

Objective

Build a platform for GW students to exchange textbooks in order to:

- Save money
- Reuse textbooks
- Operate in a trusted zone

Introduction

BookCycle is a web application platform that allows university students to exchange and donate textbooks in an effort to reduce financial strain within the safety of our campus. BookCycle is only open to GW students, and is designed to further build an academic community. Current platforms such as FaceBook Marketplace, CraigsList, and BookMooch cost money and have security implications.

Background

65% of U.S. college students do not buy textbooks because they can't afford them [Nagle & Vitez, 2021]
• Estimated cost for books in 23-24 AY at GW is \$1,400 [GW, 2023]

How It Works

1. Sign up with GW email
3. Report your financial aid
4. Enter textbooks to donate
5. Select your classes
6. Request textbooks
7. Get matched by algorithm

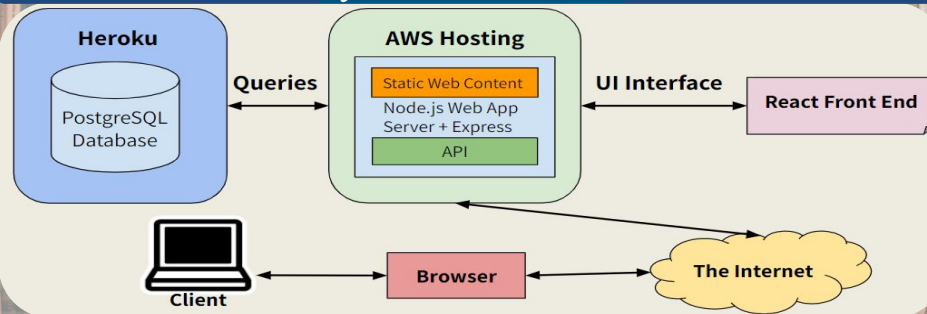
Methodology

For UX/UI design and Front-end, React served as the Front-end JavaScript framework. Axios for API requests to endpoint on the backend. Material UI for all the pre-built components to make it user-friendly. For the backend/API, Node.js as the Javascript runtime environment, Express as the framework to build REST API, PostgreSQL as the Relational Database, TypeORM to Connect Node and Postgre, BeautifulSoup to web scrape courses.

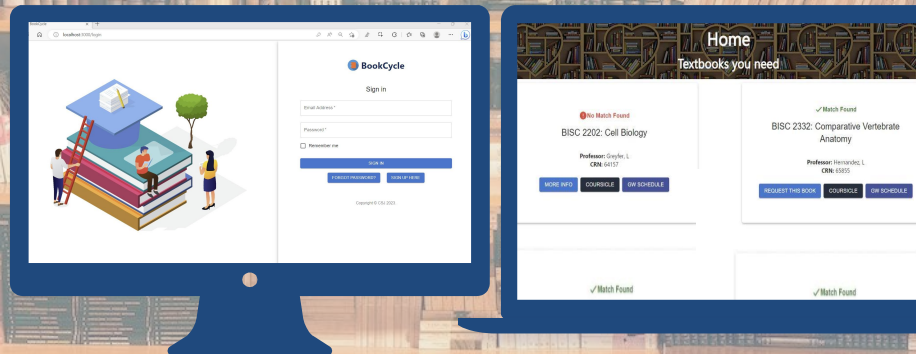
Matching Algorithm

The Weighted Bipartite Algorithm is a Bipartite graph with two sets: the student set and the textbook set. Edges between students and the books they need were constructed. Constraints were incorporated to calculate the cost matrix values/edge weights in order to 1. Consider the amount of textbooks a person has already received 2. Consider the financial need of each student. Each textbook is assigned to the student with the lowest cost, and edge weights are altered after a student is assigned a book.

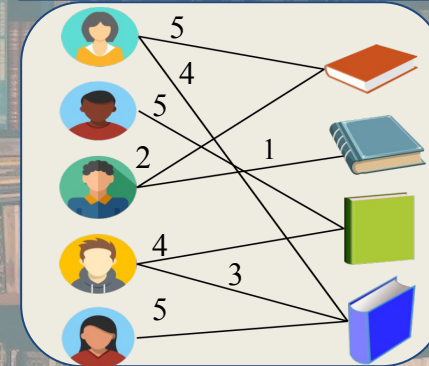
System Architecture



BookCycle



Algorithmic Model



Technical Features

- Verified GW students only
- Matching Algorithm
- Notification System
- Forum, commenting, and rating
- Emailing other students
- Meetup feature
- Price comparison
- Web scraping

Future Work

Expand to other universities and graduate students to optimize

Conclusion

This platform will provide a solution to the increasing number of students who do not buy required textbooks for their courses because they cannot afford them. BookCycle aims to close the gap between the extra financial costs aside from tuition and the ability to succeed academically, without causing financial strain.