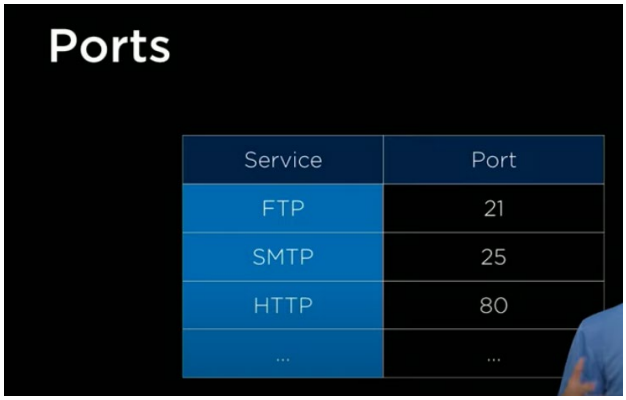
IT 105 – Principles of Programming

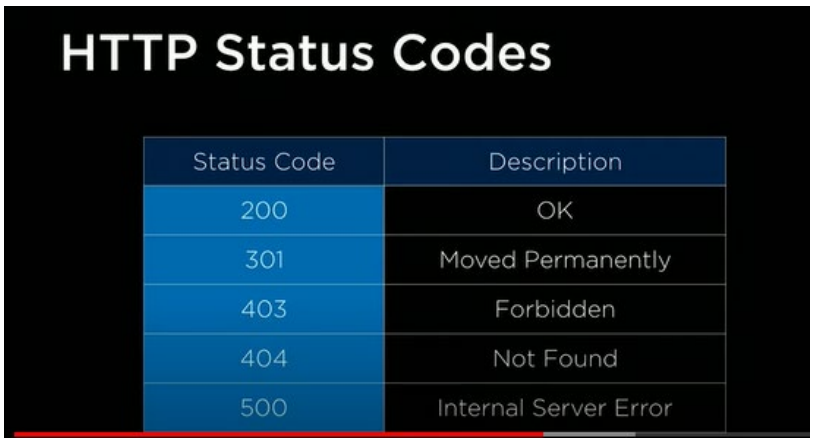
Day 05

1. Binary Numbers.
2. Web-based code, so we need to understand the web.
3. The Internet is the network.
    a. Arpanet, 1969, 4 computers
    b. federally funded by the Dept of Defense
    c. connected government labs and research universities
    d. designed to be robust and decentralized
4. Many applications on the Internet, including the World Wide Web (WWW).
5. Terminal:
    a. Microsoft: Start → Command .
    b. MAC
        i. Open a Terminal window
        ii. Command+Space → Open Spotlight → type Terminal . https://www.businessinsider.com/how-to-open-terminal-on-mac
    c. Command prompts are analogous to windows operations:
        i. Drive name, C:
        ii. cd, "change directory"
        iii. more ***filename***
6. Protocols
    a. Terminal Control Protocol / Internet Protocol (TCP/IP)
    packets (email, web pages, file transfers)
    b. Hyper Text Transfer Protocol (HTTP)
    c. IP addresses "dotted-quad" 8 bits each, all 0's or all 1's = 255
    d. 8*4 = 32 bits → 4 billion IP addresses, running out? IPv4 "version 4"
    e. IPv6 uses 128 bit addresses, many devices are transitioning to…
    f. Envelope analogy for packets (in-class demo):
        i. Source IP address
        ii. Destination IP address
        iii. sequence #
        iv. message
        v. approx. 1500 bytes per packet

g. Port number

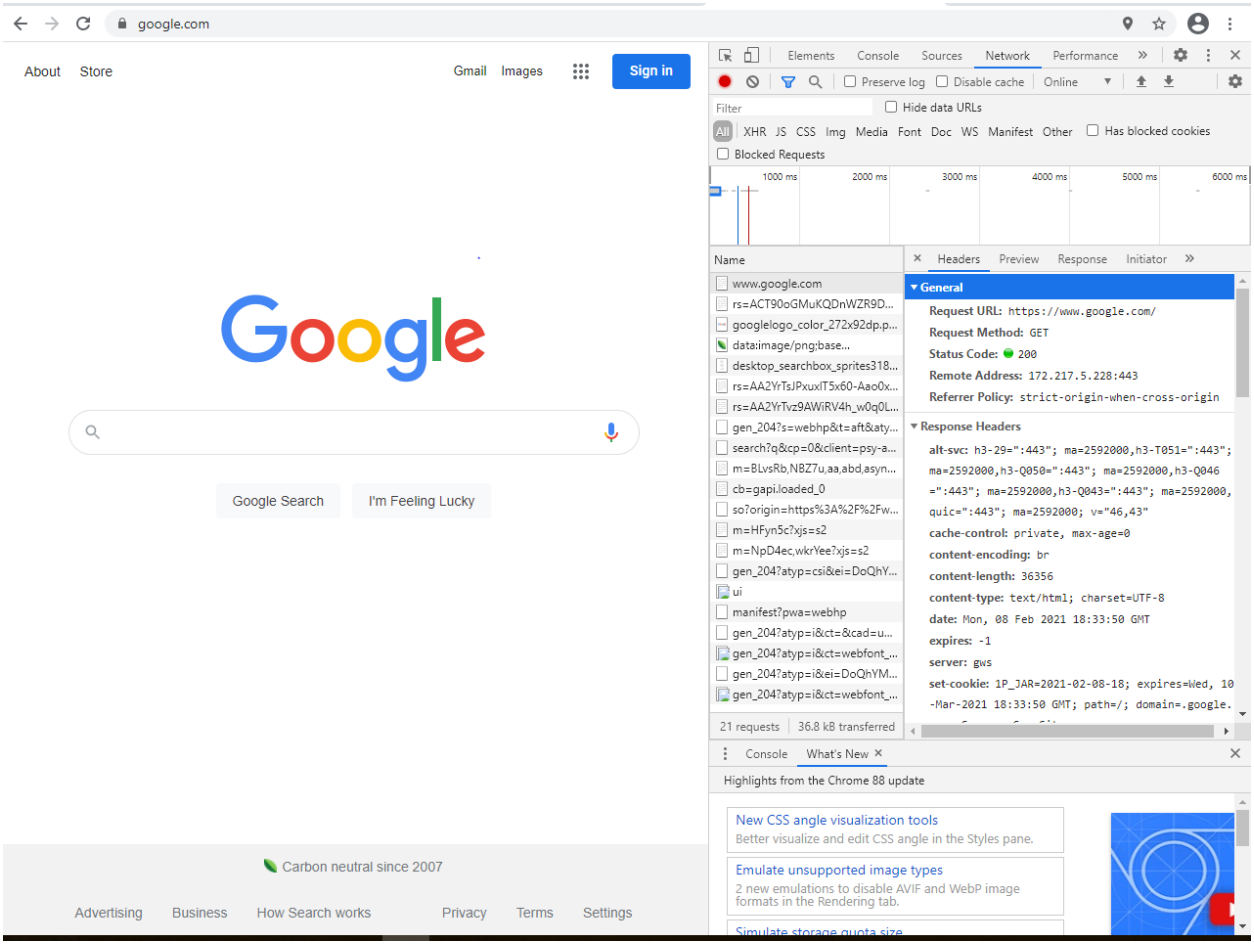


h. 1.2.3.4:80 would be a webpage to the IP address 1.2.3.4
i. In a terminal window:
    i. ping
    ii. ***Windows:*** ipconfig ***MAC OS:*** ifconfig
j. URL translates to IP address via a Domain Name Server (DNS)
    i. DNS servers all around internet
k. So, inside the packet, a request might look like:
    i. GET / HTTP/1.1 (or HTTP/2, version 1.1 vs. version 2)
    ii. Host: www.example.com
l. And the response might look like:
    i. HTTP/1.1 200 OK 200 is a status code
    ii. Where it is resolved, with an ***OK***
    iii. Content-Type: text/html the response that comes back is HTML



Open Google Chrome, and open the Developer Tools panel. In the Network tab, we can load a site, and see lots of requests.
At the very top, we can see the original request for google.com, and we'll see the Request Headers that we sent, and the Response Headers we got back, the 200 OK code.

iv. For a given page, Developer Tools → Network Tab → load a page → click on a page in the "Name" tab, then look at the tabs:
    1. Headers
    2. Preview
    3. Response



7. Languages
    a. Hyper Text Markup Language (HTML), which is an example of a hypertext language
    b. Cascading Style Sheets (CSS)
    c. Javascript
8. GitHub Repository setup.
9. Scratch lab time for A02.