

CMSC388A

Web Application Development with JavaScript



Fundamentals

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Client/Server

- What is the Internet?
- How is data transferred on the Internet?
 - A Packet's Tale. How Does the Internet Work?
(https://www.youtube.com/watch?v=ewrBaIT_eBM)

IP Addresses

- **Unique address for machine on the internet**
 - Get from ISP when connecting to the internet
 - Allows network to find your machine
- Internet Protocols **IPv4, IPv6**
 - Define how data is sent between computers over packet-switched network

IPv4 and IPv6

- (IPV4) Internet Protocol Version 4
 - **32-bit unsigned integer** (e.g., 128.8.128.8)
 - Domain name: cs.umd.edu
 - Localhost: 127.0.0.1
- (IPV6) Internet Protocol Version 6
 - **128-bit address** - Eight 16-bit numbers. Each 16-bit is represented with 4 hex characters
 - Designed to replace IPV4
 - Addresses exhaustion of addresses associated with IPV4
 - Now we have 2^{128} (3.4028237e+38)
 - Format:
 - » <https://internetofthingsagenda.techtarget.com/definition/IPv6-address>

Web Server

- **Web Server**
 - Computer program that delivers (serves up) web pages
- **Popular Web Server Programs**
 - Nginx: <https://www.nginx.com/>
 - Apache: <http://www.apache.org/>
- **Local address**
 - **`http://localhost` or `http://127.0.0.1/`**
 - Let's access the local web server and create a user account
- If you use a port different from **default (80)** you must specify it (e.g., **`http://127.0.0.1:8080/`**)
- **Web server statistics**
 - <http://news.netcraft.com/archives/category/web-server-survey/>

DNS

- DNS: Domain Name Systems
- Protocol for translating domain names to IP addresses
 - Example: cs.umd.edu - 128.8.128.44
- Multiple DNS servers on the internet
 - DNS server may need to query other DNS servers
 - edu DNS server queries umd.edu server to find cs.umd.edu

URIs

- URI (Uniform Resource Identifier) - identifier of a resource
- URL (Uniform Resource Locator) - a subcategory of URI that is an identifier and also provides information on how to access (location) the resource
- URL can:
 - Represent a web resource
 - An arbitrary file
 - A web page
 - ...
- **Examples**
 - <http://www.cs.umd.edu/index.html>
 - <ftp://www.cs.umd.edu/pub/doc/policies.pdf>
 - <https://www.google.com/>
 - <file://dir/my.txt>

URL Structure

- URL consists of the followings:
- Protocol
 - http
 - ftp
 - https (secure http)
 - file
- IP address (or domain name)
- Port (optional most of the time)
 - <http://www.cs.umd.edu:80>
- Path

Chrome Browser

- Browser we will use
 - <https://www.google.com/chrome>
 - We will grade your project using that browser
- Some nice free apps from the chrome web store
 - <https://chrome.google.com/webstore>

HTML

- **Hyper-Text Markup Language**
- Language used to define web pages
- What the server sends to the browser
- Browser reads HTML and renders the page
 - May require downloading data from server (e.g., images)

HTTP

- **Hypertext Transfer Protocol (HTTP)**
 - A protocol that defines how user agents (e.g., browser) and web servers can communicate
- HTTP is a **request/response protocol** between clients and servers
- Some methods (operations) defined as part of the protocol
 - GET: To download a resource (e.g., image, web page).
 - HEAD: Returns only the header
 - POST: Submits data (e.g., form data) to the server
- **Do not confuse with HTML**

Web Hosting

- As a student of the university, you have a directory (folder) where you can place your HTML documents so they can be accessed on the web
- **Example:** <https://terpconnect.umd.edu/~nelson/>
- Personal Websites on Terpconnect
 - <https://terpconnect.umd.edu/webhost.html>
- Accessing your Terpconnect files
 - <https://dav.terpconnect.umd.edu/>