CSC309

Programming on the Web

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Protocol

- Course Website: www.teach.cs.toronto.edu/~csc309h/fall
  Updated weekly

- Online Forum: piazza
  Crowdsourced & Moderated by TA twice a week

- Office Hours:
  Wednesdays 1-3pm & (some) Fridays 5-6pm in BA3219

- Email: gonzalez@teach.cs.toronto.edu
  Use only if all other channels have failed. May take 48hrs to respond.

Introduction

Internet and the programmable web

Internet

- A connection of computer networks using the Internet Protocol (IP)

- Began as a US Department of Defense network called ARPANET (1969)

- Opened to commercial interests in late 80s

Key Properties

- Subnetworks can stand on their own

- Computers join/leave dynamically

- Built on open standards (IETF)

- Lack of centralized control (ICANN)

Internet Protocol (IP)

- Simple protocol for attempting to send data between two computers

- Each device has a **32-bit** IP address written as four **8-bit** numbers (0-255)

  - Ask Google: "What is my IP"

  - Your local IP: ipconfig(windows) or

  - ifconfig (Mac/Linux)

Domain Name System (DNS)

- A set of servers that map written names to IP addresses

  - www.cs.toronto.edu -- 128.100.3.30

- Many systems maintain local cache

  - c:\windows\system32\drivers\etc\hosts

  - Mac: /private/etc/hosts

  - Linux: /etc/hosts

Transmission Control Protocol (TCP)

- Guaranteed message delivery

- Multiplexing: multiple programs using same IP address

  - port 80: web browser

  - port 443: secure browsing

  - port 25: email

  - port 22: ssh

World Wide Web

- Invented by Tim Berners-Lee in 1989

- CERN: looking for a way to *share* information

- Collection of standard protocols for moving content

- Managed by the W3C

Hypertext Transport Protocol (HTTP)

- Commands understood by web browser and web server

- Runs on top of TCP/IP

- Two phase protocol

  - Request ⇒ Response

Uniform Resource Locator

- URL: an identified for the location of a document on the web

```
<scheme name> :

        <hierarchical part>

                [ ? <query> ] [ # <fragment> ]
```

Content Encoding

- Hypertext Markup Language (HTML)

- Cascading Style Sheets (CSS)

- MIME: Internet media types

Programmable Web

- 80s - TCP/IP gained traction - various low level programs that preceded the web. Build your own app using sockets

- 90s - Web Browsers - Javascript - CGI

- late 90s - Java, XML, SOAP, Web Services

- 00s - the science of sessions

- RESTful

- AJAX