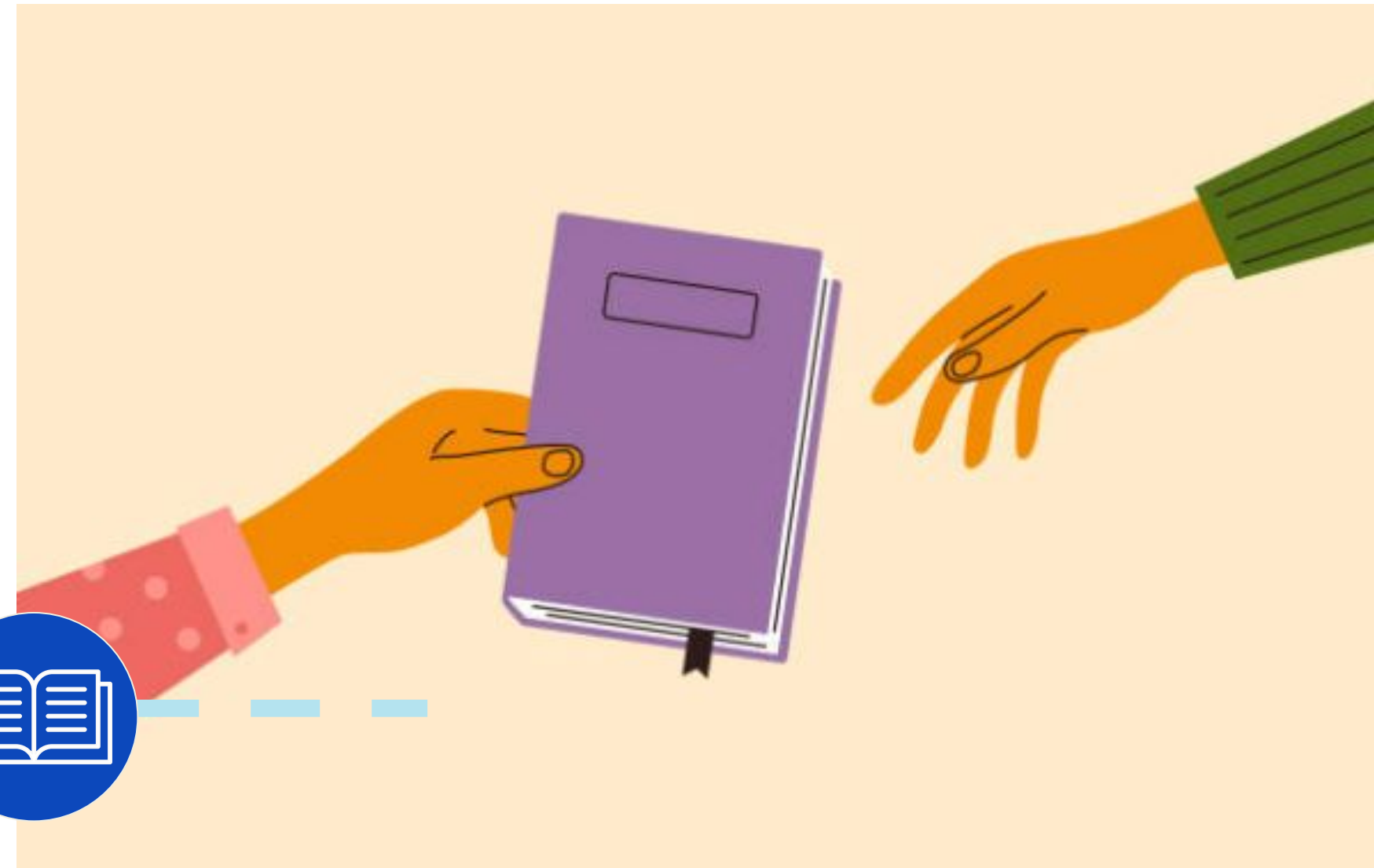


BookCycle

Technical Design

Team CSJ



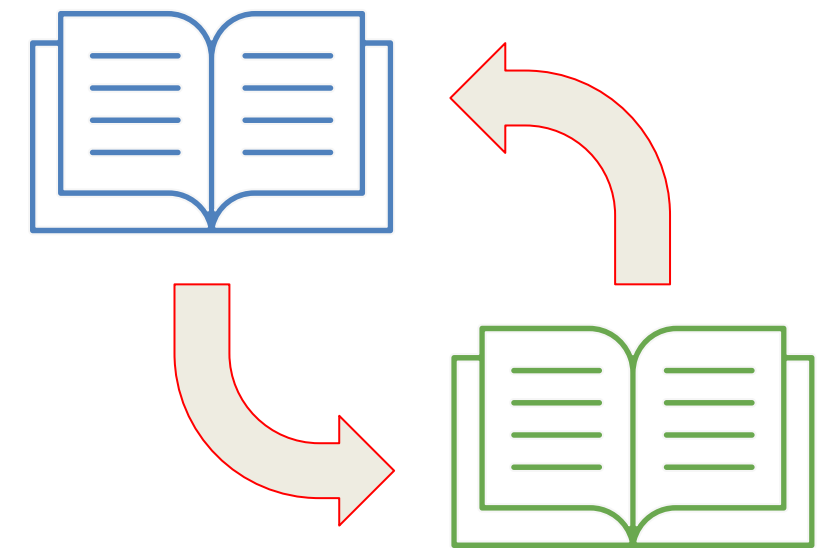
Our Project and Motivation

- Web app that allows students to donate and swap textbooks
 - Within a trusted zone and community on campus
- Reducing the financial burden of buying textbooks
 - Promote reuse

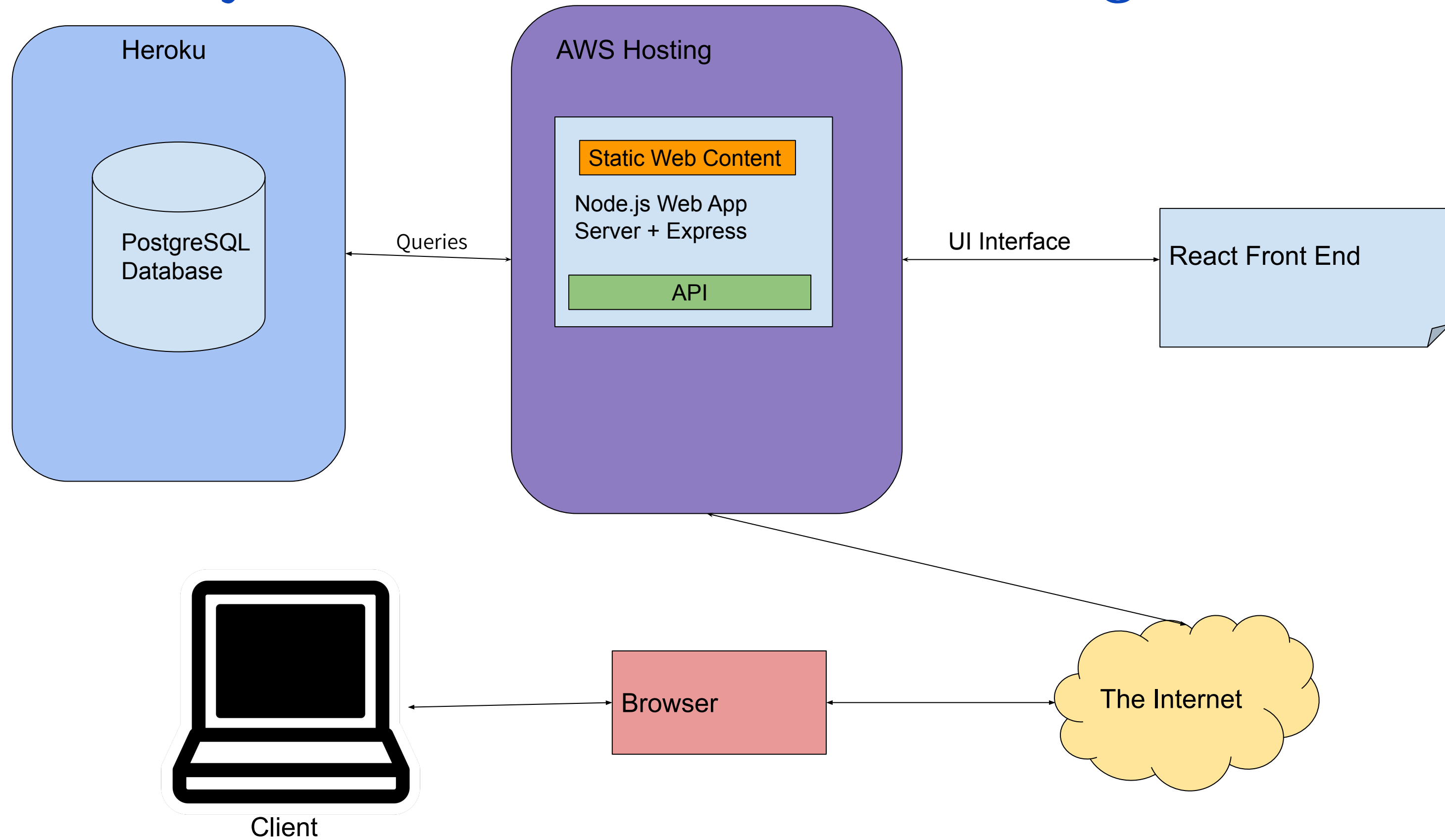


System Goals

1. User sign-in with verified GW email
2. User donates a textbook
3. User receives a list of matched textbooks upon request
4. User fills out a form detailing time/place of exchange
5. User successfully picks up a textbook

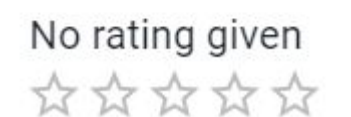
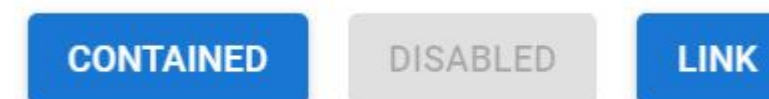
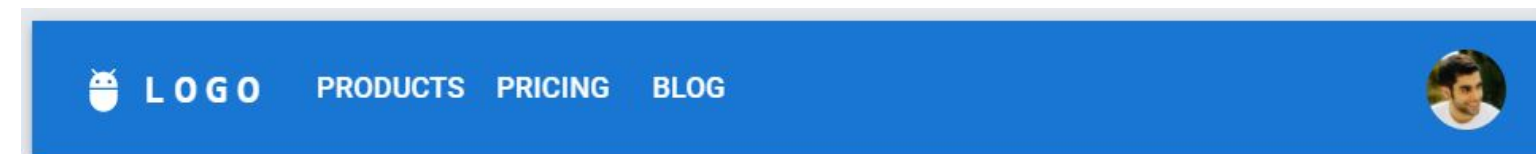
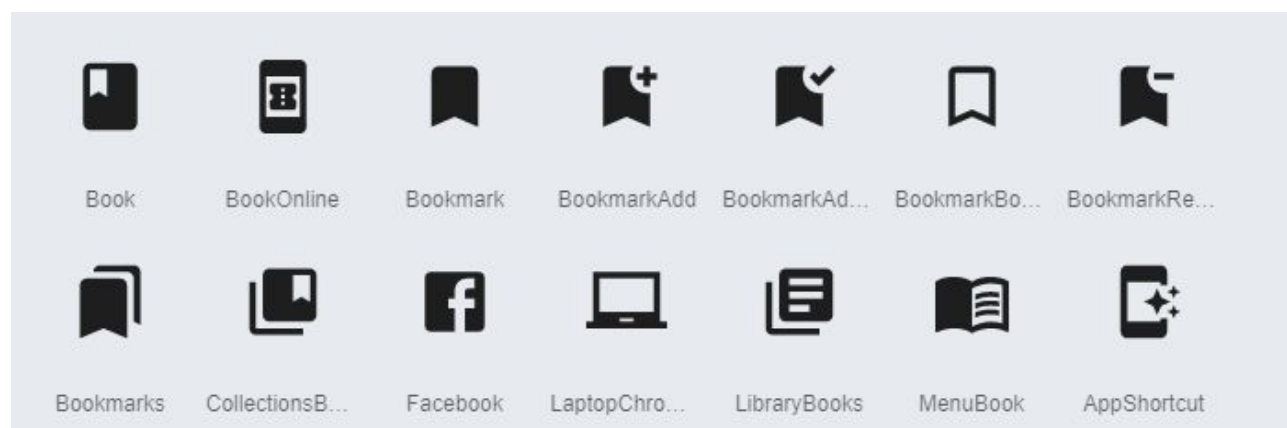


System Architecture Diagram



UX/UI Design and Front-end

- React - Frontend JavaScript framework
- Axios - JavaScript library to make HTTP requests to the API
- Material UI - framework for React



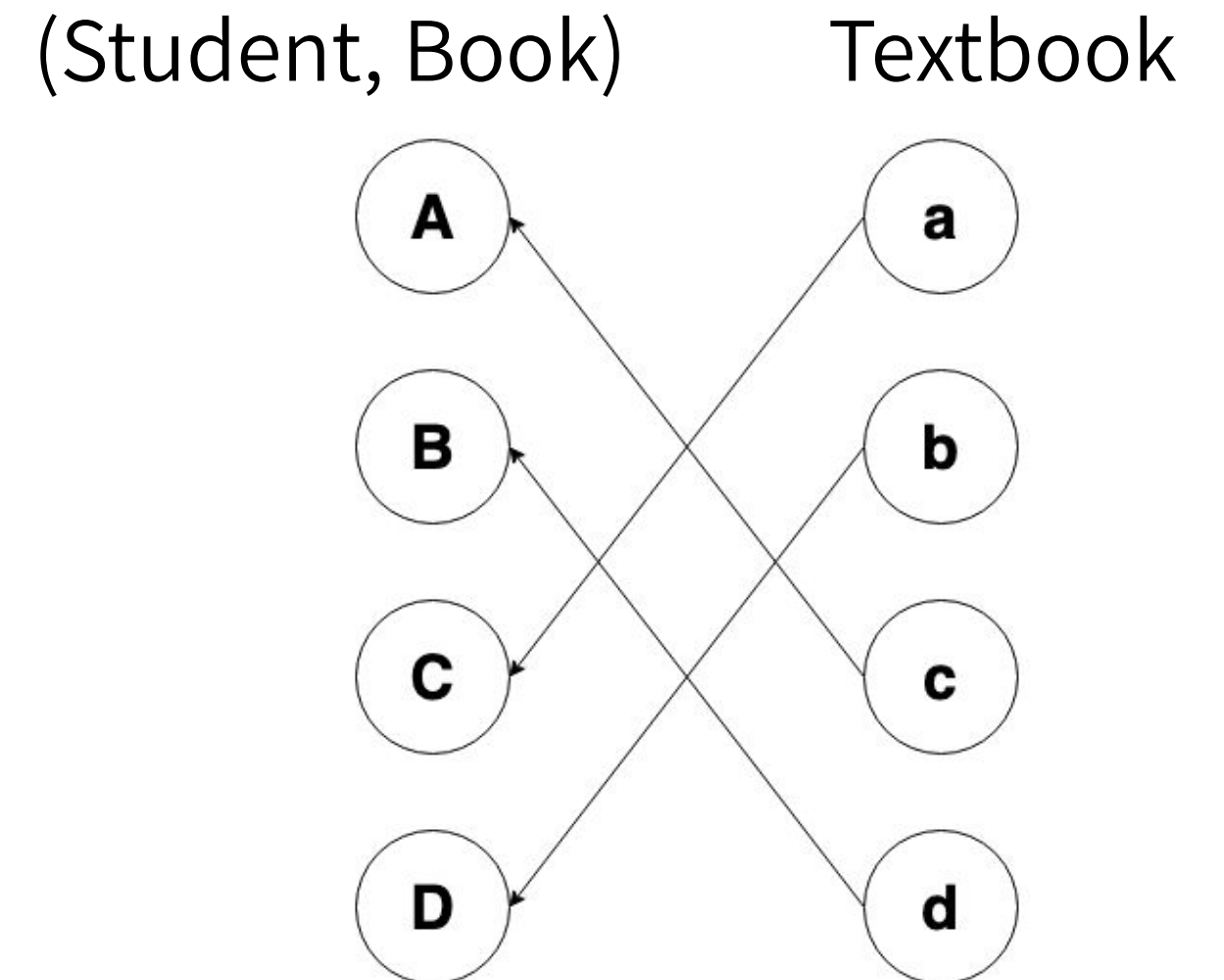
Matching Algorithm

- Goal:
 - Optimize so that students who are in financial need can get textbooks
- Considerations:
 - Prices of books
 - Financial need
 - Book:
 - Matches
 - Donations
 - Exchanges



Gale-Shapley Algorithm

- Used for stable-matching problems
 - Help find stable pairs between two sets.
- Our problem:
 - Generalization of the stable matching problem
 - Two sets:
 - A set of ordered pairs of (student s_p , book b_q)
 - A set of books b_{qn}
 - Match based on prioritizations



Backend/API

- Node.js - JavaScript runtime environment
- Express - Framework to build REST API
- PostgreSQL - Relational Database
- TypeORM - Connect Node and Postgres



What is technically novel?

- Matching Algorithm
- Meetup feature



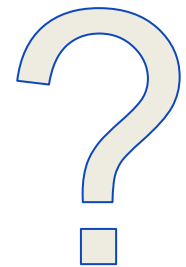
Authentication Feasibility

- Sign in verification

GW Support	Client/Server Verification
<ul style="list-style-type: none">● OAuth● Opens up other features● Integration with registration	<ul style="list-style-type: none">● Check email substring on both client and server● Bouncer email validation● Handle user authentication



Technical Challenges



Unknowns:

- Don't have GW systems to verify users or financial aid



Development Cost:

- Software is all free



Risks:

- Security
- Book donations

Alpha Prototype Release Plans



Any Questions?