

# CMSC335

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## Web Application Development with JavaScript



### Fundamentals

Department of Computer Science

University of MD, College Park

Slides material developed by Ilchul Yoon, Nelson Padua-Perez

# Client/Server

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- 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](https://www.youtube.com/watch?v=ewrBaIT_eBM))

# IP Addresses

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- **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

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- (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

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- **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/>**
- **Web server statistics**
  - <http://news.netcraft.com/archives/category/web-server-survey/>

# DNS

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- 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

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- 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

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- 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

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- 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

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- **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

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- **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

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- 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/>