Frontend Development with LLMs: Intro

CS 485/698: AI-Assisted SE

Today’s Agenda

- Team meeting (~20 minutes)
  - Sprint planning
- Short lecture on frontend development + mocking
- In-class activity and discussion
- Time for you to fill out a survey on how we’re doing

Sprint Planning

- Spend the next ~20 minutes with your project team
- This is our first official ***sprint planning meeting***:
  - Decide on what your overall goals for P3 are. What will you deliver by then?
  - Which backlog items are needed for this goal?
    - Do you need to create any?
  - Who is responsible for accomplishing each item?
    - When will you work on each item? Are there internal deadlines? How will you know if someone is stuck?

Frontend Development

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- Before we actually try it, what does the class think?

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First, though, a brief detour to discuss ***software architecture***

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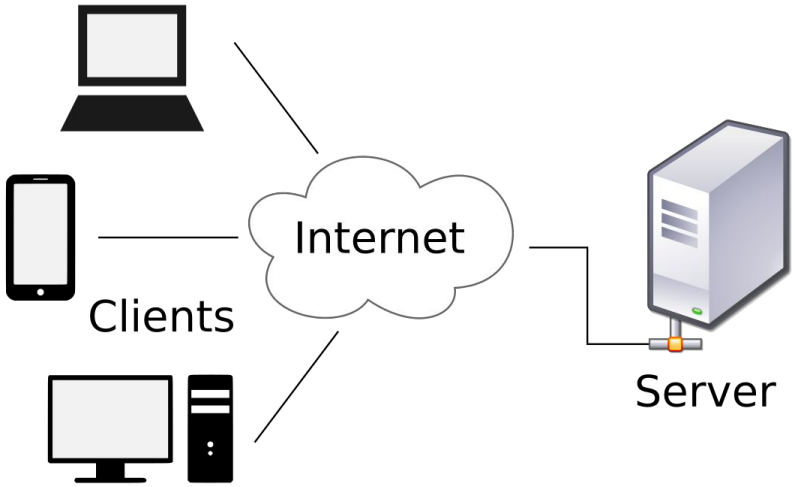
  - Typically webservices use a ***client-server architecture***
    - client is the frontend, server is the backend

Typical Webservice Architecture

Definition: a ***client-server architecture*** partitions tasks or workloads between the providers of a resource or service (***servers***) and service requesters (***clients***) [Wikipedia]



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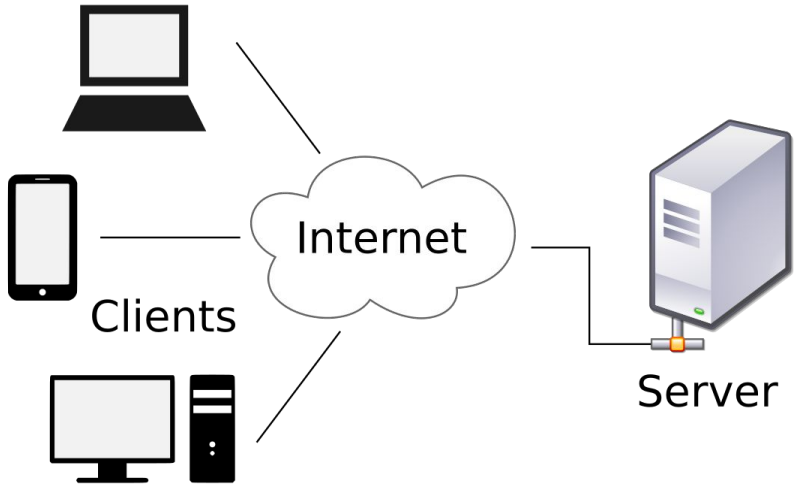

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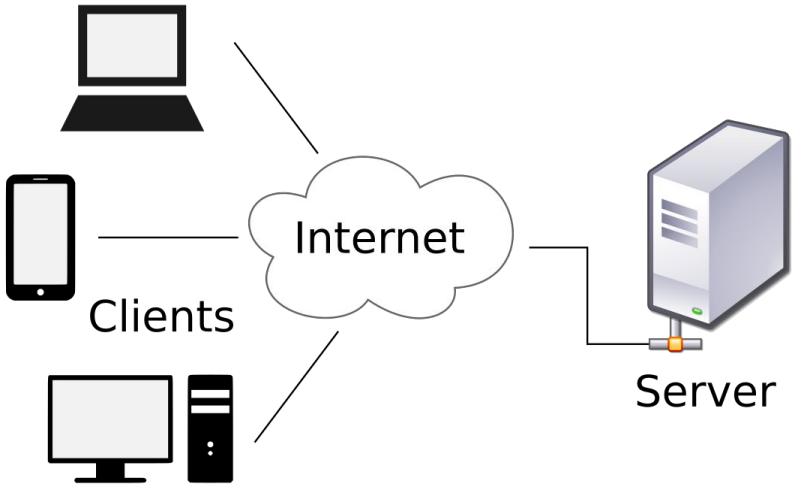
- example of decomposition: server has its **own architecture** internally, but we don't see it



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Can assign to **different teams**!

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  - Answer: ***mocking***

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- analogy: use a crash test dummy instead of real human to test automobiles

Mocking example: Web API Dependency

- Suppose we're writing a single-page web app
- The API we'll use (e.g., Speech to Text, an LLM, etc.) hasn't been implemented yet or costs money to use
- We want to be able to write our frontend (website) code without waiting on the server-side developers to implement the API and without spending money each time
- What should we do?

Mocking example: Web API Dependency

- Solution: make our own “fake” (“mock”) implementation of the API
- For each method the API exposes, write a substitute for it that just returns some **hardcoded data** (or any other approximation)
    - Why does this work?

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    - in particular, this requires us to specify the APIs well
  - mock the backend
    - hardcode API responses (we'll implement properly later)
  - design and build a nice frontend, with all the usual nice things (taking advantage of lots of web frontend code in LLM training data):
    - navigation, responsive layout, etc.
    - use standard web frameworks (e.g., React, Svelte)

In-class Activity: User Story -> Frontend Code

Goal: turn this user story into a front end with your project team:

As a student, I want to be able to send an email to my parents every day to let them know I'm ok and not to worry about me. It would relieve me if I could be sure I didn't miss a day.

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Activity steps:

1. Use Figma Make to create a UX storyboard with suggested screen mockups.
2. Use Figma Make to turn one storyboard screen mockups into a wireframe.
3. Use an LLM to turn the user story and UX storyboard into a development spec.
4. Use an LLM-enabled IDE to turn the dev spec and wireframe into a new front-end project that uses React. Mock the backend with a well-defined REST API.
5. If you finish ahead of time, an additional activity: use an LLM-enabled IDE to turn the dev spec and wireframe into a new frontend project that uses Svelte instead of React. Mock the backend with a well-defined REST API. What differs?

Whole-class Discussion

- How did you pass graphics to the LLMs?
- What did your code generation LLM need as inputs to ensure it generated the right front-end code?
  - Did anyone forget to give it something? What happened?
- Did the generated code match your expectations?
- How many rounds did it take for the LLM to generate good code?
- What are the differences between the project using React vs using Svelte?

How are we doing?

Don’t forget to sign up for A3 reflection topics!

https://forms.gle/cBCAQBY3cE68h2v46