HTML5 Syntax and Semantics

Doctype Declaration

HTML5 simplifies the doctype declaration:

<!DOCTYPE html>

New Structural Elements

HTML5 introduces several new elements to better define the structure of web documents:

- <header>: Represents introductory content or a set of navigational links.
- <nav>: Defines a set of navigation links.
- <section>: Represents a section of content, typically with a heading.
- <article>: Represents a self-contained piece of content.
- <aside>: Contains content related to the main content, such as sidebars.
- <footer>: Represents the footer of a document or section.

Content Models

HTML5 has new content models:

- Flow content: Most elements that can be used in the body.
- Sectioning content: Elements that define the scope of headings and outlines.
- Heading content: Elements that define headings.
- Phrasing content: Text and the elements that mark up text within a paragraph.
- Embedded content: Content imported into the document.
- Interactive content: Elements that users can interact with.

Global Attributes

HTML5 introduces new global attributes applicable to all HTML elements:

- data-* attributes: Used to store custom data private to the page or application.
- contenteditable: Indicates whether the element's content is editable.
- draggable: Specifies whether the element is draggable.
- hidden: Hides the element.
- spellcheck: Specifies whether the element is subject to spell checking.

Forms and Input Types

HTML5 enhances forms with new input types and attributes:

- New input types: email, url, number, range, date, time, datetime-local, month, week, search, tel, and color.
- New attributes: placeholder, required, pattern, min, max, step, and autofocus.

Semantic Elements

HTML5 introduces elements that convey meaning about their content:

- <figure>: Represents self-contained content, often with a caption.
- <figcaption>: Provides a caption for a <figure> element.
- <mark>: Represents highlighted text.
- <progress>: Represents the completion progress of a task.
- <time>: Represents a specific period in time.

Multimedia Elements

HTML5 includes native support for audio and video:

- <audio>: Embeds audio content.
- <video>: Embeds video content.
- <source>: Specifies multiple media resources for <audio> and <video>.
- <track>: Specifies text tracks for <video> and <audio>.

APIs and Scripting

HTML5 provides new APIs for scripting:

- Canvas API: Used for drawing graphics via scripting.
- Web Storage API: Offers localStorage and sessionStorage for storing data on the client-side.
- Geolocation API: Provides access to the user's geographical location.
- Web Workers API: Allows background scripts to run concurrently with the main script.
- Server-Sent Events: Enables servers to push updates to web applications over a single HTTP connection.

Document Outlines and Accessibility

HTML5 improves document outlines for better accessibility and SEO:

- Sectioning elements (<header>, <footer>, <section>, <article>, <aside>, and <nav>) create a new context for headings.
- Use of <main> element to represent the dominant content of the document, enhancing screen reader navigation.

Example of HTML5 Document

Here is an example of an HTML5 document:

```
<!DOCTYPE html>
<html lang="en">
<head>
  <meta charset="UTF-8">
```

```html
    <meta name="viewport" content="width=device-width, initial-scale=1.0">
    <title>HTML5 Syntax and Semantics</title>
</head>
<body>

    <header>
        <h1>Welcome to HTML5</h1>
        <nav>
            <ul>
                <li><a href="#intro">Introduction</a></li>
                <li><a href="#features">Features</a></li>
                <li><a href="#example">Example</a></li>
            </ul>
        </nav>
    </header>

    <main>
        <section id="intro">
            <h2>Introduction</h2>
            <p>HTML5 is the latest evolution of the standard that defines HTML.</p>
        </section>

        <section id="features">
            <h2>Features</h2>
            <article>
                <h3>New Elements</h3>
                <p>HTML5 introduces new structural elements that help organize content
better.</p>
            </article>
            <article>
                <h3>Forms</h3>
                <p>HTML5 enhances forms with new input types and attributes.</p>
            </article>
        </section>

        <section id="example">
            <h2>Example</h2>
            <figure>
                <img src="html5-logo.png" alt="HTML5 Logo">
                <figcaption>The HTML5 logo.</figcaption>
            </figure>
        </section>
    </main>
```

```html
  <footer>
    <p>&copy; 2024 HTML5 Tutorial</p>
  </footer>

</body>
</html>
```