HTML
Fundamentals

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Introduction to the Web

- Request – Response
  - User requests something
  - Server responds

- User types URL and presses Enter key in the browser
  - Finding the right place
    - Your query is submitted to your ISP
    - Within your ISP, the DNS takes the domain name and turns it into an IP address (unique identifier)

Introduction to the Web

- Going to that address
  - A request is sent to the desired IP address via HTTP
  - Your request finds the fastest possible path to the server with the specified IP
  - Not a direct journey, it requires hopping from server to server until we arrive
- Server responds
  - Server figures out exactly what we are asking for
  - Builds the right content, pulling information from data source (database)
  - Responds with a combination of HTML, CSS & JavaScript
- Browser takes the code and shows it to the user as a web page
  - We can view the underlying HTML, CSS and JavaScript on any web page

Front End Basics

- Front End vs Back End
  - Front end is the stuff that you see and interact with
    - HTML, CSS and JavaScript
  - Back end constructs the HTML and CSS that is sent back
    - Python, PHP, JavaScript, Java, C#
    - MongoDB, SQL Server, MySQL, Oracle

- HTML
  - Stands for Hypertext Markup Language
  - Defines the content and structure of a web page
    - Put an image here
    - Put a form here
  - The ***nouns*** of a web page

Front End Basics

- CSS
  - Cascading Style Sheets
  - Defines the style of HTML
    - Make text blue
    - Give the image a border
  - The ***adjectives*** of a web page

- JavaScript
  - Adds logic and interactivity to a page
    - Do some math
    - Change color when the user clicks
    - Load data from Twitter
  - The actions or ***verbs*** of a web page

HTML

- A markup language used to create web pages and web applications
- Is used for structuring and presenting content on the WWW
- Allowed publishing and exchanging of scientific and technical documents
- Allowed electronic linking of documents via hyperlinks
- Created in 1989 / 1990 by Tim Berners Lee
- Latest version is HTML5, published in 2014
- Includes markup and APIs for complex web applications

HTML5

- Represents two concepts
  1. New version of the language HTML, with new elements, attributes and behaviors
  2. A larger set of technologies for building more diverse and powerful web sites and applications

- HTML5 technologies can be classified into several groups
  - Semantics
  - Connectivity
  - Offline & Storage
  - Multimedia
  - Graphics
  - Performance & Integration
  - Device Access
  - Styling

HTML5

- Semantics: allowing you to describe more precisely what your content is
  - Sections & outlines in HTML5
    - New outlining and sectioning elements in HTML5: <section>, <article>, <nav>, <header>, <footer> and <aside>
  - Audio and video
    - The <audio> and <video> elements embed and allow the manipulation of new multimedia content
  - Forms improvements
    - Constraint validation API, several new attributes, new values for the <input> attribute type and the new <output> element
  - New semantic elements
    - Numerous new elements, like <mark>, <figure>, <figcaption>, <data>, <time>, <output>, <progress>, or <meter> and <main>

HTML5

- Connectivity: allowing you to communicate with the server in new and innovative ways
  - Web Sockets
    - Makes it possible to open an interactive communication session between the user's browser and a server. You can send messages to a server and receive event-driven responses without having to poll the server for a reply
  - Server Sent Events
    - Allows a server to push events to a client
  - WebRTC
    - Allows connecting to other people and controlling videoconferencing directly in the browser, without the need for a plugin or an external application
    - RTC stands for Real-Time Communication

HTML5

- Offline and storage: allowing webpages to store data on the client-side locally and operate offline more efficiently
  - Online & offline events
    - Let applications and extensions detect whether or not there's an active Internet connection, as well as to detect when the connection goes up and down
  - Web Storage API
    - Provides mechanisms by which browsers can store key/value pairs, in a much more intuitive fashion than using cookies
  - IndexedDB
    - A web standard for the storage of significant amounts of structured data in the browser and for high performance searches on this data using indexes

HTML5

- Multimedia: making video and audio first-class citizens in the Open Web
  - Using HTML5 audio and video
    - The <audio> and <video> elements embed and allow the manipulation of new multimedia content.
  - WebRTC
    - Same as in Connectivity section
  - Using the Camera API
    - Allows using, manipulating, and storing an image from the computer's camera.

HTML5

- 2D/3D graphics and effects: allowing a much more diverse range of presentation options
  - <canvas>
    - An HTML element which can be used to draw graphics using scripting
  - WebGL (Web Graphics Library)
    - A JavaScript API for rendering interactive 3D and 2D graphics within any compatible web browser without the use of plug-ins
  - SVG
    - An XML-based format of vectorial images that can directly be embedded in the HTML

HTML5

- Performance and integration: providing greater speed optimization and better usage of computer hardware
  - Web Workers
    - A simple means for web content to run scripts in background threads, without interfering with the user interface.
  - XMLHttpRequest
    - Allows fetching asynchronously some parts of the page, allowing it to display dynamic content, varying according to the time and user actions
  - Drag and drop
    - The HTML5 drag and drop API allows support for dragging and dropping items within and between web sites
  - Fullscreen API
    - Controls the usage of the whole screen for a Web page or application, without the browser UI displayed

HTML5

- Device access: allowing for the usage of various input and output devices
  - Using the Camera API
    - Allows using, manipulating, and storing an image from the computer's camera
  - Touch events
    - Handlers to react to events created by a user pressing touch screens
  - Using geolocation
    - Let browsers locate the position of the user using geolocation
  - Detecting device orientation
    - Get the information when the device on which the browser runs changes orientation

HTML

- HTML elements
  - The building blocks of HTML pages
  - Are represented by tags
  - HTML tags label pieces of content such as "heading", "paragraph", "table", etc.
  - Browsers do not display the HTML tags, but use them to render the content of the page
  - Element names are surrounded by angle brackets
  - Tags normally come in pairs like and

- The General Syntax

```
<tagName> Some Content </tagName>
```

HTML Boilerplate

```
<!DOCTYPE html>
<html>

<head>
  <!-- Metadata goes in head -->
  <title>Page Title</title>
</head>

<body>
  <!-- Content goes in the body -->
</body>

</html>
```

HTML Boilerplate

- DOCTYPE
  - Indicates that your HTML content uses HTML5
- <html>
  - Represents the root (top-level element) of an HTML document
  - Also referred to as the root element
  - All other elements must be descendants of this element
- <head>
  - Provides general information (metadata) about the document
    - For e.g., it provides title, links to scripts and style sheets
- <body>
  - Represents the content of an HTML document
  - Only one <body> element in a document

HTML Boilerplate

- <title>
  - Defines the title of the document, shown in a browser's title bar or on the page's tab
  - Listed as a result of a search operation in search engines
  - Can only contain text

- HTML comments
  - Comments
    - Are ignored by the browser and invisible to the user
    - ```
      <!-- Comment here -->
      ```
      ```

Basic Tags

- MDN - HTML elements reference
  - https://developer.mozilla.org/en-US/docs/Web/HTML/Element
- <h1> - <h6> - Heading elements
  - Represent six levels of section headings
  - <h1> is the highest section level and <h6> is the lowest
  - Are block-level elements – each element will get its own line
- <p> - Paragraph
  - Represents a paragraph of text
  - Is a block-level element
-
  - Indicates that its contents have strong importance, seriousness, or urgency. Browsers typically render the contents in bold type
  - Is an inline element
-
  - Marks text that has stress emphasis
  - Is an inline element

HTML Lists

- - Ordered list
  - Represents an ordered list of items, typically rendered as a numbered list
  - Can contain zero or more <li> elements, which in turn often contain nested <ol> or <ul> elements
  - Attributes
    - reversed - boolean attribute specifies that the items of the list are specified in reversed order
    - start - integer attribute specifies the start value for numbering the individual list items
    - type - indicates the numbering type – ‘a’, ‘A’, ‘i‘, ‘I’, ‘1’
- - Unordered list
  - Represents an unordered list of items, typically rendered as a bulleted list
  - Can contain zero or more <li> elements, which in turn often contain nested <ol> or <ul> elements
- - List item
  - Is used to represent an item in a list
  - It must be contained in a parent element
    - an ordered list (<ol>), an unordered list (<ul>)

Divs and Spans

- - Content division element
  - Is a generic container for content
  - Has no effect on the content or layout until styled using CSS
  - Used to group content
  - Should be used only when no other semantic element (such as <article> or <nav>) is appropriate
  - Is a block-level element

-
  - Is a generic inline container for phrasing content
  - Can be used to group elements for styling purposes
  - Should be used only when no other semantic element is appropriate
  - Is an inline element

HTML Attributes

- MDN – HTML attribute reference
  - https://developer.mozilla.org/en-US/docs/Web/HTML/Attributes

- Attributes
  - Provide additional values to elements
  - Can be used to
    - Configure the elements
    - Adjust the behavior in various ways to meet the criteria the users want
  - Take the form of key=“value” pair for an element

```
<element name=“value”></element>
```

Images

- <img>
  - Embeds an image into the document
  - Does not have end tag
  - Attributes
    - alt
      - defines the alternative text describing the image
      - users will see this text displayed if the image URL is wrong, or if the image is not yet downloaded
    - src
      - specifies image URL. This attribute is mandatory for the <img> element
    - height
      - the intrinsic height of the image in pixels
    - width
      - the intrinsic width of the image in pixels

```
<img src="mdn-logo-sm.png" alt="MDN">
```

Links

- <a> - Anchor element
  - Creates a hyperlink to other web pages, files, locations within the same page, email addresses, or any other URL
  - Attributes
    - href - Contains a URL or a URL fragment that the hyperlink points to
      - URL can be relative or absolute
      - URLs are not restricted to Web (HTTP)-based documents, but can use any protocol supported by the browser
        - For example, file:, ftp:, and mailto: work in most browsers
    - target - Specifies where to display the linked URL
      - It is a name of, or keyword for, a browsing context: a tab, window, or <iframe>
        - Keywords: _self (default), _blank, _parent, _top

```
<a href="https://www.mozilla.com/">
  Go to Mozilla
</a>
```

Tables

- <table>
  - Represents tabular data, information presented in a two-dimensional table comprised of rows and columns of cells containing data
- <tr>
  - Defines a row of cells in a table
  - Within each row (<tr>), the <th> and <td> elements can be used to create header and data cells, respectively
  - Each cell is placed into its own column
- <td>
  - Defines a cell of a table that contains data
- <th>
  - Defines a cell as header of a group of table cells

Tables

- <thead>
  - Defines a set of rows defining the head of the columns of the table
- <tbody>
  - Encapsulates a set of table row (<tr>) elements, indicating that they comprise the body of the table (<table>)
  - You may use more than one <tbody> per table as long as they are all consecutive. This lets you divide the rows in large tables into sections
- <tfoot>
  - Defines a set of rows summarizing the columns of the table

Tables

- <caption> - Table Caption element
  - Specifies the caption (or title) of a table
  - If used, is always the first child of a <table>
- <colgroup>
  - Defines a group of columns within a table
- <col>
  - Defines a column within a table
  - Used for defining common semantics on all common cells
  - Generally found within a <colgroup> element
  - Allows styling columns using CSS

Forms

- <form>
  - Represents a document section that contains interactive controls for submitting information to a web server
  - Attributes
    - action - The URI of a program that processes the form information
    - method - The HTTP method that the browser uses to submit the form
      - Possible values are
        - post - Corresponds to the HTTP POST method; form data are included in the body of the form and sent to the server
        - get - Corresponds to the HTTP GET method; form data are appended to the action attribute URI with a '?' as separator, and the resulting URI is sent to the server

Forms

- <input>
  - Is used to create interactive controls for web-based forms in order to accept data from the user
  - How an <input> works varies considerably depending on the value of its type attribute
  - The default type adopted is text

  - Commonly used input types include
    - text
      - A single-line text field. Line-breaks are automatically removed from the input value
    - password
      - A single-line text field whose value is obscured
    - file
      - A control that lets the user select a file. Use the accept attribute to define the types of files that the control can select
    - hidden
      - A control that is not displayed but whose value is submitted to the server

Forms

- Button, checkbox, radio
  - submit: A button that submits the form
  - reset: A button that resets the contents of the form to default values

  - button: A push button with no default behavior
  - image: A graphical submit button. You must use the src attribute to define the source of the image and the alt attribute to define alternative text

  - checkbox: A check box allowing single values to be selected/deselected
  - radio: A radio button, allowing a single value to be selected out of multiple choices

Forms

- HTML5
  - date: A control for entering a date (year, month, and day, with no time)
  - month: A control for entering a month and year, with no time zone
  - week: A control for entering a date consisting of a week-year number and a week number with no time zone
  - time: A control for entering a time value with no time zone

  - number: A control for entering a number
  - range: A control for entering a number whose exact value is not important

  - color: A control for specifying a color. A color picker's UI has no required features other than accepting simple colors as text
  - email: A field for editing an e-mail address
  - search: A single-line text field for entering search strings. Line-breaks are automatically removed from the input value
  - tel: A control for entering a telephone number
  - url: HTML5 A field for entering a URL

Forms

- <label>
  - Represents a caption for an item in a user interface
  - A <label> can be associated with a control
    - Either by placing the control element inside the <label> element,

```
<label>Click me <input type="text"></label>
```

    - Or by using the ‘for’ attribute

```
<label for="username">Click me</label>
<input type="text" id="username">
```

  - Attributes
    - ***for*** - The id of a labelable form-related element in the same document as the label element

Forms

- Form data validation
  - Form validation helps us to ensure that users fill out forms in the correct format, making sure that submitted data will work successfully with our applications

  - required attribute
    - makes an input mandatory
    - the form won't submit (and will display an error message) when the input is empty

  - pattern attribute
    - expects a Regular Expression as its value
    - a pattern that can be used to match character combinations in text strings
    - The <textarea> element does not support the pattern attribute

Forms

- Constraining the length of entries
  - Text fields can be constrained in size using ‘minlength’ and ‘maxlength’ attributes
  - A field is invalid if its value is
    - shorter than the minlength value or
    - longer than the maxlength value
  - For number fields (i.e. <input type="number">), the ‘min’ and ‘max’ attributes also provide a validation constraint

Forms

- <input type="checkbox">
  - Rendered by default as square boxes that are checked (ticked) when activated
  - 'value' attribute can be used to mention the value of the checkbox
  - Has 'checked' attribute that is readable and settable

- <input type="radio">
  - Radio buttons let a user select one of a limited number of choices
  - 'value' attribute can be used to mention the value of the radio button
  - Has 'checked' attribute that is readable and settable
  - A radio group is defined by giving each of radio buttons in the group the same name

Forms

- <select>
  - Represents a control that provides a menu of options
  - The <option> element defines an option that can be selected
  - By default, the first item in the drop-down list is selected

  - Attributes
    - size - represents the number of rows in the list that should be visible at one time
    - multiple - boolean attribute indicates that multiple options can be selected in the list

- <option>
  - Is used to define an item contained in a <select> element

  - Attributes
    - value - specifies the value to be sent to a server
    - selected - specifies that an option should be pre-selected when the page loads

Forms

- <textarea>
  - Represents a multi-line plain-text editing control
  - Can hold an unlimited number of characters, and the text renders in a fixed-width font

  - Attributes
    - cols - the visible width of the text control, in average character widths
    - rows - the number of visible text lines for the control
    - maxlength - maximum number of characters (Unicode code points) that the user can enter
    - minlength - minimum number of characters (Unicode code points) required that the user should enter
    - wrap – (hard | soft) specifies how the text in a text area is to be wrapped when submitted in a form

Q & A

- Thank you!