# Web Applications 2017

Week 1, Slides 1

# Content

- HTTP,
- Internet Media Types
- Uniform Resource Locators
- Platforms and frameworks
- NodeJS
- Java Enterprise Edition
- HTML
- CSS
- Frontend user interface frameworks

# HTTP

| HTTP Method | RFC | Request Has Body | Response Has Body | Safe | Idempotent | Cacheable |
|---|---|---|---|---|---|---|
| GET | RFC 7231 | No | Yes | Yes | Yes | Yes |
| HEAD | RFC 7231 | No | No | Yes | Yes | Yes |
| POST | RFC 7231 | Yes | Yes | No | No | Yes |
| PUT | RFC 7231 | Yes | Yes | No | Yes | No |
| DELETE | RFC 7231 | No | Yes | No | Yes | No |
| CONNECT | RFC 7231 | Yes | Yes | No | No | No |
| OPTIONS | RFC 7231 | Optional | Yes | Yes | Yes | No |
| TRACE | RFC 7231 | No | Yes | Yes | Yes | No |
| PATCH | RFC 5789 | Yes | Yes | No | No | Yes |

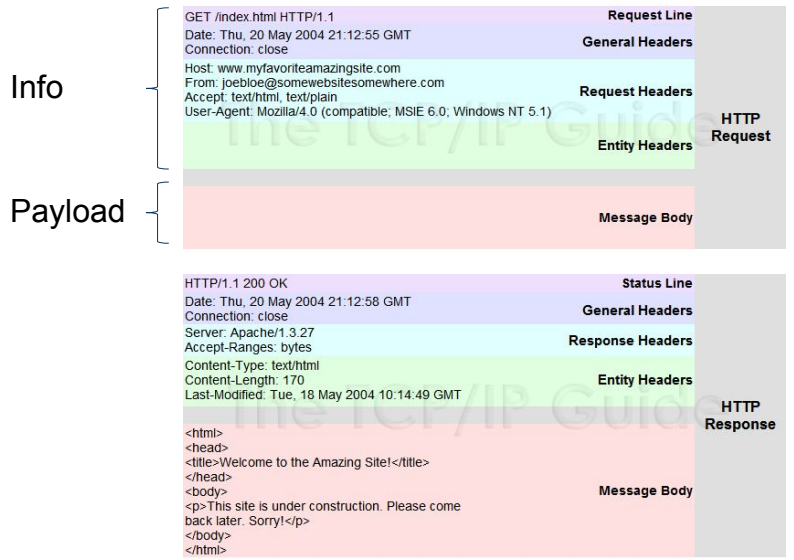
The “Verbs”

The basic protocol for web applications.

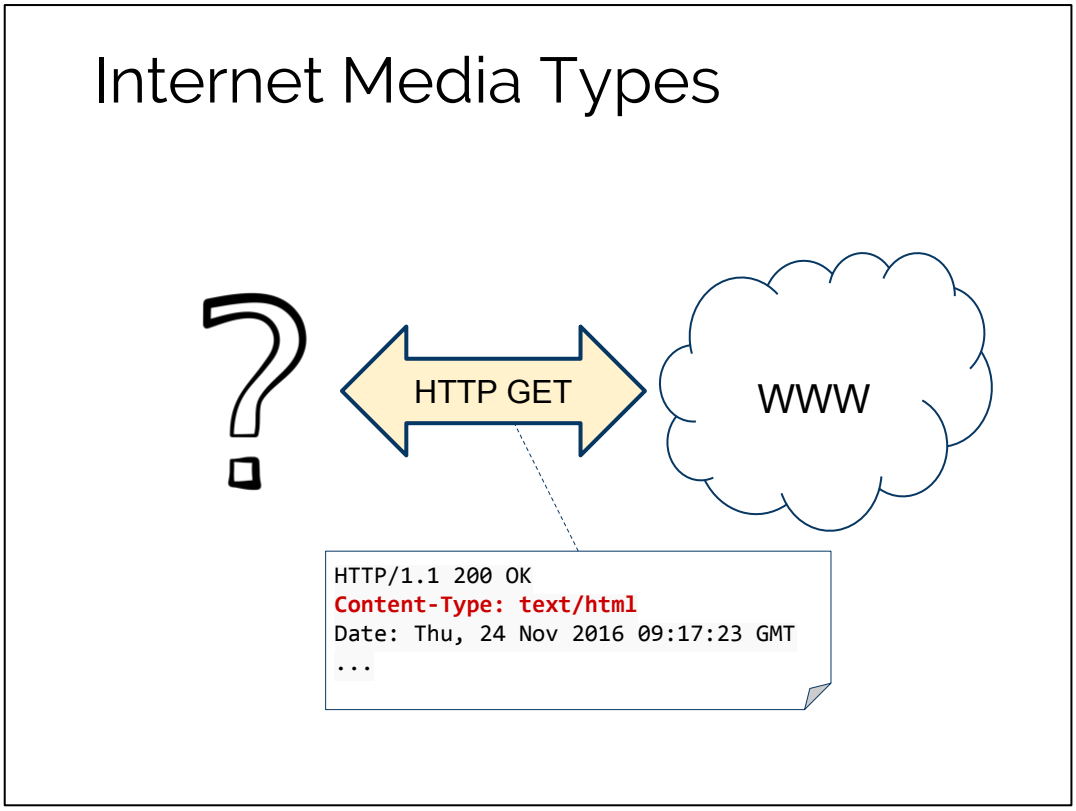
Readings

- HTTP Wikipedia
- HTTP for web developers
- HTTP-in depth
- HTTPS Wikipedia
- Cacheable

# HTTP Messages




List of [status codes]

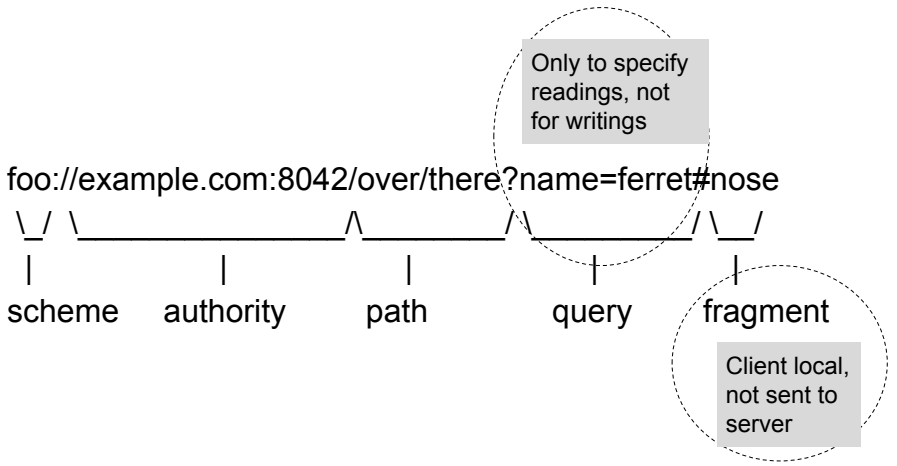



HTTP messages are capable of carrying arbitrary “labeled” content. The mechanism used to label such content is a media type.

Readings:

- Media types Wikipedia
- Full list of med media types.

# Uniform Resource Locator

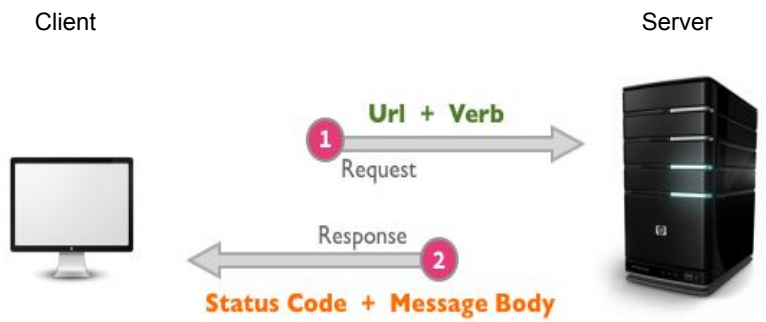



Resources specified by URLs

Readings:

- URLs Wikipedia
- Percent Encoding of URLs

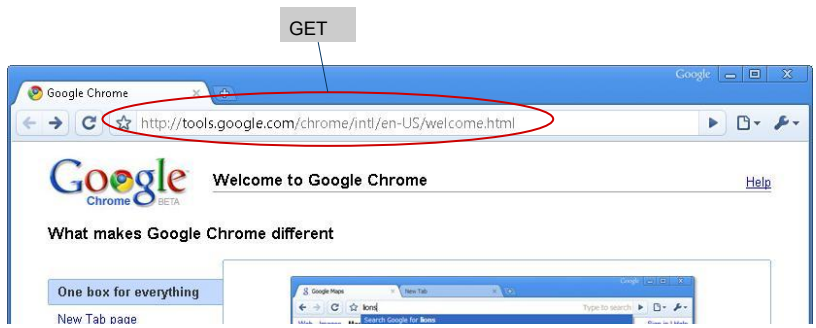
# Request and Response




The basic interaction!

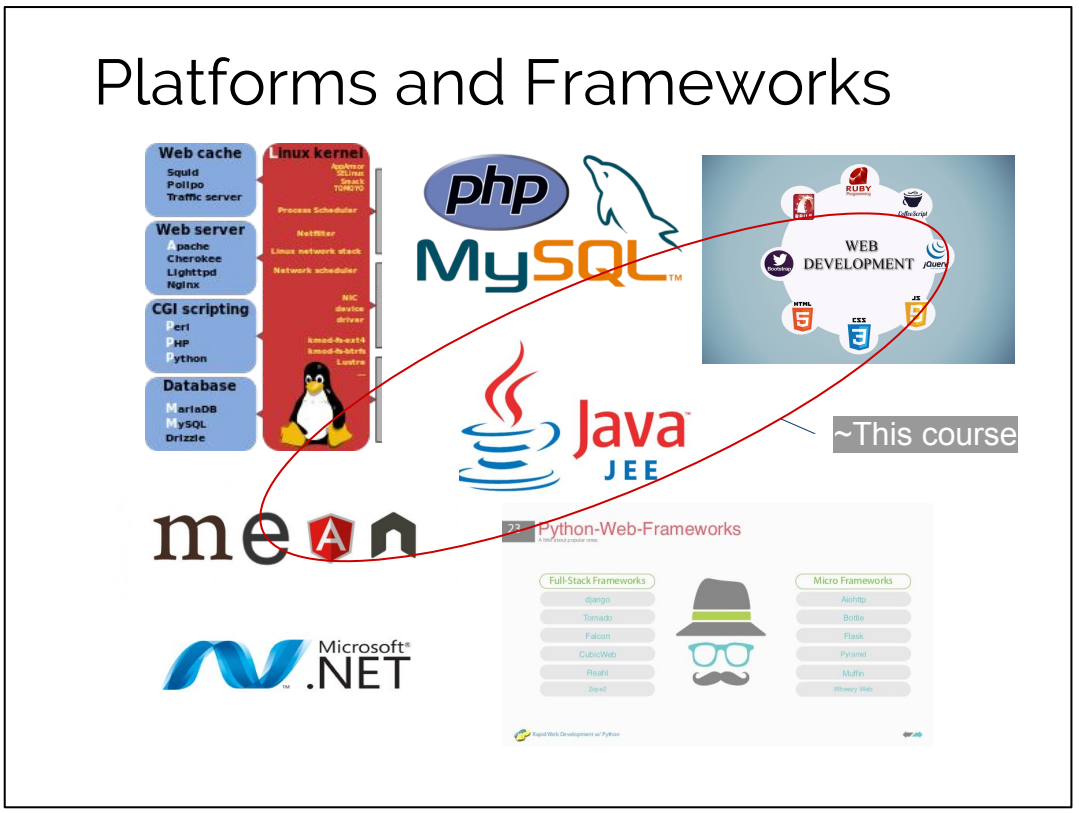
# Sending Requests

```
$ curl -X POST -TODO
```




Sending request

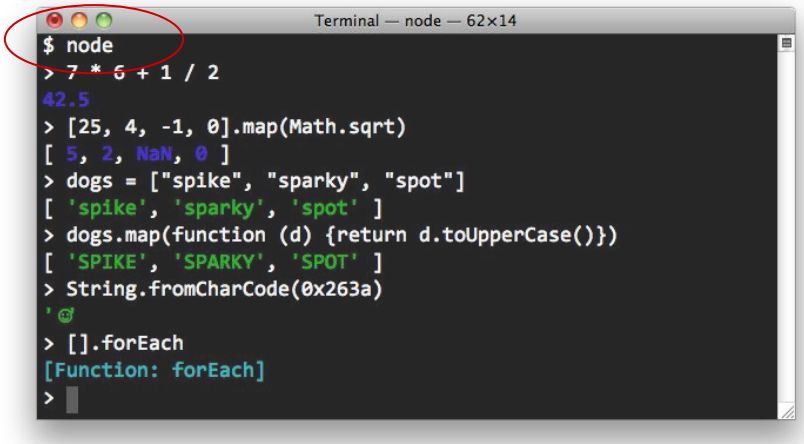
- Using command line tool curl or browser




Major [platforms] and [frameworks]
- I would say: A platform > a framework
- Most (all?) cover both client and server side

Readings:
- [Web frameworks Wikipedia]
- [Comparison of web frameworks]
- [.NET]
- [JEE]
- [LAMP]
- [MEAN]

# NodeJS




NodeJS is a an asynchronous (more later) event driven JavaScript runtime (server side)

Readings

- NodeJS Home
- About NodeJS
- NodeJS full API
- Node Hero (tutorial)

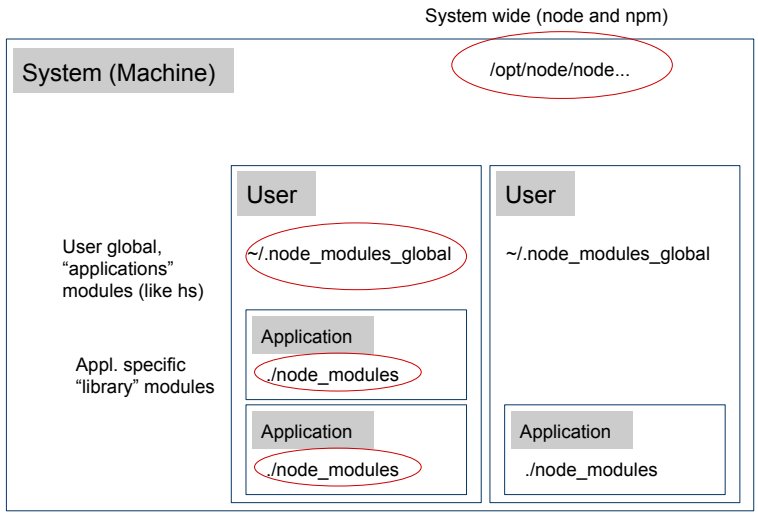
# Node Package Manager (npm)


npm is a module (dependencies) system for NodeJS (compare Maven for Java)

Readings

- NPM Home
- Installing (tutorial)

# Npm Environment




npm is a module (dependencies) system for NodeJS (compare Maven for Java)

Readings

- NPM Home
- Installing (tutorial)

# Http-server

```
$ npm install http-server -g
```

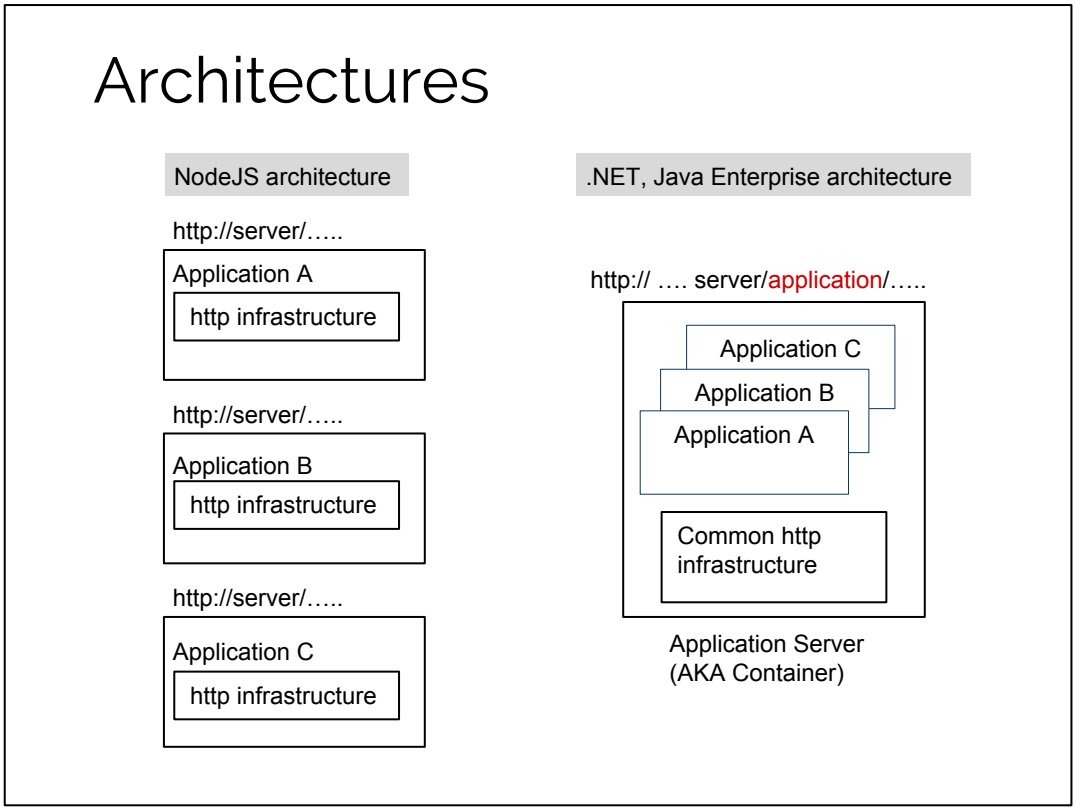
User global

```
$ hs
Starting up http-server, serving
./public
Available on:
  http://127.0.0.1:8080
  http://192.168.1.12:8080
Hit CTRL-C to stop the server
```

A development server built on top of NodeJs.

Readings:

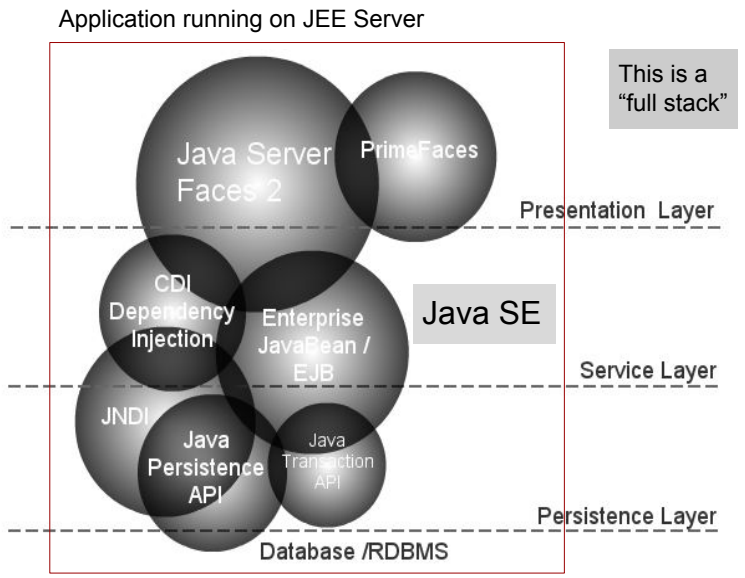
- [http-server]




Architecture

- (Server) process and application the same (process to application is 1:1) …
- …or applications in server process ( server to application is 1:M)?
- If more applications on same server have to distinguish them (path)

# Java Enterprise Edition 7

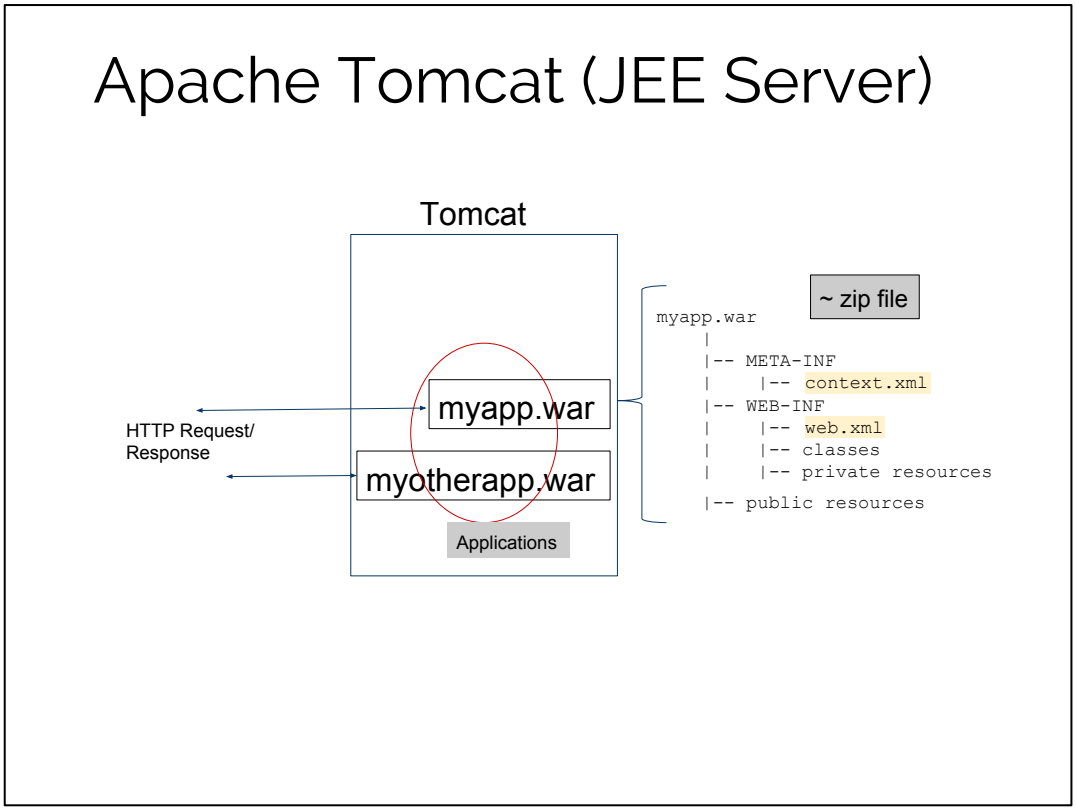



Java Enterprise Edition 7 (JEE 7)
Platform for developing and running web/enterprise software, including network and web services, and other large-scale, multi-tiered, scalable,

- Java SE is a subset of Java EE

Readings

- Specifications
- JEE7 is an umbrella specification including a specific subset of JSRs.
- Java Specification Requests, JSRs,



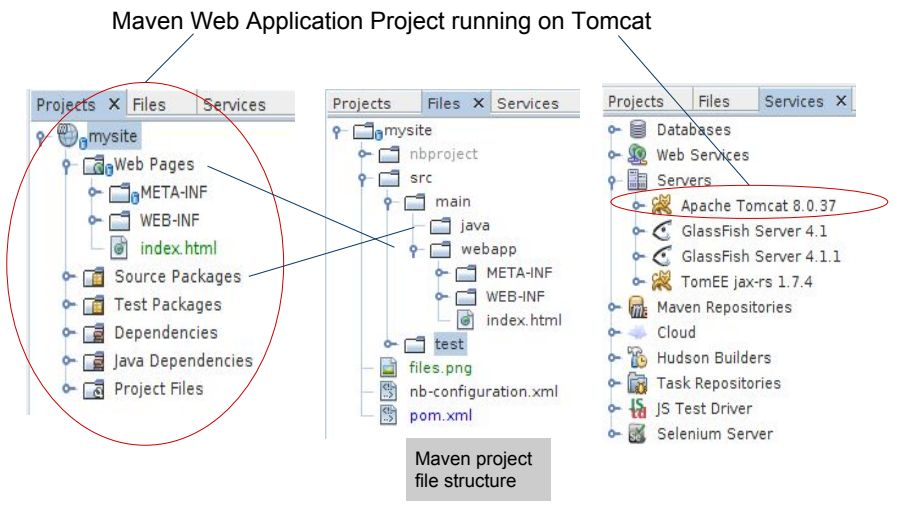

Tomcat is an open source implementation of the Java Servlet, JavaServer Pages, Java Expression Language and Java WebSocket technologies.

- More on technologies later
- Application deployed as *.war files (like *.zip).
- Server also serve static content like HTML.

Readings

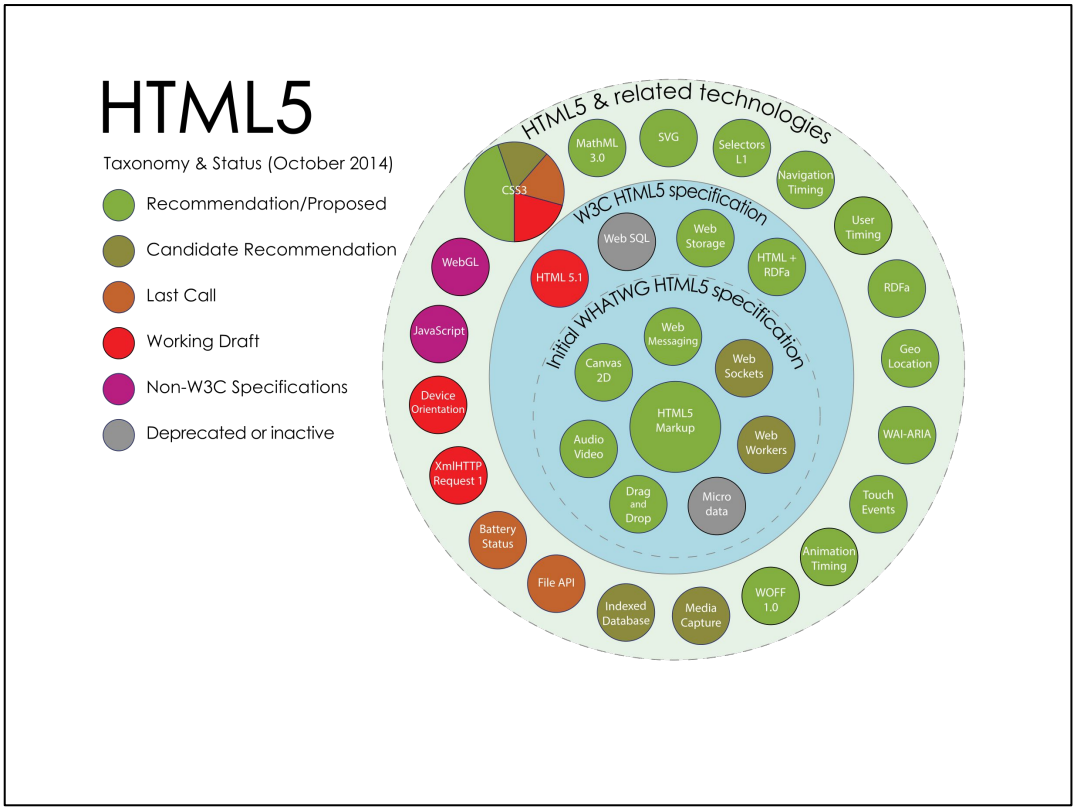
- Apache Tomcat

# NetBeans and Tomcat




Tomcat bundled with NetBeans

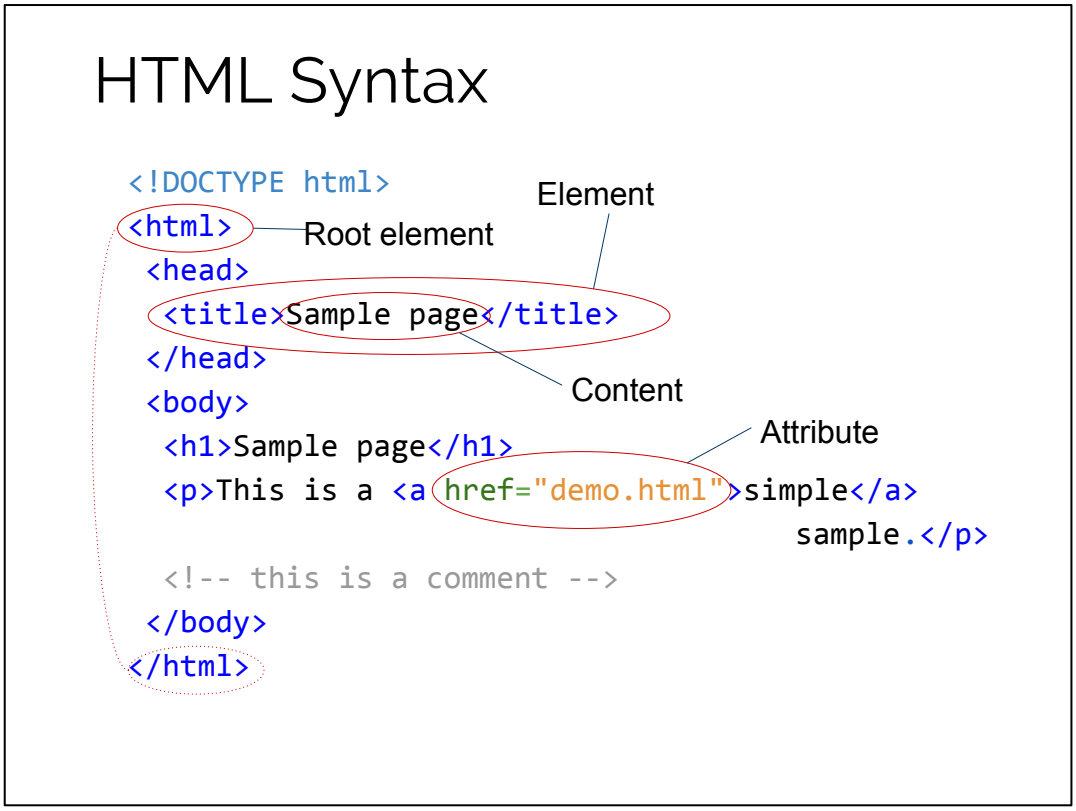
- Will pack, deploy and run application on Tomcat (in place) from inside IDE




HTML ("HyperText Markup Language") is a language to describe the contents of web documents

Readings

- About w3c
- W3C HTML5 recommendation
- HTML5 Quick introduction
- HTML5 is not same as HTML4
- WHATWG

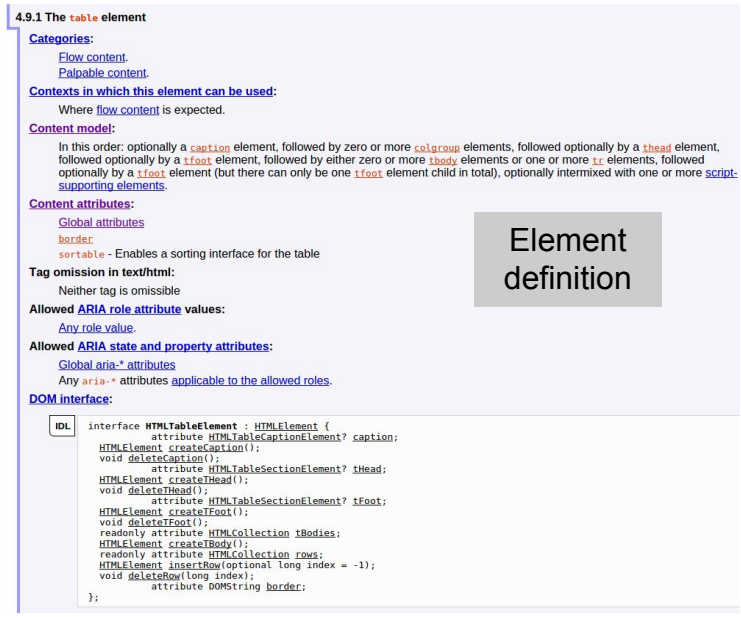



<head> non-visible metadata, <body> visible content.

Readings:

- Basics of HTML
- HTML data types
- Tutorials at W3C
- Tutorials at MDN
- Tutorial ar w3schools
- HTML Validator

# HTML Semantics



**4.9.1 The `table` element**

**Categories:**

Flow content.
Palpable content.

**Contexts in which this element can be used:**

Where flow content is expected.

**Content model:**

In this order: optionally a `caption` element, followed by zero or more `colgroup` elements, followed optionally by a `thead` element, followed optionally by a `tfoot` element, followed by either zero or more `tbody` elements or one or more `tr` elements, followed optionally by a `tfoot` element (but there can only be one `tfoot` element child in total), optionally intermixed with one or more script-supporting elements.

**Content attributes:**

Global attributes
`border`
`sortable` - Enables a sorting interface for the table

**Tag omission in text/html:**

Neither tag is omissible

**Allowed ARIA role attribute values:**

Any role value.

**Allowed ARIA state and property attributes:**

Global aria-* attributes
Any `aria-*` attributes applicable to the allowed roles.

**DOM interface:**

IDL

```
interface HTMLTableElement : HTMLElement {
             attribute HTMLTableCaptionElement? caption;
  HTMLElement createCaption();
  void deleteCaption();
             attribute HTMLTableSectionElement? tHead;
  HTMLElement createTHead();
  void deleteTHead();
             attribute HTMLTableSectionElement? tFoot;
  HTMLElement createTFoot();
  void deleteTFoot();
  readonly attribute HTMLCollection tBodies;
  HTMLElement createTBody();
  readonly attribute HTMLCollection rows;
  HTMLElement insertRow(optional long index = -1);
  void deleteRow(long index);
             attribute DOMString border;
};
```

Element definition

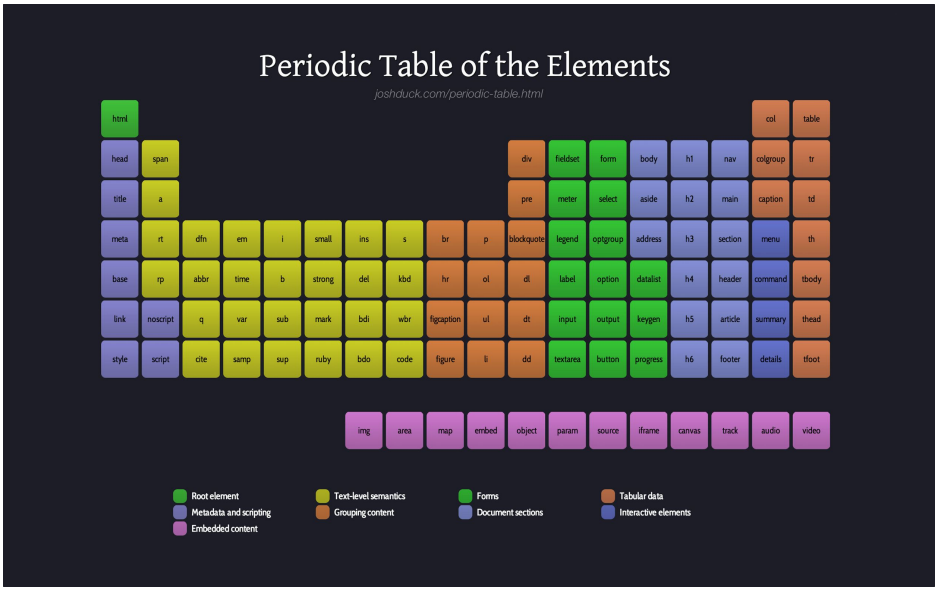
Elements, attributes, and attribute values in HTML are defined to have certain meanings (semantics).

- Authors must not use elements, attributes, or attribute values for purposes other than their appropriate intended semantic purpose, as doing so prevents software from correctly processing the page (browsers, search engines).

Readings:

- Browsing context

# HTML Elements




Not exactly as in recommendation but nice overview.

Readings

- The elements of HTML
- MDNs HTML element reference
- W3schools HTML Reference

# Some Global Attributes

### Id

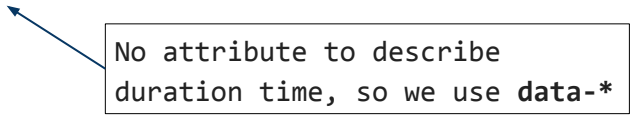
```
<section id="content"> ... </section>
```

### Class

```
<article class="important"> ... </article>
```

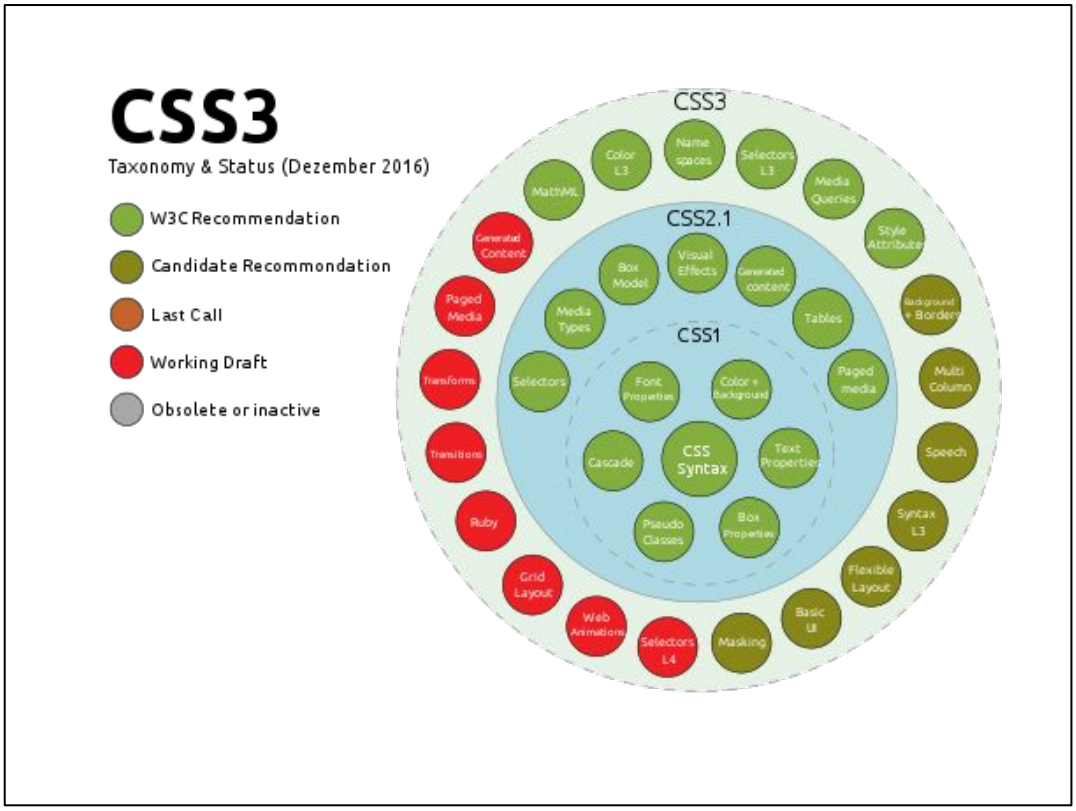
### Custom Attribute

```
<li data-length="2m11s">Beyond The Sea</li>
```




Readings:

- Global attributes



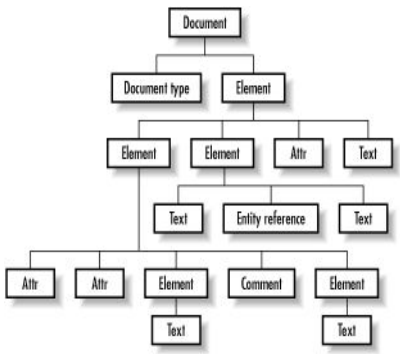

Cascading Style Sheets (CSS) is a language for describing the presentation semantics of markup documents
CSS allows authors to move style information to a separate style sheet resulting in considerably simpler HTML markup

Readings:

- CSS Roadmap (see selectors far down)
- CSS at MDN
- CSS at w3Schools
- Cascade
-

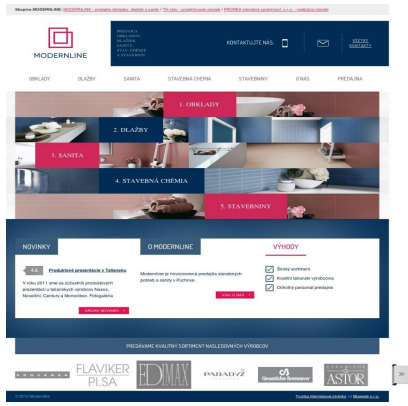
# Rendering HTML

The HTML structure



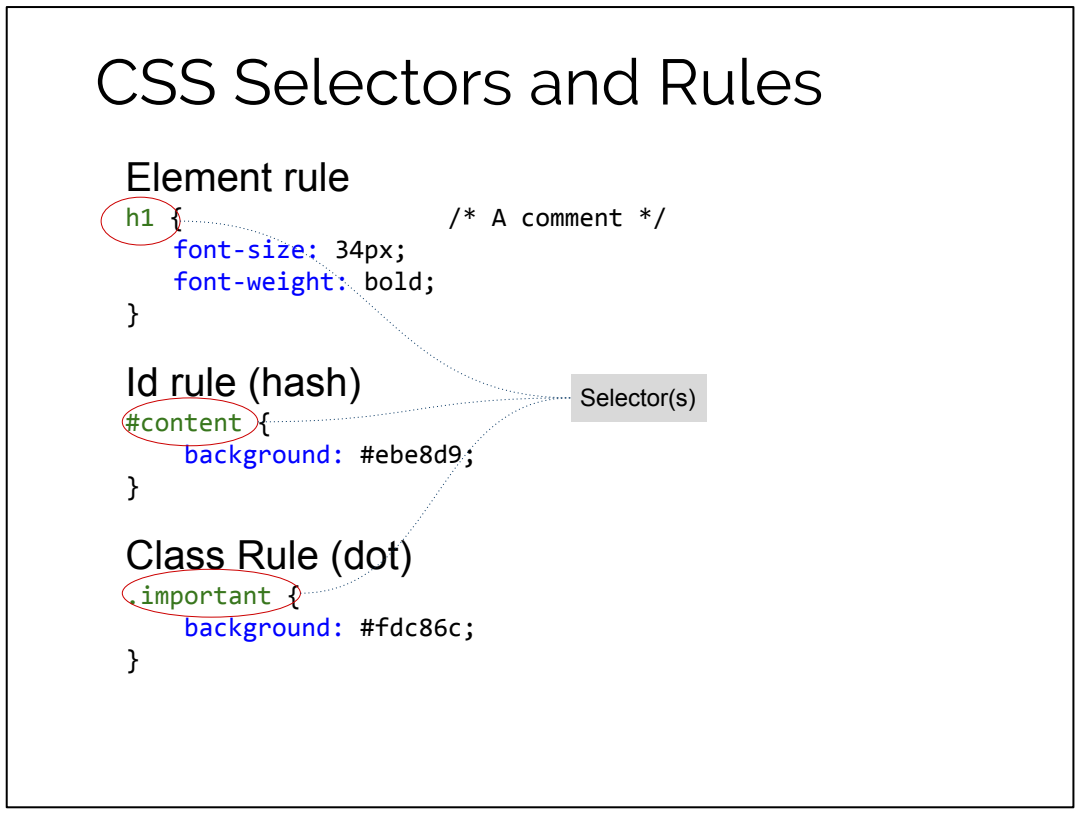

CSS

The “look”




In HTML page

```
<link href="resources/css/default.css" rel="stylesheet" />
```




CSS: Case insensitive, comments begin with the characters "/*" and end with the characters "*/"

- A rule set (also called "rule") consists of a selector followed by a declaration block.
- Selectors are patterns used to determine which style rules apply to elements in the document tree.

Reading

- CSS Syntax

# @ Rules (at rules)

At-rules are instructions or directives to the CSS parser. Not targeting specific HTML elements or attributes.

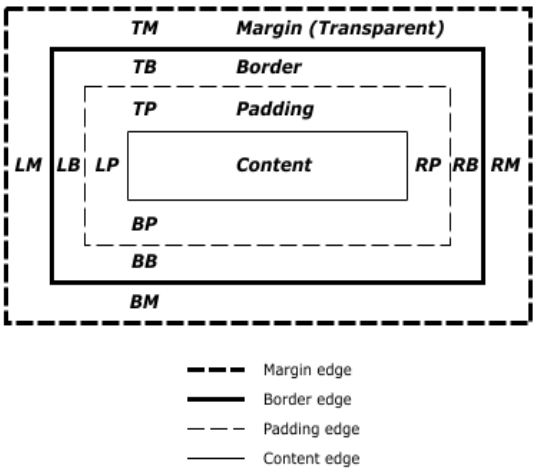
Some are:

- @import: Import one style sheet into another. All @import at-rules must appear before any rules.
- @media: Target media types we specify.
- @font-face: Custom fonts

Readings

- "At rules"

# The Box Model

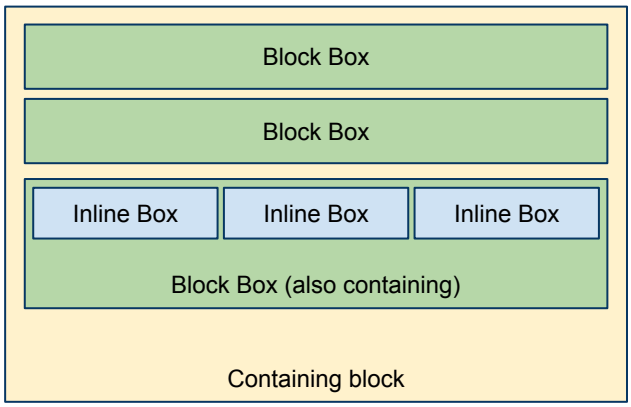



The CSS box model describes the rectangular boxes that are generated for HTML elements in the document tree and laid out according to the visual formatting model.

Readings:

- Intro to box model
- CSS units

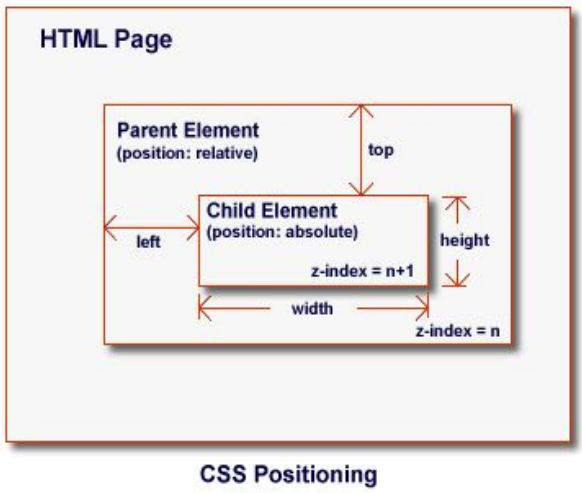
# Visual Formatting




Readings

- Visual Formatting
- MDN CSS Layout

# Positioning Schemas




CSS Positioning

In CSS 2.2, a box may be laid out according positioning schemes

Readings

- Positioning CSS3
- Advanced HTML and CSS

# CSS Preprocessors

CSS designed for non programmers

Preprocessors add features for programmers

- Variables
- Nesting
- Mixins
- Extends
- Selection/Iteration
- Math
- Imports

Readings

- Intro to CSS preprocessors
- Sass
- node-sass

# Front End User Interface Frameworks

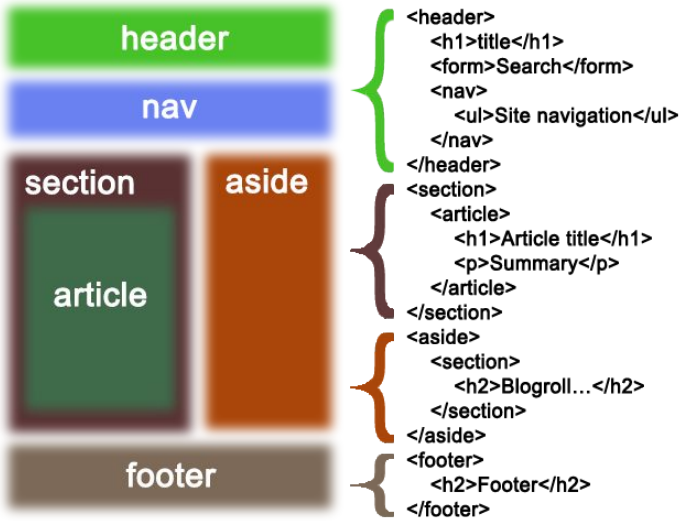
```
<body class="container">


<nav class="navbar navbar-default" role="navigation">
    <a class="navbar-brand" href="/home">Home</a>
  ...
</nav>
```


We're not graphical designers …

- CSS very tedious …
- Better use some client side framework
- Possibly Bootstrap
    - Bootstrap components …
    - …mostly using the class-attribute

NOTE: Bootstrap uses some JavaScript so it's not a pure CSS framework

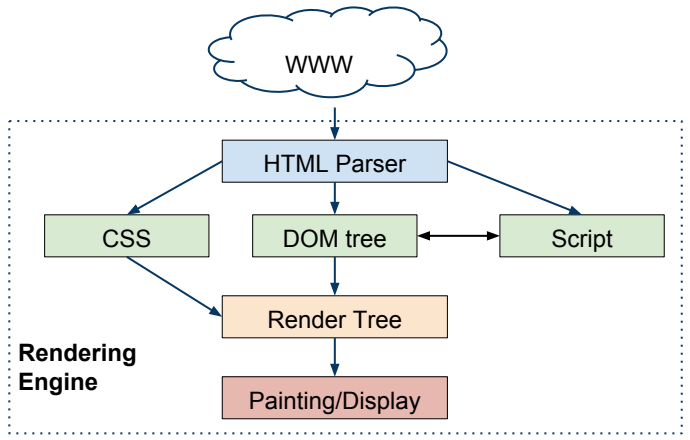
# Basic Page Structure with HTML/CSS




Creating a basic page style (layout and styles)

- HTML document using section tags
- CSS style sheet to normalize the default browser style (normalize.css or similar recommended)
- CSS stylesheet (default.css) containing positioning rules for the section tags …
- … and colors, fonts, etc. for remaining tags

# Page Loading




Readings:

- How Browsers Work