INTRODUCTION TO ACCESSIBILITY

Some common terms

Here are some **common terms** that are relevant to accessibility.

The W3C

The **World Wide Web Consortium** or the W3C is an international community that develops the open standards for the Web.

The W3C produces **specifications** on a wide range of web-related topics including HTML, CSS and Accessibility.

W3C technical specifications have **four levels of maturity**:

1. Working Draft (WD)

A document that W3C has published for review by the community, including W3C Members, the public, and other technical organizations.

2. Candidate Recommendation (CR)

A document that satisfies the Working Group's technical requirements, and has already received a comprehensive review.

3. Proposed Recommendation (PR)

A document that has been accepted by the W3C Director as of sufficient quality to become a W3C Recommendation.

4. W3C Recommendation (REC)

A specification or set of guidelines that, after extensive consensus-building, has received the endorsement of W3C Members and the Director.

WAI

Within the W3C, there is a sub-group called the **Web Accessibility Initiative** (WAI) Working Group.

The WAI Working Group has been responsible for developing the **Web Content Accessibility Guidelines** (WCAG).

WCAG

The WCAG guidelines **provide a standard for web content accessibility**.

WCAG 1.0 became a **W3C Recommendation** in May 1999.

https://www.w3.org/TR/WAI-WEBCONTENT/

WCAG 2.0 became a **W3C Recommendation** in December 2008.

http://www.w3.org/TR/WCAG20/

WCAG 2.1 became a **W3C Recommendation** in June 2018.

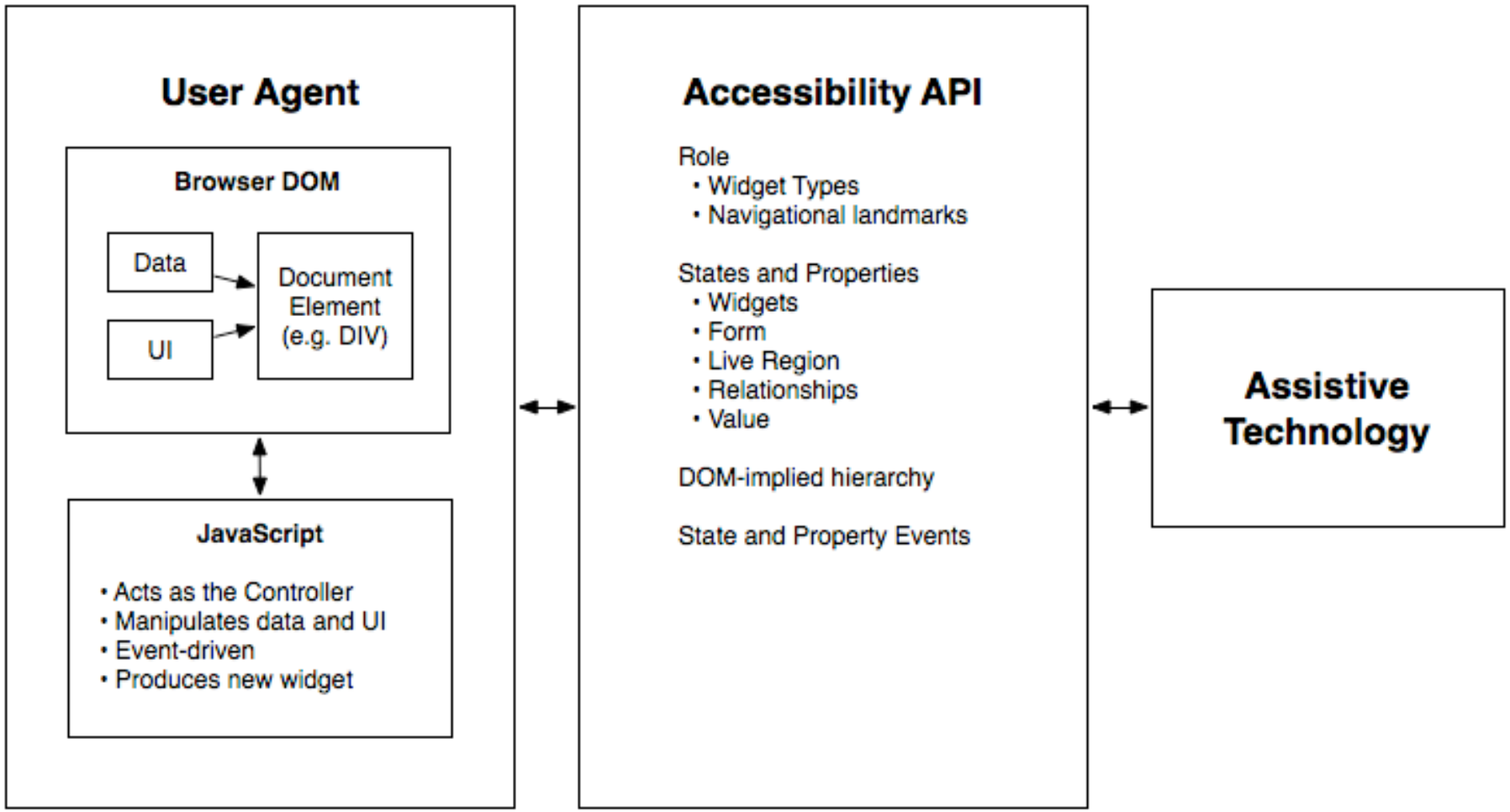
https://www.w3.org/TR/WCAG21/

Accessibility API

Accessibility application programming interfaces (APIs) are used to **communicate semantic information about the user interface** to Assistive Technologies.

“Accessibility APIs constitute a **contract between applications and assistive technologies**, to enable them to access the appropriate semantics needed to produce a usable alternative to interactive applications.”

For example, the Accessibility API **helps screen reading software** determine whether a particular UI widget is a menu, button, text field, list box, etc.


User Agent
Browser DOM
Data
UI
Document Element (e.g. DIV)
JavaScript
• Acts as the Controller
• Manipulates data and UI
• Event-driven
• Produces new widget
Accessibility API
Role
• Widget Types
• Navigational landmarks
States and Properties
• Widgets
• Form
• Live Region
• Relationships
• Value
DOM-implied hierarchy
State and Property Events
Assistive Technology

Accessibility APIs **expose information about each object** within the application such as:

1. The object's **role** (e.g. a menu, a button, an input, an image).

2. A **name that identifies the object within the interface** (e.g. a visible label or a name that has been encoded directly in the object).

3. The object's **state** (e.g. selected, unselected, checked, unchecked).

More than one API?

In OS X Safari and Chrome support **NSAccessibility**.

In iOS Safari and Chrome support **UIAccessibility**.

Some browsers support **one or more of the available accessibility APIs** for the platform they're running on.

In Windows, Firefox and Chrome support **MSAA/IAccessible** and **IAccessible2**.

And Internet Explorer supports **MSAA/IAccessible** and **UIAExpress**.

This is why you should always test against **more than one** Browser/ Assistive Technology combination.

Windows

IE: JAWS & NVDA
FireFox: JAWS & NVDA
Chrome: JAWS & NVDA

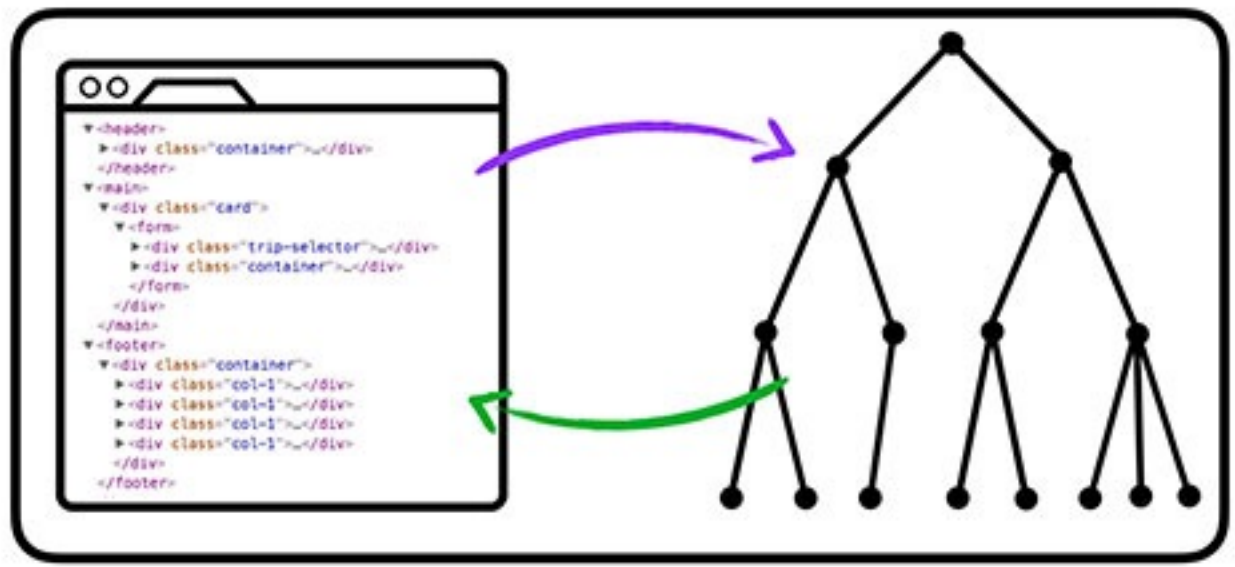
OSX

Safari: VoiceOver
FF: VoiceOver
Chrome: VoiceOver

Accessibility Tree

Browsers take the DOM tree **and modify it**, to turn it into a form that is useful for assistive technologies.

This modified tree, is referred to as **the accessibility tree** - a subset of of the DOM tree.


▼<header>
▶ …
</header>
▼<main>
▼
▼<form>
▶ …
▶ …
</form>

</main>
▼<footer>
▼
▶ …
▶ …
▶ …
▶ …

</footer>
DOM
accessibility tree

The accessibility tree contains **only “Accessible objects”**. These are nodes that have states, properties or events.

All other DOM nodes (that do not have states, properties or events) **are not presented in the accessibility tree**.

For example, **a section within the DOM tree** could be:

```
<div class="container">
  <form action="#">
    <div class="form-container">
      <label for="name">Name</label>
      <input id="name" type="text">
    </div>
    <div class="form-container">
      <button type="submit">Submit</button>
    </div>
  </form>
</div>
```

The Accessibility tree would **only present the following**:

```
<form action="#">

    <label for="name">Name</label>
    <input id="name" type="text">


    <button type="submit">Submit</button>

</form>
```

Each browser could potentially present a **slightly different accessibility tree**.

Widgets

Within the various WAI ARIA specifications, there are multiple references to **“widgets”**.

A widget is a component that **enables a user to perform a function** or access a service such as a dropdown menu, a modal or a tooltip.

Exercise 01a:
Using keyboard-only

Before using any screen reader, it is important to understand how to navigate websites and applications **using the keyboard only**.

We'll start by opening a
demonstration page to practice on.

Open **exercise01-keyboard-only/exercise1.html**

Moving forwards and backwards

The TAB keystroke moves focus to the **next focusable element** on the page.

The `SHIFT TAB` keystroke moves focus to the **previous focusable element** on the page.

Select menus

The `DOWN ARROW` keystroke will move focus to the **next option in dropdown menu**.

The UP ARROW keystroke will move focus to the **previous option in dropdown menu**.

The ENTER and SPACEBAR keystrokes will **select the option** that is currently in focus.

The ESC keystroke will **close the dropdown menu**.

Radio buttons

As long as all radio buttons have a matching name value, **they will act as a radio button group**.

This means you can **only select one radio button** from within the group at a time.

The TAB will move focus **into and out of a radio button group**.

The SPACEBAR keystroke will **select the current radio button**.

The DOWN ARROW keystroke will **move focus to next radio button and select it**.

The UP ARROW keystroke will **move to focus to the previous radio button and select it**.

When a radio buttons has been selected from within a radio group, **it is impossible to uncheck radio buttons from within this group**. The selection can be changed, but not unselected.

Checkboxes

Unlike radio buttons within a group, checkboxes are **always treated as individual form controls**.

The TAB will move focus **into and out of each checkbox**.

The SPACEBAR keystroke will **select and unselect the current checkbox**.

Exercise 01b: VoiceOver

Open **exercise01-keyboard-only/exercise1.html**

VO keys

VoiceOver uses **“VO” keys for control**. The default VO keys are the CONTROL + OPTION keystrokes.

The + symbol indicates that these keys are **used together**.

These two keys can be **changed in VoiceOver settings** as needed.

Starting and stopping

The COMMAND + F5 keystrokes will **start VoiceOver**.

Alternatively, **VoiceOver can be started manually via**:

System Preferences > Accessibility > VoiceOver > Enable VoiceOver

The COMMAND + F5 keystrokes will also **quit VoiceOver**.

Alternatively, VoiceOver can be **quit manually** by clicking the “X” icon in the top left corner of the VoiceOver panel.

Reading

The VO + A keystrokes will trigger VoiceOver to **start reading**.

The `CONTROL` keystroke will trigger VoiceOver to **stop reading**.

The VO + RIGHT ARROW keystrokes will **read the next item**.

The VO + LEFT ARROW keystrokes will **read the previous item**.

The VO + B keystrokes will **read from top of the page to the current location**.

Navigating

The VO + COMMAND + L keystrokes will **take you to the next link**.

The VO + COMMAND + H keystrokes will **take you to the next heading**.

The VO + COMMAND + J keystrokes will **take you to the next form control**.

The VO + COMMAND + X keystrokes will **take you to the next list**.

The VO + COMMAND + T keystrokes will **take you to the next table**.

Exercise 01c: NVDA

Open **exercise01-keyboard-only/exercise1.html**

NVDA key

The **NVDA key** is set to the `INSERT` key by default, but it can be changed to the `Caps lock` key when installing NVDA for the first time.

If you want to **change your NVDA key preferences**, press CTRL + NVDA + K.

Starting and stopping

The NVDA application **needs to be manually opened** in order to begin reading.

The INSERT + Q keystrokes will **quit NVDA**.

Reading

The INSERT + DOWN ARROW keystrokes will trigger NVDA to **start reading continuously from this point on**.

The `CONTROL` keystroke will trigger NVDA to **stop reading**.

The DOWN ARROW keystrokes will **read the next item**.

The UP ARROW keystrokes will **read the previous item**.

Navigating

The K keystrokes will **take you to the next link**.

The L keystrokes will **take you to the next list**.

The H keystrokes will **take you to the next heading**.

The T keystrokes will **take you to the next table**.