CS142 - Web Applications

http://cs142.stanford.edu

Mendel Rosenblum
mendel@cs.stanford.edu

CS142 - Spring 2022 Edition

- Lectures:
  MWF 9:45-10:45am in Gates B01
- Discussion sections:
  Weekly, Friday afternoons (likely 2:45-3:45pm)
- Lectures and discussion sections are live-streamed and recorded by SCPD
  - For live-stream and recordings
    - See Canva Panopto Course Video Tab.
  - Back channel for questions from remote students available via a Zoom meeting.
    - See Canva Zoom Tab

Today: CS142 FAQ

- What is this course about?
- How is my course grade determined?
- Who is teaching the course?
- How do I communicate with the course staff?
- What kind of programming projects will I have do?
- What kind of computing environment do I need?
- Do I need to buy a textbook?
- Are the course lectures recorded?

Course is about Web Applications

Technologies used to **build** modern web applications

Note: CS14x (computer systems course in Computer Science department)

Full stack: Browser ⇔ Web server ⇔ Storage system

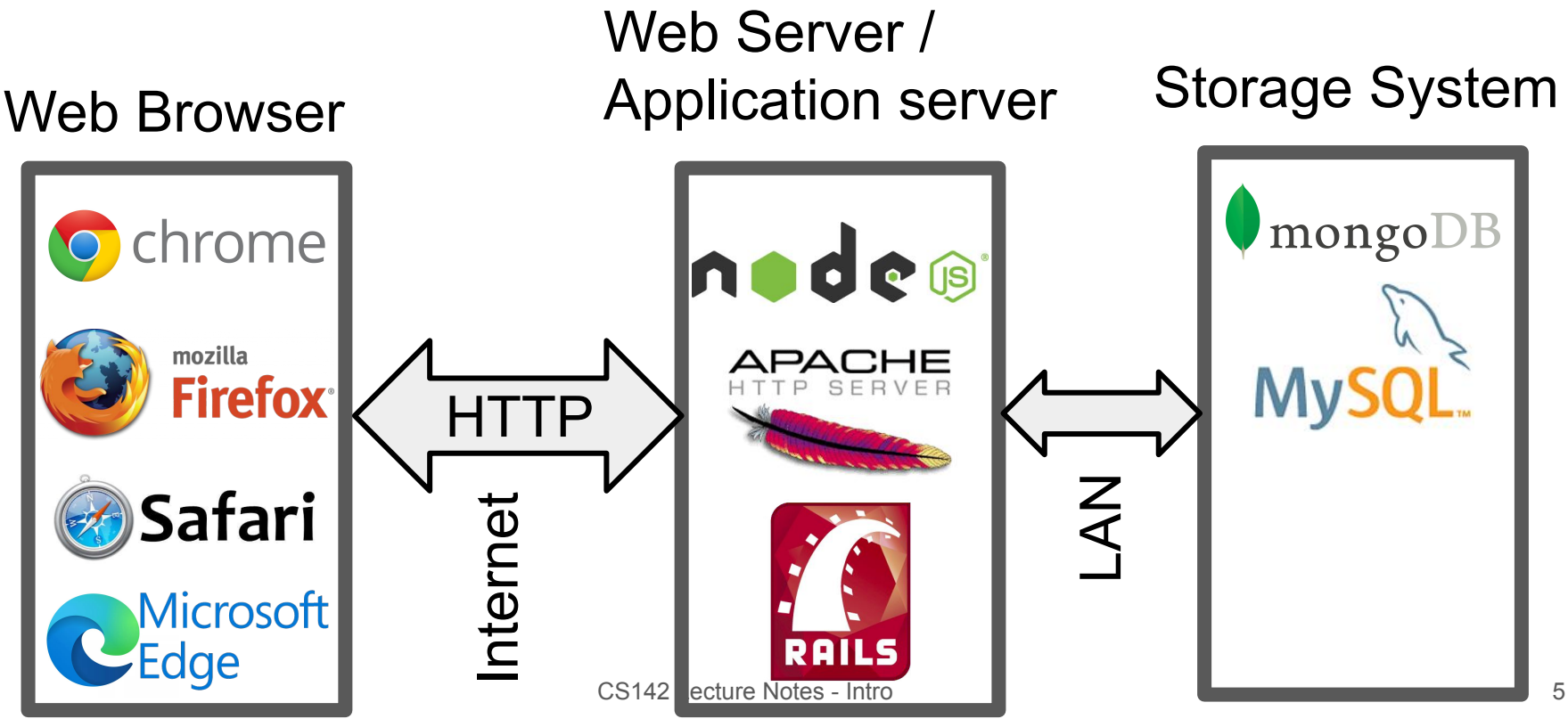
Learning Goal: Learn how a web application is built and run

How to build a web application - learn by doing:

Use MERN stack (React.js, Node.js, Express.js, MongoDB)

Learning Goal: Build a photo sharing web app and understand how it works!

Full Stack Web Application Architecture



CS142 Technologies and Concepts

Browser environment:

- HTML/CSS/JavaScript - Markup, separation of content & style, reuse, scripting
- Document object Model (DOM) - Document structure

Browser software:

- Model View Controller, Single page applications, Responsive design - React.js

Backend communication:

- API design - HTTP/AJAX/REST/GraphQL
- Cookies/Sessions/State management - Storage/Trust

Backend implementation:

- Web Server - HTTP request processing - Node.js
- DBMS - Schema, Objects, CRUD, indexes, transactions - MongoDB
- End-to-End - Scale and Security

Grading

55% Projects - 8 projects (Due on Thursdays - First due 4/7, last due 6/2)

Projects 1-4: Learn technologies in front-end: HTML/CSS/React.js

Projects 5-8: Building a Photo Sharing App using React.js/Node.js/MongoDB

Later projects worth more and take more time

45% Exams - 1.5 hour Midterm Exam and 3 hour Final Exam

15% - Midterm Exam, Wednesday, May 4, 7:30pm – 9:00pm

30% - Final Exam, Monday, June 6, 3:30pm – 6:30pm

Course Material and Grading

- CS142 is different from introductory programming class
- Lectures cover many more concepts than are addressed in the programming projects
  - Lecture focused on concepts, not directly helping with project coding
- Exams focused on concepts presented in class but not used in projects
  - Possible to do well on all the projects and not get a good grade in the class
  - Need understanding beyond "magic incantations"

Course Staff

Instructor: Mendel Rosenblum (mendel@cs.stanford.edu)

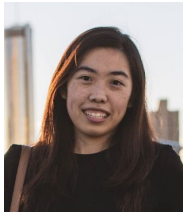
Course Assistants (cs142-spr2122-staff@lists.stanford.edu)

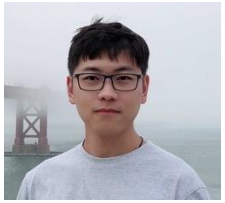

Ana Selvaraj

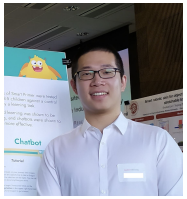

Anh Nguyen


Cat Davis


Christie Di


Michelle Liu


Qirui Zhou


Rui Ying

Course Communication

1. Course website: http://cs142.stanford.edu - Good starting point
2. Canvas - https://canvas.stanford.edu/courses/152240
   Panopto/Zoom meeting links and cloud recordings of lectures and sections
   Course calendar - Office hour meeting links, etc.
3. 
   Forum - Available via Canvas Home page ("Ed Discussion" on nav bar)
   Good for questions/comments where everyone can see the reply
   Can also posts privately to course staff (Use for post containing code)
4. Email - cs142-spr2122-staff@lists.stanford.edu
   Good for private communication with the course staff (CAs and myself - mendel@cs.stanford.edu)

CS142 Course Project Evolution

Largely driven by trends in industry and open source community

CS142 started in Winter 2009: Ruby on Rails with a SQL relational database

Winter 2016: CS142 switched projects to the MEAN stack

- AngularJS - JavaScript-based browser framework for apps
- Node.js - JavaScript-based server engine
- MongoDB - An object database

Spring 2019: CS142 switched projects to the MERN stack

- React.js/Node.js/MongoDB
- Component-focused JavaScript-based framework (Similar to Vue.js/Angular)

Project details

1. HTML & CSS
2. JavaScript
3. Browser Document Object Model (DOM)
4. Learn React.js - Single page application
5. Photo Sharing App
6. Backend server - Node.js and MongoDB
7. Sessions state and validation
8. Photo App Scrumboard

Discussion sections will be scheduled the day after project is released:

Weekly on Fridays 2:45-3:45pm in TBA

Class software requirements

- A modern web browser

  Chrome is strongly suggested

- Node.js

  Installs fairly easily on modern OS environment (Linux, MacOS, Windows)

  npm (in Node.js install) is used for fetching assignments and dependencies

- MongoDB

  Easy to install (for a DBMS) on modern OS environments

Stanford Honor Code

We want you to do the projects individually

Questions?