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