Accessibility as a First-Class Concern in Teaching GUIs and Software Engineering

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SIGCSE 2017, Seattle, WA
Accessibility should be a core topic in software development.

Including accessibility is a low-effort task that can improve software design skills.
Our Course Context

Info 343: Client-Side Web Development

- HTML, CSS, JavaScript, Web Frameworks (Angular, React)
- Required one-quarter course for our majors!

https://info343-au16.github.io/
"New" Material: Perceivability

Provide textual equivalent to visual elements

```
<!-- `alt` to describe images -->
<img src="baby_picture.jpg" alt="a cute baby">

<!-- ARIA attributes for other elements -->
<div class="green-rect" aria-label="a green rectangle"></div>

<button>
  <span class="search-glyph" aria-hidden="true">Search</span>
</button>
```
"New" Material: Navigability

Use **semantic tags** (and ARIA landmarks)

<table>
<thead>
<tr>
<th>HTML 5</th>
<th>ARIA Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;header&gt;</td>
<td>role=&quot;banner&quot;</td>
</tr>
<tr>
<td>&lt;nav&gt;</td>
<td>role=&quot;navigation&quot;</td>
</tr>
<tr>
<td>&lt;main&gt;</td>
<td>role=&quot;main&quot;</td>
</tr>
<tr>
<td>&lt;footer&gt;</td>
<td>role=&quot;contentinfo&quot;</td>
</tr>
<tr>
<td>&lt;aside&gt;</td>
<td>role=&quot;complementary&quot;</td>
</tr>
<tr>
<td>&lt;section&gt;</td>
<td>role=&quot;region&quot; *</td>
</tr>
<tr>
<td>&lt;article&gt;</td>
<td>role=&quot;article&quot; *</td>
</tr>
<tr>
<td>none</td>
<td>role=&quot;search&quot;</td>
</tr>
<tr>
<td>&lt;form&gt;</td>
<td>role=&quot;form&quot;</td>
</tr>
</tbody>
</table>
Course Changes

Reinforced content that we included anyway!

• Change one lecture on accessibility concepts
  – Practice HTML tag and attribute syntax
  – Have students use a screen reader!

• Add one focused assignment
  – Adding HTML to follow W3C & Accessibility standards
  – Can be graded automatically

https://info343-au16.github.io/
Supported CS Principles

• Separation of Concerns
  – HTML for *content* semantics, not *appearance*!

• Working with Standards
  – Following W3C and WAI-ARIA specifications
Works for Most GUI Frameworks!

- Example: Java Swing
  
  (http://docs.oracle.com/javase/tutorial/uiswing/misc/access.html)

<table>
<thead>
<tr>
<th>Method</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>getAccessibleContext().setAccessibleName(String)</code></td>
<td>Provide a name or description for an accessible object.</td>
</tr>
<tr>
<td><code>getAccessibleContext().setAccessibleDescription(String)</code></td>
<td></td>
</tr>
<tr>
<td>(on a <code>JComponent</code> or <code>Accessible object</code>)</td>
<td></td>
</tr>
<tr>
<td><code>void setToolTipText(String)</code></td>
<td>Set a component's tool tip. If you don't set the description, than many accessible contexts use the tool-tip text as the accessible description.</td>
</tr>
<tr>
<td><code>(in </code>JComponent<code>)</code></td>
<td></td>
</tr>
<tr>
<td><code>void setLabelFor(Component)</code></td>
<td>Associate a label with a component. This tells assistive technologies that a label describes another component.</td>
</tr>
<tr>
<td><code>(in </code>Label<code>)</code></td>
<td></td>
</tr>
<tr>
<td><code>void setDescription(String)</code></td>
<td>Provide a description for an image icon.</td>
</tr>
<tr>
<td><code>(in </code>ImageIcon<code>)</code></td>
<td></td>
</tr>
</tbody>
</table>

- Example: Android Development
  
Works for Many Courses!

• Software Engineering
  – A *non-functional requirement* for student projects
    ...that is testable!

• Human-Computer Interaction
  – A lens for considering navigation / Universal Design

• Any Course!
  – A way to emphasize *diversity* in software design
An accessibility focus improves teaching software development

Contact Info

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[AccessComputing](https://www.washington.edu/accesscomputing/)