



CSSE280: Introduction to Web Programming

Introductions, Internet, WWW, HTML Intro

Rose-Hulman Institute of Technology

Intro to Course



Front-end development

Back-end development

[Node.js](#)

Data-driven application

[MongoDB](#)

[REST API](#)



Agenda



Roll call, course introduction

In-class partners

Visual Studio Code installation

The Internet and the World Wide Web

HTML Intro

Roll call, Introductions



Student Introductions (Name, Hometown, Web development experience)

- ❖ Listen to other students' Web dev background
- ❖ One of them will be your in-class partner
- ❖ You should partner with someone with similar experience

Student Assistants Introductions

- ❖ Jake, Stefan (Section 1)
- ❖ Steven, Zach (Section 2)

More Introductions, partner selection



Instructor Introductions

- ❖ Why I am doing this course (passion for Web dev, learn by teaching)
- ❖ We will all learn from each other
- ❖ Teach web services development

In-class partner selection, sign contract

Course intro



Course Schedule Page

- ❖ <https://www.rose-hulman.edu/class/csse/csse280/201710/Schedule/Schedule.htm>
- ❖ Resource column is of paramount importance
- ❖ Due date column is also very important

Course Piazza Page

- ❖ <https://piazza.com/rose-hulman/fall2016/csse280>
- ❖ Announcements, Q&A, bug reports (earn extra points!)

Course Syllabus



Course Grades

Weight	Grade Component
10%	Attendance, participation in-class, online, & with in-class partner
10%	Quizzes
25%	Graded Homework Assignments (6 to 8)
30%	Exams (Thursday of weeks 3, 6, & 9), no finals
25%	Term Project

Read the syllabus before next class

Install Visual Studio Code



<http://code.visualstudio.com/Download>

- ❖ Installation instructions:
<https://www.rose-hulman.edu/class/csse/csse280/201710/Software/vscodeInstallation.pdf>
- ❖ Launch from Terminal/Command Prompt
- ❖ Install extensions to add themes, languages, debuggers, additional services
- ❖ Built-in support for Git
- ❖ IntelliSense



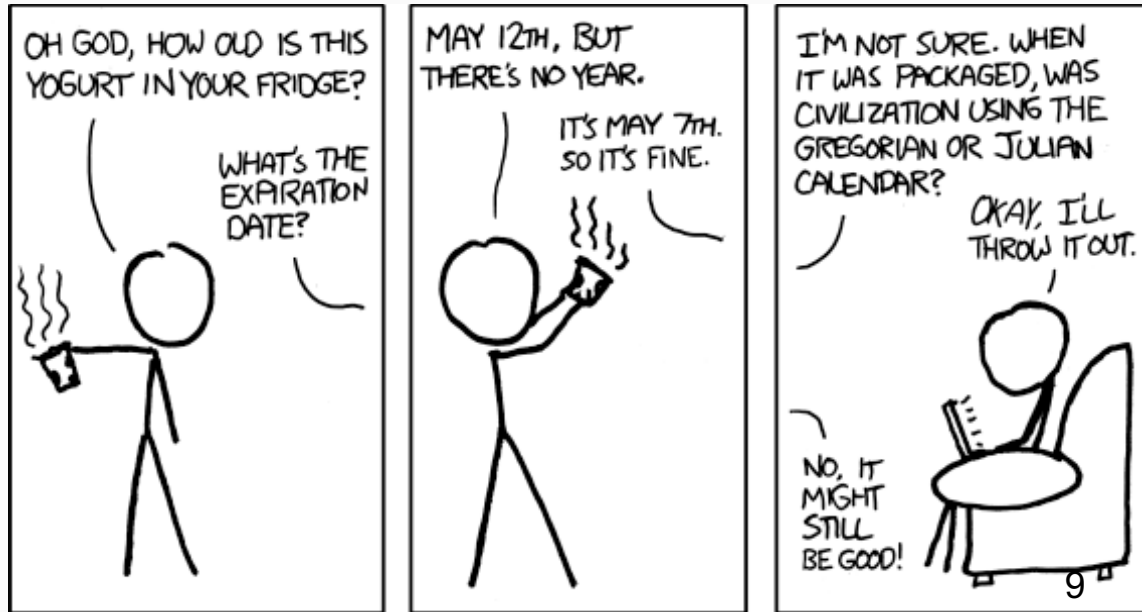
5-mins break



Break every class

Get help finishing installation
of VS Code

Can use other editor if you
prefer



Internet vs World Wide Web



The Internet

- ❖ Network of networks that use the Internet protocol suite to link billions of devices worldwide
- ❖ Consists of millions of private, public, academic, business, government networks
- ❖ Networks linked together by electronic, wireless, & optical networking technologies
- ❖ Carries information resources and services, e.g. WWW



Brief history of the Internet



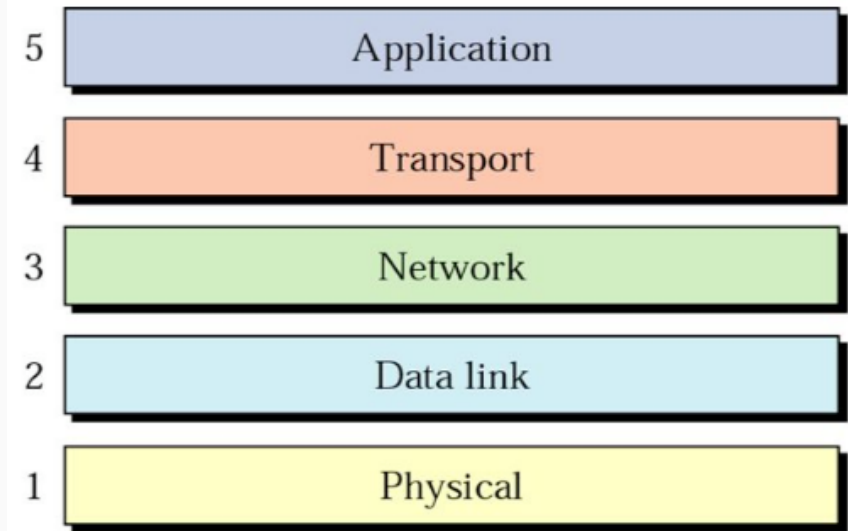
The Internet

- ❖ Began as a US Department of Defense network called ARPANET (1960s-70s)
- ❖ Initial services: electronic mail, file transfer
- ❖ Opened to commercial interests and most universities in late 80s
- ❖ WWW created in 1989-91 by Tim Berners-Lee
- ❖ Early web browsers released: Mosaic 1992, Netscape 1994, Internet Explorer 1995
- ❖ Amazon.com opens in 1995; Google January 1996

Internet: Layered Network Architecture



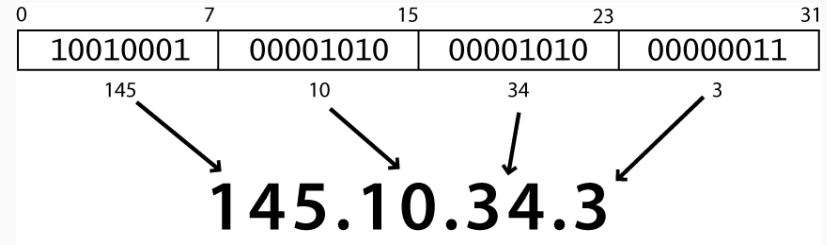
- ❖ Physical layer: devices such as Ethernet, coaxial cables, fiber-optic lines, modems
- ❖ Data link layer: basic hardware protocols (ethernet, wifi, DSL PPP)
- ❖ Network / internet layer: basic software protocol (IP)
- ❖ Transport layer: adds reliability to network layer (TCP, UDP)
- ❖ Application layer: implements specific communication for each kind of program (HTTP, POP3/IMAP, SSH, FTP)



Internet Protocol (IPv4)



- ❖ Simple protocol for attempting to exchange data between two computers
- ❖ Each device has a 32-bit IP address written as four 8-bit numbers (0-255)
- ❖ Find out your internet IP address:
<http://ip-lookup.net/>
- ❖ Find out your local IP address:
in a terminal window, type: **ipconfig** (Windows) or **ifconfig** (Mac/Linux)
- ❖ Rose-Hulman's IP addresses begin with 137.112



Transport Control Protocol (TCP)



- ❖ Adds multiplexing and guaranteed packet delivery on top of IP
- ❖ Multiplexing: multiple programs using the same IP

port: a number given to each program or service

port 80: web client (port 443 for secure web browsing)

port 25: email

port 22: ssh and sftp

port 27017: mongoDB

- ❖ Some programs (games, streaming media programs) use simpler **UDP** protocol instead of **TCP**

World Wide Web



The WWW comprises Web Servers and Web Browsers

- ❖ **Web Server:** software that listens for Web page requests and serves up the requested pages

Apache - <http://www.apache.org>

Microsoft Internet Information Server (IIS) - <http://www.iis.net/>

Express - <https://expressjs.com>

Phusion Passenger - <https://www.phusionpassenger.com>

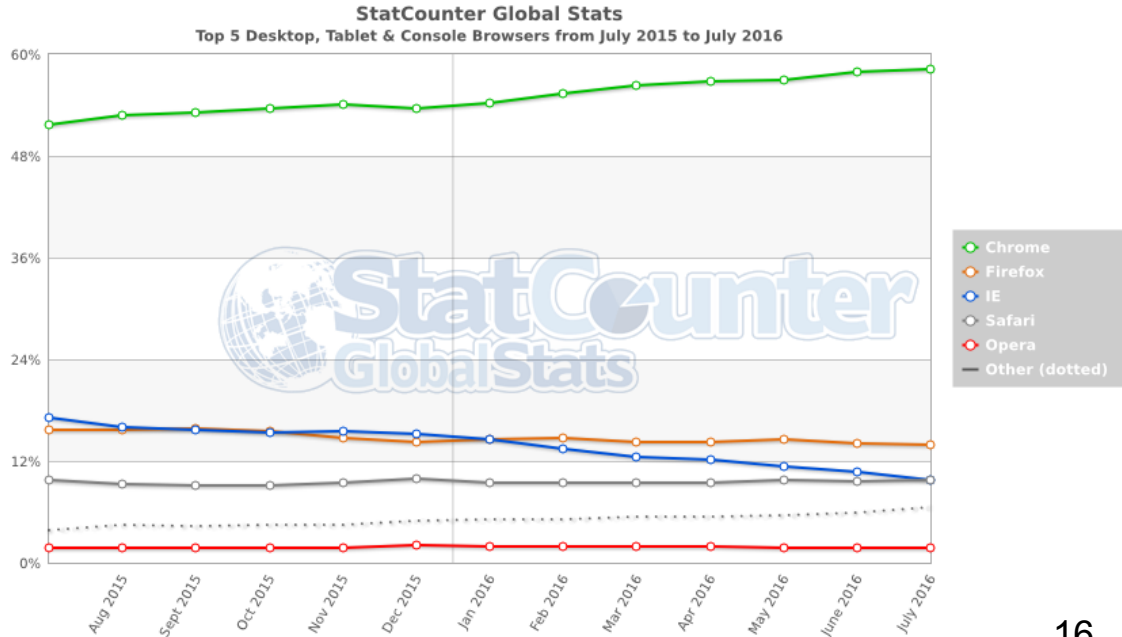
World Wide Web



The WWW comprises Web Servers and Web Browsers

- ❖ **Web browser:** gets and renders documents from servers

Popular browsers

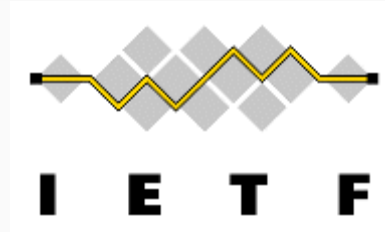


Organizations you should know



Internet Engineering Task Force (IETF)

- ❖ [internet protocol standards](#)



Internet Corporation for Assigned Names and Numbers (ICANN)

- ❖ [decides top-level domain names](#)



World Wide Web Consortium (W3C)

- ❖ [web standards](#)



Domain Name System (DNS)



Set of servers that map domain names to IP addresses

❖ **Example:**

www.rose-hulman.edu → 137.112.18.53

❖ DNS Lookup Tool

<http://mxtoolbox.com/DNSLookup.aspx>

Uniform Resource Locator (URL)



Web Address OR an ID for the location of a Web resource on a computer network

- ❖ <http://www.rose-hulman.edu/class/csse/csse280/index.html>
protocol **host** **path**

When this URL is entered in the browser, it would:

- ❖ Ask the DNS server for the IP address of www.rose-hulman.edu
- ❖ Connect to that IP address at port 80
- ❖ Ask the server to **GET** [/class/csse/csse280/index.html](http://www.rose-hulman.edu/class/csse/csse280/index.html) and display the result in the browser

Advanced URLs



Anchor: jumps to a given section of a page

- ❖ http://en.wikipedia.org/wiki/HTML_element#Anchor

Fetches the **HTML_element** document, then jumps to the part of the page labeled **Anchor**

Port: for web servers on ports other than the default port 80

- ❖ <http://portquiz.net:8080/index.php>

Advanced URLs



Query string: a set of parameters passed to a web application

<http://www.google.com/search?q=miserable+failure&start=10>

- ❖ parameter named **q** is set to value **miserable+failure**
- ❖ Parameter named **start** is set to value **10**

Hypertext Transfer Protocol (HTTP)



Defines a set of commands understood by a Web server and sent from a browser

Some HTTP commands (your browser sends these internally)

- ❖ GET **resource** -- requests data from a specified resource
- ❖ POST **resource** -- submits data to be processed to a specified resource
- ❖ PUT **resource** -- uploads a representation of the specified URL
- ❖ DELETE **resource** -- deletes the specified resource

HTTP status codes



When a request is made by the browser, a response is sent back by the server with a status code, possibly followed by a Web resource

Number	Meaning
200	OK
301-303	Page has moved (temporarily or permanently)
403	It is forbidden to access this page
404	Page not found
500	Internal server error

[Complete list of HTTP status codes](#)

Internet Media Types (MIME)



Sometimes when including other resources in a Web page (stylesheet, image, multimedia object), we specify their type of data

MIME Type	File Extension
text/html	.html
text/plain	.txt
image/gif	.gif
image/jpeg	.jpg
video/quicktime	.mov
application/octet-stream	.exe

Basic HTML



Defines the **content** and **structure** of information on a page

- ❖ Not the same as **presentation** (appearance in the browser)

Surrounds text content with opening and closing **tags**

Each tag's name represents an HTML **element**

- ❖ Syntax: `<tagname>Content goes here...</tagname>`

Most whitespace is collapsed or ignored in HTML

We will use HTML5 syntax

Structure of HTML page



DOCTYPE tells browser to interpret code as HTML5

HTML page is save in a file with extension .html

The **header** describes the page, and the body holds the page's content

```
<!DOCTYPE html>
<html>
  <head>
    information about the page
  </head>

  <body>
    page contents
  </body>
</html>
```

Page title: <title>



Describes the title of the page

Displayed in the Web browser's title bar and when bookmarking a page

```
<!DOCTYPE html>
<html>
  <head>
    <title>Introduction to HTML</title>
  </head>

  <body>
    page contents
  </body>
</html>
```



Paragraph: <p>

Describes a paragraph of text
(block element)

This is placed within the body of
the page

Examples:

- ❖ http://www.w3schools.com/tags/tryit.asp?filename=tryhtml_paragraphs2

```
<!DOCTYPE html>
<html>
  <head>
    <title>Introduction to HTML </title>
  </head>

  <body>
    <p>This is a paragraph of text </p>
  </body>
</html>
```



Headings: `<h1>`, `<h2>`, ... `<h6>`

Separate major areas of a page
(block element)

This is placed within the body of
the page

Examples:

- ❖ http://www.w3schools.com/tags/tryit.asp?filename=tryhtml_headers

```
<!DOCTYPE html>
<html>
  <head>
    <title>Introduction to HTML </title>
  </head>

  <body>
    <p>This is      a paragraph of text </p>
    <h1>University of Smart People</h1>
    <h2>Department of Computer Science</h2>
    <h3>Sponsored by Big Rich Corporation</h3>
    <h6>We teach the best stuff here!</h6>

  </body>
</html>
```



Questions?