Welcome to
CS 4640
Programming Languages for Web Applications

Why We Care

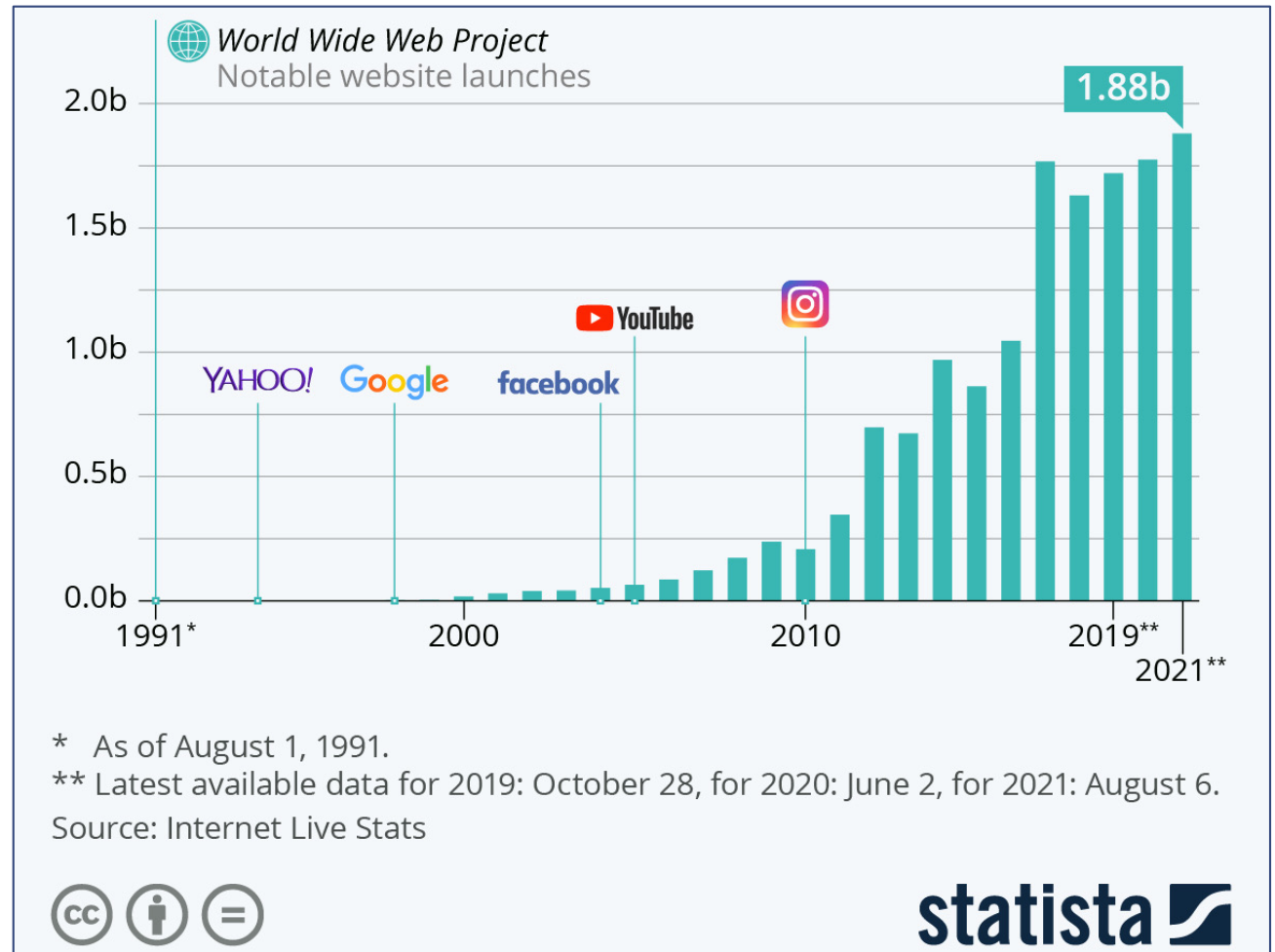**1,953,018,114**

Total number of Websites
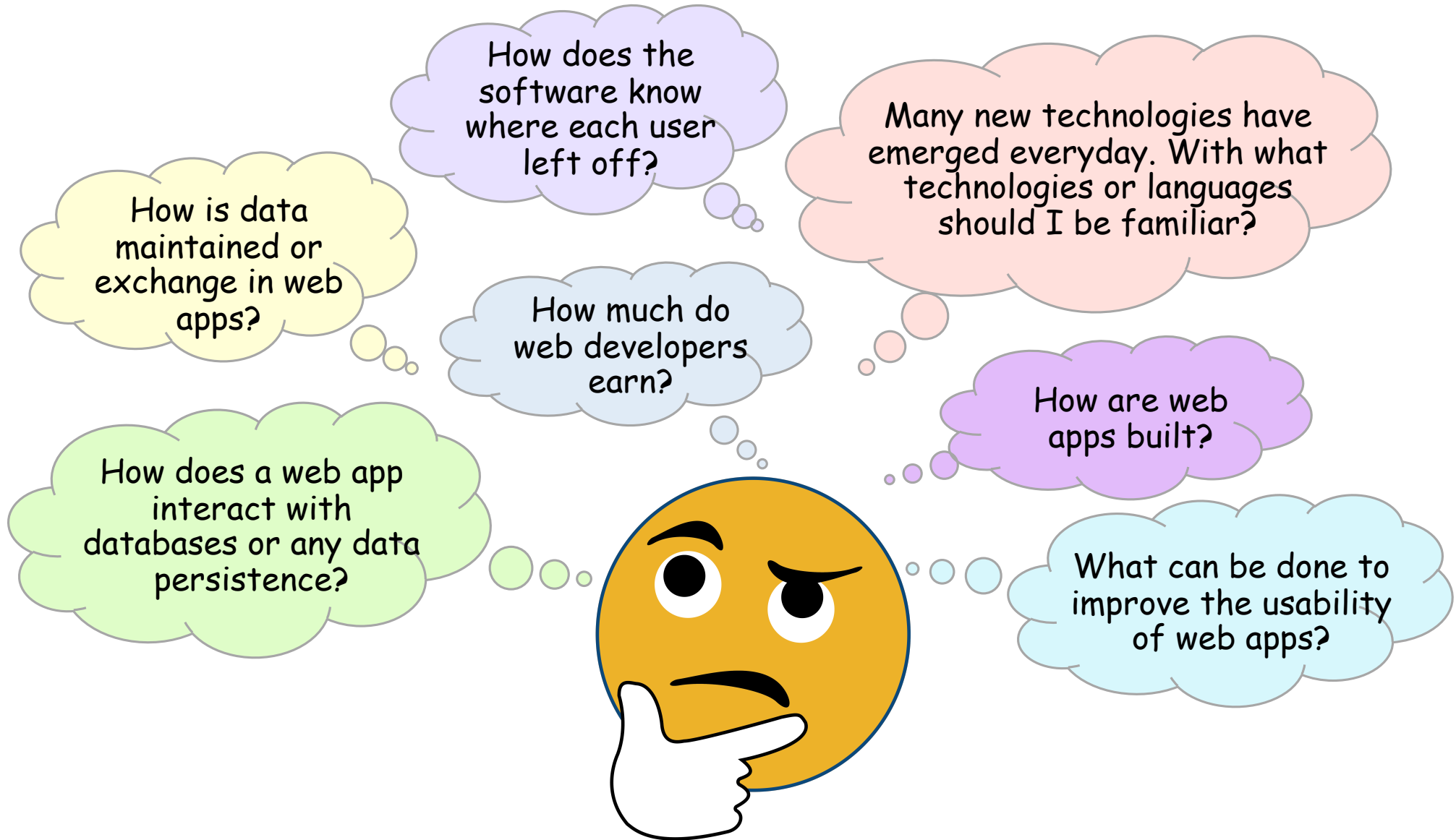
5,310,792,628

Internet Users in the world

[Ref: https://www.internetlivestats.com/
last accessed: 21-May-2022]

World Wide Web Project
Notable website launches

1.88b

YAHOO! Google facebook YouTube Instagram

* As of August 1, 1991.
** Latest available data for 2019: October 28, for 2020: June 2, for 2021: August 6.
Source: Internet Live Stats

statista

[Ref: https://www.statista.com/chart/19058/number-of-websites-online/]

Have You Ever Wondered

How does the software know where each user left off?

Many new technologies have emerged everyday. With what technologies or languages should I be familiar?

How is data maintained or exchange in web apps?

How much do web developers earn?

How are web apps built?

How does a web app interact with databases or any data persistence?

What can be done to improve the usability of web apps?

[Ref: emoji by Ekarin Apirakthanakorn]

Web Development (General View)

Front End Development

$50k to $118k, avg = $77k

(developer / engineer)

- UI/UX design, usability
- Web design
- Responsive design

- Client side
- HTML, CSS, JS (and JS libraries, frameworks)
- Fixed huge amount of data, no database interaction

Full-Stack Development

$55k to $118k, avg = $80k

(developer)

$68k – $131k, avg = $92k

(engineer)

- Variety of skills (both front end and back end)
- Horizontal technology development (+)
- Not expert in particular skill (-)

Back End Development

$54k to $131k, avg = $87k

(developer / engineer)

- Server side
- Speed, performance, scalability, security, availability, accessibility, reliability
- Business logic
- Java, PHP, Python, Ruby on Rails, and back end frameworks
- Database interaction

- Server administration
- Database, data science

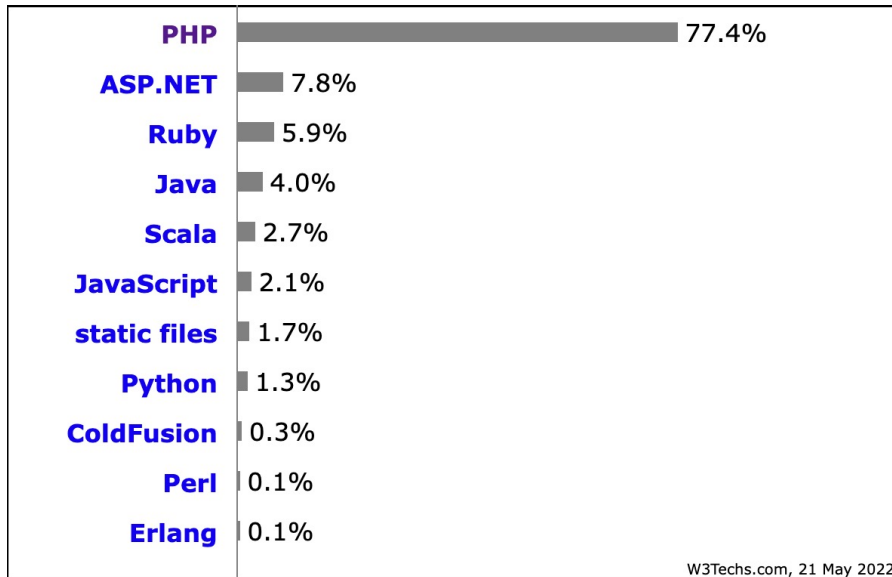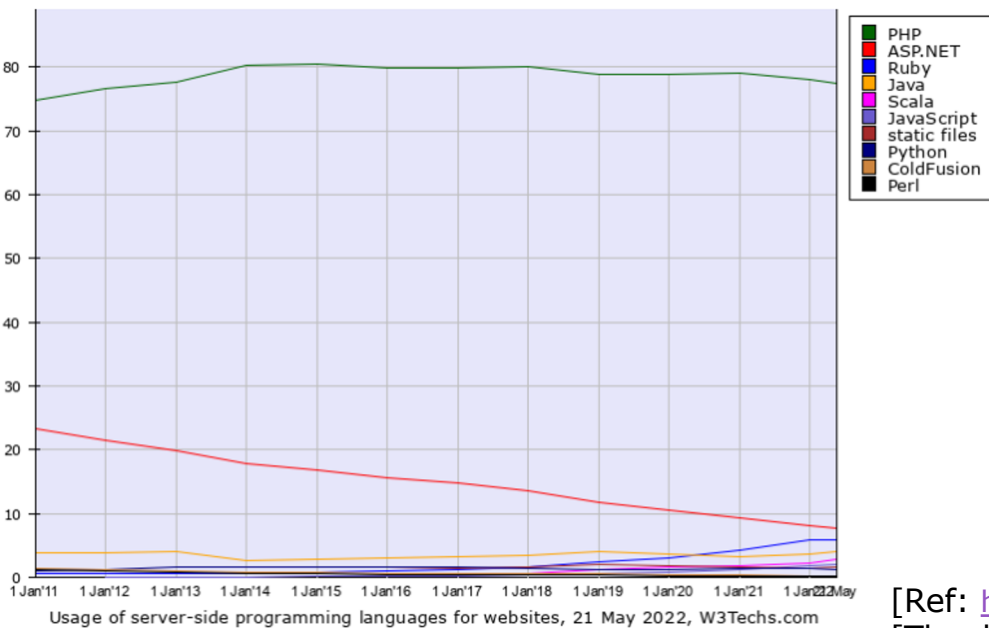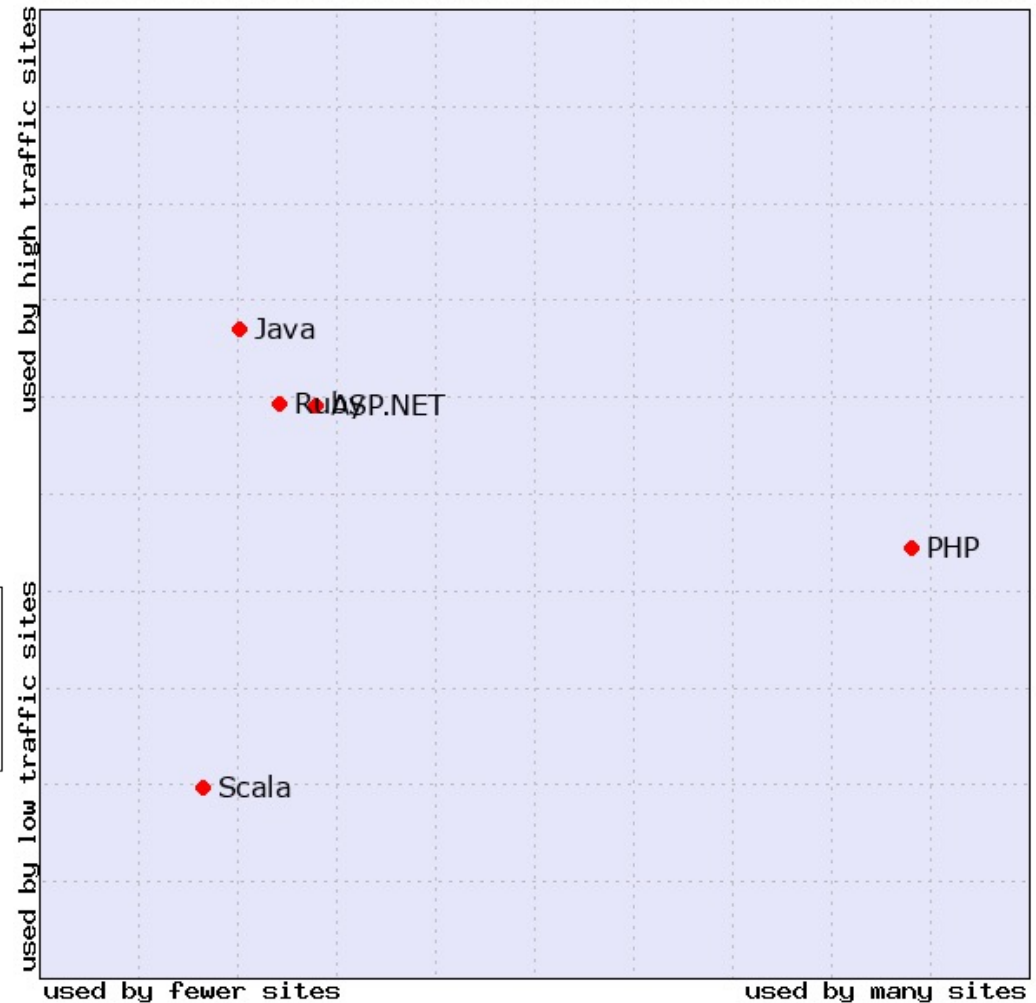[Salaries reference: PayScale
Last accessed: 21-May-2022]
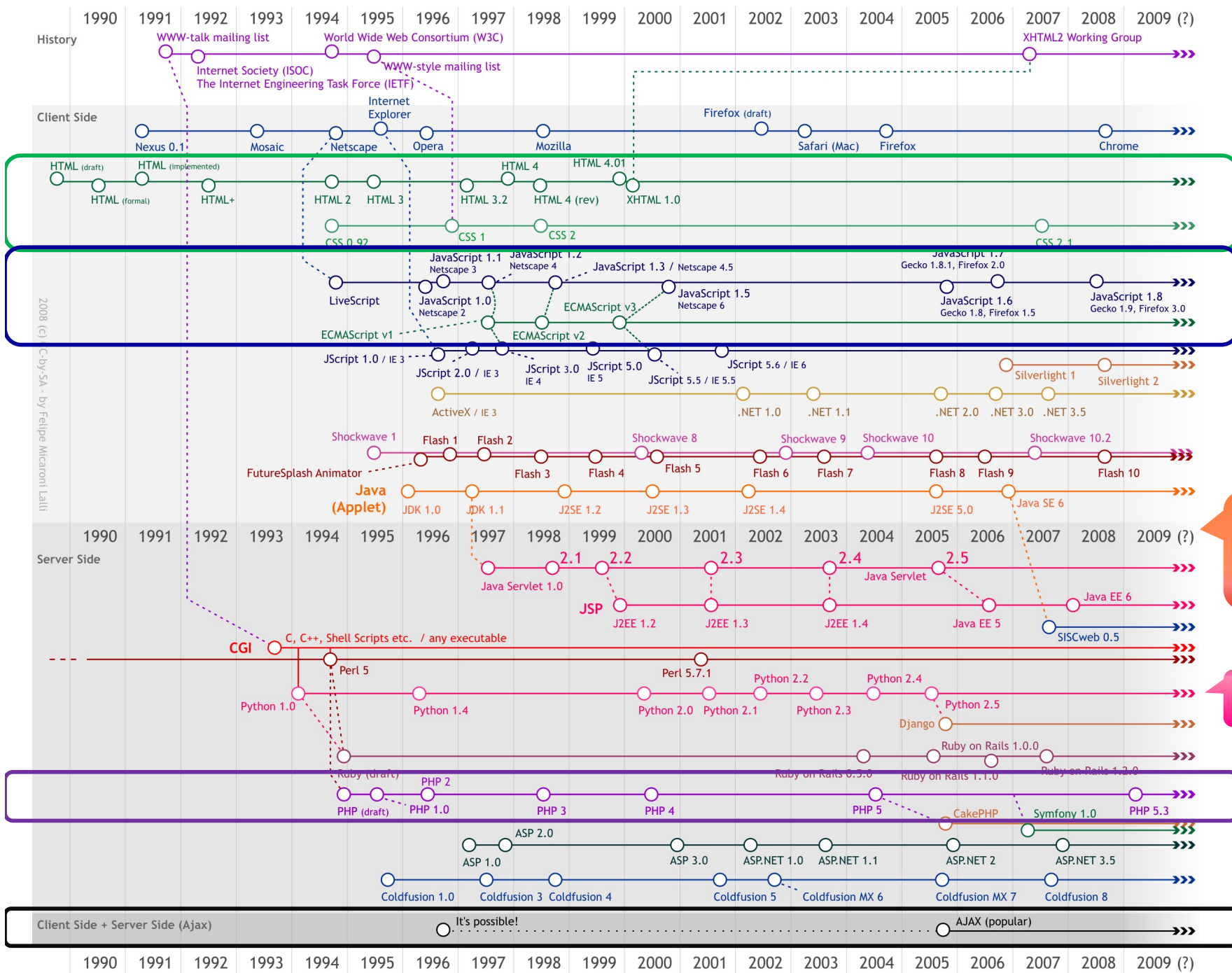
[Ref: Wikimedia Commons https://commons.wikimedia.org/wiki/File:Web_development_timeline.png]
[Thanks to Prof. Hott for the input and content]

Which Languages to Use

Server-side Programming Languages, Market Positions, W3Techs.com, 21 May 2022

Language	Percentage
PHP	77.4%
ASP.NET	7.8%
Ruby	5.9%
Java	4.0%
Scala	2.7%
JavaScript	2.1%
static files	1.7%
Python	1.3%
ColdFusion	0.3%
Perl	0.1%
Erlang	0.1%

W3Techs.com, 21 May 2022

Usage of server-side programming languages for websites, 21 May 2022, W3Techs.com

[Ref: https://w3techs.com/technologies/overview/programming_language]
[Thanks to Prof. Hott for the input and content]

Which Frameworks To Use

[Ref: https://github.com/mraible/history-of-web-frameworks-timeline]
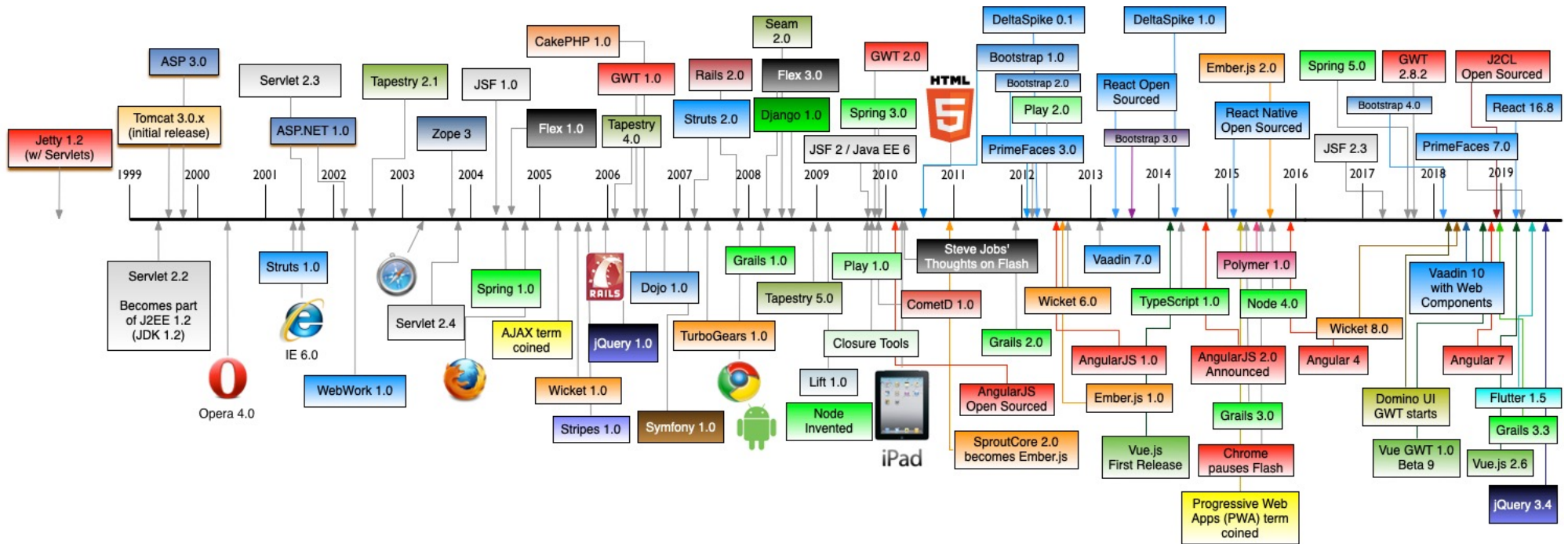
What This Course is About

- Split web software into two aspects:
  - The interface aspect
  - The software aspect

- The interface runs on the client side (web client)
  - HTML, CSS, JavaScript
  - Achieving usability is a key, and very difficult

- The software runs on the server side (web server)
  - PHP
  - The key to other quality criteria (reliability, etc.)

- Other technologies
  - AJAX
  - Angular
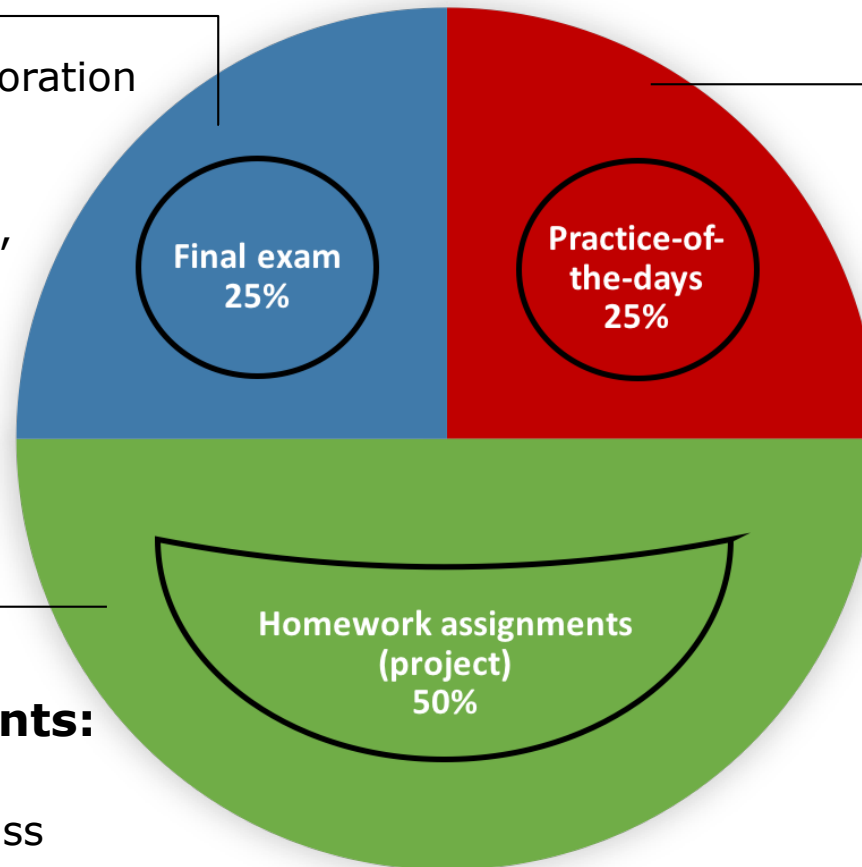 - XML, JSON
  - Database (MySQL)
  - Bootstrap

I Hope to Help You

- Understand the importance of the usability aspect
  - Outside-in vs inside-out
  - Design usable web user interfaces

- Understand and be able to program web apps
  - Client side and Server side
  - Front end framework and Single Page Application (SPA)

- Understand how data stored and shared in web apps

- Understand and able to utilize asynchronous processing
  - Improve interaction between web servers and web clients
  - Improve usability

What You Will Do

Final exam:

- **Individual**, no collaboration
- Comprehensive
- Take home
- Open book, your note, your IDE, course site, class recordings
- Close any forms of discussion or collaboration, Google, …

Practice-of-the-days:

- 5 POTDs, Wed and Thu
- Grade on done/not done
- Due next day, 1pm EST
- No late submission

Homework assignments:

- Team of 2
- Weekly, due before class
- -25% per 24 hours late
- Not accepted after 48 hours past due
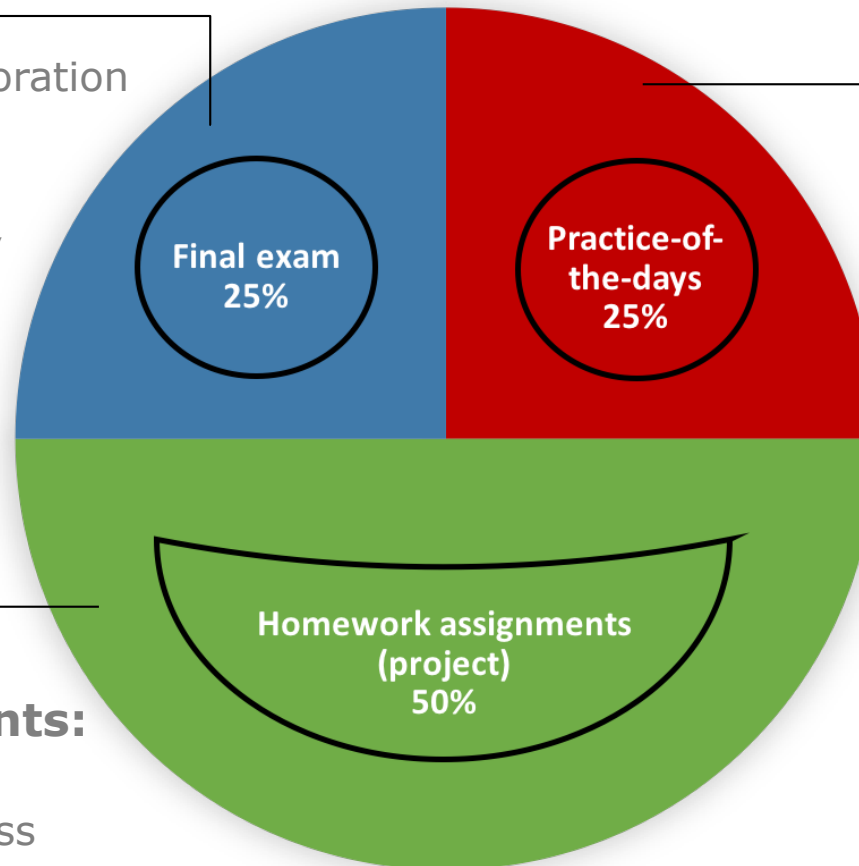- Design & develop a full-stack web app (prototype) & present your project

Hands-on activities:

- Almost every meeting
- No submission

Final exam 25%

Practice-of-the-days 25%

Homework assignments (project) 50%

How Your Learning will be Evaluated

Final exam:

- **Individual**, no collaboration
- Comprehensive
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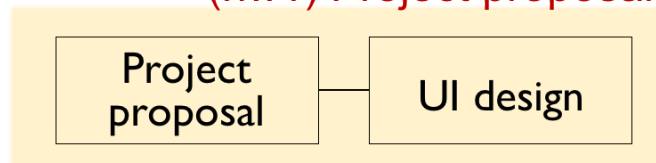- Design & develop a full-stack web app (prototype) & present your project

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Final exam 25%

Practice-of-the-days 25%

Homework assignments (project) 50%

By default, grades will not be bumped, rounded, or curved in this course

Project Overview

Prerequisites

- CS 2150 or DSA2, with C- or better (or COVID CR)

- Programming skills

- Basic HTML is expected

- Software installation and troubleshooting skills

- Time management skills

- Ability to work independently

Prerequisites define what you need to know before taking a class to succeed in the class. Please do not ask if you can take the class without the prerequisites. I have to advise <u>against</u> it

The CS student services staff will monitor and remove students not meeting prerequisites in courses in which they are enrolled

More Info to Help You Learn

- **Class URL:** http://www.cs.virginia.edu/~up3f/cs4640/

- **Textbook:** No text required, additional references will be provided

- **Learning style:** In-person, lab-style work

- **Class recordings:** In Collab > Class Recordings, available 24-48 hours after class (by default)

- **Emails:** Use your UVA email and check it regularly include **CS 4640** in subject

- **Masking:** Not required, but highly encouraged, **no eating & no drinking in class**

Share Ideas, Get Help, Just Talk

- Instructor office hours: virtual, Zoom link on class website

- TA office hours: *TBD*

- Piazza: https://piazza.com/virginia/summer2022/cs4640/home
  - You should have gotten an invitation today
  - If not, check your UVA email or check with me

- Questions should be posted to an appropriate thread
  - Answered by instructor, TA, and your peers
  - Public: general questions and answers
  - Private: Grade/homework-specific questions – instructor and TA

- Help yourself learn: https://forms.office.com/r/QANZdDnegF

You are the Main Driver!!

"You" are the main driver of your learning success.

Your engagement and participation is
the most important aspect of your learning experience.

You are encouraged to do all the activities,
try all technologies, experience all languages …
and do beyond the project's minimum requirements!!