

01 The Internet

(MCA) CSA-507 Web Development
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Networks

- Network - connected computing nodes
- Network (communicating) capabilities
- Standardized protocols
- Network structure models (mesh, token, bridge, etc.)



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Networks

- Layer-to-layer communication protocols
- Encoding and decoding at each layer

| TCP/IP model | Protocols and services | OSI model |
|-------------------|------------------------------------|--------------|
| Application | HTTP, FTP, Telnet, NTP, DHCP, PING | Application |
| Transport | TCP, UDP | Presentation |
| Network | IP, ARP, ICMP, IGMP | Session |
| Network Interface | Ethernet | Transport |
| | | Network |
| | | Data Link |
| | | Physical |

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Client-Server

- Client-Server : Master-Slave relation
 - Client requests, Server responds
- P2P : No explicit hierarchy



Client-Server



Peer-to-Peer

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Internet-enabled devices

- Conventional & Non-conventional
- Computing device vs. Internet-connected



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Protocols

- Rules w.r.t. process (specifically w.r.t. communication)
- Usually published as RFCs



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Standards

- Regulatory bodies
- IEEE - communication protocols
- W3C - web-based



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Web Browser

- Supports web pages



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Head-less Browser

- Without application UI ...?
 - (for rendering HTML) Viewport



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Browser engines

- Core component
 - Render (component) - (html, css)
 - Interpretation (component) - (js)



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Website

- (Web) Pages hosted at a location (URL)
 - Location : Server



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Web Application

- Website, but more...
- Software on the web



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Separation of Concerns

- Separated functional units/ task-handlers
- HTML | CSS | JS



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HTML

CSS

JS



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HTML

- (HyperText Markup Language)
- Language of a web page
- Markup language
- XML based

```
1 <!DOCTYPE html>
2 <html>
3 <head>
4   <meta charset="utf-8">
5   <title>title goes here</title>
6 </head>
7 <body>
8
9 </body>
10 </html>
```

<html>

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CSS

- (Cascading Style Sheets)
- Stylizing HTML content
- Attached to HTML tags

```
body {
  font: x-small;
  background: #
  color: black;
  margin: 0;
  padding: 0;
```

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JS

- (JavaScript or ECMA-Script)
- Interactivity aspect
- Full-fledged (programming) scripting language

```
const http = require('http');

const hostname = '127.0.0.1';
const port = 3000;

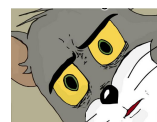
const server = http.createServer((req, res) => {
  res.statusCode = 200;
  res.setHeader('Content-Type', 'text/plain');
  res.end('hello world!');
});

server.listen(port, hostname, () => {
  console.log(`server running at http://${hostname}:${port}/`);
});
```

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Understanding HTML

- XML -> XHTML / (HTML) XML
 - Inverted tree structure
 - Tags (is contents) + Attributes
- Basic Structure
 - <HEAD>
 - <BODY>
- Compiled or Interpreted ?



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HTML Basics

- HTML Elements (start_tag + content + end_tag)
 - Tags with (html) meaning
- HTML Attributes
 - Attributes with (HTML) meaning w.r.t. the (HTML) tags

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More on HTML elements

- Semantic tags vs. Non-semantic tags
 - `<table>`, `<header>`, `<section>`
 - ``, `<div>`
- `<head>` & `<body>` are semantic or non-semantic?



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HTML (fixed page) Layouts

- Frames
- Tables
- Div/ Span; and header, nav, main, footer, etc.



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HTML Forms

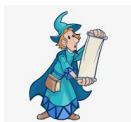
- Common `<input>` tags; `<select>` - `<option>`; `<button>`; `<textarea>`; etc.
- Form action; form element name
- `<input>` "type" (& attributes)
 - text, email, tel, button/submit, etc.
 - date, time, file, etc.



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Other HTML concepts...

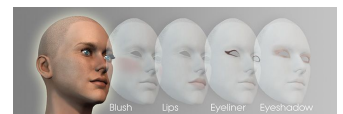
- DOCTYPE
- Text tags
- Links, lists (ordered/ unordered)
- HTML Media
- Entities, Symbols, CharSet



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Understanding CSS

- "style"
- "cascading"
- SYNTAX = selector + declaration(s)
- Bind via inline/internal/external



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CSS Selector

- Tag name / ID / CLASS
- Combining selectors
- Pseudo-class (element state)
- Pseudo-element (element part)
- Attribute-based



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CSS Declaration(s)

- CSS property-value pair
- Background-related properties
- Colors
 - RGB(A), HEX, HSL(A) color schemes
- Text and Font properties
- Dimensions (width, min-height, max-width, etc.)
- Units - px, pt, in; %, em, rem, vh, vmax; etc.

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CSS Layout(s)

- display
- width-height
- position, left, right, top, bottom
- z-index
- float & clear
- Horizontal & Vertical alignments



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