**Case Study: HTML Testing for a University Admission Portal**

**🎓 Background**

A university built a new **admission portal** to allow students to apply online. The front-end was developed using HTML5, CSS3, and JavaScript, and it had to work on multiple devices and browsers while remaining accessible to all users, including those with disabilities.

**🎯 Objectives of HTML Testing**

1. **Ensure HTML structure is valid** and semantic.
2. **Verify cross-browser compatibility** (Chrome, Firefox, Safari, Edge).
3. **Confirm mobile responsiveness**.
4. **Check accessibility** compliance (WCAG 2.1 AA).
5. **Ensure usability and performance** for end-users.

**🧪 Testing Strategy**

| **Test Type** | **Tools Used** | **Purpose** |
| --- | --- | --- |
| HTML Validation | W3C Validator, HTMLHint | Detect malformed HTML and deprecated tags |
| Accessibility Testing | Axe, Lighthouse, NVDA | Ensure compliance with WCAG standards |
| Cross-browser Testing | BrowserStack, manual testing | Check layout and behavior on all browsers |
| Responsiveness | Chrome DevTools, Responsively | Ensure mobile-friendly layout |
| Manual Usability Tests | User testing, feedback forms | Validate clarity, navigation, form usability |

**📄 Example: HTML Snippet from the Form**

html

<form action="/submit" method="POST">

<label for="fullName">Full Name:</label>

<input type="text" id="fullName" name="fullName" required>

<label for="email">Email:</label>

<input type="email" id="email" name="email" required>

<label for="program">Program:</label>

<select id="program" name="program">

<option value="cs">Computer Science</option>

<option value="math">Mathematics</option>

</select>

<button type="submit">Apply Now</button>

</form>

**🔍 Testing Highlights**

**✅ HTML Validation with W3C**

* **Findings**:
  + Unclosed <input> tag in early draft
  + Improper nesting of <div> and <span>
* **Action Taken**:
  + All HTML validated and corrected to be W3C-compliant

**♿ Accessibility Testing with Axe & NVDA**

* **Issues Found**:
  + Missing aria-label on navigation links
  + Low color contrast for text on buttons
* **Resolution**:
  + Added descriptive ARIA roles and labels
  + Updated color scheme for higher contrast

**🌍 Cross-Browser and Responsive Testing**

* **Tested on**: Chrome, Firefox, Safari, Edge, Opera
* **Screen Sizes**: Mobile, Tablet, Desktop
* **Tools Used**: BrowserStack, DevTools
* **Outcome**:
  + Layout inconsistencies on Safari iOS fixed with CSS media queries
  + Font rendering issues resolved using web-safe fonts

**📊 Results**

| **Metric** | **Before Testing** | **After Testing** |
| --- | --- | --- |
| Validation Errors | 15+ | 0 |
| Accessibility Score (Lighthouse) | 65/100 | 95/100 |
| Cross-browser issues | Major on Safari | None |
| Mobile usability complaints | Frequent | Minimal |
| User satisfaction (survey) | 3.5/5 | 4.7/5 |

**💡 Key Takeaways**

* Valid HTML is critical for **accessibility** and **browser compatibility**.
* Automated tools (Lighthouse, Axe, W3C Validator) save time but should be **combined with manual testing**.
* Accessibility isn’t just compliance — it’s about making the web usable for **everyone**.
* Responsive testing across devices is essential for a positive user experience.