

Project Objective

We will be creating a book shelf software that can manage all your books in one place, including being able to read them, annotate them, and sort them into different categories.

Cost Estimation

Hardware

Since the average size of a book is only around 2 MB, with 4 TB of storage we could hold roughly 2 million books in our repository. Building a small business server with no storage would cost around \$2000. Add in four 1TB SSDs for \$200 each, and the final price for our server will only be \$2800.



Costs Estimation

- Most of our costs will come from personnel:
 - Per levels.fyi, the median software engineer salary in Dallas, Texas is \$124,000 and the median software engineering manager salary in Dallas, Texas is \$210,095. I estimate that we could build and maintain our app with a team of 7 engineers and 1 manager which would lead to a cost of personnel of \$1,078,095
- Almost all of our technology is free and open source which allows our team to save a lot of money.
 - MariaDB Database Software
 - React Native Cross-Platform Framework
 - Spring Boot Java Backend Framework
 - Figma UI/UX Design
 - o Trello Team Management
- If our team was to want to move our application to the cloud MariaDB charges as you go:

STORAGE PER NODE	PRICE / MONTH	PRICE / HOUR
AWS io1 Storage / GB	\$0.125	\$0.0001712329
AWS io1 I/O / IOPS	\$0.065	\$0.0000890411
AWS GP2 / GB	\$0.100	\$0.0001369863
GCP SSD / GB	\$0.170	\$0.0002328767
AWS S3 / GB	\$0.023	\$0.0000315068
GCP Cloud Storage	\$0.026	\$0.0000356164



Effort Estimation

	Function	Count	Complexity			Count x
	Category		Simple	Avg	Cmplx	Complexity
1	# of User Input	1 (Notation) + 1 (Categories + 1 (Search Text) + 1 (Adding Bookmark) + 1 (View settings) = 5 inputs	3	4	6	4 * 5 = 20
2	# of User Output	1 (Displaying Text W/ Correct View Settings) + 1 (Displaying a Notation) = 2	4	5	7	2 * 5 = 10
3	# of User Queries	2 (Displaying Notations per book/per page) + 1 (Text Search Results) + 1 (Displaying books within a category) = 4	3	4	6	4 * 4 = 16
4	# of Data Files and Relational Tables	1 (Type of book file), 1 (Table to categorize all the books), 1 (Relational table to connect the first and second) = 3	7	10	15	Complexity of Relational table is simple the other two are average 3 * 9 = 27
5	# of External Interfaces	1 (Touchscreen)	5	7	10	1 * 7 = 7
			2		GFP	80

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PC1 = 1
PC2 = 1
PC3 = 0
PC4 = 1
PC5 = 4
PC6 = 1
PC7 = 0
PC8 = 0
PC9 = 2
PC10 = 1
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PC11 = 1

PC12 = 3

PC13 = 3 PC14 = 5

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Sum(PC) = 20
PCA = 0.65 + .01(20) = 0.85

Function Point = GFP x PCA
Function Point = 80 * 0.85

Function Point = 68
Estimated effort = FP / productivity = 68 / 60 = 1.13333
D = 1.13333 / 7 = .162 weeks
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Assuming that one programmer has a productivity equivalent to 60 function points per week, it would take roughly .162 weeks to finish this project with 7 employees.

Project Timeline

Initial Start Date: May 1, 2023

Initial End Date: May 8, 2023

Using the function point algorithm it was estimated that it will take less than 1 week to program our bookshelves functional capabilities, as seen in the next question. Thus, we will spend a couple extra days sorting out bugs, which is why I gave it a week for the initial release. The number of workers per day is estimated to be 8 hours a day per person only on weekdays, and we would have 7 employees. Furthermore, after the initial release we plan to operate and update the software for at least 25 years.

Functional Requirements

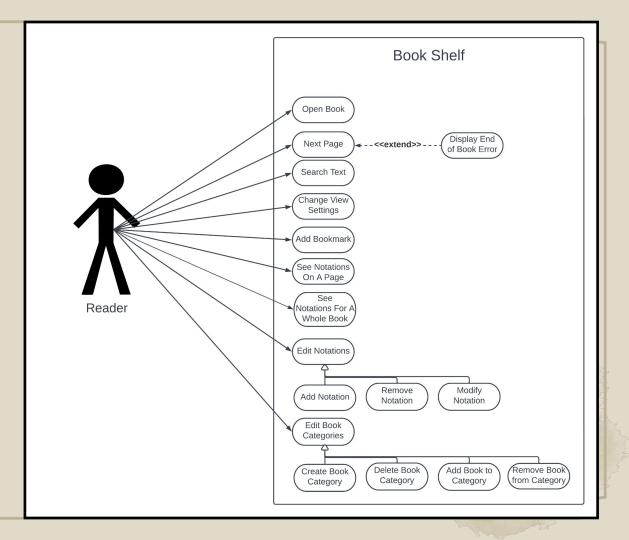
User should be able to:

- 1. Load and delete books
- 2. Create and maintain categories
- 3. Read books
- 4. Search book text
- 5. Add bookmarks
- 6. Change visual settings (dark mode, text display size, etc.)
- 7. Add and manage notations
 - a. See all notations per page or per book

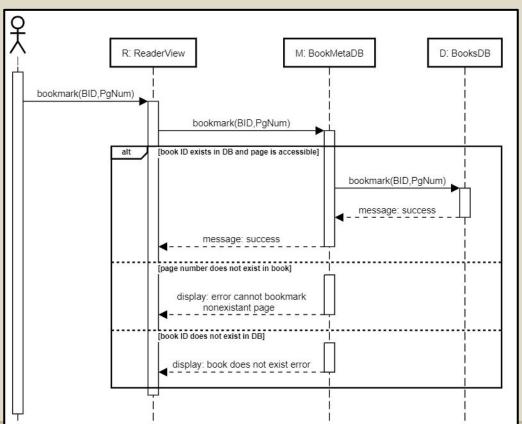
Non-functional Requirements

- Usability requirement: The software should support English, Spanish, and Chinese languages.
- Performance requirement: It should not take more than 5 seconds to load a book.
- Space requirement: The software should not be larger than 10 GB.
- Dependability requirement: There should be multiple clouder servers that have backed up information for users to offer redundancy if one of the servers fails.
- Security requirement: It should require the user to set up 2-factor authentication.
- Environmental requirement: The servers that we use to store user data should run purely on renewable electricity.
- Operational requirement: The basic local functionalities of the software should be able to continue to run when internet connection is lost.
- Development requirement: There should be an update to the software once a month to fix any reported bugs or issues.
- Regulatory requirement: The software should require age verification before allowing children to read explicit books.
 (Assuming there is a regulation for showing explicit material to children)
- Ethical requirement: User data should not be shared with any third-parties without the user's authorization.

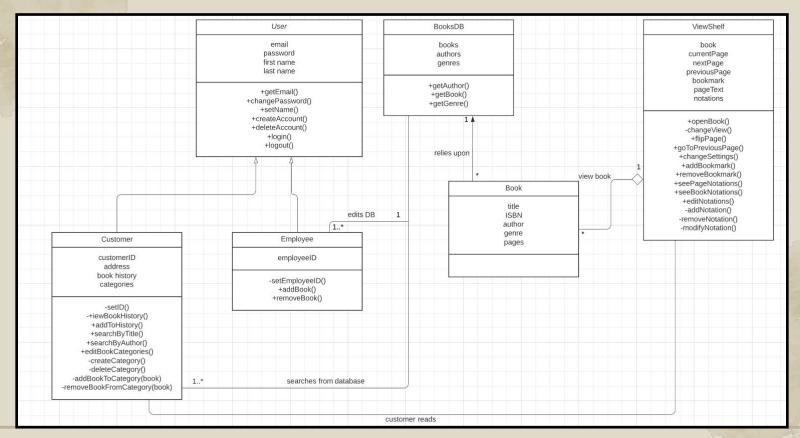
Use Case Diagram



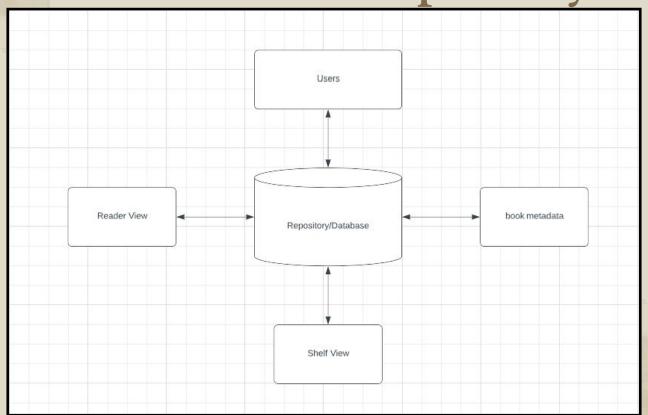
Sequence Diagram Example - Add Bookmark



Class Diagram

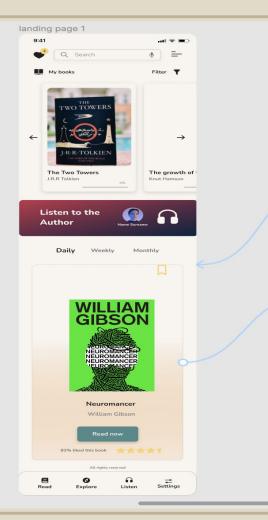


Architecture - Repository



UI Mockup -Shelf View

Created using Figma





UI Mockup - Book View

- The book scrolls as you read just as any normal app would. This is demonstrated in the 1st and 2nd images
- It also keeps track of your current chapter



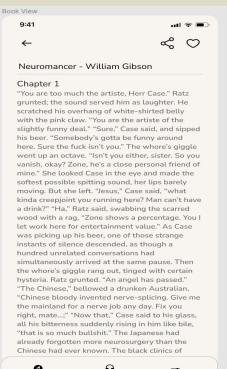
Chapter 1

The sky above the port was the color of television, tuned to a dead channel. "It's not like I'm using," Case heard someone say, as he shouldered his way through the crowd around the door of the Chat. "It's like my body's developed this massive drug deficiency." It was a Sprawl voice and a Sprawl joke. The Chatsubo was a bar for professional expatriates; you could drink there for a week and never hear two words in Japanese. Ratz was tending bar, h is prosthetic arm jerking monotonously as he filled a tray of glasses with draft Kirin. He saw Case and smiled, his teeth a webwork of East European steel and brown decay. Case found a place at the bar, between the unlikely tan on one of Lonny Zone's whores and the crisp naval uniform of a tall African whose cheekbones were ridged with precise rows of tribal scars. "Wage was in her early, with two joeboys," Ratz said, shoving a draft across the bar with his good hand. "Maybe some business with you, Case?" Case shrugged. The girl to his right giggled and nudged him. The bartender's smile widened. His ugliness was the stuff of legend. In an age of affordable beauty, there was something heraldic about his lack of it. The antique arm whined as he reached for another mug. It was a Russian military prosthesis, a seven-function force-feedback manipulator, cased in grubby pink plastic. "You are too much the artiste, Herr Case." Ratz grunted; the sound served him as laughter.





 Settings







Settings