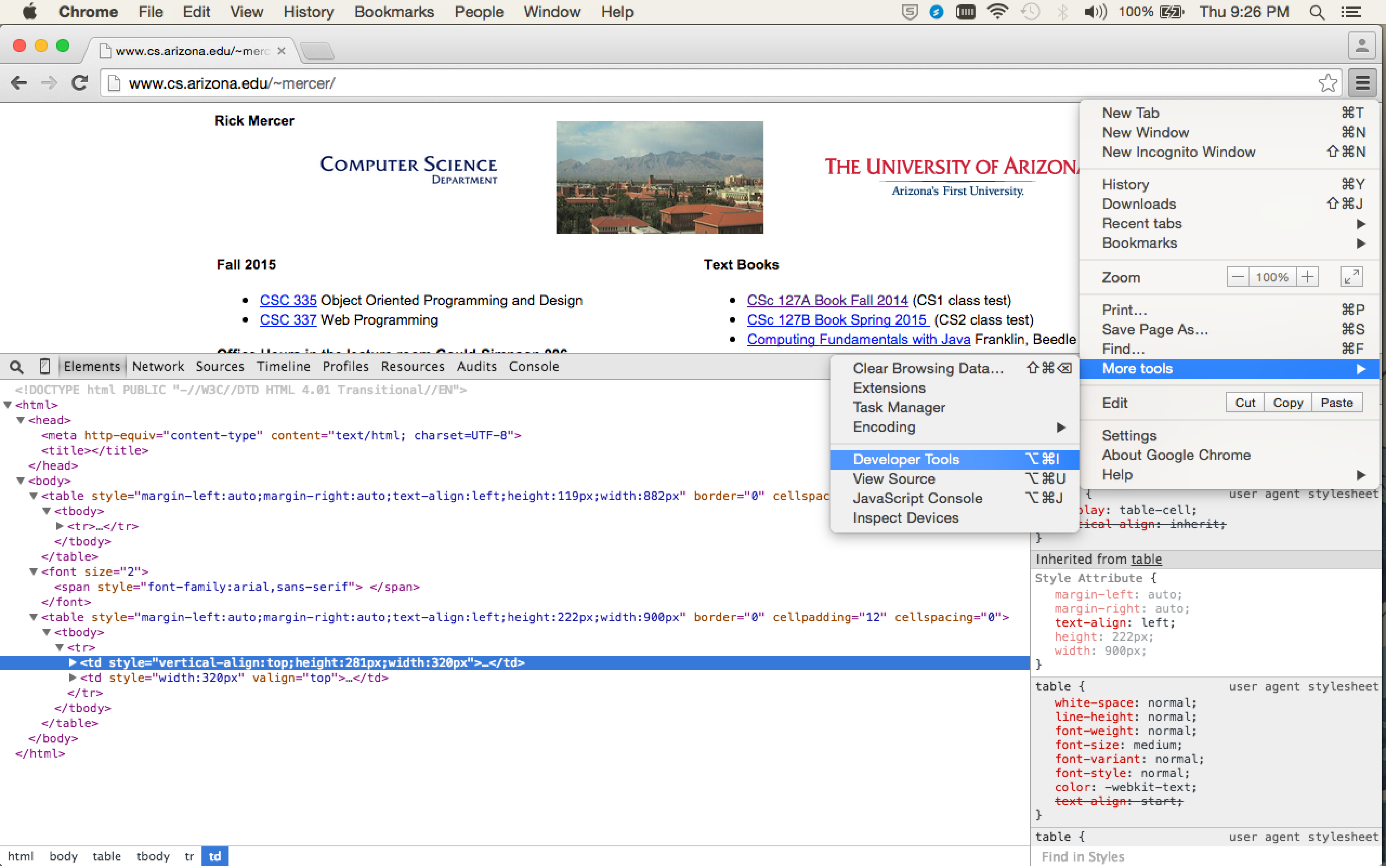


```
▼ html
  ▼ < > head
      title
  ▼ body
    ▼ < > div id="main-body"
      ▼ < > div id="contents"
        ▼ table
          ▼ < > tr
                < > th
                < > th
          ▼ < > tr
                < > td
              ▶ < > td
          ▼ < > tr
                < > td
              ▶ < > td
          ▼ < > tr
                < > td
              ▶ < > td
      ▼ < > div id="closing"
          < > em
          a href=answers.html
          < > em
```

Hand Drawn

DOM Tree View





Rick Mercer

Fall 2015

- CSC 335 Object Oriented Programming and Design
- CSC 337 Web Programming

Text Books

- CSc 127A Book Fall 2014 (CS1 class test)
- CSc 127B Book Spring 2015 (CS2 class test)
- Computing Fundamentals with Java Franklin, Beedle

```
<!DOCTYPE html PUBLIC "-//W3C//DTD HTML 4.01 Transitional//EN">
▼<html>
  ▼<head>
      <meta http-equiv="content-type" content="text/html; charset=UTF-8">
      <title></title>
    </head>
  ▼<body>
    ▼<table style="margin-left:auto;margin-right:auto;text-align:left;height:119px;width:882px" border="0" cellspac
      ▼<tbody>
        ▶<tr>…</tr>
        </tbody>
      </table>
    ▼<font size="2">
        <span style="font-family:arial,sans-serif"> </span>
      </font>
    ▼<table style="margin-left:auto;margin-right:auto;text-align:left;height:222px;width:900px" border="0" cellpadding="12" cellspacing="0">
      ▼<tbody>
        ▼<tr>
          ▶<td style="vertical-align:top;height:281px;width:320px">…</td>
          ▶<td style="width:320px" valign="top">…</td>
          </tr>
        </tbody>
      </table>
    </body>
</html>
```

```
{                                user agent stylesheet
  lay: table-cell;
  ~~ical-align: inherit;~~
}
Inherited from table
Style Attribute {
  margin-left: auto;
  margin-right: auto;
  text-align: left;
  height: 222px;
  width: 900px;
}
table {                          user agent stylesheet
  white-space: normal;
  line-height: normal;
  font-weight: normal;
  font-size: medium;
  font-variant: normal;
  font-style: normal;
  color: -webkit-text;
  ~~text-align: start;~~
}
table {                          user agent stylesheet
Find in Styles
```

Where does the DOM tree come from?

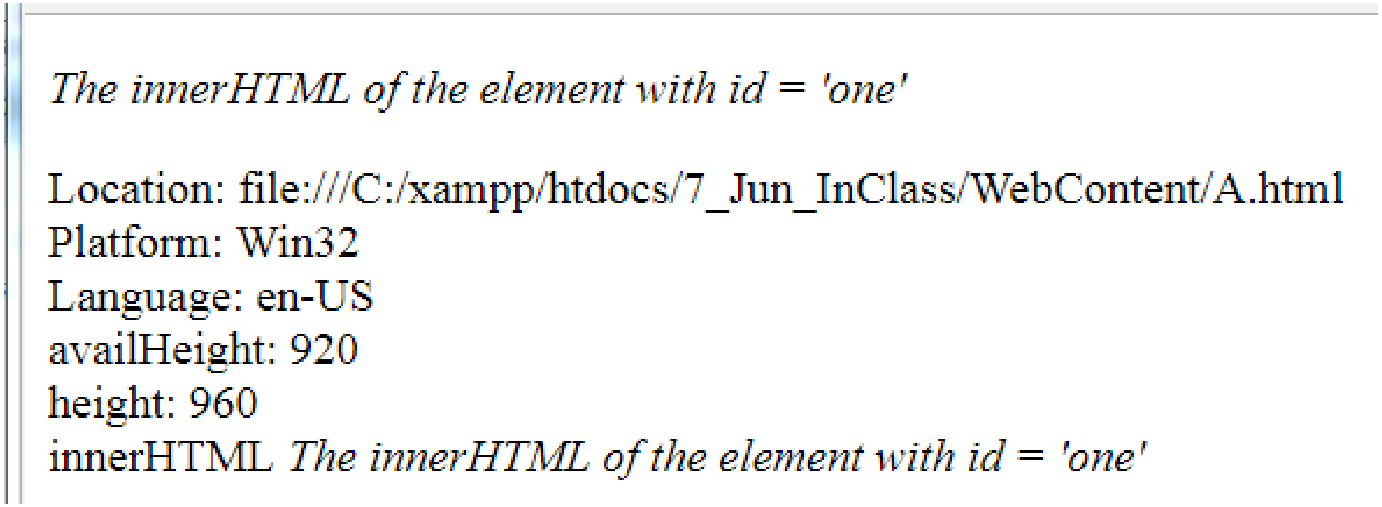
- Web browsers parse HTML to build the DOM tree
- The web browser then traverses that tree to render the web page
- Later we'll observe the server created HTML code and sending that file to any browser

Global DOM Objects

- Web browsers have six global objects
  - `history` list of pages the have been visited
    - methods back() forward() go(index)
  - `location` page's url
  - `navigator` the Web browser in use
    - Properties like `language` and `platform`
  - `screen` the area occupied by the page and browser
  - `window` the browser window
    - methods include `prompt()` and `alert()`
  - `document` the web page
    - methods `write() getElementById()`

Use a few DOM objects

```
<p id="one">
  <i>The innerHTML of the element with id = 'one'</i>
</p>
<script>
  document.write('Location: ' + location + '<br>');
  document.write('Platform: ' + navigator.platform + '<br>');
  document.write('Language: ' + navigator.language + '<br>');
  document.write('availHeight: ' + screen.availHeight + '<br>');
  document.write('height: ' + screen.height + '<br>');
  document.write('innerHTML ' +
                 document.getElementById("one").innerHTML);
</script>
```

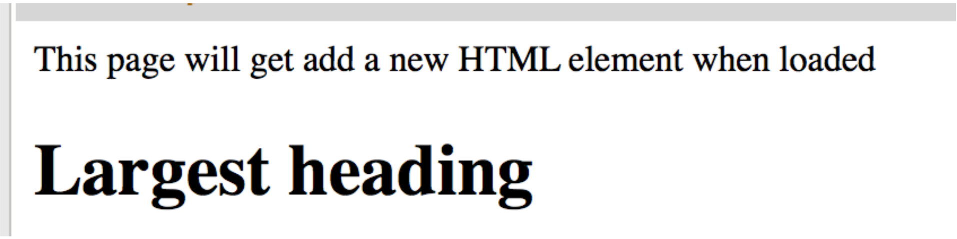


```
The innerHTML of the element with id = 'one'

Location: file:///C:/xampp/htdocs/7_Jun_InClass/WebContent/A.html
Platform: Win32
Language: en-US
availHeight: 920
height: 960
innerHTML The innerHTML of the element with id = 'one'
```

Growing the DOM Tree

```
<script>
This page will  add a new HTML element when loaded
<script>
heading = document.createElement("h1");
heading_text = document.createTextNode("Largest heading");
heading.appendChild(heading_text);
document.body.appendChild(heading);
</script>
```



This page will get add a new HTML element when loaded

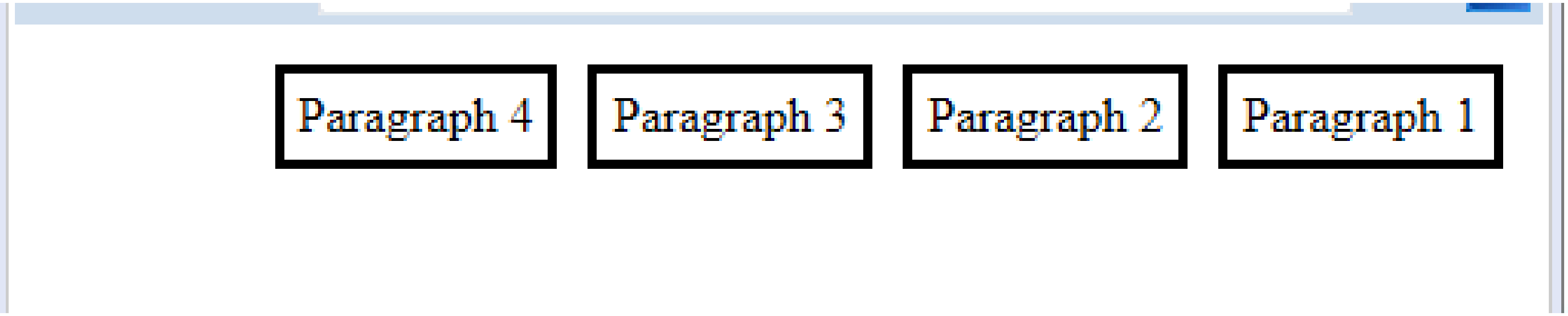
Largest heading

In-Class Activity

- Write an HTML page using DOM objects and a JS function with a JS for loop in the `<script>` to generate n paragraphs

```
<script>
<body>
addParagraphs(4);
function addParagraphs(n) {
  // TODO: Complete this function (and a style above)
```

- Use a `<style>` for each `p` (paragraph) to add n paragraphs in a *right* to *left* order with a border, 2px padding, 8px margin
  - Rendering should look like this using the loop control variable as the paragraph numbers 1..n



Paragraph 4 Paragraph 3 Paragraph 2 Paragraph 1