

Booked

CS 410 | Team Gold | 15 December 2022

Our Team



Estefania Barron



Jada Keeve



Natalie Mohun



Vaelyn Dulce



Joshua Wang



Thomas Harlow



Yao Wang

Table of Contents

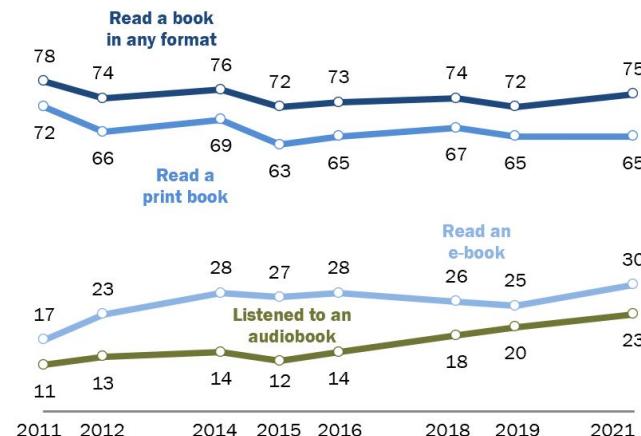
4. Problem Background
5. Problem Background cont.
6. Problem Statement
7. Customers & End-Users
8. Current Process Flow
9. Solution Statement
10. Solution Characteristics
11. Solution Process Flow
12. Competitors
13. Indirect Competitors
14. Competition Matrix
15. Security/Technical Risks
16. Tech Stack
17. Development Tools
18. Major Functional Components Diagram
19. Development Model
20. Milestones
21. GUI Sitemap
22. GUI Mockup: Login Page
23. GUI Mockup: Account Creation Page
24. GUI Mockup: User Profile Page
25. GUI Mockup: Partner Profile Page
26. GUI Mockup: Partner Profile Page (Analytics)
27. GUI Mockup: Partner Profile Page (Inventory)
28. GUI Mockup: Search Page (Guest)
29. GUI Mockup: Search Page (User)
30. GUI Mockup: Search Result Page
31. GUI Mockup: Search Result Page (Distance Feature)
32. GUI Mockup: Search Result Page (Variants Feature)
33. Algorithm: Booked Search
34. Algorithm: Booked Scraper
35. Algorithm: Recommendation System
36. Work Breakdown Structure
37. Database Schema
38. Conclusion
39. References

Problem Background

- In 2021, 75% of U.S. adults say they have read a book in any format in the previous 12 months.
 - 65% say they read a print book in the last year.
 - 30% say they read an e-book in the last year.
- Despite print books being favored, many independent bookstores have gone out of business or have been unable to compete with online conglomerates, such as Amazon.

Print books continue to be more popular than e-books or audiobooks

% of U.S. adults who say they have ____ in the previous 12 months



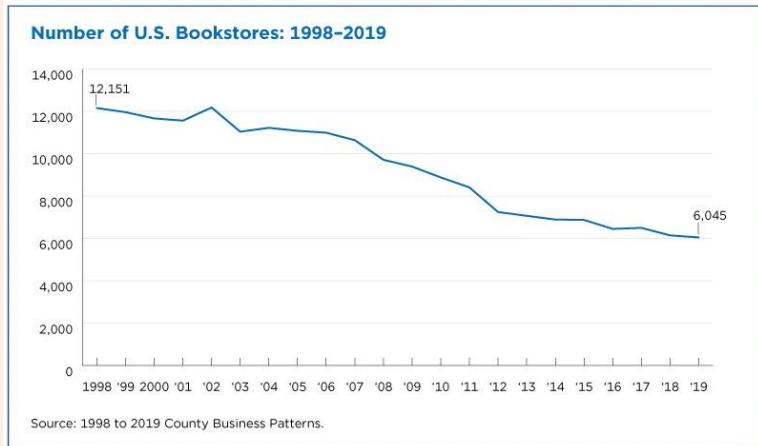
Note: Those who did not give an answer are not shown.

Source: Survey conducted Jan. 25-Feb. 8, 2021.

PEW RESEARCH CENTER

Problem Background cont.

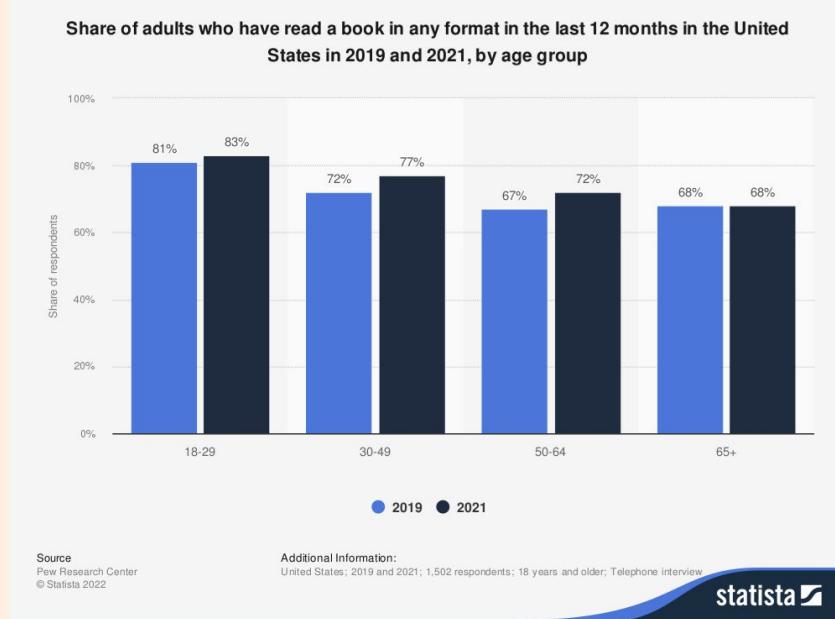
- Since 1998, there has been a steady decrease in physical bookstores and increase in online bookstores^{[1][5]}
- Not all online booksellers list the same criteria
 - Type, edition, condition, etc.
- Hard to find the lowest cost when buying books online
 - Book collecting can be expensive



Problem Statement

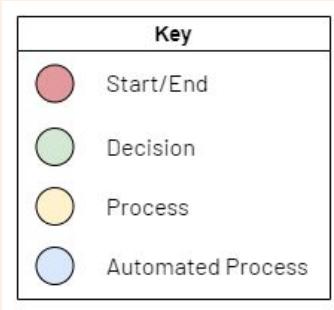
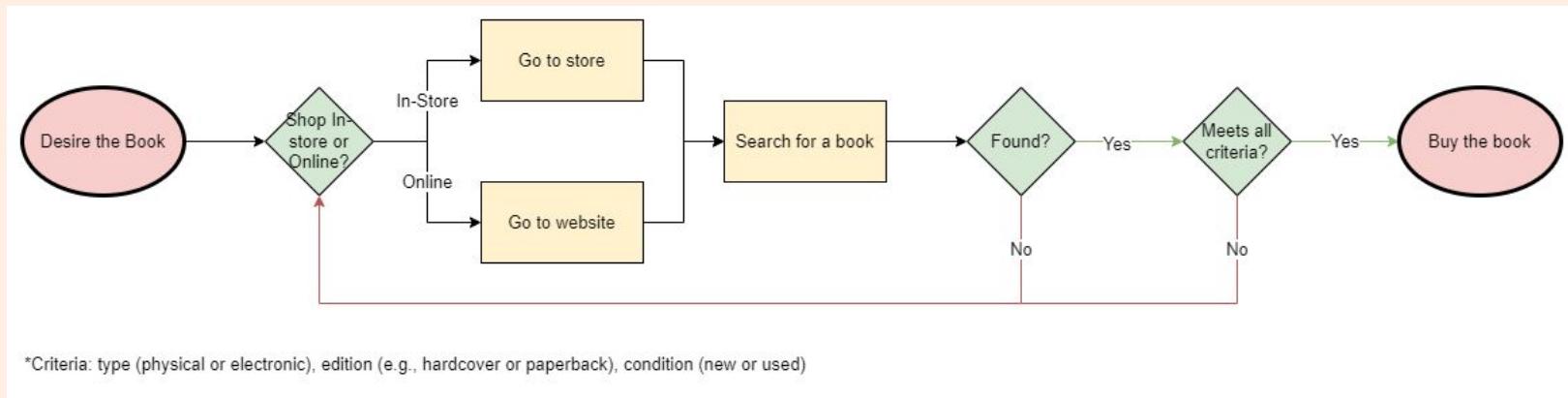
There exists no platform that allows a user to search for a book based on its type (physical or electronic), edition (e.g., hardcover or paperback), and condition (new or used) as well as display its cheapest cost (including shipping and handling) for **small and/or independent bookstores**.

Customers & End-Users



- Customers: independent bookstores
- End-Users: book-lovers

Current Process Flow



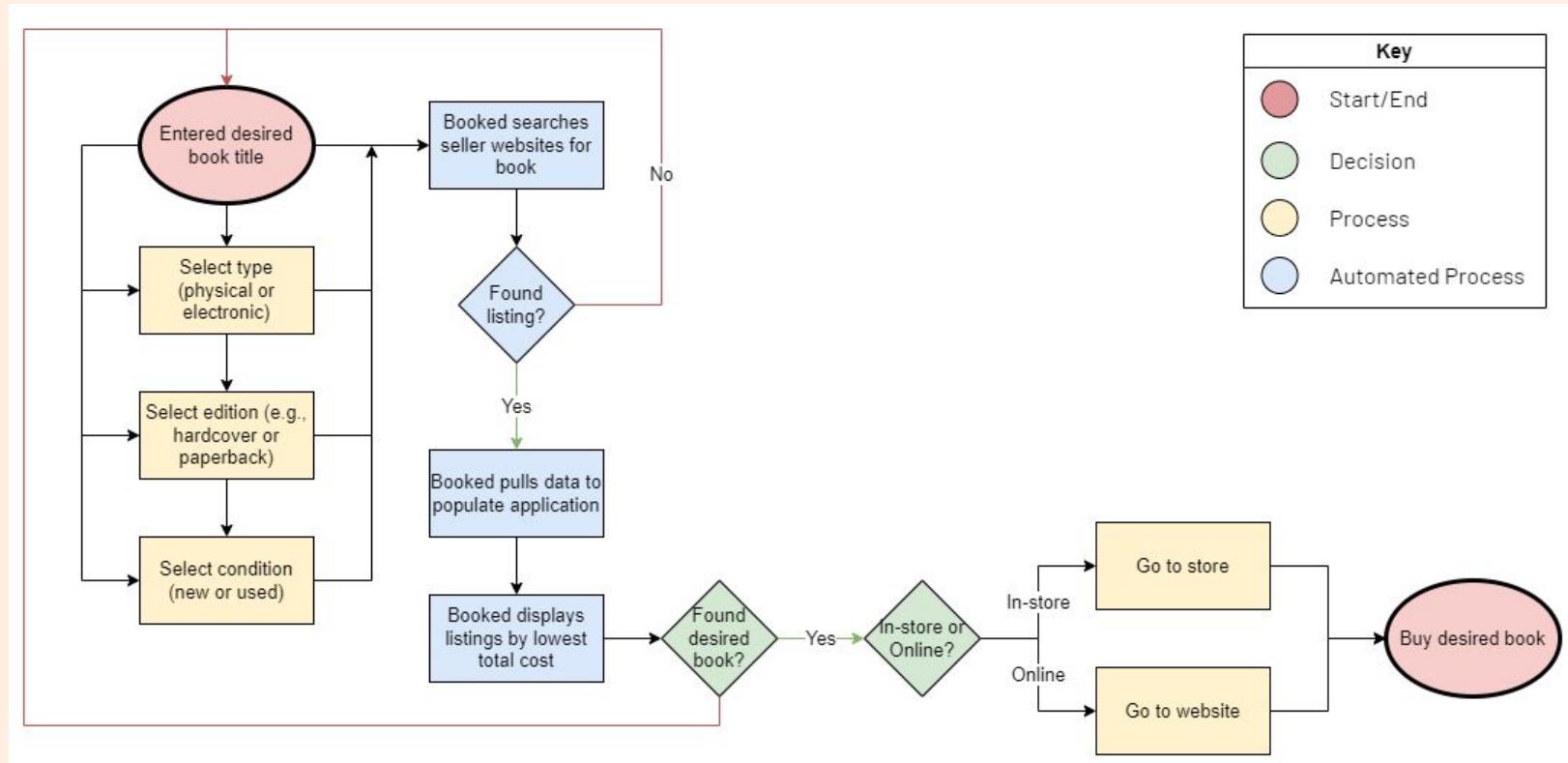
Solution Statement

Booked is a web-based application that shows users which **independent bookstore** to purchase a book from based on its type, edition, condition, and lowest total cost.

Solution Characteristics

- Booked will save time and money during the book-searching process by laying out the type, edition, condition, and cost for customers
- It will also introduce users to local and/or **independent businesses**.
- Those who prefer to shop online will be presented with a link to seller's website
- Those who prefer to shop in-person will be presented with the **local bookstore's** address
 - This feature will give readers the opportunity to explore independent bookstores and will build a strong independent bookstore presence in cities across the country.

Solution Process Flow



Competitors

Biblio: Largest independent book marketplace that specializes in used, rare, and out-of-print books.

BookFinder: Search engine for new, used, out-of-print books and textbooks. Checks major catalogs, retailers and listing sites.

Bookshop: Online marketplace that partners with independent bookstores.

Amazon: Largest marketplace in the United States. Offers new and used books and textbooks, as well as book and ebook rentals.

AbeBooks: A top online marketplace focusing on used, rare, collectible and out of print titles for sale by independent booksellers.

Ebay: An auction house and marketplace that simply facilitates the sale of goods between third-party buyers and sellers.

Indirect Competitors

Barnes and Noble: Physical bookstore in most large U.S. cities. Also, offers an online bookstore to purchase new books.

Book Publishers (e.g., Penguin Random House): Publishing houses offer new books to be purchased online.

Local Libraries: Local libraries are an alternative to buying books as they provide free book rentals to the general public.

Competition Matrix

Functionality	Booked	Biblio	BookFinder	Bookshop	Amazon AbeBooks	Ebay
Find physical books and e-books	✓			✓	✓	✓
Sources exclusively from independent bookstores	✓			✓		
Shows each bookstore's distance from user	✓					
Filter and sort by edition and/or condition	✓	✓	✓		✓	✓
Compares variants of same item	✓	✓	✓		✓	
Provides user analytics to independent bookstore users	✓					
Show total cost	✓		✓			
Recommend books	✓			✓	✓	✓

Security/Technical Risks

T1: Incomplete or outdated data pulled

Mitigation:

- Put checks in place to verify data

Initial: MEDIUM → MITIGATED: LOW

T2: No backup system for unplanned downtime

Mitigation:

- Use standard practices for load balancing

Initial: HIGH → MITIGATED: MEDIUM

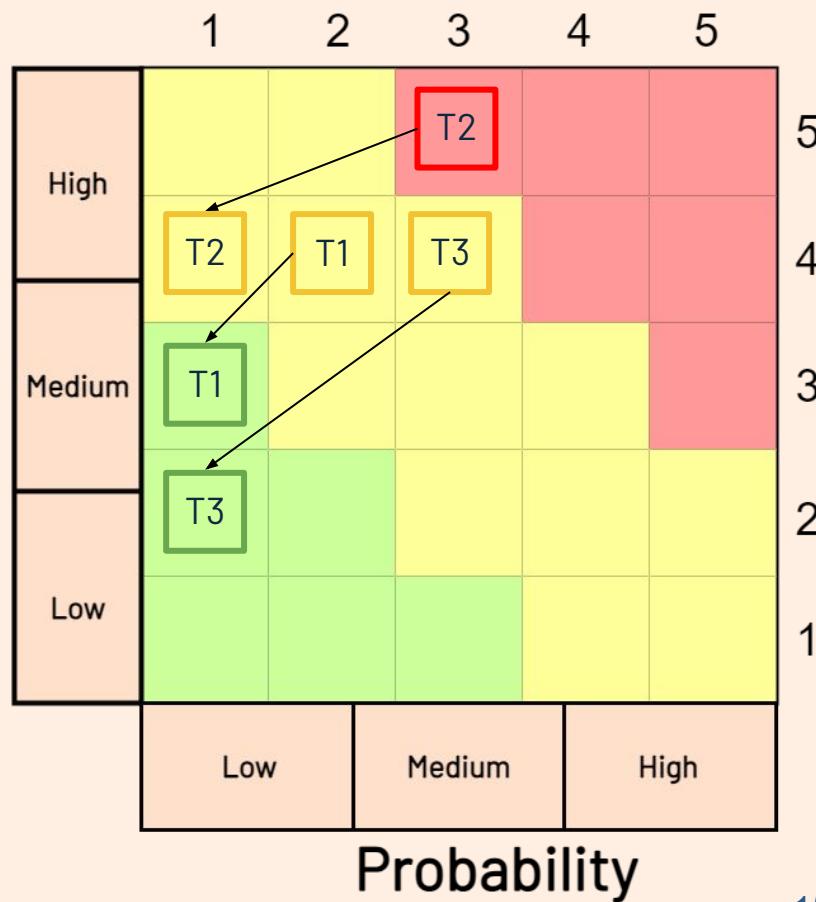
T3: Booked platform is compromised

Mitigation:

- Use standard practices for website security

Initial: MEDIUM → MITIGATED: LOW

Impact



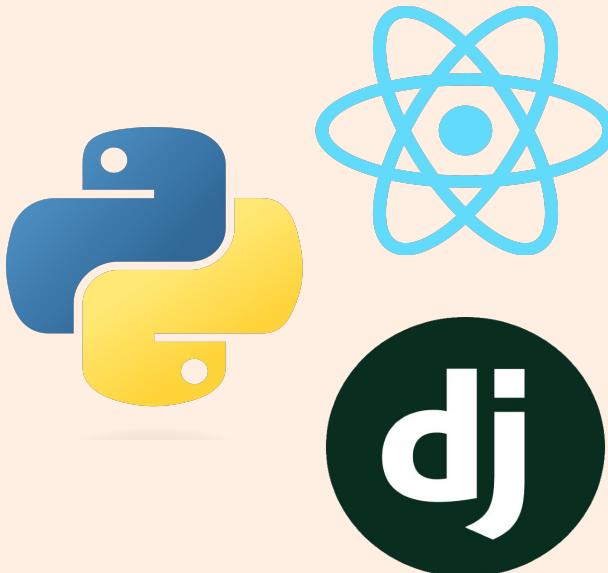
Tech Stack

Front-End:

- HTML, CSS, JavaScript (React)

Back-End:

- Python
- Django
- PostgreSQL



Source: [React Logo](#), [Python Logo](#), [Django Logo](#)

Development Tools

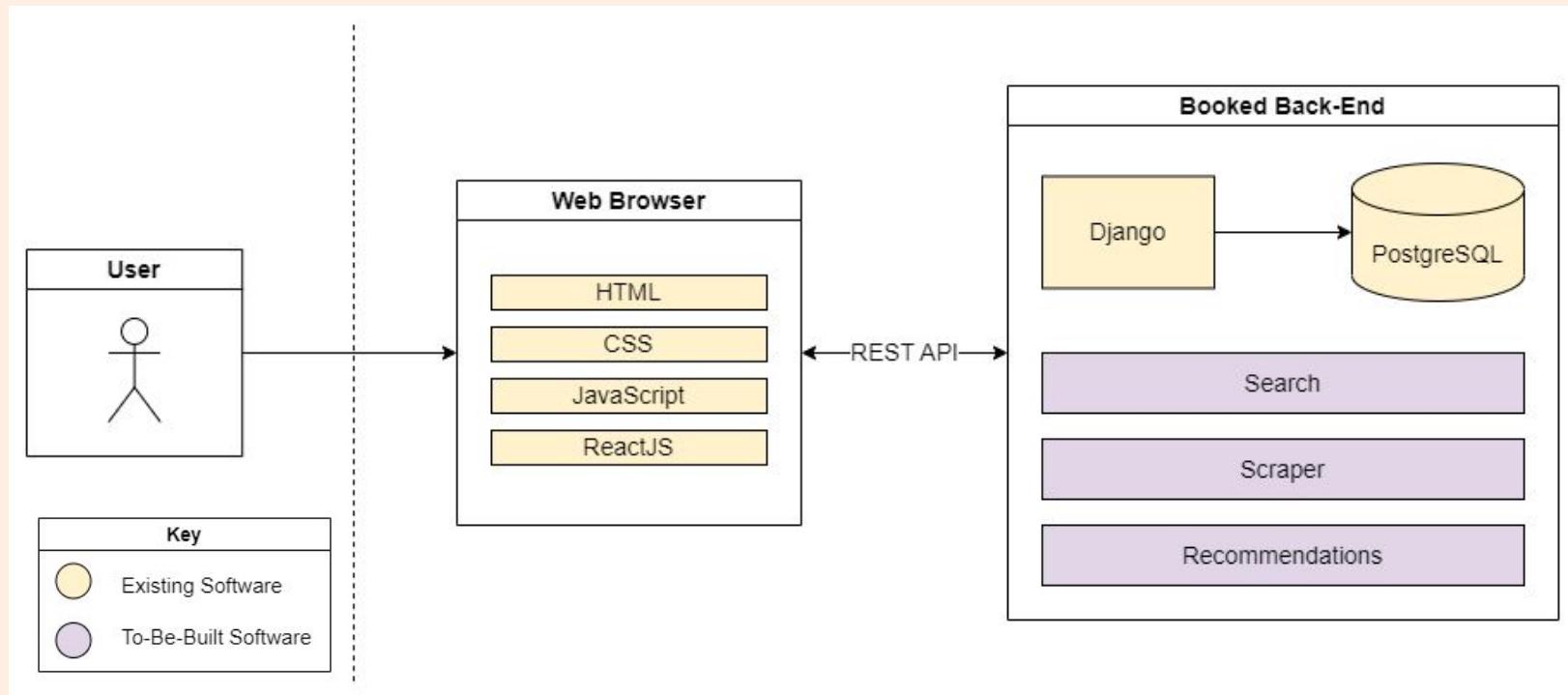
Software Requirements:

- **Scheduling:** Trello
- **Issue Tracking:** GitHub
- **Version Control:** Git via GitHub
- **IDE:** Visual Studio Code
- **Unit Testing:** Jest, PyTest
- **Documentation:** PyDoc, GitHub Pages
- **API Testing:** Postman
- **GUI Mockups:** Figma

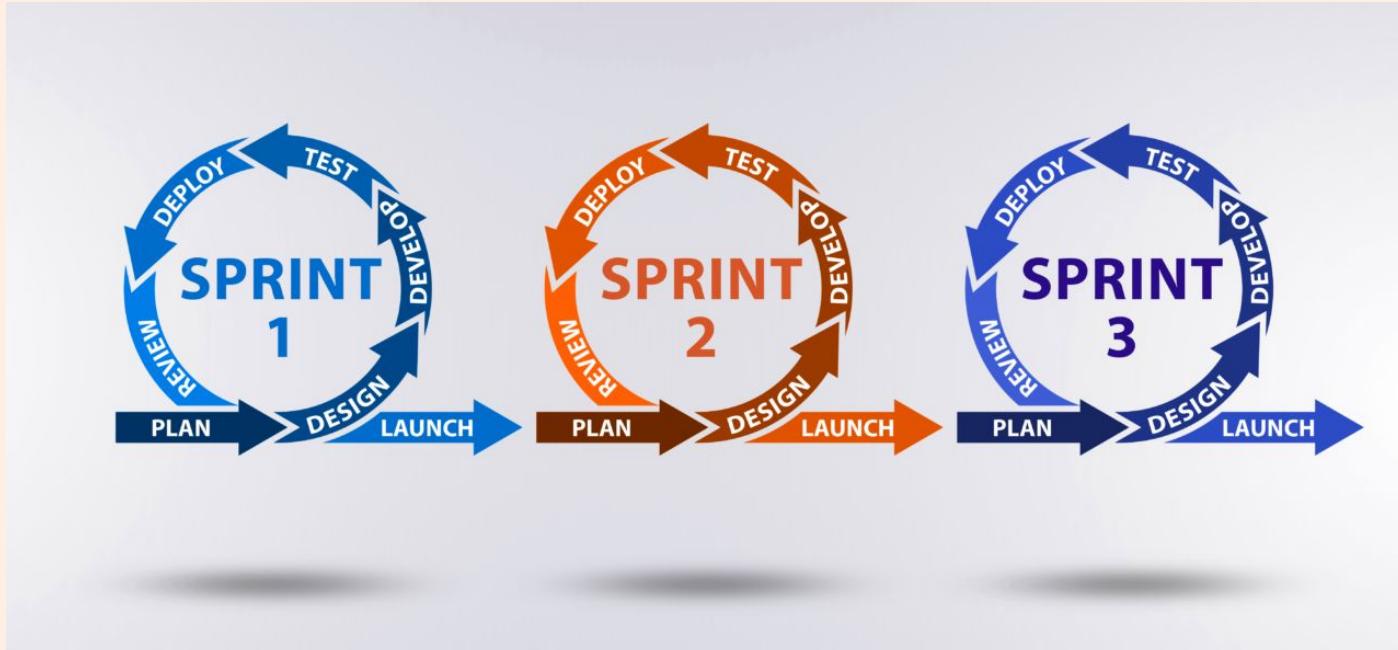
Hardware Requirements:

- Only a PC capable of running the software tools listed is needed.

Major Functional Components Diagram



Development Model



Source: [What is Agile software development?](#)

Milestones

01/09 - 01/20

Sprint 1

- Role assignments
- Project management tool setup
- Environment and database setup and configuration

01/23 - 02/03

Sprint 2

- Focus on the front-end
- Create front tests
- Assess test results

02/06 - 02/17

Sprint 3

- Focus on the back-end (search algorithm)
- Test search code
- MVP: application with basic search algorithm

02/20 - 03/03

Sprint 4

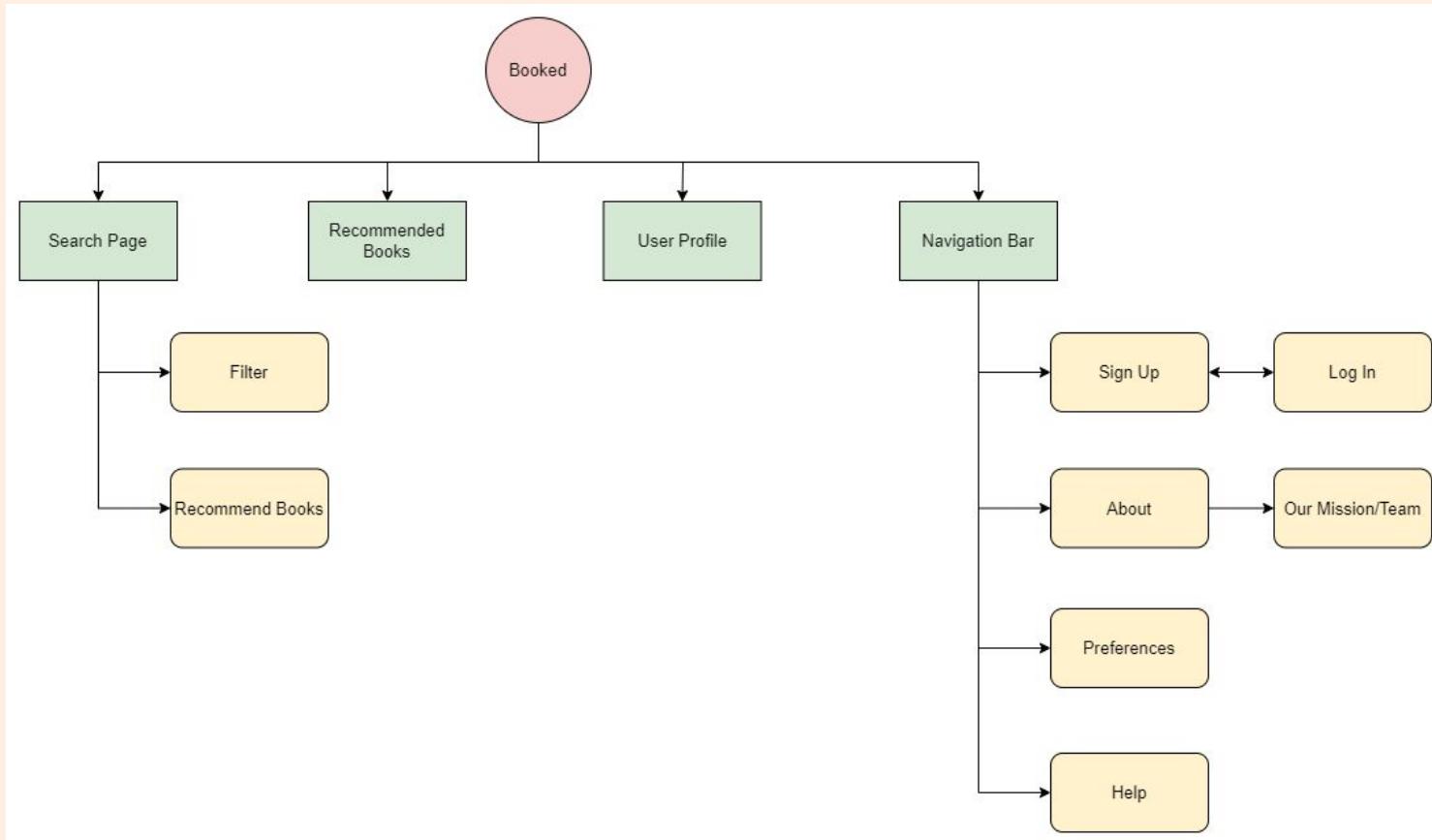
- Focus on the back-end (scraper algorithm)
- Test scraper code
- MVP: application with basic search and scraper algorithm

03/13 - 03/24

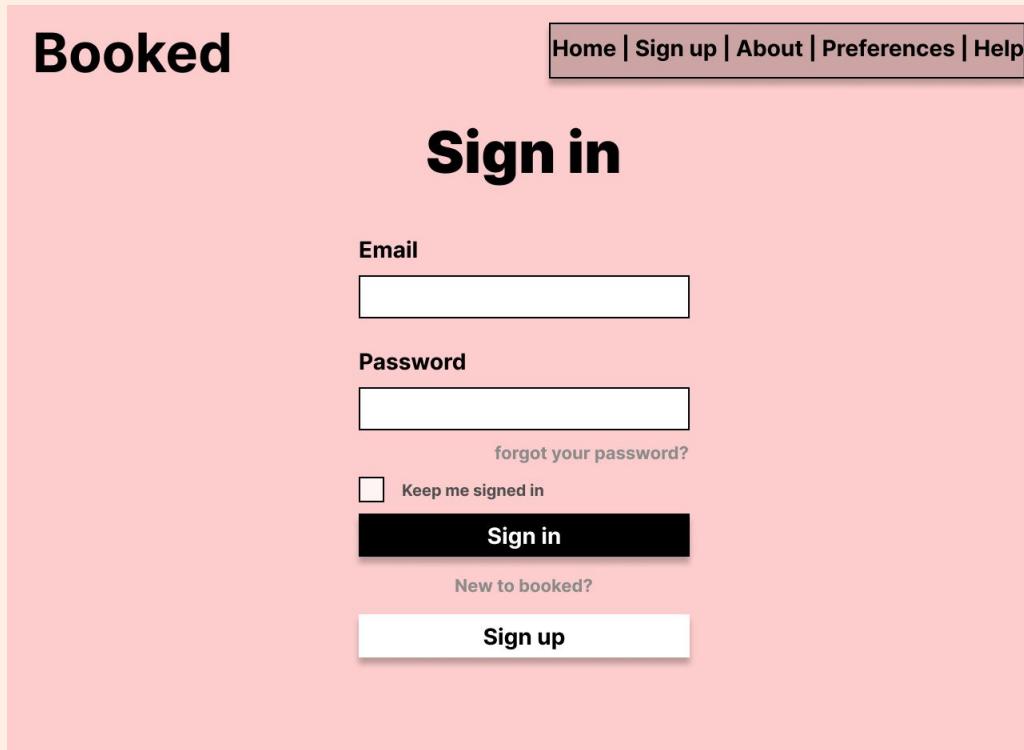
Sprint 5

- Focus on the back-end (recommendation algorithm)
- Test recommendation system code
- MVP: application with basic search, scraper, and recommendation algorithm

GUI Sitemap



GUI Mockup: Login Page



The mockup shows a login page with a light orange header and a pink body. The header contains the word "Booked" and a navigation bar with links: Home, Sign up, About, Preferences, and Help. The main title "Sign in" is centered above two input fields: "Email" and "Password". Below the password field is a "forgot your password?" link. A "Keep me signed in" checkbox is followed by a "Sign in" button. At the bottom, there's a "New to booked?" link and a "Sign up" button.

Booked

[Home](#) | [Sign up](#) | [About](#) | [Preferences](#) | [Help](#)

Sign in

Email

Password

[forgot your password?](#)

Keep me signed in

Sign in

New to booked?

Sign up

GUI Mockup: Account Creation Page

Booked

[Home](#) | [Sign in](#) | [About](#) | [Preferences](#) | [Help](#)

Create Account

Your name *

Email *

Password *

⚠ Passwords must be at least 6 characters

Re-enter password

⚠ Passwords must match

Zip code (optional)

Sign up

By creating an account, you agree to the Booked Terms of Service and Privacy Policy

Already have an account?

Sign in

GUI Mockup: User Profile Page

Booked

Welcome back, Stephen! [sign out]

PERSONAL HOME | TO-BE-READ | SAVED-SEARCHES

Recent Searches

- books by Sun Tzu
- "Art of war" by Sun Tzu
- "art of war"

(Clear searches)

Saved Searches

Book Title: The Hunger Games
Author: Suzanne Collins

(x)

To Be Read

ADD

currently empty

Book Title: A Game of Thrones
Author: George R. R. Martin
Condition: New

(x)

Role:
[register user](#) [become a partner]

Name:
[Stephen](#) [change name]

Member since:
[Fri, Jan 24, 2020](#)

GUI Mockup: Partner Profile Page

Booked

Welcome back, Abe's Bookstore! [\[sign out\]](#)

[Home](#) | [David](#) | [About](#) | [Preferences](#) | [Help](#)

BOOKED-WEEKLY-FEED | MY-weekly feed | [Update my inventory](#)

My weekly feed

Book title	total traffic
It Ends with Us: A Novel by Colleen Hoover	52%
Verity by Colleen Hoover	28%
Harry Potter and the Order of the Phoenix: The Illustrated Edition by J. K. Rowling	13%
Others	7%

Role:
[Partner](#) [\[end partnership\]](#)

Name:
[Abe's Bookstore](#) [\[change name\]](#)

Member since:
[Thr, Mar 3, 2022](#)



GUI Mockup: Partner Profile Page (Analytics)

Booked

Welcome back, Abe's Bookstore! [\[sign out\]](#)

[Home](#) | [David](#) | [About](#) | [Preferences](#) | [Help](#)

It Starts with Us: A Novel (It Ends with Us)
by Colleen Hoover

12/18/2022 ~ 12/24/2022

Day	Average	Checked-out	Your price
Sunday	\$32.88	\$16.00	\$22.00
Monday	\$34.00	\$32.00	\$38.00
Tuesday	\$31.00	\$29.00	\$31.00
Wednesday	\$33.00	\$28.00	\$39.00
Thursday	\$37.00	\$27.00	\$44.00
Friday	\$30.00	\$29.00	\$25.00
Saturday	\$28.00	\$26.00	\$30.00
Sunday	\$33.00	\$28.00	\$34.00
Average	\$32.88	\$27.63	\$31.43

Role: Partner [edit]

Name: Abe's Bookstore

Member since: Thr, Mar 3, 2022

Books sold: 311 visits from Booked

Your Average price \$32.88 **16% Higher than Avg-Checked-out**
32% NEW **23% Hardcover**

Average Checked-out price \$27.63
Average Market price \$32.46
45% NEW **65% Hardcover**

311 visits from Booked

Legend: — Average ● Checked-out ■ Your price

weekly feed | Update my inventory

weekly feed

total traffic

Book	Percentage
The First Monday in September by Michelle Obama	52%
It Starts with Us (It Ends with Us) by Colleen Hoover	28%
Midwives by Jennifer Chiaverini	13%
My Name is Maria Last by Linda Rodriguez McPherson	7%

GUI Mockup: Partner Profile Page (Inventory)

Booked

Welcome back, Abe's Bookstore! [\[sign out\]](#)

[BOOKED-WEEKLY-FEED](#) | [MY-WEEKLY-FEED](#) | [UPDATE-INVENTORY](#)

Update My Inventory

Book title	OUT OF STOCK	number...	UPDATE
<input checked="" type="radio"/> It Ends with Us: A Novel by Colleen Hoover	OUT OF STOCK	number...	UPDATE
<input type="radio"/> Verity by Colleen Hoover	OUT OF STOCK	number...	UPDATE
<input type="radio"/> Harry Potter and the Order of the Phoenix: The Illustrated Edition by J. K. ...	OUT OF STOCK	number...	UPDATE

Role:
[Partner](#) [\[end partnership\]](#)

Name:
[Abe's Bookstore](#) [\[change name\]](#)

Member since:
[Thr, Mar 3, 2022](#)

GUI Mockup: Search Page (Guest)

Booked

Finding the book from your local independent bookstore - Simplified!

Book Price Comparison

Book Title:

Book is written in ▾

Author:

ISBN:

Condition: ▾ Binding: ▾

Edition: ▾ Format: ▾

Price range: Minimum to: Maximum

Search

Home | Sign in | About | Preferences | Help

Books based on your interests

< >

GUI Mockup: Search Page (User)

Booked

Welcome back, Stephen!

Finding the book from your local independent bookstore - Simplified!

Book Price Comparison

Book Title:

Book is written in: English ▾

Author:

ISBN:

Condition: Any ▾ Binding: Any ▾

Edition: Any ▾ Format: Any ▾

Price range: \$ Minimum to: \$ Maximum

Search

Home | Stephen | About | Preferences | Help

Books based on your interests

< >

GUI Mockup: Search Results Page

Booked

[Home](#) | [Sign in](#) | [About](#) | [Preferences](#) | [Help](#)

Search Results

Showing all matches where

Author is:	Sun Tzu
Title is:	Art of war
ISBN is:	[not specify]
Condition is:	New
Edition is:	[not specify]
Format is:	Physical
Binding is:	Hardcover
Book is written in:	English

[Save Search](#) [New Search](#)

[All listings](#) [Condition ▼](#) [Edition ▼](#) [Format ▼](#) [Binding ▼](#) [Best Match ▼](#)

13,000+ results for Art of War [Filter options](#)

Book results 1 - 50 of 13521 [Click on price to find out about the book](#)

#	Book Seller	Book Info	Base	Estimated Shipping	Total
1	right now on	New, Sun Tzu, The Art of War, Hardcover, ISBN 0780097420124, Publisher: HarperCollins Publishers, 2011, Available - dispatched from the UK in 1 business day with free delivery worldwide	4.38	6.38	\$ 10.76
2		New, Sun Tzu, The Art Of War, Hardcover, ISBN 9781599869773, Publisher: Filiquarian, 2007, Edition: First Thus. 68 pages, In Stock, Fulfillment by Amazon	5.53	7.34	\$ 12.87

< Last [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) ... [677](#) Next >

GUI Mockup: Search Results Page (Distance Feature)

Booked

Home | Sign in | About | Preferences | Help

Search Results

Showing all matches where

Author is:	Sun Tzu
Title is:	Art of war
ISBN is:	[not specify]
Condition is:	New
Edition is:	[not specify]
Format is:	Physical
Binding is:	Hardcover
Book is written in:	English

[Save Search](#) [New Search](#)

All listings	Condition ▼	Edition ▼	Format ▼	Binding ▼	Best Match ▼
13,000+ results for Art of War	Distance ▼	Show distance		Filter options	

Book results 1 - 50 of 13521 [Click on total to find out about the book](#)

#	Book Seller	Book Info	Dst.	Base	Estimated Shipping	Total
1	 right now on eBay	New, Sun Tzu, The Art Of War, Hardcover, ISBN 9780007420124, Publisher: HarperCollins Available - the UK in 1, day with free delivery worldwide	32 mi.	4.38	6.38	\$ 10.76
2	 PRINCE BOOKS	New, Sun Tzu, The Art Of War, Hardcover, ISBN 9781599869773, Publisher: Filigarian, 2007, Edition: First Thus. 68 pages, In Stock, Fulfillment by Amazon	18.53 mil	5.53	7.34	\$ 12.87

< [Last](#) [1](#) [2](#) [3](#) [4](#) [5](#) [6](#) [7](#) [8](#) [9](#) [10](#) [11](#) [12](#) [13](#) [14](#) [15](#) [16](#) [17](#) [18](#) [19](#) [20](#) ... [677](#) Next >

GUI Mockup: Search Results Page (Variants Feature)

Booked

Home | Sign in | About | Preferences | Help

Search Results

Showing all matches where

Author is:	Sun Tzu
Title is:	Art of war
ISBN is:	[not specify]
Condition is:	New
Edition is:	[not specify]
Format is:	Physical
Binding is:	Hardcover
Book is written in:	English

Save Search **New Search**

All listings Condition ▼ Edition ▼ Format ▼ Binding ▼ Best Match ▼

13,000+ results for Art of War Show distance Filter options

Book results 1 - 50 of 13521 Click on price to find out about the book

Hey! You are in luck, we found **3** books with **hotter deals** X

As high as **89%** match rate and **13% cheaper** based on your current search results

Yes, please **No, I'm good**

Thank you for checking out our hot deals!



89%
Your search Our deal

Author :	Sun Tzu	Sun Tzu
Binding :	Hardcover	Paperback
Condition :	New	New
Title :		

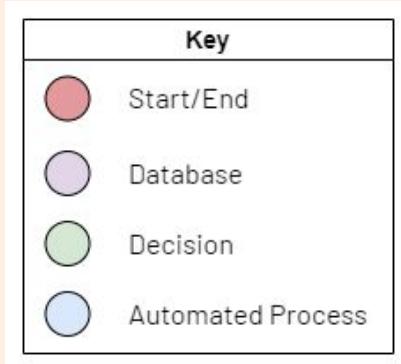
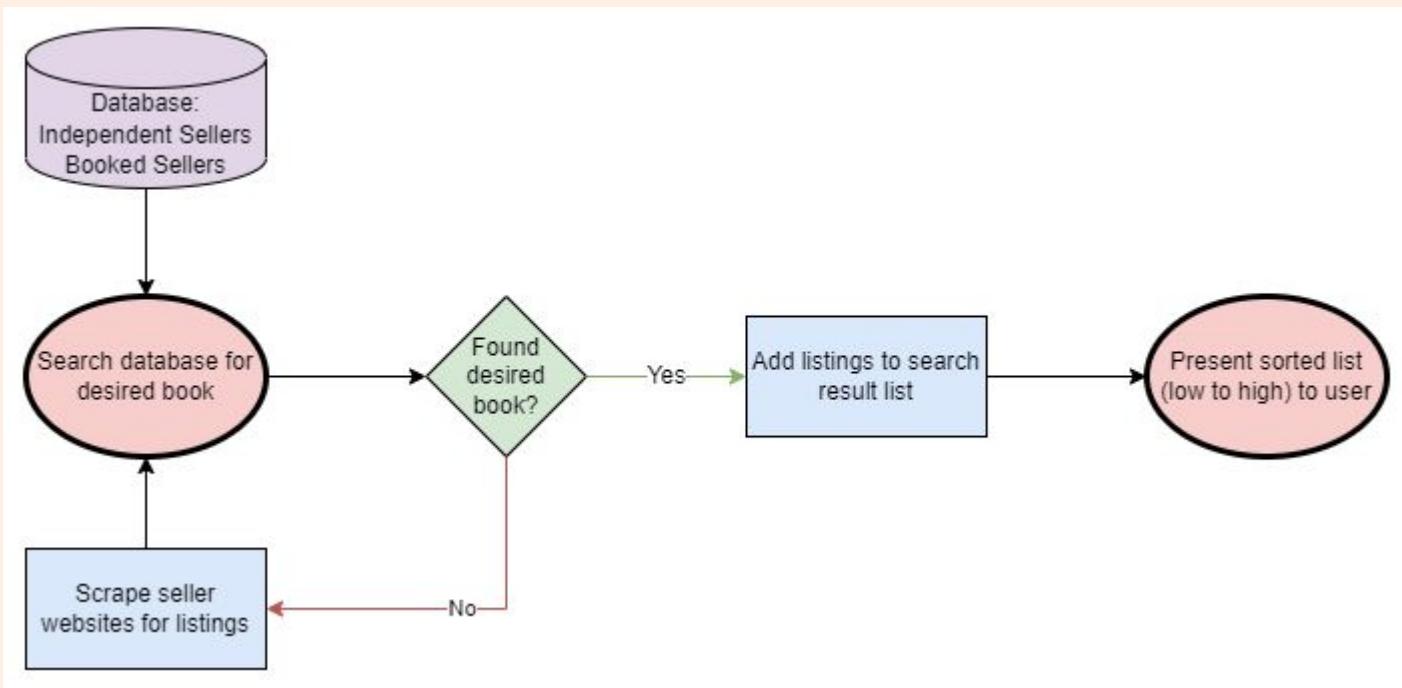
sold by: PRINCE BOOKS

Estimated distance **7 miles**
Estimated distance **\$ 4.50**
Total price : **\$ 9.81**

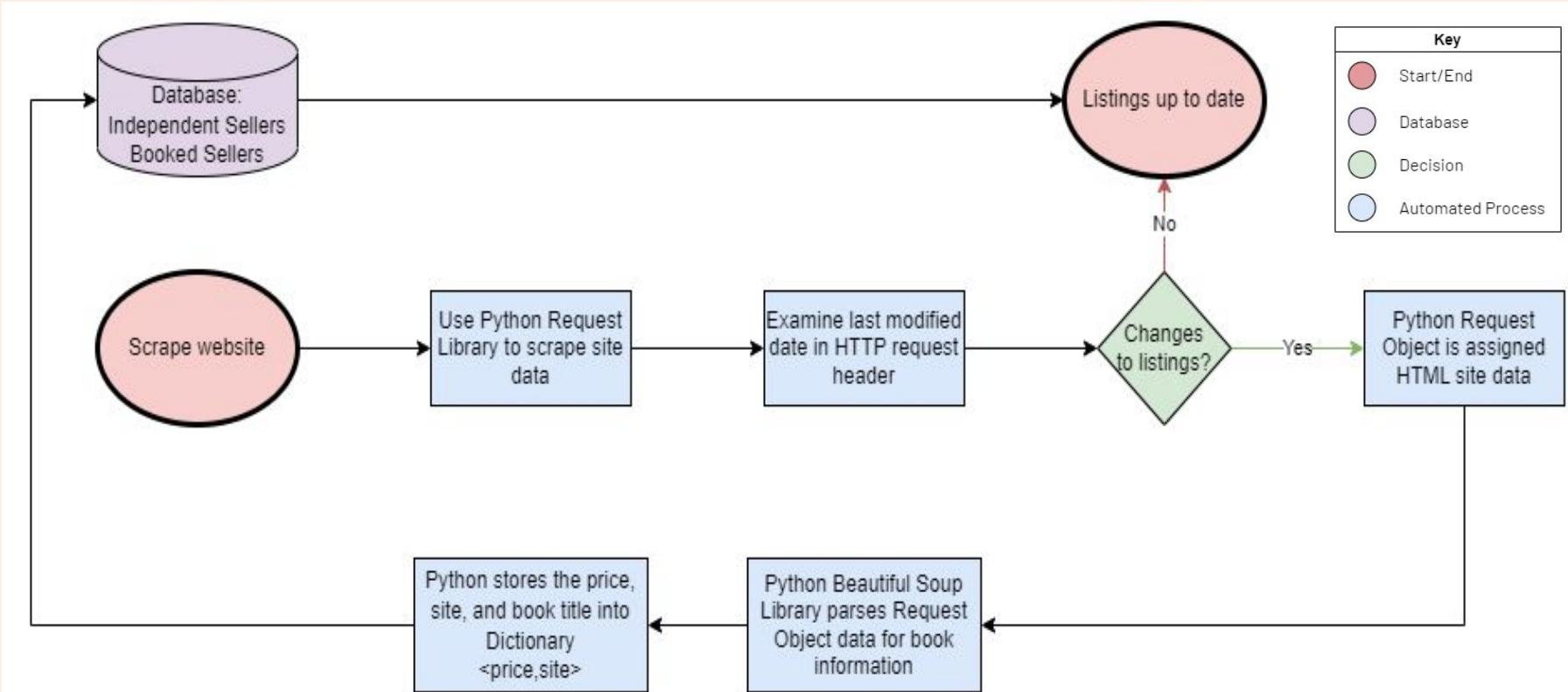
Accept **Reject**

< Last 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 ... 677 Next >

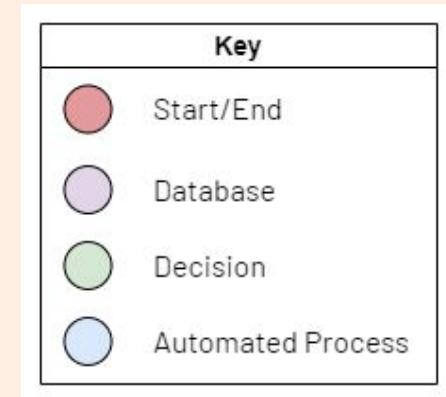
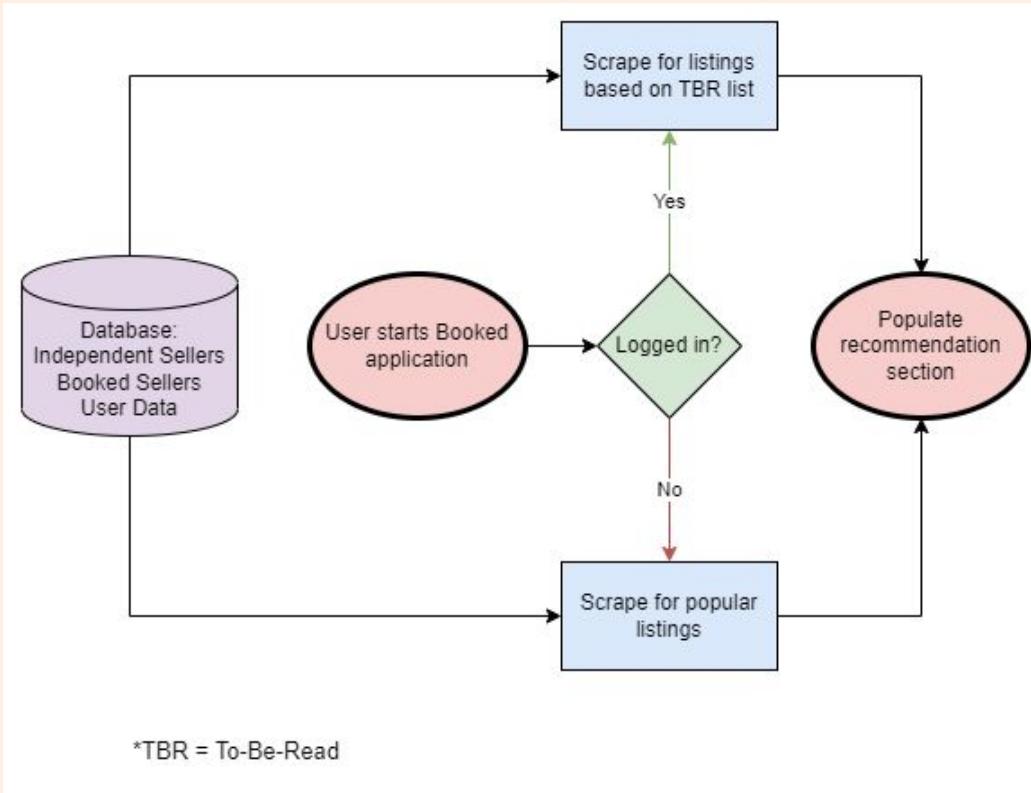
Algorithm: Booked Search



Algorithm: Booked Scraper

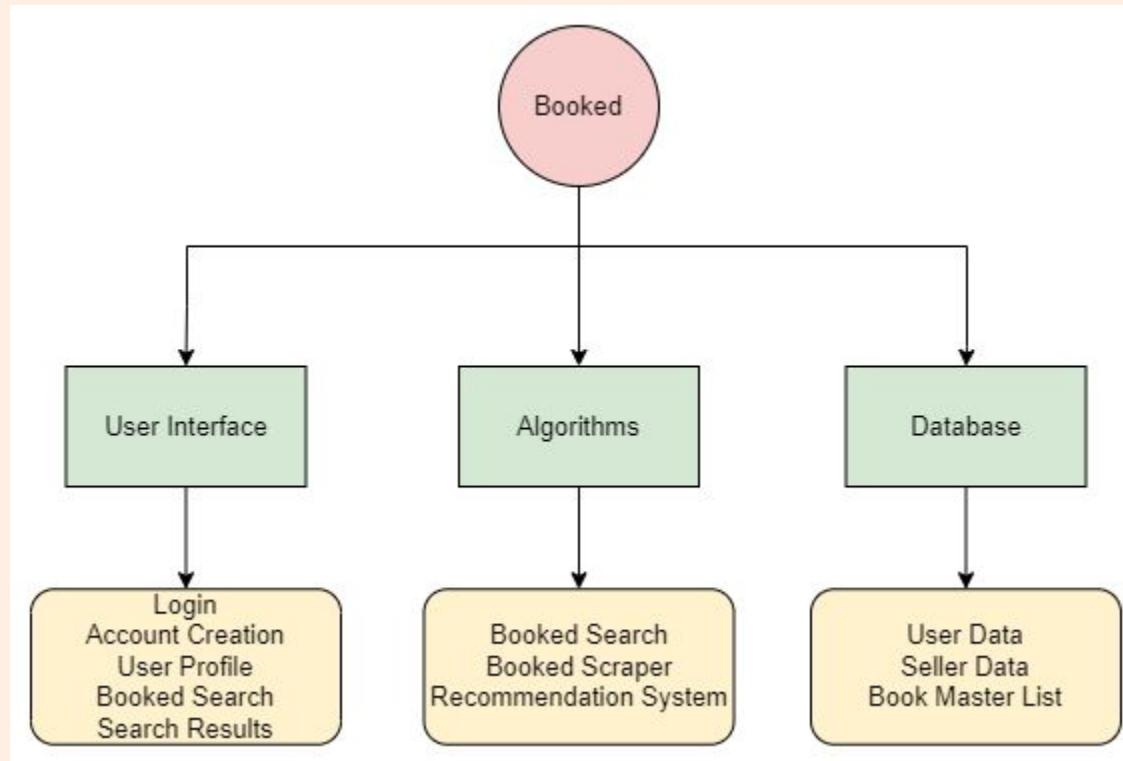


Algorithm: Recommendation System

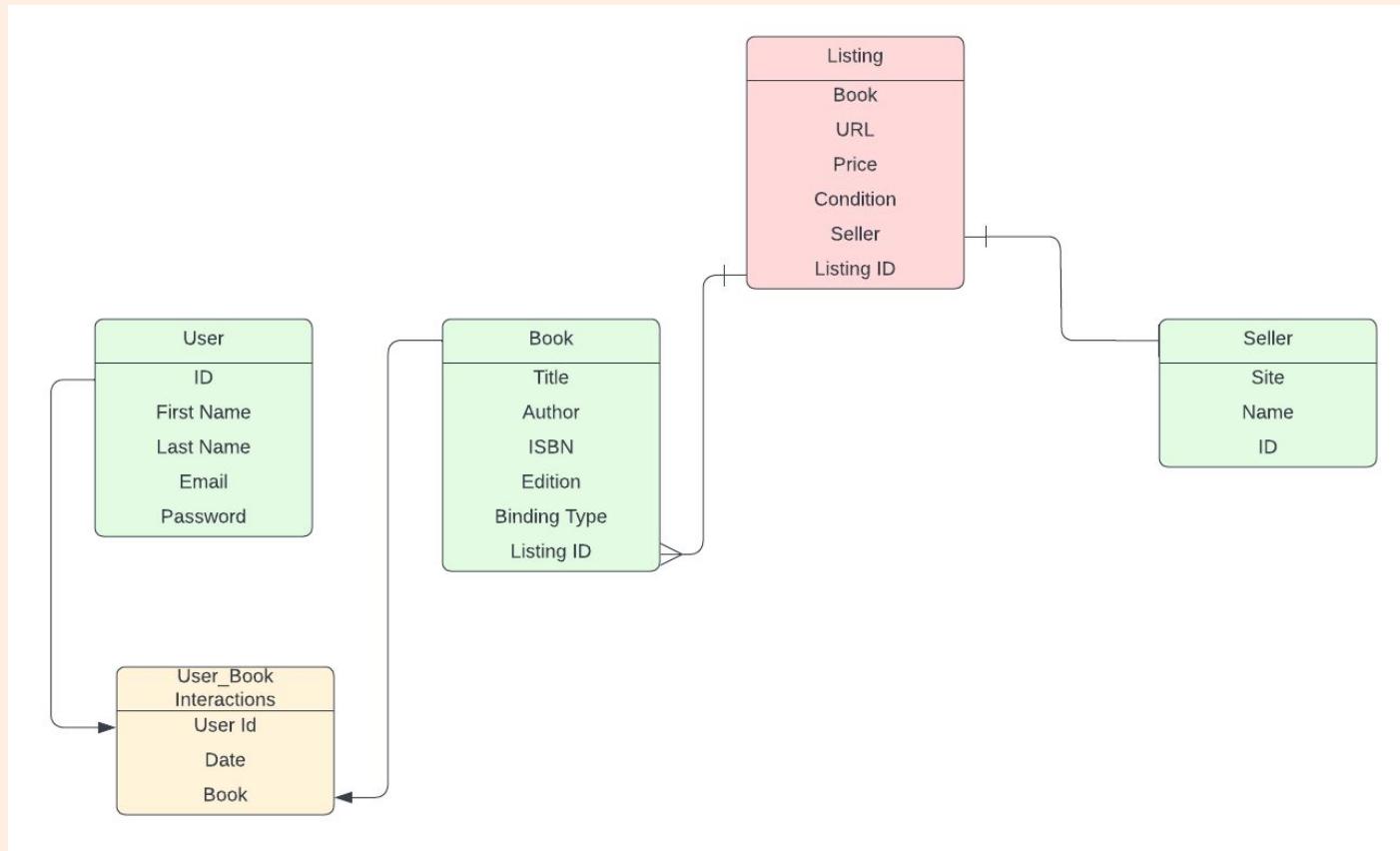


*TBR = To-Be-Read

Work Breakdown Structure



Database Schema



Conclusion

Booked will not...

- Include major book retailers
- Provide personalized book recommendations
 - Relevant purchases only
- Be limited to textbooks

Booked will...

- Include **independent bookstores** in search results
- Allow users to find **specific books** based on **specific criteria**
 - Ensure that the criteria are met exactly
- Provide users with the **cheapest price**

Thank you!

References

1. "12 Stats on the State of Bookstores in the U.S." *OEDB.org*, Copyright © 2006-2022 OEDb.org, a Red Ventures Company, 2 Aug. 2018, <https://oedb.org/ilibrarian/12-stats-on-the-state-of-bookstores-in-america-today/#:~:text=Today%2C%20there%20are%20around%2010%2C800%20bookstores%20in%20the%20U.S>
2. "4 Reasons Why Shipping Is so Expensive in 2022." *Gilson Solutions*, 11 Mar. 2022, <https://gillsonsolutions.com/4-reasons-why-shipping-is-so-expensive-in-2022/>
3. "Book Lovers Presentation." Slidesgo, <https://slidesgo.com/theme/book-lovers#search-book+lovers&position-1&results-3&rs=search>.
4. Faverio, Michelle, and Andrew Perrin. "Three-in-Ten Americans Now Read e-Books." Pew Research Center, Pew Research Center, 2 Feb. 2022, <https://www.pewresearch.org/fact-tank/2022/01/06/three-in-ten-americans-now-read-e-books/>
5. Hait, Andrew W. "Despite Our Love of All Things Electronic, Bookstores Still Relevant This Holiday Season." Census.gov, 13 Apr. 2022, <https://www.census.gov/library/stories/2021/12/do-not-turn-the-page-on-bookstores.html>
6. "Print Book Market Share by Channel", ©Statista 2022, 6 Jan 2016, <https://www.statista.com/statistics/534111/amazon-book-market-share-usa/>
7. Watson, Amy. "Book Readers in the U.S. by Age 2021." Statista, 27 July 2022, <https://www.statista.com/statistics/249787/book-reading-population-in-the-us-by-age/>.

Appendix

Customer Risks

C1: Difficult to appeal to customers

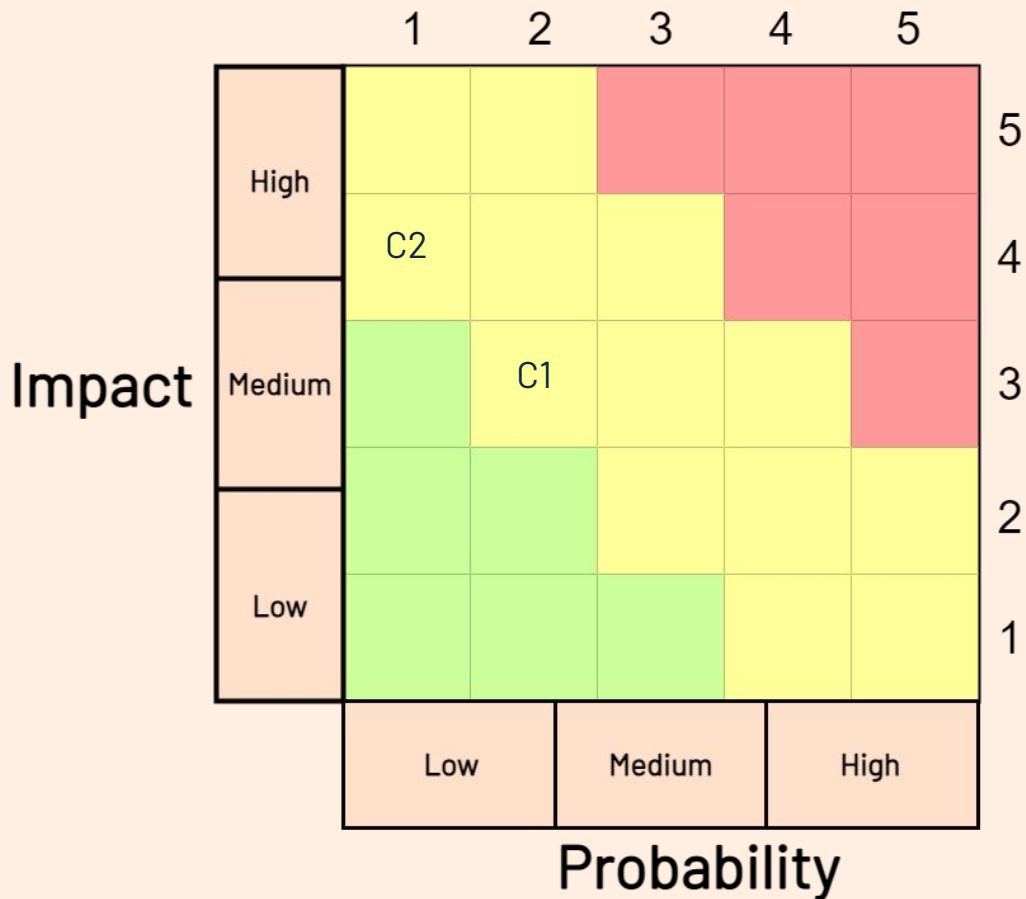
Mitigation:

- Show differences between us and competitors

C2: Account emails could be compromised

Mitigation:

- Use best practices to secure customer information

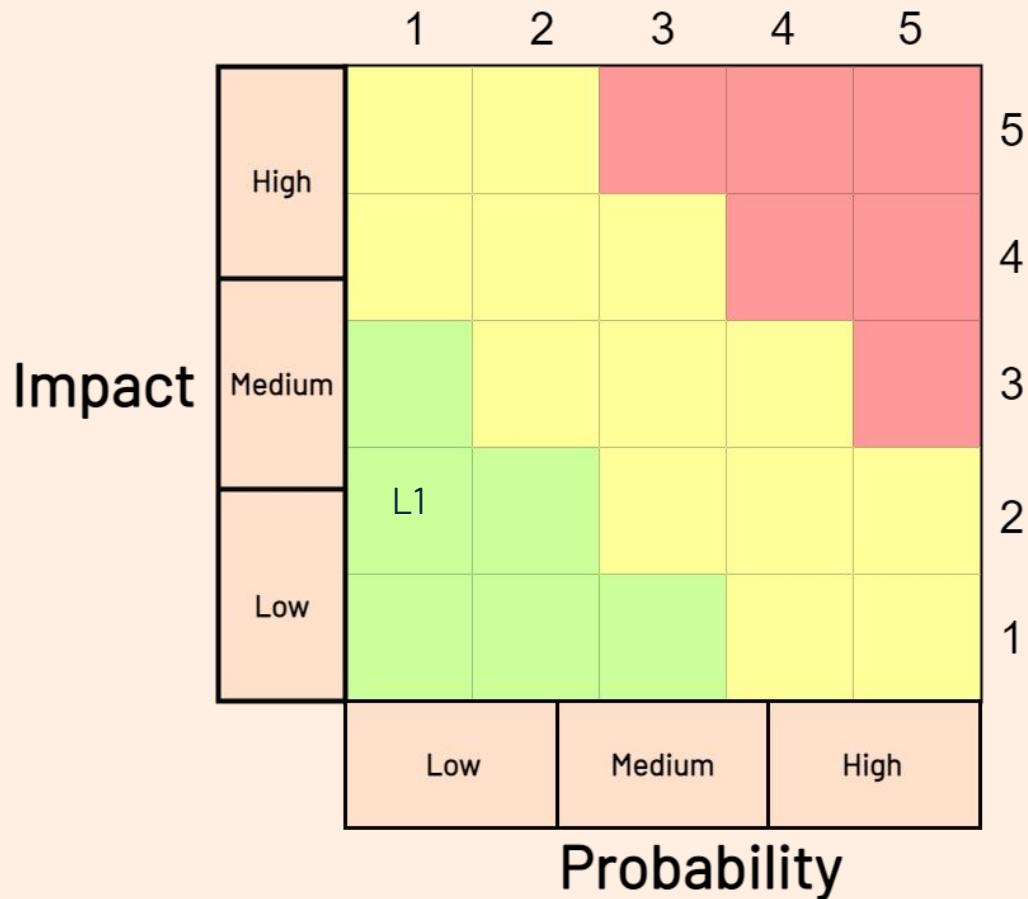


Legal Risks

L1: Cease and desist for web scraping

Mitigation:

- Obtain data through API
- Form partnerships with bookstores that want advertising



User Roles

- **Guest:** Non-registered user and visitor to Booked website
- **Booked-user:** Registered user and returning customer to Booked website
- **Booked-partner:** Registered user and independent/local bookstore owner partnered with Booked website
- **Administrator:** Registered user that has administrator privileges that can give a partner role to or remove a partner role from another registered user

User Stories: Guest

- As a guest, I would like the option to create an account with my name and email address.
- As a guest, I would like search for a book based on the book information that I provided.
- As a guest, I would like to see the cheapest overall price for books on top of on the search result page (including shipping).
- As a guest, I would like to see a list of popular books on the search page.
- As a guest, I would like to see the distance of a physical bookstore in the search results.
- As a guest, I would like to compare variants of the same book.

User Stories: Booked-user

- As a Booked-user, I would like to login to my account with my email address and password.
- As a Booked-user, I would like to change my account password.
- As a Booked-user, I would like search for a book based on the book information that I provided.
- As a Booked-user, I would like to see the cheapest overall price for books on top of on the search result page (including shipping).
- As a Booked-user, I would like to have the option to save the book search on the search result page.

User Stories: Booked-user cont.

- As a Booked-user, I would like to create a to-be-read list.
- As a Booked-user, I would like to see a list of recommended books based on my to-be-read list.
- As a Booked-user, I would like to have the option to become a Booked-partner.
- As a Booked-user, I would like to see the distance of a physical bookstore in the search results.
- As a Booked-user, I would like to compare variants of the same book.

User Stories: Booked-partner

- As a Booked-partner, I would like to login to my account with my organization's email address and password.
- As a Booked-partner, I would like to change my account password.
- As a Booked-partner, I would like to alert admin about incorrect information on Booked.
- As a Booked-partner, I would like to view analytics for my store.
- As a Booked-partner, I would like to manage my store's inventory.

User Stories: Administrator

- As an Administrator, I would like to help a Booked-user to change their password.
- As an Administrator, I would like to see a list of pending requests for Booked partnerships.
- As an Administrator, I would like to approve a partnership request from a Booked-user.
- As an Administrator, I would like to deny a partnership request from a Booked-user.
- As an Administrator, I would like to have the ability to give a Booked-user a partner role.
- As an Administrator, I would like to have the ability to remove a partner role from a Booked-user.

Real World Product vs. Prototype

Feature	RWP	Prototype
Landing Pages	✓	✓
User Account Creation or Login	✓	
User Profile (includes to-be-read list)	✓	
Partner Account Creation or Login	✓	
Partner Profile (includes analytics and inventory management)	✓	
Search Form with Specific Search Criteria	✓	✓
Search Results List (includes total cost, seller website link, seller bookstore address, etc.)	✓	✓

Real World Product vs. Prototype *cont.*

Feature	RWP	Prototype
Recommendations based on To-Be-Read List	✓	
Recommendations based on Popular Listings	✓	✓
Booked Database (e.g., book data, seller data, and user data)	✓	✓
Show distance of physical bookstore from user	✓	✓
Show comparison of book variants	✓	✓