

System/Software requirements specification

Book Book (Group 12)

The new chapter for secondhand books



Presented to

Assoc. Prof. Nakornthip Prompoon

Project Members

6532125821 Peneik Sitthimongkhon

6531337321 Yuatyong Chaichana

6531335021 Puvamin Tanakittanon

6531322921 Pranesh Ingkanunt

6530363421 Wasutha Sukkrasanti

6530313021 Peemdej Chancharoen

6530186721 Tapaneeya Odmung

6530128321 Nutthapong Dissanont

6530105921 Naphon Tangtrongpairoj

2110335 Software Engineering I

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Department of Computer Engineering Faculty of Engineering,
Chulalongkorn University

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1. Project Name: Book Book

The new chapter for secondhand books

2. Introduction

The two most popular channels for trading secondhand books in Thailand are Facebook Group Platform and Shopee e-Commerce. Currently, both present significant challenges. Facebook Group Platform offers flexibility allowing sellers and buyers to interact freely without intermediaries, but they lack security and structure. Shopee e-Commerce provides an intermediary system for safer transactions but is not specifically designed for secondhand book trading which limits its flexibility and user experience. Our goal is to create a dedicated platform that combines the strengths of both systems. By incorporating the security of an intermediary system with features specifically designed for secondhand books we aim to reduce trading risks, improve customer satisfaction and establish sustainable revenue streams for long-term success.

3. Project objective

The objective is to develop web-based applications for matching people who want to buy and sell the same book. This application provides a system where users can either choose books that they have and create a post to sell them, or they can search and find secondhand books by name or other specification, For instance, author signature, book version, or special book cover. To look for the price and book condition and negotiate with the seller for reasonable price and inquire more information about the book. This application could also prevent buyers from buying overpriced secondhand books and helping sellers sell their books at a reasonable price.

4. Objective of the analysis phase document

1. To enumerate both the functional and non-functional requirements of the system.
2. to provide an overview of the to-be system, including details of requirements, use case diagram, use case description, activity diagram, class diagram, sequence diagram and state machine diagram.
3. To clarify the relation between functional model, structural model, behavioral model and give a clearer vision about relationship and collaborations between actor and the system.
4. To verify and validate all the models within the document to ensure their accuracy and consistency.
5. To serve as a formal agreement among the software developer, customer, and designer for further process of work.

5. Reference Documents

1. Project Milestone 2: Book Book's Project Proposal
To serve as a guide for this document as some of its information can be applied.

6. Terms and Definitions

Term	Definition
Secondhand Books	Previously owned books sold again, typically at a reduced price.
E-Commerce	Online buying and selling of goods, like on Shopee.
Facebook Group Platform	A social media space where users can post and negotiate sales, such as secondhand books.
Book Dealers	Businesses or individuals that buy books at low prices and resell them for profit.
Transaction Fee	A percentage charged by a platform for facilitating a sale, e.g., 5% for Book Book.
Mobile Banking	Banking services accessed through a mobile device for transactions.
Personal Data Protection Act (2019)	Thai law protecting the privacy and use of personal data.
Electronic Transactions Act (2001)	Thai law that ensures the security and validity of online transactions.
ISBN Database	A system that identifies books by ISBN for accurate verification of details.
Buyers	Individuals or entities who purchase goods or services, such as secondhand books, from sellers.
Sellers	Individuals or entities offering goods or services for sale, such as secondhand books, to buyers.

Table 1 Term of definitions

7. List of stakeholders and their responsibilities

1. Buyer: a user who are looking to buy a book

Register their account, manage their profile, search book with book name, filter book with special description, filter book with book condition, view book information , initiate transaction from selling post, make payment, confirm completed transaction, review book and seller after completed transaction, chat with Seller, view chat history, report transaction, get transaction report.

2. Seller: a user who are looking to sell a book

Register their account, add information for verification, manage their profile, search book, filter book with special description, filter book with book condition, view book information, create/delete selling post, add shipment information, chat with Buyer, view chat history, get payment, get transaction report.

3. Administrator: a user who are looking to manage platform

Register their account, search for a book with book name, filter book with special description, filter book with book condition, view book information, manage seller and buyer accounts, approve or reject book listings posted by sellers. Manage book data in the database, view all transactions between buyers and sellers, resolve report including tracking report status, set or update guidelines for recommended prices for books, generate reports on sales, transactions, user activity, and other relevant metrics, view user posts.

8. Overview of the to-be system context

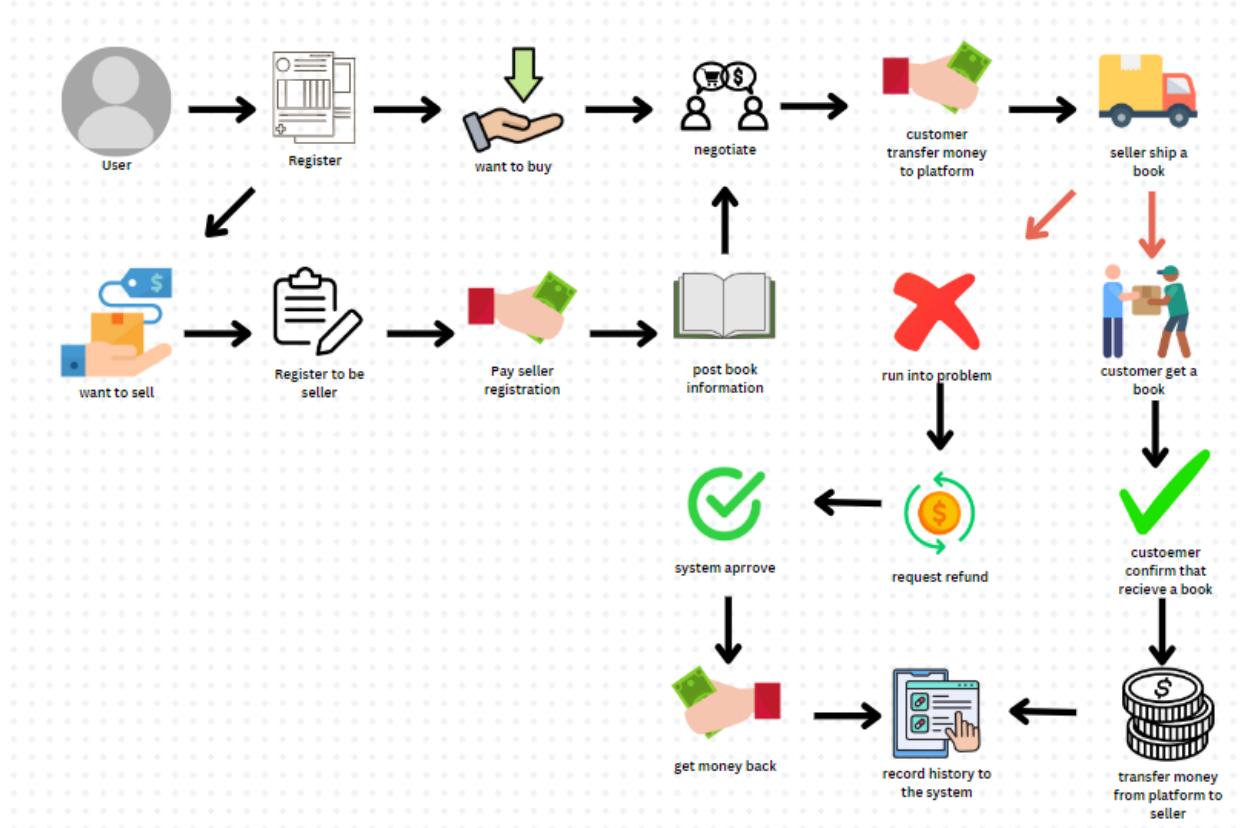


Figure 1 An overview of to-be system

1. When opening the platform, the users will have to log in to the system with their username and password, otherwise they have to sign up with some basic information.
 - 1.1 In case that user wants to sign up as seller, they need to go through extra step by registering their mobile number through OTP and sending ID card pictures to the system then the admin will approve their seller account to join.
2. There are multiple actions for the users to do in the system.
 - 2.1 users can buy secondhand books through searching or browsing in recommendation feeds. Users can select tags to sort the type of the book, such as genre, number of pages, book condition, or special feature.
 - 2.1.1 In case that there is no current selling book that the user is interested they can make a request post with the book detail that use the same description system as in selling post(2.2)

-
- 2.2 User that register as seller can sell their book. by create a post to sell the book. The post shall contain the book name, author name, and book condition. Users can add a special tag to identify the type of book to make their book easy to find. If that book is already in the system database. The system will add further info about the book and show the firsthand book price to be a tools for secondhand price estimation with current book condition. Otherwise, the system will request more information, and system administrators will check the validity of the book and add it to the database.
3. If the desire to sell and buy is matching. Users can chat with each other through the chat box. Users can ask for further information, negotiate the price, or talk about shipping methods. The system can recommend shipping methods with different prices but can top up with extra packaging prices from seller. The price for the book including the shipment is up to both party dealing.
4. After negotiation customers will have to transfer money to the system and the book owner will deliver the book. If delivery is through the standardize method that can be access by the platform, The application will provide customer with tracking service. If not, seller need to provide the buyer with the shipment tracking themselves.
5. After book owners ship the book there will be 3 possible cases
- 5.1. The customer receives the book. Ensure that the book's condition on the website is correct. Customers will have to confirm in the system, then the payment will be forward to seller accounts and record that transaction as completed.
- 5.2. The customer receives the book, but the books have a problem as state in policy, for instance, the book's condition is not in the same state as declared by seller. Customers will have to report the problem within the time limit after receiving the book to the system. Afterward the platform will approve return request sending the book back to the owner within five calendar days. And the payment would be refund back to the customer accounts. If the inspection said that it is seller false. Seller will receive penalty.
- 5.3. If the customer did not receive the book. system will transfer money back to the customer. And the investigation will be launch to determine the cause of the undelivery book and may result in refund and punishment to the seller if not provide with reasonable cause.

9. Functional Requirements

Seller Features

- The system shall allow sellers to post their books for sale.
- The system shall allow sellers to add extra description&book condition in their post.
- The system shall filled in the book description in the post from book database when sufficient initial data is provided to accurately identify the book.
- The system shall allow sellers to view data on books in the database.
- The system shall allow sellers to request for new book to be add into book database.
- The system shall allow sellers to match with buyer when the buyer's search criteria align with the seller's post description.
- The system shall allow sellers to respond to buyers question through a chat feature.
- The system shall allow seller to initiate transaction when the transaction detail including the book description, the book condition, the shipment detail, payment amount and payment method are confirm
- The system shall assist the seller in package shipment by recommend shipping method.
- The system shall allow seller to add shipment tracking number to the system after the shipment is made.
- The system shall facilitate the transfer of payment to the seller's account upon completion of the transaction.
- The system shall notify sellers of the transaction status when the transaction is finished in both complete transaction and fail transaction case.
- The system shall show recommended prices for books to sell.
- The system shall allow sellers to view past transactions.
- The system shall allow sellers to view and edit their post.
- The system shall allow sellers to make a report to administrators in cases of policy violations in posts or inappropriate behavior in chats.
- The system shall allow sellers to respond to administrator inquiries during the investigation of a report.

Buyer Features

- The system shall allow buyers to perform searches for seller's post with book data, book description and book condition.
- The system shall assist buyer when performing the search by fill in the book description in the search criteria from book database when sufficient initial data is provided to accurately identify the book.
- The system shall allow buyers to match with seller's post when the buyer's search criteria align with the seller's post description.
- The system shall allow buyers to communicate with sellers through chat feature to negotiate terms, ask questions, or discuss details about the books after the match is made.
- The system shall handle payment transactions for books bought by buyers, including processing payments through credit card and digital wallets.
- The system shall hold buyers payment until completion of transaction.
- The system shall allow buyers to view their transactions, including details such as purchase dates, amounts spent, and transaction statuses.
- The system shall allow buyers to track the status of their orders, including shipment tracking and delivery updates given by the sellers.
- The system shall allow buyers to confirm completion of transactions after the shipment is arrived.
- The system shall allow buyers to deny the completion of a transaction by providing a reason and supporting evidence for their denial.
- The system shall make an automated report to administrator in case of fail transaction.
- The system shall allow buyers to make a report to administrators in cases of policy violations in posts or inappropriate behavior in chats.
- The system shall allow buyers to respond to administrator inquiries during the investigation of a report.
- The system shall allow buyers to save or bookmark books they are interested in for easy access later. The system shall provide recommendations for books based on the buyer's search history, preferences, and past transactions.
- The system shall allow buyers to leave reviews and ratings for completed transaction.

Administration Features

- The system shall allow administrators to view, add, edit, and remove seller and buyer accounts.
- The system shall allow administrators to verify and approve new seller and buyer accounts.
- The system shall allow administrators to review and approve or reject book listings posted by sellers.
- The system shall allow administrators to view, edit, delete, or update book data in the database.
- The system shall allow administrators to verify data of books added by sellers.
- The system shall allow administrators to view all transactions between buyers and sellers.
- The system shall notify administrators when a new report is submitted.
- The system shall allow administrators to set or update guidelines for recommended prices for books.
- The system shall allow administrators to generate reports on sales, transactions, user activity, and other relevant metrics.
- The system shall allow administrators to view user posts.
- The system shall allow administrators to configure system settings, including payment gateways, user status, and user permissions.

10. Non-Functional Requirements

Operational requirements

- The system shall operate on desktop and mobile.
- The system shall operate on Windows, MacOS, Android and iOS.
- The system shall be connected to ISBN database
- The system shall be able to record users' previous transactions.

Performance requirements

- The system shall be able to retrieve the data of any book in 2 seconds or less.
- The system shall be able to add new data to any book in 2 seconds or less.
- The system shall be able to retrieve the data of any post in 2 seconds or less.
- The system shall be able to add new data to any post in 2 second or less.
- The system shall receive and confirm payment after the payment is made by the buyer in 1 second or less.
- The system shall be able to notify any user about critical transaction in the system after transaction is made in less than 1 seconds or less.

Security requirements

- The system shall authenticate users using username-password.
- The system shall be able to secure every user's transaction in private.
- The system shall allow only administrator to modify data of books and posts.
- The system shall prevent users from accessing the admin's data and authorization.

Cultural and political requirements

- The system shall operate in Thai.
- The system shall use Thai Baht currency.
- The system shall follow Thailand's Computer-related Crime Act 2017 and Personal Data Protection Act 2019.

11. The proposed method of systems analysis phase

11.1. System Analysis Approach

We selected Business Process Improvement (BPI) as our analysis approach because our primary goal is to enhance the functionality and efficiency of the existing secondhand books trading platform.

This platform already has a basic structure in place, but to remain competitive and meet the evolving needs of users, it is essential to optimize its processes. Through BPI, we can systematically identify inefficiencies, bottlenecks, and areas for improvement within the platform. By refining workflows, enhancing user experience, and integrating feedback loops, we aim to create a more streamlined, user-friendly, and scalable solution for buyers and sellers alike.

11.2. Requirements Analysis Techniques

Problem Analysis

We used problem analysis as an analysis technique to gather an overview of the problem statement. We have gathered data via questionnaires and interviews with secondhand book buyers and sellers. The primary objective of this technique usage is to be aware of the starting point on how our work will be conducted and where our focuses will be.

Root Cause Analysis

We used root cause analysis as an analysis technique to elaborate on project problem statements. We have gathered data via further interview sessions with interviewees from the problem analysis interview. The primary objective of this technique usage is to realize the true cause of the problem which leads to a better and deeper understanding of user requirements.

Informal Benchmarking

We used informal benchmarking as a supplement analysis technique in parallel to the two aforementioned techniques. We conducted our analysis from comparison with three main current secondhand book trading platforms: Facebook Group Platform, Shopee E-Commerce and bookstores. The primary objective of this technique usage is to gather business requirements to ensure platform ability to compete and proper market segment identification.

11.3. Requirements Gathering Techniques

Researches on existing platforms

This requirement gathering technique is the first part of our requirement gathering funnel, acting as a compass. For this part, we aimed at getting a better understanding of as-is to system in order to continue the other requirement gathering techniques in the right direction.

We begin our requirement gathering process by first performing researches on existing secondhand book trading platforms, namely, Facebook Group Platform, Shopee e-Commerce and book dealers. Our key findings are

- All online platforms, namely Facebook Group Platform and Shopee e-Commerce, have item posting, item searching, and a chat system as common features.
- Facebook Group Platform offer flexibility and convenience, allowing both buyers and sellers to post freely to search for or sell books with few restrictions, which is assumed to be its strength.
- Shopee e-Commerce, on the other hand, emphasizes robustness and safety. Buyers have confidence in avoiding scams or low-quality books, as Shopee acts as a middleman, which is assumed to be its strength as well.
- However, both platforms receive some negative reviews related to secondhand book trading, which are assumed to be their drawbacks. On Facebook Group Platform, the main concern is the risk of scams. On Shopee, there are no specific features designed for secondhand book trading.
- For book dealers, the process involves buying secondhand books from sellers and reselling them at higher prices, with revenue generated from the price spread. Most book dealers use Facebook Group Platform and Shopee e-Commerce to resell books. Therefore, Facebook Group Platform and Shopee e-Commerce are our main focus. Further details for each platform are elaborated below.

1. Facebook Group Platform

For sellers, they post images and details of books, including title, author, condition, and any special features like author signatures, for buyers to browse. Once price and conditions are agreed upon, sellers arrange shipping or meet buyers in person to complete the transfer. For buyers, they search for books matching their preferences, contact sellers to negotiate or reserve, and finalize purchases via online payment or in-person exchange. If buyers encounter fraud or scams, they must report them directly to the police.

The important features are group membership system, posting and comment system (including item posting), item searching, and the chat system.

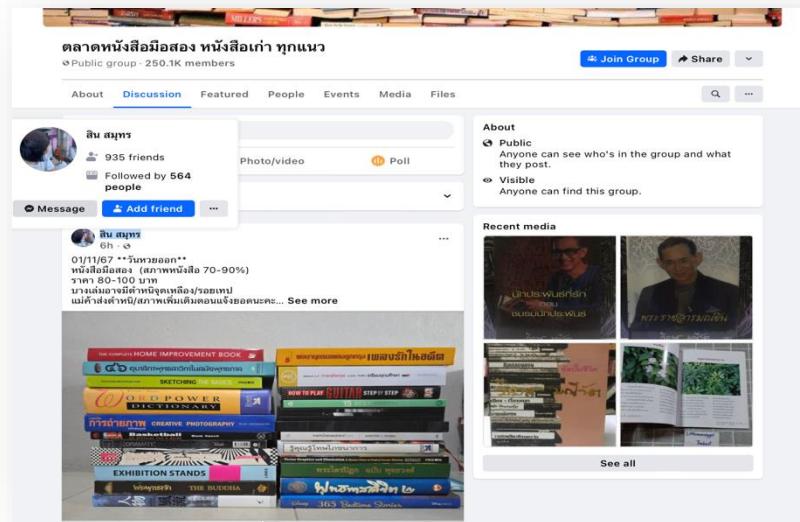


Figure 2 Facebook Group Platform secondhand book trading features

2. Shopee e-Commerce

For sellers, they post book images and details, including title, author, condition, and any added value such as an author's signature, on their Shopee storefront for buyers to browse, search, or add to a shopping cart. After buyers make payment to Shopee, sellers ship the item within a specified time. Once buyers confirm the item's condition matches the description, funds are released to the seller. If sellers encounter fraudulent claims of damaged items, they can contact Shopee support. For buyers, they search for books matching their preferences, add them to the cart, and complete payment via Shopee. In cases of false advertisement, buyers can report issues directly to Shopee support.

The important features are storefront system, item posting, item searching, and the support system.

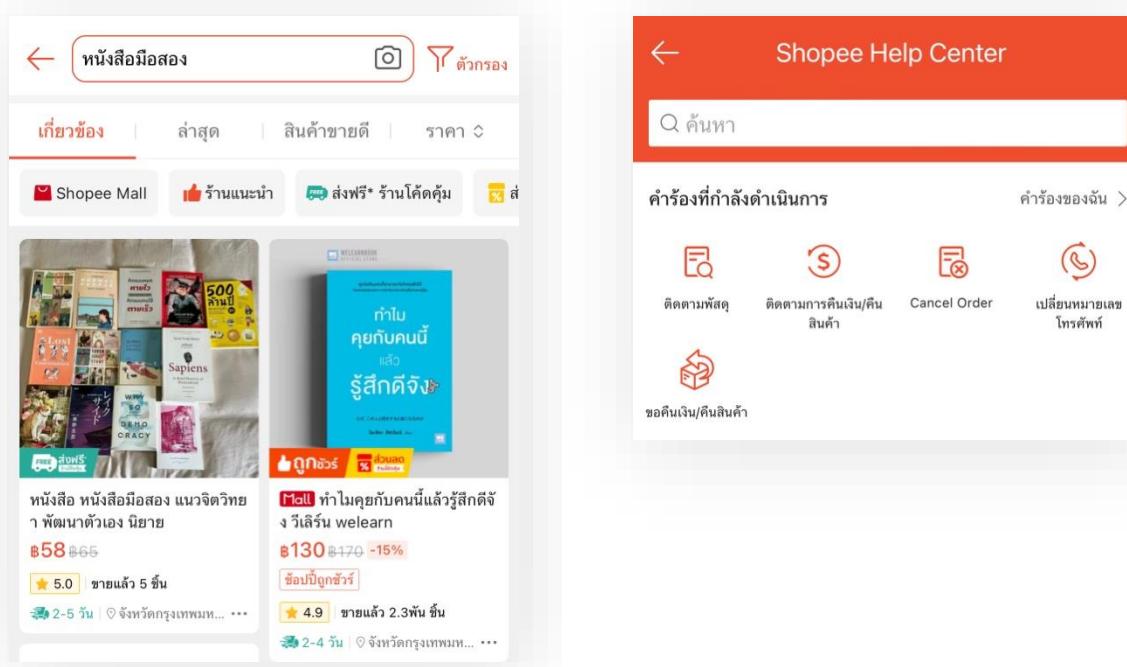


Figure 3 Item posting and searching feature in Shopee e-Commerce and Book dealer Facebook page

3. Book dealers

For sellers, they offer their secondhand books directly to book dealers, who assess prices based on market value, condition, and any unique features, like author signatures. For buyers, they purchase these secondhand books from book dealers through bookstores, Facebook Group posts, or Shopee storefronts managed by the dealers. Dealers profit by buying at lower prices and selling at higher ones, generating revenue from the price spread.

Most book dealers use Facebook Group Platform and Shopee e-Commerce to resell books.



Figure 4 Book dealer Facebook page

Questionnaires

This requirement gathering technique is the second part of our requirement gathering funnel. We aimed at gathering a broad range of existing user problems on what are their obstacles or dissatisfy them. We are also interested in non-user insights on how can we turn them to a secondhand book traders. To fulfill the purpose, we selected Questionnaires as our requirement gathering technique.

We created a Google Form questionnaire to gather insights. For book traders, we ask their general opinions, satisfaction level on existing platform and current obstacles for trading secondhand books. For non-secondhand book traders, we ask their general opinions, why they are not interested in trading secondhand books and possibility of changing this behavior. (Complete form questions and responses are available in Appendix A.)

เหตุใดท่านจึงไม่ซื้อหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ) *

- ไม่ชอบอ่านหนังสือเป็นปกติอย่างแล้ว
- ไม่ชอบการซื้อหนังสือที่รีไซค์ค่าน้ำมือสอง ชอบซื้อแบบมือหนึ่งมากกว่า
- การซื้อหนังสือมือสอง远 from ทางออนไลน์มีความเสี่ยงมาก
- การซื้อหนังสือมือสองอาจได้รับหนังสือสภาพแย่ๆ
- การซื้อหนังสือมือสอง远 from ชั้นห้อง ไม่สะดวก
- Other...

Figure 5 An example of form question for secondhand book buyers

Our key findings are the followings which are illustrated in the figures below.

- Secondhand book buyers prioritized book condition as the most important decision factor.

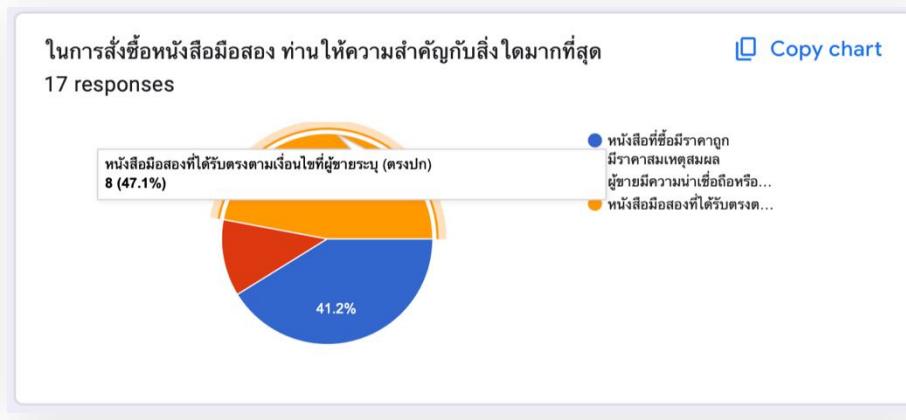


Figure 6 A form response regarding secondhand book buyer decision factors

- Secondhand book buyers face the problem of inability to post or search for sellers the most.

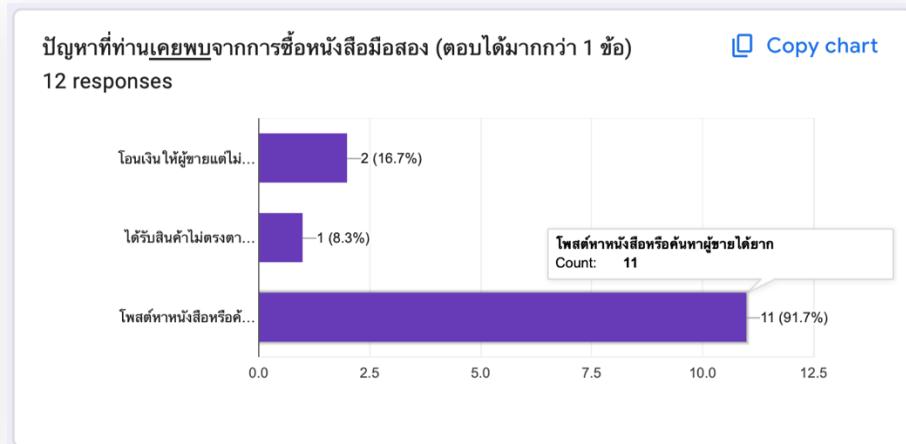


Figure 7 A form response regarding secondhand book buyer problems

- Secondhand book sellers face the problem of difficulty over book transportation the most.

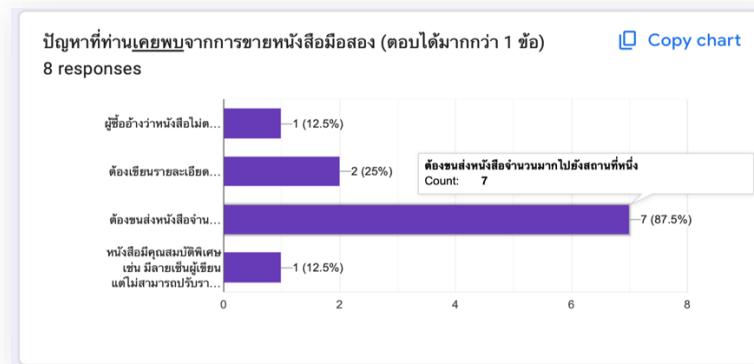


Figure 8 A form response regarding secondhand book seller problems

- Non-secondhand book traders do not trade secondhand books due to inconvenience and risks of being scammed.

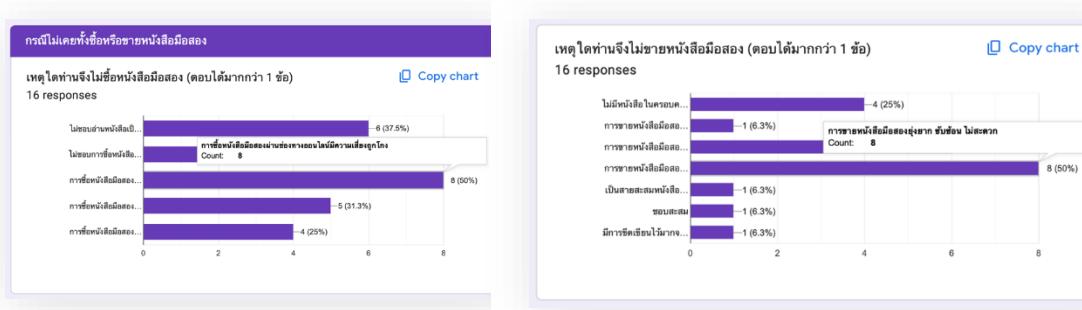


Figure 9 A form response regarding why ones do not trade secondhand books

Interviews

This requirement gathering technique is the last part of our requirement gathering funnel. We aimed at getting a deeper understanding of user problems to properly identify the system requirements. Therefore, we selected Interviews as our requirement gathering technique.

We conducted an interview with secondhand book buyers and sellers. We divided the interview session into two phases: introductory interview and further interview.

For introductory interview session, we asked general questions and their thoughts on existing platform. This session is aimed at gathering as much as insights as possible to verify previous assumptions and Google Forms result.

For further interview session, we picked noteworthy insights from the previous phase and Google Forms response for further elaboration on particular topic. This session, unlike the previous one, is targeted at sharpening our understanding on certain topic to find root causes.

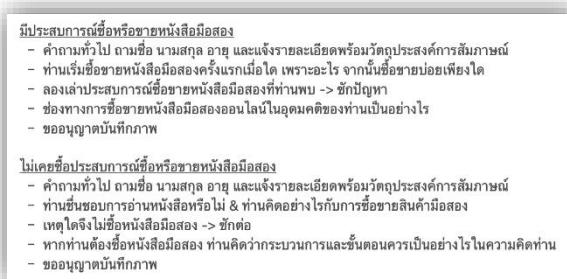


Figure 10 One of interview sessions by our team member via ZOOM meeting

Our key findings are the followings.

- Our previous assumptions are correct.
- Interviewee responses correspond to Google Forms responses.
- Secondhand book trading can only be initiated from the seller side by posting an item on sale, while, buyers can only search for their posts.
- Though buyers can actively post on Facebook Group Platform to search for certain books, it is not effective in practical.
- Non-secondhand book traders have a bad perception and wrong understanding of secondhand books trading mechanism.
- For non-secondhand book buyers who read books, they are willing to start buying secondhand books if specific book trading platform exists and is reliable and trustworthy.

11.4. Analysis Modeling

11.4.1. Functional Modeling

Our report includes two functional models that depict the system's behavior from an external perspective.

11.4.1.1 Use Case Diagram

The team analyzed the requirements to identify actors, goals, and the main use cases. Based on this analysis, we developed a use case diagram that outlines the expected system behavior without specifying the implementation details.

11.4.1.2 Use Case Description

We created use case descriptions from the use case diagrams to define system functionalities, gather requirements, clarify behaviors, guide design and development, generate test cases, document the system, and facilitate stakeholder communication.

11.4.2. Business Process Modeling

11.4.2.1 Activity Diagram

We utilized swim lane activity diagrams, which we developed from the selected use case descriptions. These diagrams clarify the responsibilities of different actors in each event, show the entire workflow, and visualize how each use case proceeds.

11.4.3. Structural Modeling

Structural modeling involves creating visual representations that illustrate the structure or components of a system, which helps stakeholders understand relationships and dependencies between elements. We used two structural modeling techniques.

11.4.3.1 Class Diagram

We employed class diagrams to display the structure of classes within the software system, including class names, attributes, and methods, as well as the relationships between these classes through associations and inheritance.

11.4.4. Behavioral Modeling

11.4.4.1 Sequence Diagram

Sequence diagrams represent the interactions between system components over time. We used information from the activity diagrams and references from the class and use case diagrams to identify the actors and objects involved, then illustrated the sequence of interactions using arrows to show the step-by-step process.

11.4.4.2 Behavioral State Machine

Behavioral state machines illustrate how objects change states based on actions or conditions. We selected a highly interactive object and mapped out its state transitions, using conditions and actions to track its behavior until the end of the process.

11.5. Verifying and Validating the Analysis Model

This process ensures that each diagram or model is accurate and consistent with one another.

11.5.1. Verifying and Validating Functional Models and Business Process Modeling

This step checks that the system fulfills its intended purpose and meets the needs of users and stakeholders.

Use Case Diagram and Use Case Description

Ensure that all actors in the use case description are represented in the diagram with appropriate association links. Check if stakeholders and other relationships, such as "include," "extend," and "generalization," are accurately reflected in the diagram.

Activity Diagram and Use Case Description

Ensure each event in the use case description corresponds to an action or activity in the diagram. Confirm that all objects mentioned in the activity diagram appear in the use case description and that the sequence of events matches between the two.

11.5.2. Verifying and Validating the Structural Model

The goal is to ensure the structural model accurately reflects the intended system architecture, aligns with requirements, and communicates effectively to stakeholders.

Class Diagram and Use Case Diagram

Ensure each class in the class diagram corresponds to an entity in the use case diagram, supporting the interactions and roles defined for each actor. Verify that "include," "extend," or "generalization" links in the use case diagram correspond accurately to relationships among classes in the class diagram.

11.5.3. Verifying and Validating the Behavioral Model

Sequence Diagram and Class Diagram

Ensure that each object in the sequence diagram corresponds to a class in the class diagram, with methods and interactions aligning between the two. Verify that messages in the sequence diagram map to operations in the class diagram, and the sequence of interactions reflects class responsibilities accurately. Confirm consistency in object lifetimes and associations, ensuring updates in one diagram are reflected in the other.

State Machine Diagram and Use Case Description

Ensure each action in the activity diagram corresponds to an event in the use case description, maintaining consistency in the sequence of steps. Verify that all objects in the activity diagram appear in the use case description and accurately reflect the workflow. Confirm that updates in one are synchronized with the other for clarity and coherence

12. Detail of requirements (from tester view)

Requirement ID	Requirement Name	Name	Type/length	Valid value	Invalid Value	Output for valid value	Output for invalid value
UP01	User Login (The system shall authenticate users using username-password.)	Username	String/16	Has less than 16 characters and does not contain special characters.	Has more than 16 characters or contains special characters.	If all inputs (username, password) are valid, redirect to dashboard and send message “Login Success”	Send message “Wrong username or password”
		Password	String/8-20	Has at least 8 and not more than 20 characters which contain at least 1 uppercase and 1 digit.	Has less than 8 or more than 20 characters or does not contain at least 1 uppercase or 1 digit.	If all inputs are valid but username and password do not match any record in the database, send the message “Wrong username or password.”	

						If all inputs are valid but unable to connect to the database, send the message “Service unavailable at current time. Please, try again later.”.	
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UP02	Create User Profile (The system shall allow users to create a user profile.)	Username	String/16	Has less than 16 characters and does not contain special characters.	Has more than 16 characters or contains special characters.	If all inputs (username, password, email) are valid, redirect to login and send message “User Register Success.”.	Error message for invalid username, password, and email.
		Password	String/8-20	Has at least 8 characters which contain at least 1 uppercase and 1 digit.	Has less than 8 characters or does not contain at least 1 uppercase or 1 digit.	If all inputs are valid but email already exists in the database, send the message “This email is already taken.”.	

	Email	String/ 64	Consists of a username (containing letters, numbers, periods, hyphens, and underscores, starting with a letter or number and not ending with period), followed by the "@" symbol, and domain name (starting with letter) with a top-level domain (TLD) of 2 to 6 characters in length (e.g., .com, .org, .net)	Not match with the email pattern.	If all inputs are valid but the username already exists in the database, send the message "This username is already taken.".	
					If all inputs are valid but unable to connect to the database, send the message "Service unavailable at current time. Please, try again later.".	

UP03	Create Seller Profile (The system shall allow users to create a seller profile.)	Username	String/ 16	Has less than 16 characters and does not contain special characters.	Has more than 16 characters or contains special characters.	If all inputs (username, password, email, otp, id card number, id card picture) are valid, redirect to login and send message "Seller Register Success.".	Error message for invalid username, password, email, otp, id card number and id card picture.
		Password	String/ 8-20	Has at least 8 and not more than 20 characters which contain at least 1 uppercase and 1 digit.	Has less than 8 or more than 20 characters or does not contain at least 1 uppercase or 1 digit.	If all inputs are valid but email already exists in the database, send the message "This email is already taken.".	

	Email	String/ 64	Consists of a username (containing letters, numbers, periods, hyphens, and underscores, starting with a letter or number and not ending with period), followed by the "@" symbol, and domain name (starting with letter) with a top-level domain (TLD) of 2 to 6 characters in length (e.g., .com, .org, .net)	Not match with the email pattern.	If all inputs are valid but the username already exists in the database, send the message "This username is already taken.".	
One time password (OTP)		String/ 6	6-digit OTP	Invalid OTP	If all inputs are valid but the id card number and the number	

System/Software requirements specification: Book Book

The new chapter for second hand books

	ID card number	String/ 13	13-digit number	Less than 13 digits	on the id card picture does not match, send the message “The id card image and id card number do not match”.	
	ID card picture	Image/ jpg	Jpg image file with resolution not less than 460p and the file size is not exceed 2MB.	File is not Jpg image or resolution less than 460p or file size exceed 2MB	If all inputs are valid but unable to connect to the database, send the message “Service unavailable at current time. Please, try again later.”.	

UP04	Admin Verify User (The system shall allow administrators to verify and approve new seller and buyer accounts.)	User ID	Intege r	N/A	N/A	Change the verified status of the user id in the database then send the message “Verify Success.”.	N/A
		Verify	Boolea n	N/A	N/A	If the user id is not found in the database, send the message “User not found.”.	

UP05	Update User Profile (The system shall allow users to update their profile information.)	Username	String/ 16	Has less than 16 characters and does not contain special characters.	Has more than 16 characters or contains special characters.	If all inputs are valid (username, password, house no., village no., alley, lane, road, sub-district, district, province, and postal code), change data in database correspond to input then send message “Update Profile Success”	Error message for invalid username, password, house no., village no., alley, lane, road, sub-district, district, province, and postal code.
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System/Software requirements specification: Book Book

The new chapter for second hand books

	Password	String/ 8-20	Has at least 8 characters which contain at least 1 uppercase and 1 digit.	Less than 8 characters or does not contain at least 1 uppercase and 1 digit.		
	House No.	String/ 10	Has less than 10 characters	Has more than 10 characters		
	Village No.	String/ 10	Has less than 10 characters	Has more than 10 characters		
	Alley	String/ 20	Has less than 20 characters	Has more than 20 characters		

	Lane	String/ 20	Has less than 20 characters	Has more than 20 characters		
	Road	String/ 20	Has less than 20 characters	Has more than 20 characters	If all inputs are valid but the password does not match in the database, send the message “Wrong Password.”.	
	Sub-district	String/ 20	Has less than 20 characters	Has more than 20 characters		
	District	String/ 20	Has less than 20 characters	Has more than 20 characters		
	Province	String/ 20	Has less than 20 characters	Has more than 20 characters		

		Postal Code	Integer/ 6	Has 6 digits.	Has more or less than 6 digits.		
UP06	Update Password (The system shall let users change user's password.)	Old Password	String/ 8-20	Has at least 8 characters which contain at least 1 uppercase and 1 digit.	Has less than 8 characters or does not contain at least 1 uppercase or 1 digit.	If all inputs are valid (old password, new password), change the user's password in the database then send the message “Update Password Success.”.	Error message for invalid old password and new password.

System/Software requirements specification: Book Book

The new chapter for second hand books

	New Password	String/ 8-20	Has at least 8 characters which contain at least 1 uppercase and 1 digit.	Has less than 8 characters or does not contain at least 1 uppercase or 1 digit.	If all inputs are valid but the old password is the same as the new password, send the message “Cannot use the same password”.	
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UP07	Admin Update Profile (The system shall allow administrators to view, add, edit, and remove seller and buyer accounts.)	User ID	Integer	N/A	N/A	If all inputs are valid (username, password, house no., village no., alley, lane, road, sub-district, district, province, and postal code), change data in database correspond to input then send message “Update Profile Success”	Error message for invalid username, password, house no., village no., alley, lane, road, sub-district, district, province, and postal code.
		Username	String/ 16	Has less than 16 characters and does not contain special characters.	Has more than 16 characters or contains special characters.		
		Password	String/ 8-20	Has at least 8 characters which contain at least 1 uppercase and 1 digit.	Less than 8 characters or does not contain at least 1 uppercase and 1 digit.		

	House No.	String/ 10	Has less than 10 characters	Has more than 10 characters		
	Village No.	String/ 10	Has less than 10 characters	Has more than 10 characters		
	Alley	String/ 20	Has less than 20 characters	Has more than 20 characters		
	Lane	String/ 20	Has less than 20 characters	Has more than 20 characters	If the user id is not found in the database, send the message “User not found.”.	
	Road	String/ 20	Has less than 20 characters	Has more than 20 characters		

System/Software requirements specification: Book Book

The new chapter for second hand books

	Sub-district	String/ 20	Has less than 20 characters	Has more than 20 characters		
	District	String/ 20	Has less than 20 characters	Has more than 20 characters		
	Province	String/ 20	Has less than 20 characters	Has more than 20 characters		
	Postal Code	Integer/ 6	Has 6 digits.	Has more or less than 6 digits.		

UP08	Admin Delete User (The system shall allow administrators to view, add, edit, and remove seller and buyer accounts.)	User ID	Integer	N/A	N/A	Remove user data with user id specified from the database then send the message “Remove Success.”.	N/A
						If the user id is not found in the database, send the message “User not found.”.	

System/Software requirements specification: Book Book

The new chapter for second hand books

BS01	Book Search (The system shall allow buyers to perform searches for books based on special criteria, such as author's signature, limited editions, or other unique features which could affect the book pricing and assist a book collector in searching for a special feature in a book.)	Search Query	String	N/A	N/A	Perform search by query provided by input and return the books which have the same criteria.	N/A
						If there is no book within the criteria provided by input, send the message "No book is found".	

BS02	Apply Search Filters (The system shall allow buyers to perform searches for books based on special criteria, such as author's signature , limited editions, or other unique features which could affect the book pricing and assist a book collector in searching for a special feature in a book.)	IsDecsendi ng	Boolean	N/A	N/A	If IsDescending value is true, sort the item in descending order otherwise sort in ascending order.	
		Start Date	Date	N/A	N/A	If the start date and end date is not specified, must return all books within the BookSearch query.	N/A
						If the start date is specified but the end date is not, must return all books which contain the date from the start date to the latest date.	

System/Software requirements specification: Book Book

The new chapter for second hand books

					If the end date is specified but the start date is not, must return the oldest date to the end date.	
	End Date	Date	N/A	N/A	If the start date and the end date is specified, must return all the books in range of start date to end date.	
					If no book is found, send the message “No book is found.”.	

BP01	Create Book Request Post (The system shall allow buyers to post requests for specific books they are looking for, including details such as title, author, and any special requirements.)	Title	String/ 0-N	Has more than 0 characters.	Has 0 characters.	If all inputs (book name, author, publish date) are valid, add all inputs to the database then send the message “Create Book Request Success.”.	Error message for invalid book name, author and publish date.
		Author	String/ 0-N	Has more than 0 characters	Has 0 characters.		
		Publish Date	Date	N/A	N/A		
BP02	Create Book Post (The system shall allow sellers to post their books on sale.)	Title	String/ 0-	Has more than 0 characters.	Has 0 characters.	If all inputs (book name, author, publish date) are valid, add all inputs to the database then send the message “Create Book Post Success.”.	Error message for invalid book name, author and publish date.
		Author	String/ 0-	Has more than 0 characters	Has 0 characters.		
		Publish Date	Date	N/A	N/A		

BP03	Edit Book Post (The system shall allow sellers to edit their post.)	Title	String/ 1-N	Has more than 1 character.	Has 0 characters.	If all inputs (book name, author, publish date) are valid, add all inputs to the database then send the message "Edit Book Post Success.".	Error message for invalid book name, author and publish date.
		Author	String/ 1-N	Has more than 1 character.	Has 0 characters.		
		Publish Date	Date	N/A	N/A		
BP04	Admin Verify Book Post (The system shall allow administrators to review and approve or reject book listings posted by sellers.)	Book ID	Integer	N/A	N/A	Update the verified value in book with book id in database, and send the message "Verify Success.".	N/A
		Verify	Boolean	N/A	N/A	If the book id is not found in the database, send the message "Book not found.".	

BD01	Create Book Data (The system shall allow sellers to add data on books that are not in the database.)	Title	String/ 1-	Has more than 1 character.	N/A	Create new content with specified value in the database then send the message “Create book data success.”.	Error message for invalid title, author, genre, tag, and ISBN.
		Author	String/ 1-N	Has more than 1 character.	N/A		
		Genre	String/ 1-N	Has more than 1 character.	N/A		
		Tag	String/ 1-N	Has more than 1 character.	N/A		
		Description	String	N/A	N/A		
		BookPhoto URL	String	N/A	N/A	If ISBN already exists in the database, send the message “Book already	

System/Software requirements specification: Book Book

The new chapter for second hand books

		ISBN	String/ 1-N	Has more than 1 character.	N/A	registered in database.”.	
		Page	Integer	N/A	N/A		
BD02	Find Book (The system shall allow sellers to view data on books in the database. The system shall show recommended prices for books to sell.)	Title	String/ 1-N	Has more than 1 character.	N/A	Return all of the book with the same title from the database. If a book with the same title is not found, send the message “Book Not Found.”	N/A
BD03		Book ID	Integer	N/A	N/A	If all inputs are valid (title,	Error message

System/Software requirements specification: Book Book

The new chapter for second hand books

Admin Update Book (The system shall allow administrators to view, edit, delete, or update book data in the database.)	Title	String/ 1-N	Has more than 1 character.	N/A	author, genre, tag, and isbn), update book data with book id then send message “Update Book Success.”.	for invalid title, author, genre, tag, and ISBN.
	Author	String/ 1-N	Has more than 1 character.	N/A		
	Genre	String/ 1-N	Has more than 1 character.	N/A		
	Tag	String/ 1-N	Has more than 1 character.	N/A		
	Description	String	N/A	N/A		
	BookPhoto URL	String	N/A	N/A		
	ISBN	String/ 1-N	Has more than 1 character.	N/A		

		Page	Integer	N/A	N/A	message “This book already exists in the database.”	
UP08	<p>Admin Delete Book</p> <p>(The system shall allow administrators to view, edit, delete, or update book data in the database.)</p>	Book ID	Integer	N/A	N/A	<p>Remove user data with book id specified from the database then send the message “Remove Success.”.</p> <p>If the book id is not found in the database, send the message “Book not found.”.</p>	N/A

CS01	Create Chat Room (The system shall allow buyers to communicate with sellers through a messaging or chat feature to negotiate terms, ask questions, or discuss details about the books.)	Buyer ID	Integer	N/A	N/A	Create a new chat room session and update the database.	N/A
	Seller ID	Integer	N/A	N/A	If the seller id or the buyer id does not exist in the database, send the message “User Not Found.”.		

CS02	Send Message (The system shall allow buyers to communicate with sellers through a messaging or chat feature to negotiate terms, ask questions, or discuss details about the books.)	Chat Room ID	Integer	N/A	N/A	If the message is not empty, update the database and session with input.	N/A
		Message	String	N/A	N/A	If the chat room id does not exist in the database, send the message “Chat room Not Found.”.	
CS03	Admin Interrupt (The system shall provide tools for administrators to manage and resolve disputes between buyers and sellers.)	Chat Room ID	Integer	N/A	N/A	Update database and add admin to chat session.	N/A
						If the chat room id does not exist in the database, send the message “Chat room Not Found”.	

TS01	Credit Card Payment (The system shall handle payment transactions for books bought by buyers, including processing payments through various methods (credit card, digital wallets, etc.).	Transac tion ID	Integer	N/A	N/A	If all inputs are valid (total cost, shipment method, payer id, receiver id, card number, and card holder), send all inputs to third party's credit card validation system.	Error message for invalid total cost, shipment method, payer id, receiver id, card number, and card holder.
		Total Cost	Integer	Has value more or equal to 0	Has value less than 0		
		Shipme nt Method	String/ 1-20	Has more than 1 character but less than 20 characters.	Has less than 1 character or more than 20 characters	If credit card validation returns successful, send the message "Payment submitted success" and save transaction information to database.	
		Payer ID	Integer	Has value more than 0	Has value less than 0		
		Receiver ID	Integer	Has value more than 0	Has value less than 0		

		Card Number	Integer/ 13	Has 13 characters.	Has more or less than 13 characters.	If credit card validation returns unsuccessful, send the message “Credit Card Validation Failed Please Try Again”.	
		Card Holder	String	N/A	N/A		
TS02	QR Payment (The system shall handle payment transactions for books bought by buyers, including processing payments through various methods (credit card, digital wallets, etc.).	Transac tion ID	Integer	N/A	N/A	If all inputs are valid (total cost, shipment method, payer id, and receiver id), send all inputs to third party's QR code payment generator.	Error message for invalid total cost, shipment method, payer id, and receiver id.
		Total Cost	Integer	Has value more or equal to 0	Has value less than 0		

System/Software requirements specification: Book Book

The new chapter for second hand books

		Shipme nt Method	String/ 1-20	Has more than 1 character but less than 20 characters.	Has less than 1 character or more than 20 characters	If a third party's generator success on creation of QR code, send the generated QR code and save transaction information to database.	
		Payer ID	Integer	Has value more than 0	Has value less than 0		

		Receiver ID	Integer	Has value more than 0	Has value less than 0	If a third party's generator unsuccessful on creation of QR code, send the message "Unable to generate QR code currently. Please try again later.".	
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TS03	On Delivery Payment (The system shall handle payment transactions for books bought by buyers, including processing payments through various methods (credit card, digital wallets, etc.)).	Transaction ID	Integer	N/A	N/A	If all inputs are valid (total cost, shipment method, payer id, receiver id, and delivery time), save the new transaction information in database.	Error message for invalid total cost, shipment method, payer id, receiver id, and delivery time.
		Total Cost	Integer	Has value more or equal to 0	Has value less than 0		

System/Software requirements specification: Book Book

The new chapter for second hand books

		Shipment Method	String/ 1-20	Has more than 1 character but less than 20 characters.	Has less than 1 character or more than 20 characters		
		Payer ID	Integer	Has value more than 0	Has value less than 0		
		Receiver ID	Integer	Has value more than 0	Has value less than 0		
		Delivery ID	Integer	N/A	N/A		

System/Software requirements specification: Book Book

The new chapter for second hand books

		Delivery Time	Date	Has value more or equal to current date.	Has value less to current date.		
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TS04	Buyer Transaction History (The system shall allow buyers to view a history of their past transactions, including details such as purchase dates, amounts spent, and transaction statuses.)	User ID	Integer	N/A	N/A	If user id matches any buyer id record in database, send all transactions relate to that buyer id.	N/A
	If user id does not match any buyer id record in database, send message “This user is not buyer”.						

TS05	Seller Transaction History (The system shall allow sellers to see past transactions)	User ID	Integer	N/A	N/A	If the user id matches any seller id record in database, send all transactions relate to that seller id. If user id does not match any seller id record in database, send message “This user is not seller”.	N/A
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TS06	Get All Transaction History (The system shall allow administrators to view and monitor all transactions between buyers and sellers.)	User ID	Integer	N/A	N/A	If user id matches any administrator id record in database, send all transactions in the system.	N/A
	If user id does not match any administrator id record in database, send message "This user is not administrator.."						

Table 2 List of Requirements

14. Functional modeling

14.1) Use case diagram

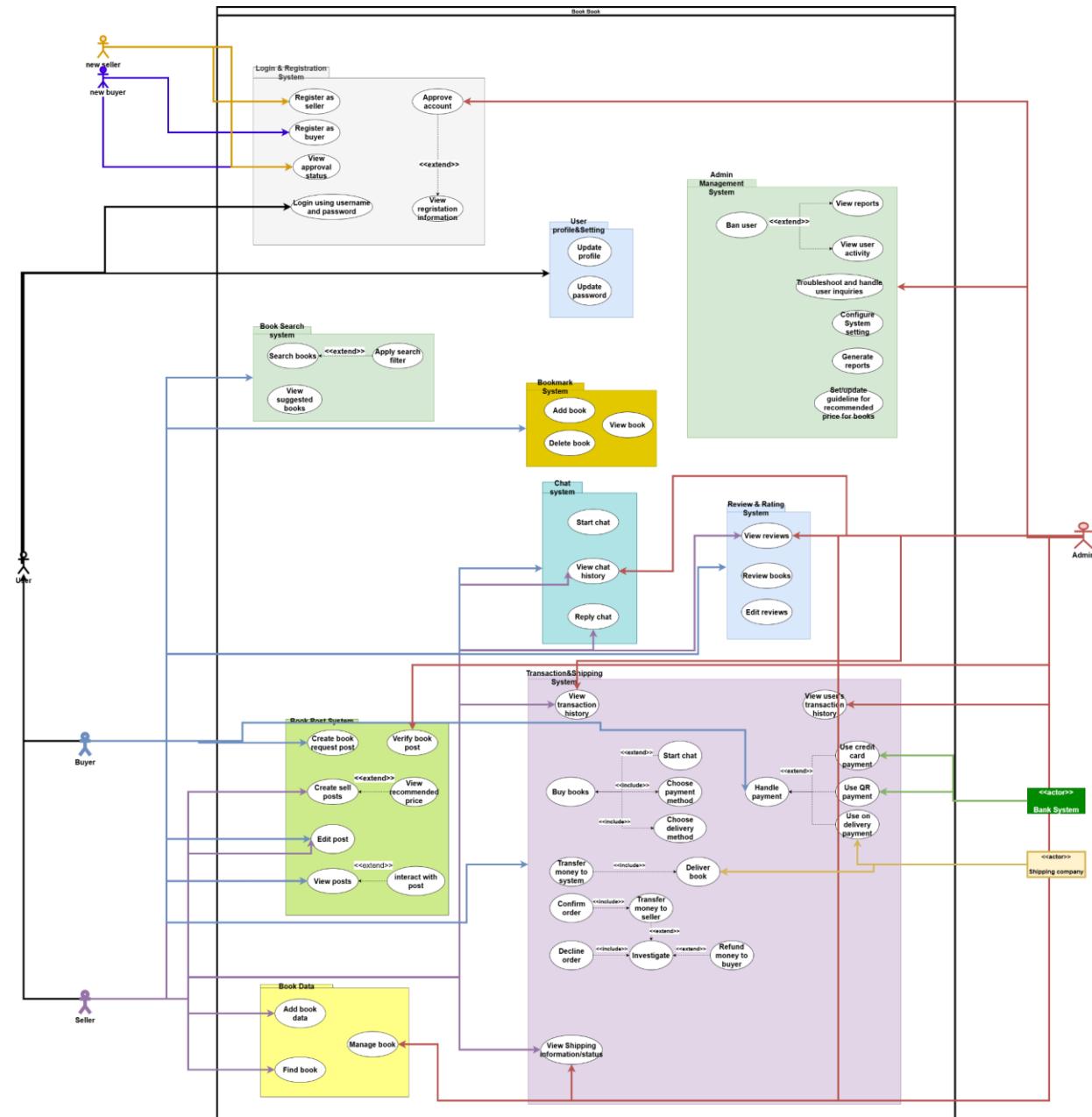


Figure 11 Use Case Diagram

https://drive.google.com/file/d/1JDT4N7zvTquDqlfDPk3aBMZnCk061XJP/view?usp=drive_link

14.2) Use case descriptions

14.2.1) Create sell post

Use Case Name: Create sell posts	ID: 1	Importance Level: High
Primary Actor: Seller	Use Case Type: Detail, Essential	
Stakeholders and Interests: Seller– wants to sell books		
Brief Description: This case describes how to sell book in platform		
Trigger: User decides to sell their own book		
Type: External		
Relationships:		
Association: Seller		
Include: Validate post		
Extend: View recommended price, Edit post		
Generalization: Create post		
Precondition: Seller wants to sell a book.		
Postcondition: The book listing is live on the platform, or the seller is informed that further validation by the System Administrator is required		
Normal Flow of Events:		
1. Create a Book Post:		
<ul style="list-style-type: none">• The seller provides the basic details of the book they wish to sell, including:<ul style="list-style-type: none">○ Book Name○ Author Name○ Book Condition (New/Used)• The seller may also add a special tag to categorize the book, making it easier for buyers to find.		

2. System Check for Existing Book:

- The system checks if the same book (based on title and author) already exists in its database.
 - If the book exists:
 - The system automatically adds additional details about the book e.g. ISBN, publication year.
 - If the seller needs to view recommended price. Execute A2
 - If the book does not exist:
 - The system requests further information from the seller (e.g., ISBN, publication date, genre).
 - The system notifies the System Administrator to validate the book details and adds it to the platform's database.

3. Review and Publish Listing:

- The seller reviews the post for accuracy and submits it for approval or publishes it directly, based on the platform's policy. Execute S1

4. Receive Confirmation:

- The platform confirms the successful listing, and the seller receives a notification that their book is live.

Sub Flows:

S1: System Administrator validates and adds the book, the listing automatically goes live.

Alternate/Exceptional Flows:

E1: If required information is missing or incorrect during step 3, the system prompts the seller to complete or correct the fields before proceeding.

A1: The seller can edit or remove the listing at any time before a sale is made.

A2: The system recommends a selling price based on current listings and market trends.

14.2.2) Buy Books

Use Case Name: Buy books	ID: 2	Importance Level: High		
Primary Actor: Buyer	Use Case Type: Detail, Essential			
Stakeholders and Interests: Buyer-want to buy a book				
Brief Description: This use case describes how buyers can create post and buy books.				
Trigger: Buyer wants to buy book				
Type: External				
Relationships: Association: Include: Choose shipping method, Select payment method Extend: Start chat				
Precondition: Buyer wants to buy the books from an interested post				
Postcondition: Buyer successfully buys the book.				
Normal Flow of Event: 1. Buyer Chat with seller <ul style="list-style-type: none">• If buyer wants to chat with seller to negotiate or ask more details, execute A1 2. Buyer confirms purchase <ul style="list-style-type: none">• Buyer chooses shipping method and select payment method (Execute S2 and S3)• Buyer confirms purchase with seller 3. Buyer transfers money <ul style="list-style-type: none">• Buyer transfer money to the system with the selected method 4. System notifies buyer and seller <ul style="list-style-type: none">• If the money is transferred to the system, the system notifies both seller and buyer				

Sub flow:

S1: Choose shipping method

- Buyer views available shipping options provided by the seller.
- Buyer selects the preferred shipping method based on factors like delivery time, cost, or shipping provider.

S2: Select payment method

- Buyer views available payment methods, such as credit card, QR payment, or on delivery payment.

Alternate/Exceptional Flows:

A1: Start chat

- The buyer initiates a chat with the seller to ask questions or negotiate terms.
- Buyer and seller exchange messages until all questions are answered, or terms are agreed upon.

E1: Retry payment or select alternative method

- If the payment is unsuccessful, the system will inform the buyer to retry the payment or select an alternative method.

14.3) Activity Diagram

14.3.1) Create sell post

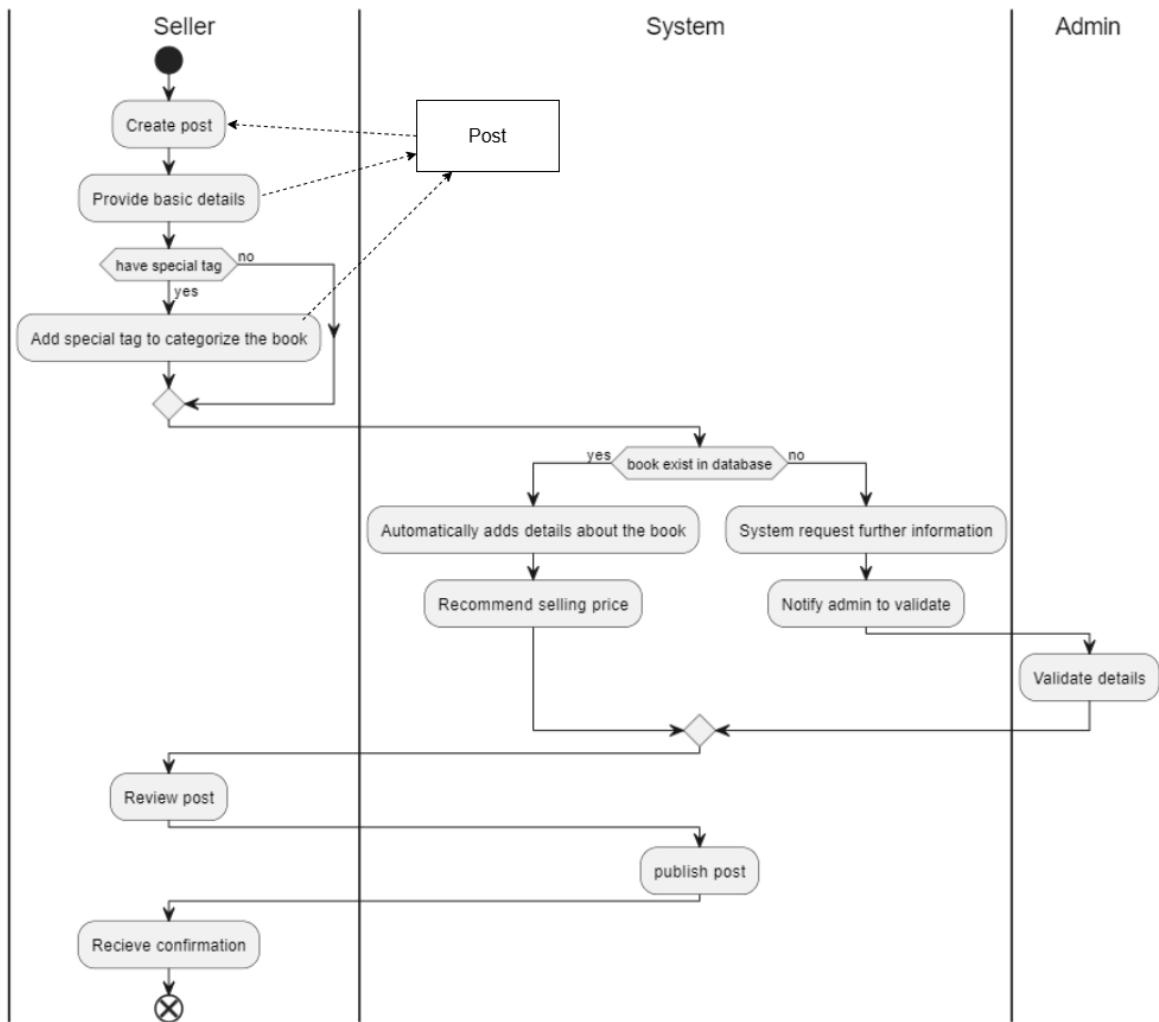


Figure 12 Create sell post Activity Diagram

<https://drive.google.com/file/d/109tIEhvSHz824J5C4IUf5MHxbTFPypa0/view?usp=sharing>

14.3.2) Buy books

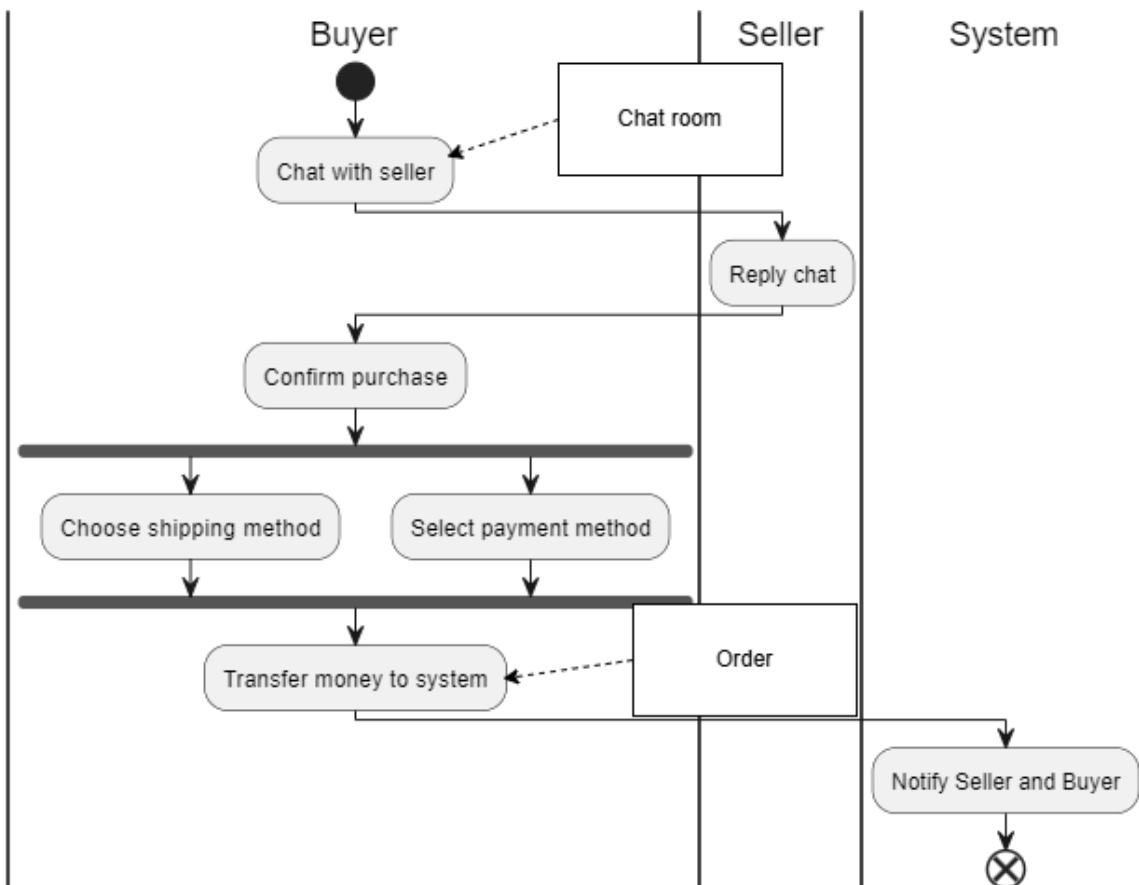


Figure 13 Buy books Activity Diagram

<https://drive.google.com/file/d/1VXdAD1MrlwSJUjgXpbo1InrGxSKlcJxX/view?usp=sharing>

15. Structural Modelling

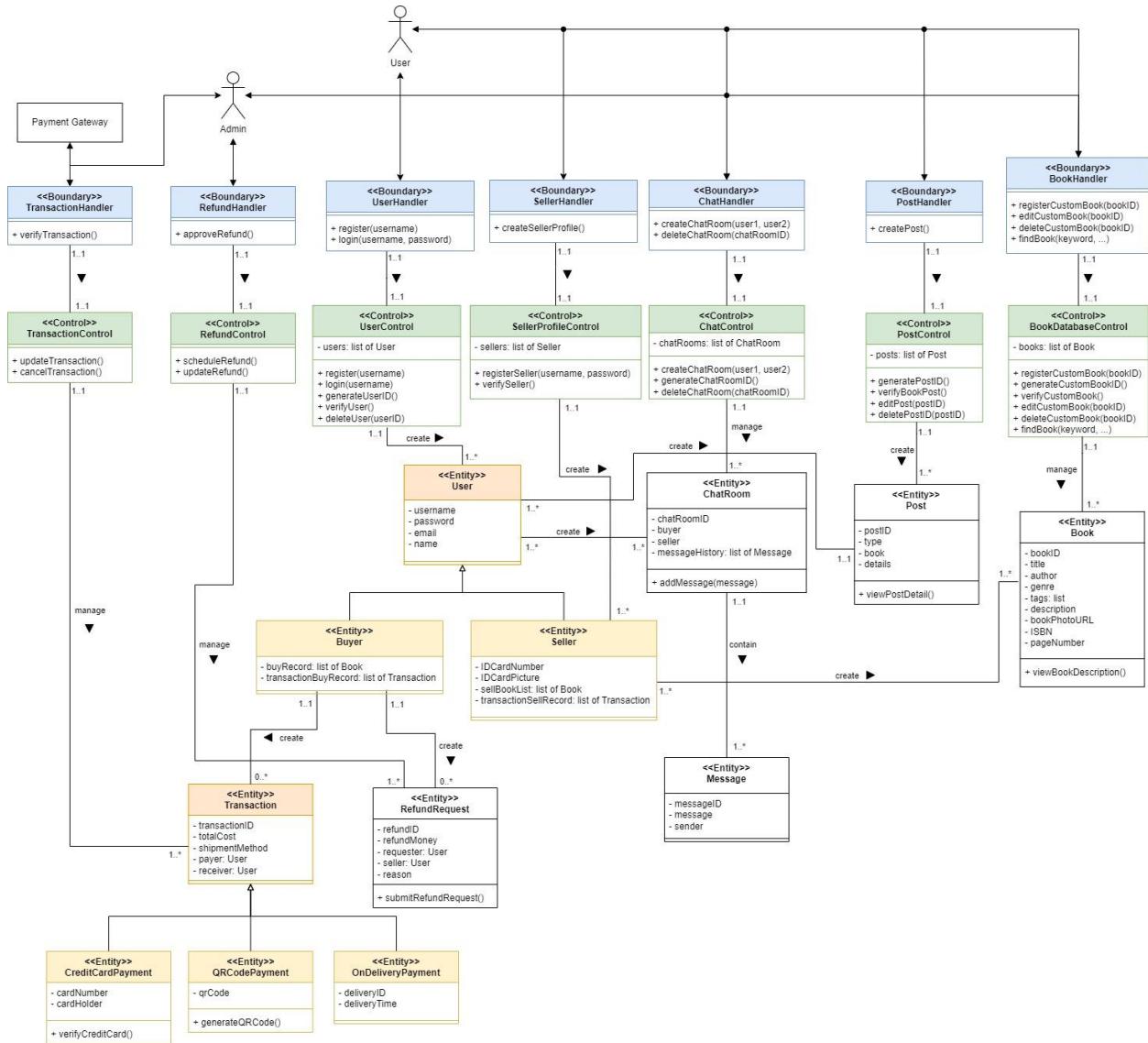


Figure 14 Class Diagram (Entity-Control-Boundary Pattern)

https://drive.google.com/file/d/10Pk_sc6o-gEMeHbsVgazZWiEoZyTIBaT/view?usp=sharing

16. Behavioral Modelling

16.1 Sequence Diagram

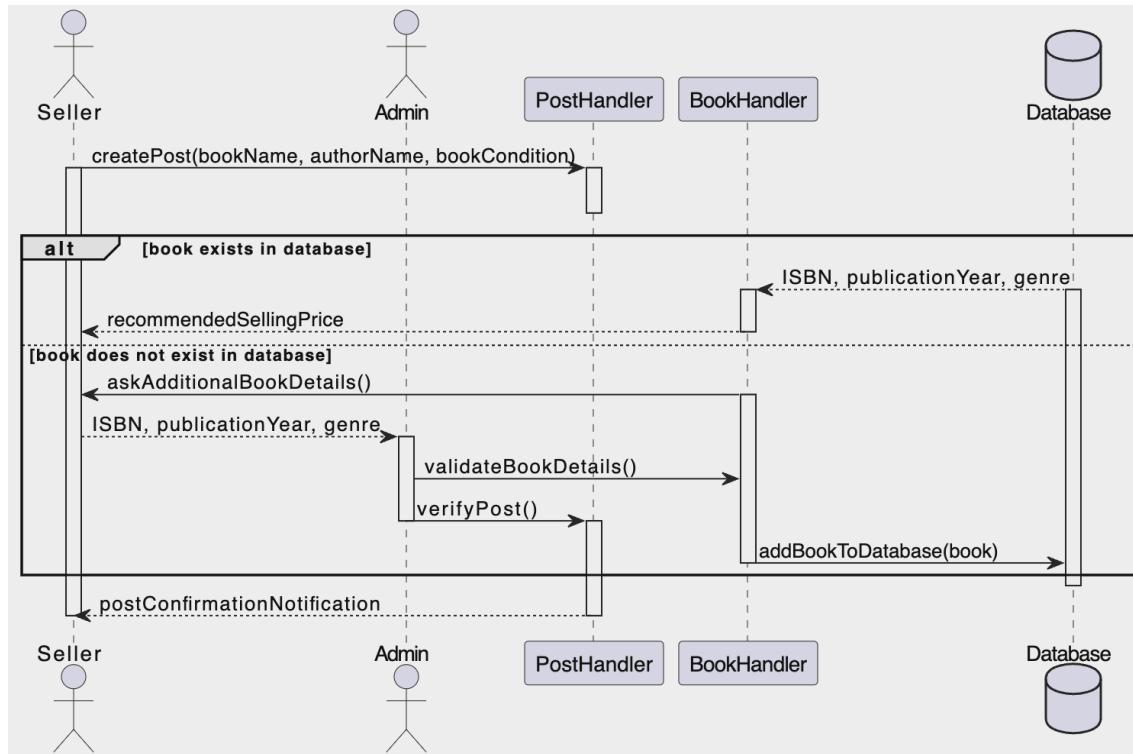


Figure 15 Sequence Diagram of Create sell post

<https://drive.google.com/file/d/1rEZEQIDQEJbQOSc04ZwwFjHzVHBuw9v5/view?usp=sharing>

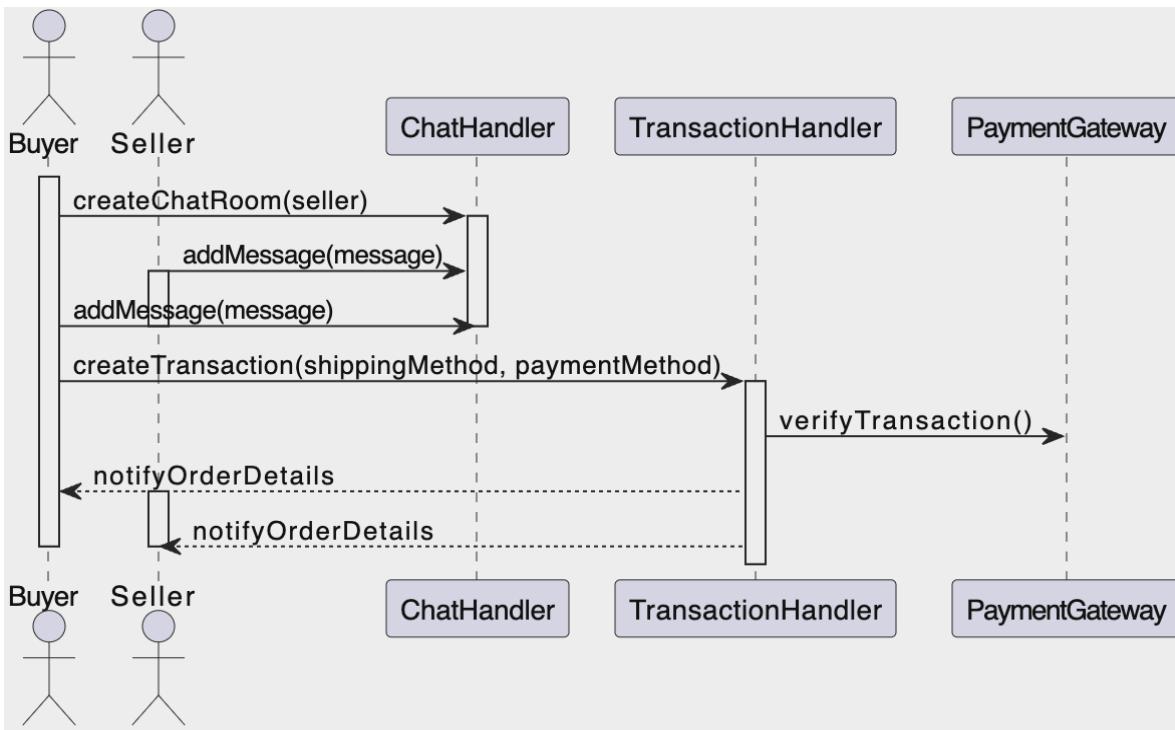


Figure 16 Sequence Diagram of Buy books

<https://drive.google.com/file/d/1KCpb4cLNY4aA1vdG54v3GIz3ZtYnoC0d/view?usp=sharing>

16.2 State Machine Diagram

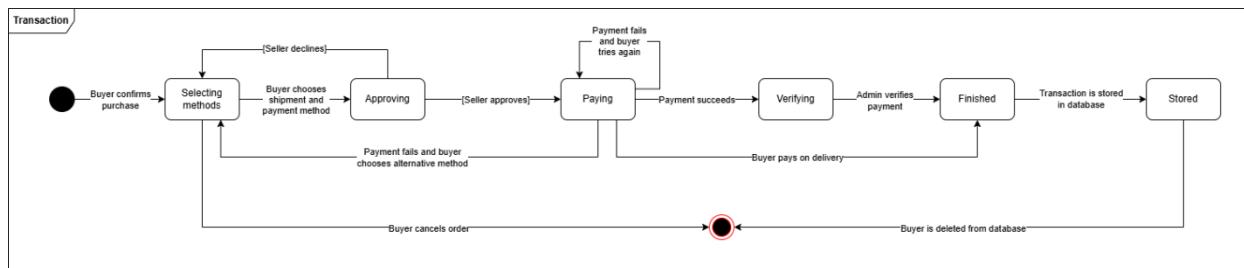


Figure 17 Behavioral State Machine Diagram of Transaction Class

<https://drive.google.com/file/d/19i8p6AAyYa0EM4fJ1RlJz0zq-XlzWPxk/view?usp=sharing>

17. Verifying and Validating the Analysis Model

The purpose of verifying and validating the structural model is to check and fix each diagram or model to conform to the business requirements and to check the compatibility of every model.

17.1 Verifying and Validating the Functional Model and Business Process Modeling

- All actors listed in the use case descriptions are represented in the use case diagram with association links.
- All other relationships specified in the use case descriptions (include, extend, and generalization) are depicted in the use case diagram.

Use Case: Create sell posts

Use Case Name: Create sell posts 1.	ID: 1	Importance Level: High
Primary Actor: Seller	Use Case Type: Detail, Essential 2.	
Stakeholders and Interests: Seller– wants to sell books		
Brief Description: This case describes how to sell book in platform		
Trigger: User decides to sell their own book		
Type: External		
Relationships:		
Association: Seller		
Include: -		
Extend: View recommended price 3.		
Generalization: -		

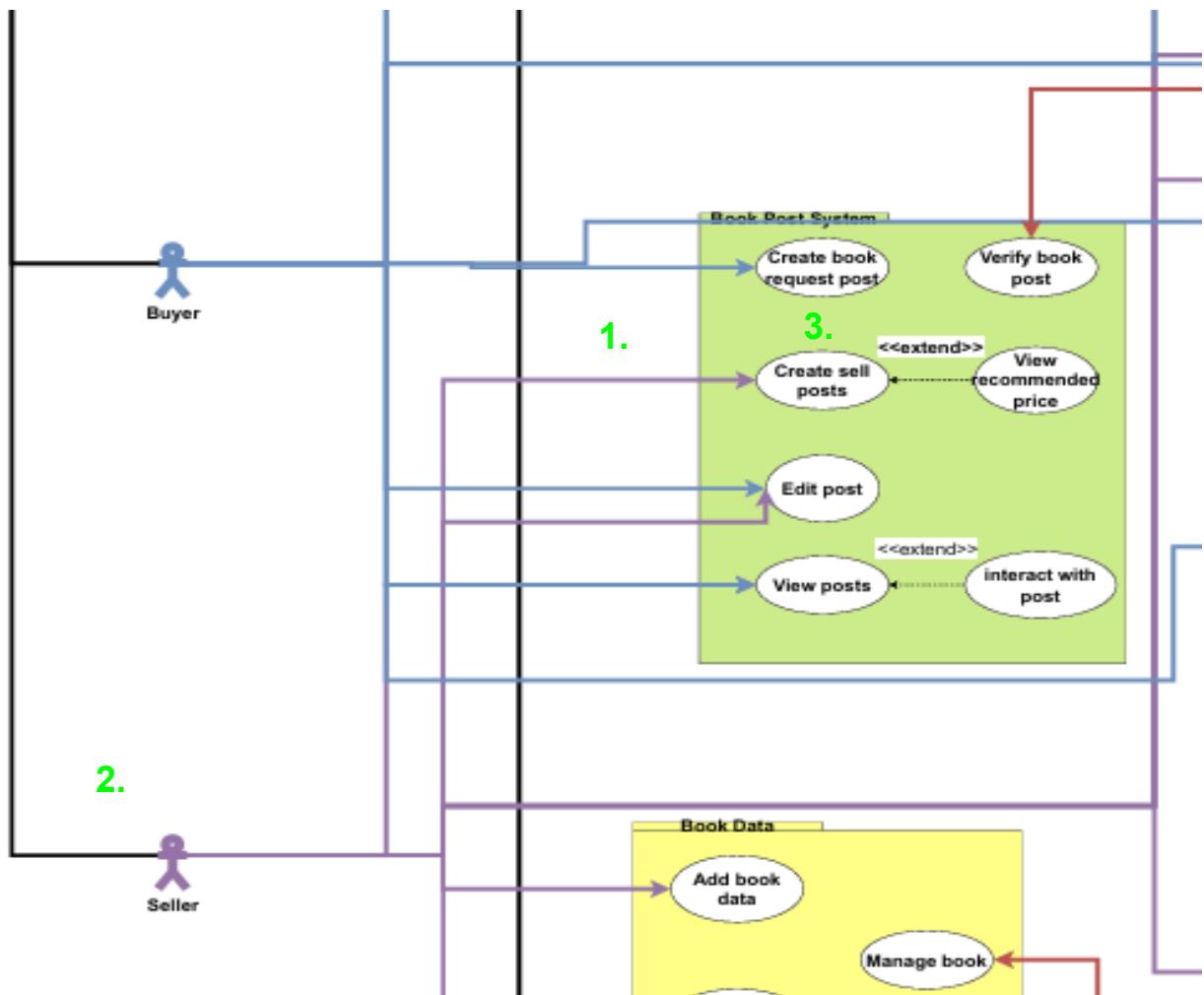


Figure 18 Verifying and Validating the Functional Model 1

Use Case: Buy books

Use Case Name: Buy books 1.		ID: 2	Importance Level: High		
Primary Actor: Buyer	Use Case Type: Detail, Essential				
Stakeholders and Interests: Buyer-want to buy a book					
Brief Description: This use case describes how buyers can create posts and buy books.					
Trigger: Buyer wants to buy book					
Type: External					
Relationships:					
Association:					
Include: Choose shipping method, Select payment method 2.					
Extend: Start chat 3.					
Generalization:					

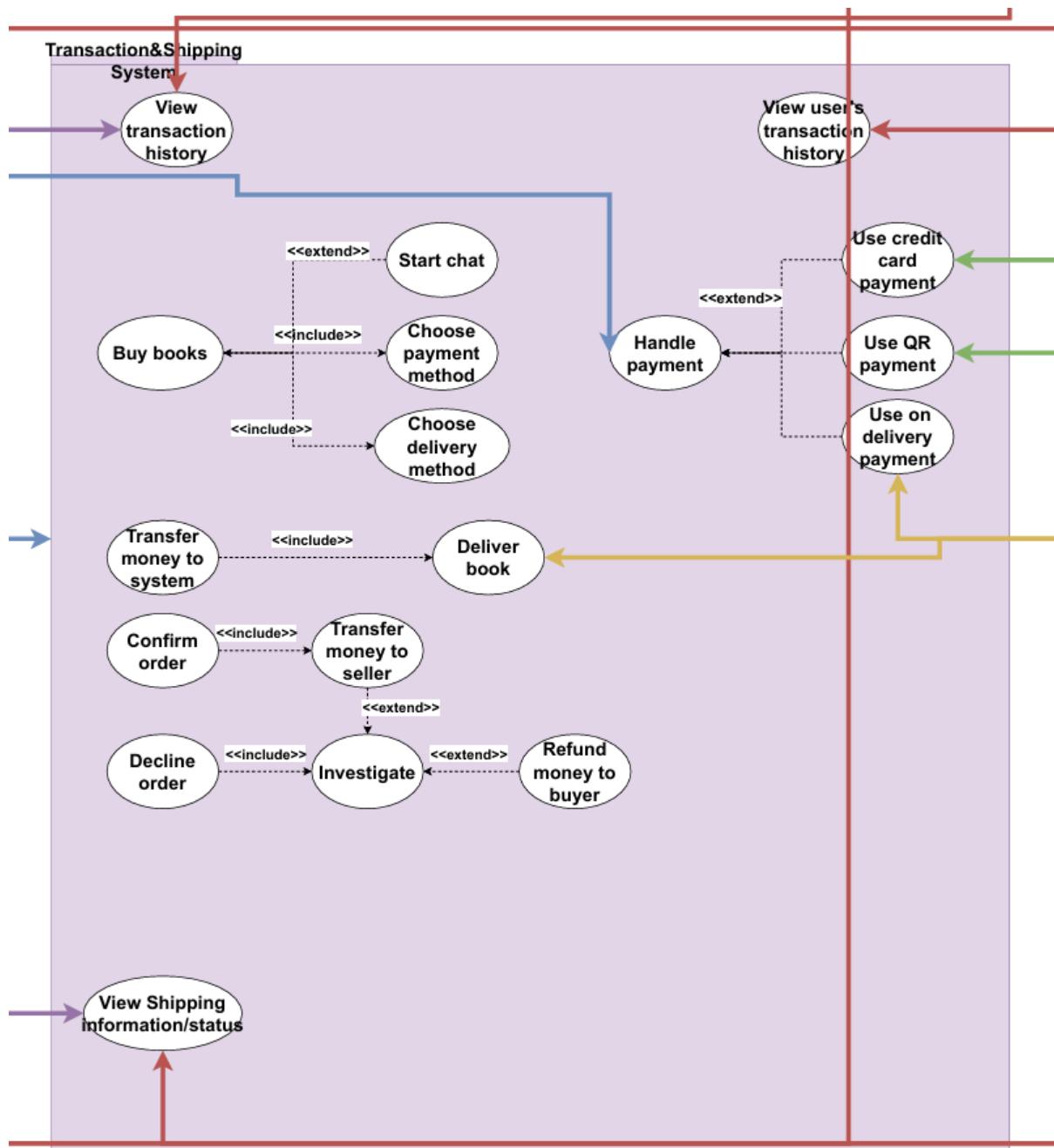


Figure 19 Verifying and Validating the Functional Model 2

17.1.2. Activity Diagram and Use Case Description

- Each action and activity in the activity diagram corresponds to an event in the flows of the use case descriptions.
- All objects in the activity diagram are mentioned as events in the use case descriptions.
- The sequence of events in the create post's use case descriptions is not aligned with the use case description because the flow of events is different on two sections which are the flow of system recommendation. The second case is the flow is missing the notification to the admin.
- The sequence of events on the buy book's use case description is not aligned with the use case description because the flow of events is different on the Transfer money flow (ie. from the text, it's suggest that Transfer money will be started after both transportation selection and transfer method selection)

Use Case: Create sell posts

Normal Flow of Events:

1. Create a Book Post:

- The seller provides the basic details of the book they wish to sell, including:
 - Book Name
 - Author Name
 - Book Condition (New/Used)
- The seller may also add a special tag to categorize the book, making it easier for buyers to find.

2. System Check for Existing Book:

- The system checks if the same book (based on title and author) already exists in its database.
 - If the book exists:
 - The system automatically adds additional details about the book e.g. ISBN, publication year.
 - The system recommends a selling price based on current listings and market trends.
 - If the book does not exist:
 - The system requests further information from the seller (e.g., ISBN, publication date, genre).
 - The system notifies the System Administrator to validate the book details and adds it to the platform's database.

3. Review and Publish Listing:

- The seller reviews the post for accuracy and submits it for approval or publishes it directly, based on the platform's policy.

4. Receive Confirmation:

- The platform confirms the successful listing, and the seller receives a notification that their book is live.

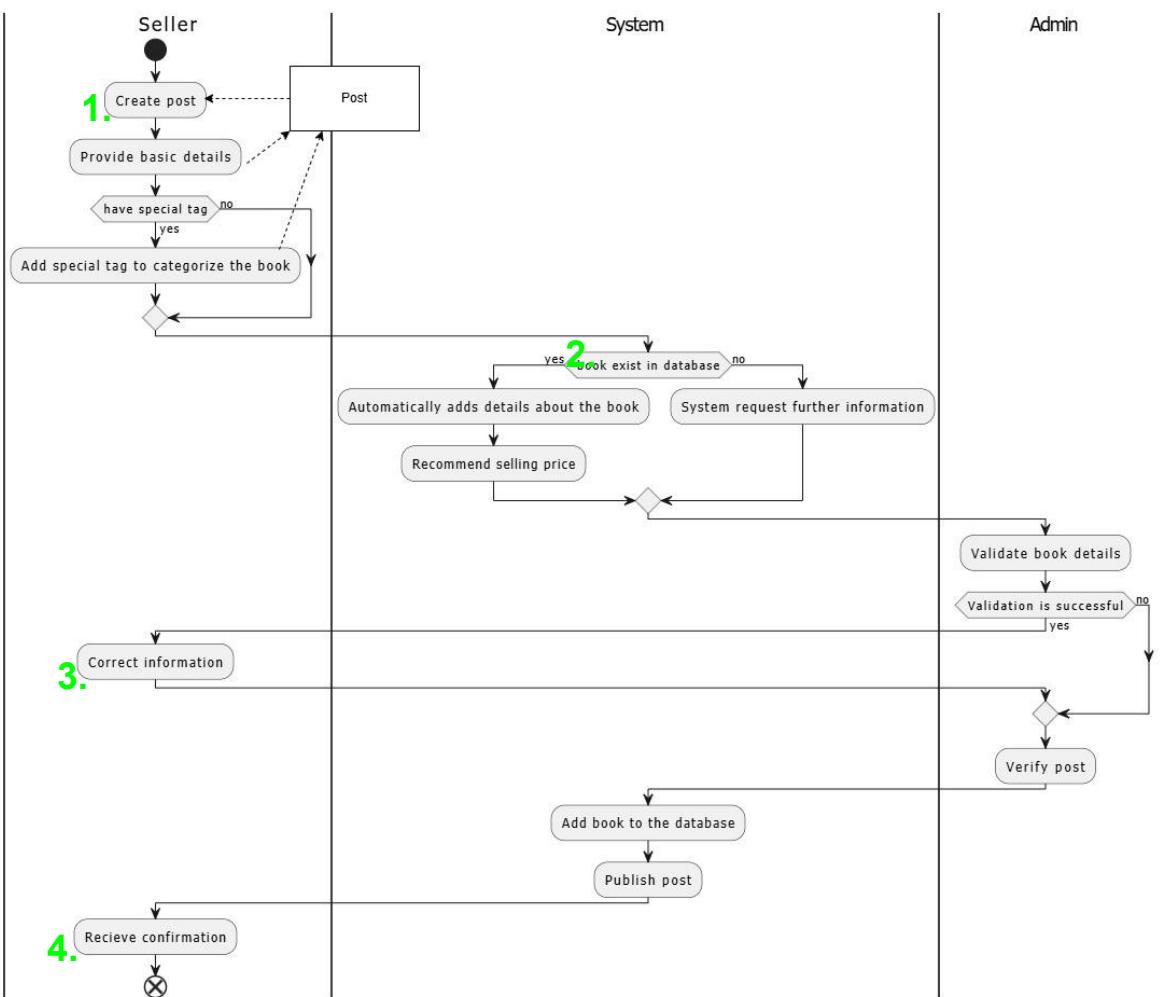


Figure 20 Verifying and Validating the Functional Model 3

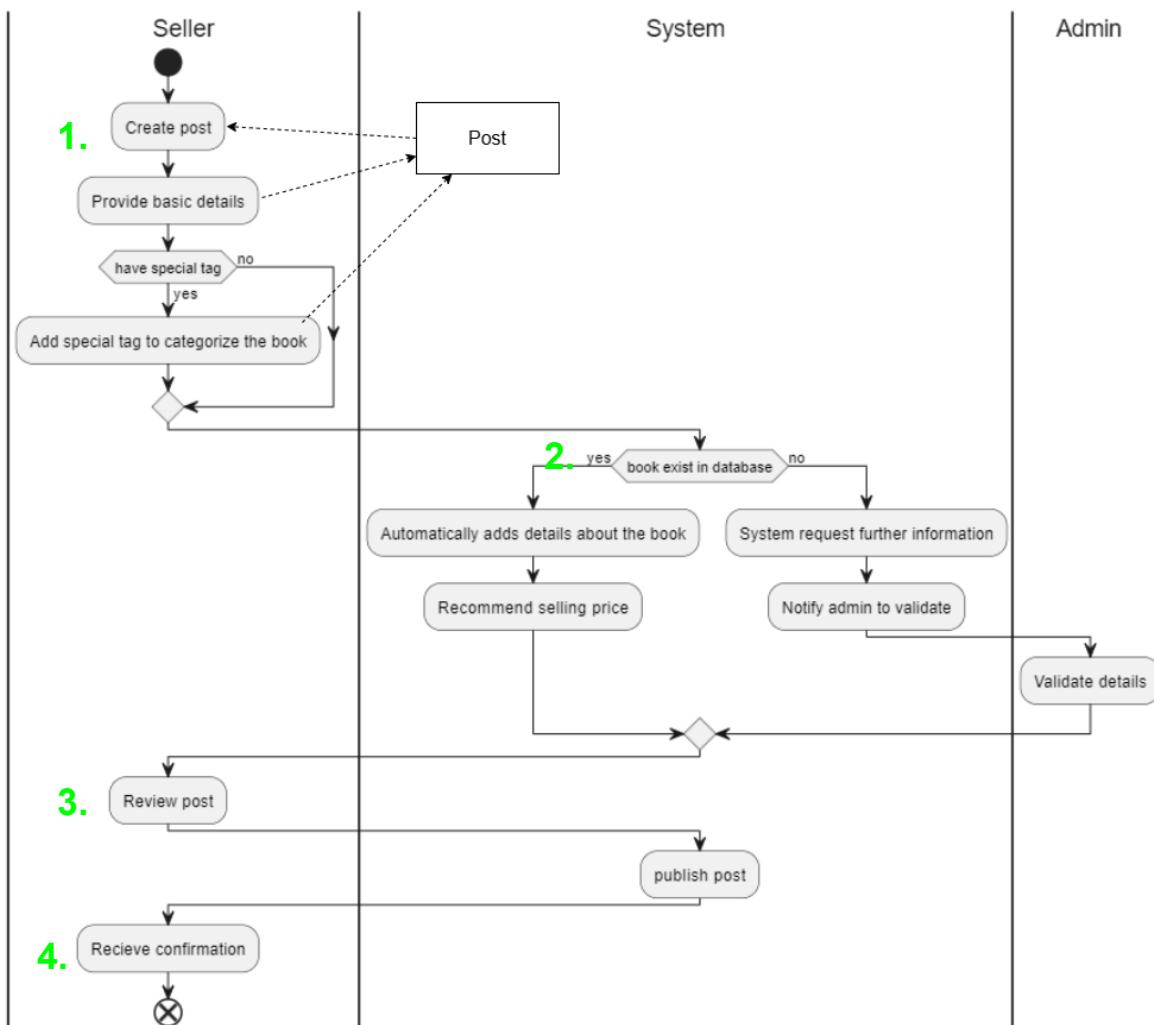


Figure 21 Verifying and Validating the Functional Model 4 (After Fix)

Use Case: Buy books

Normal Flow of Event:

1. Buyer Chat with seller

- If buyer wants to chat with seller to negotiate or ask more details, execute S1

2. Buyer confirms purchase

- Buyer chooses shipping method and select payment method (Execute S3 and S4)
- Buyer confirms purchase with seller

3. Buyer transfers money

- Buyer transfer money to the system with the selected method

4. System notifies buyer and seller

- If the money is transferred to the system, the system notifies both seller and buyer

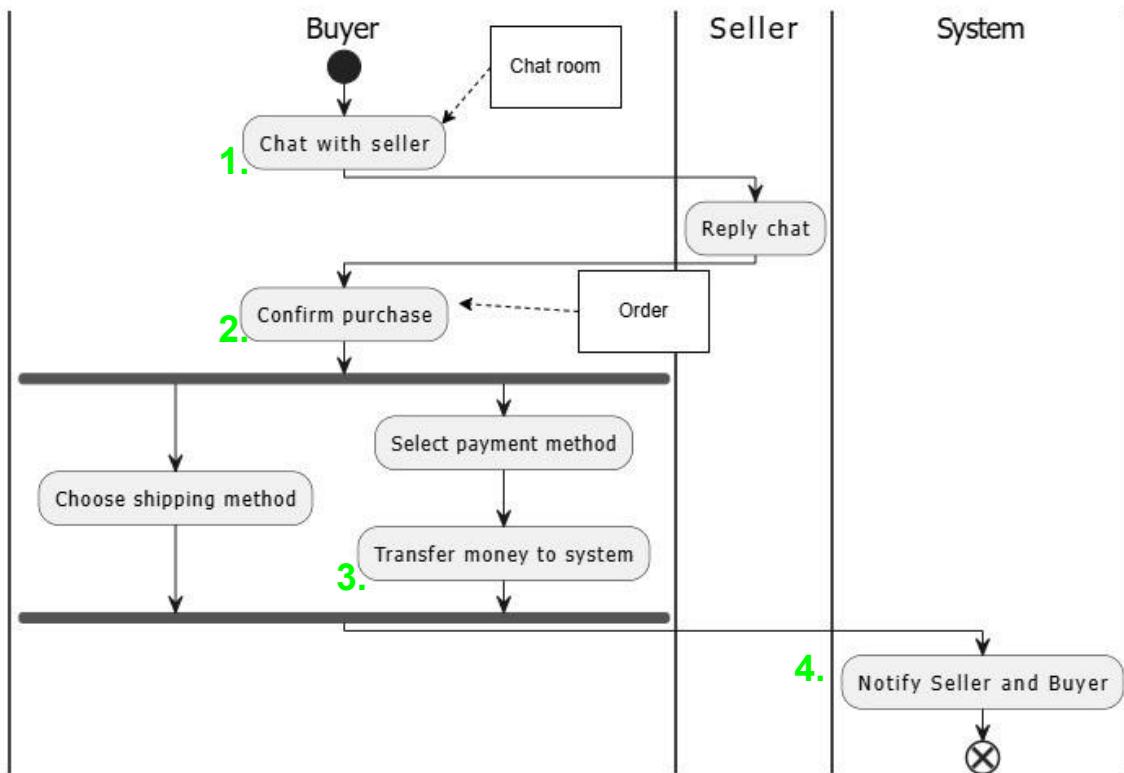


Figure 22 Verifying and Validating the Functional Model 5

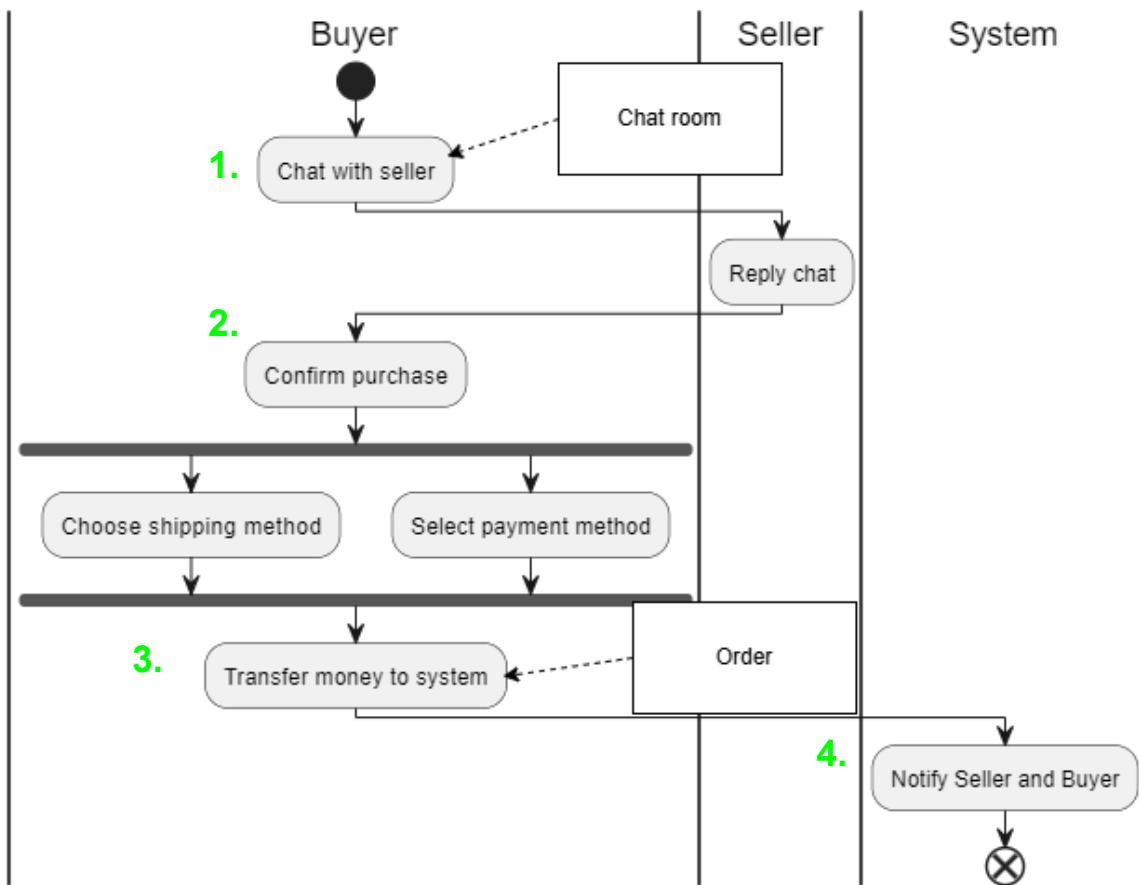


Figure 23 Verifying and Validating the Functional Model 6 (After Fix)

17.2. Verifying and Validating the Structural Model

17.2.1 Class Diagram and Detail of Requirements

- The class diagram corresponds to the use case diagram.
- The class structure aligns with the use case diagram as shown below.

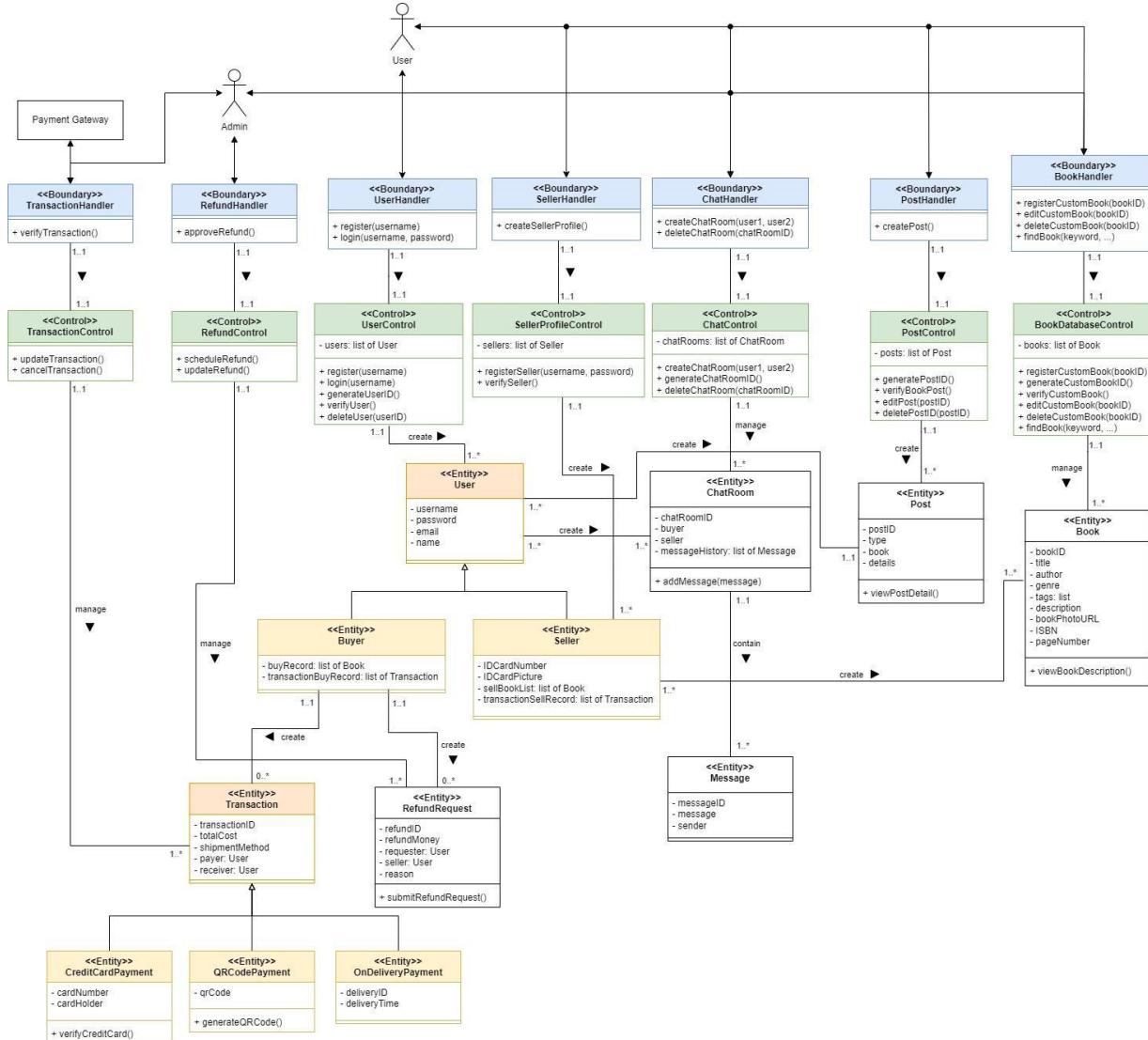


Figure 24 Verifying and Validating the Structural Model 1

17.2.2 Class Diagram and Use Case Diagram

- The class diagram must correspond to the use case diagram.
- The class diagram is conformed to the use case diagram as shown below.

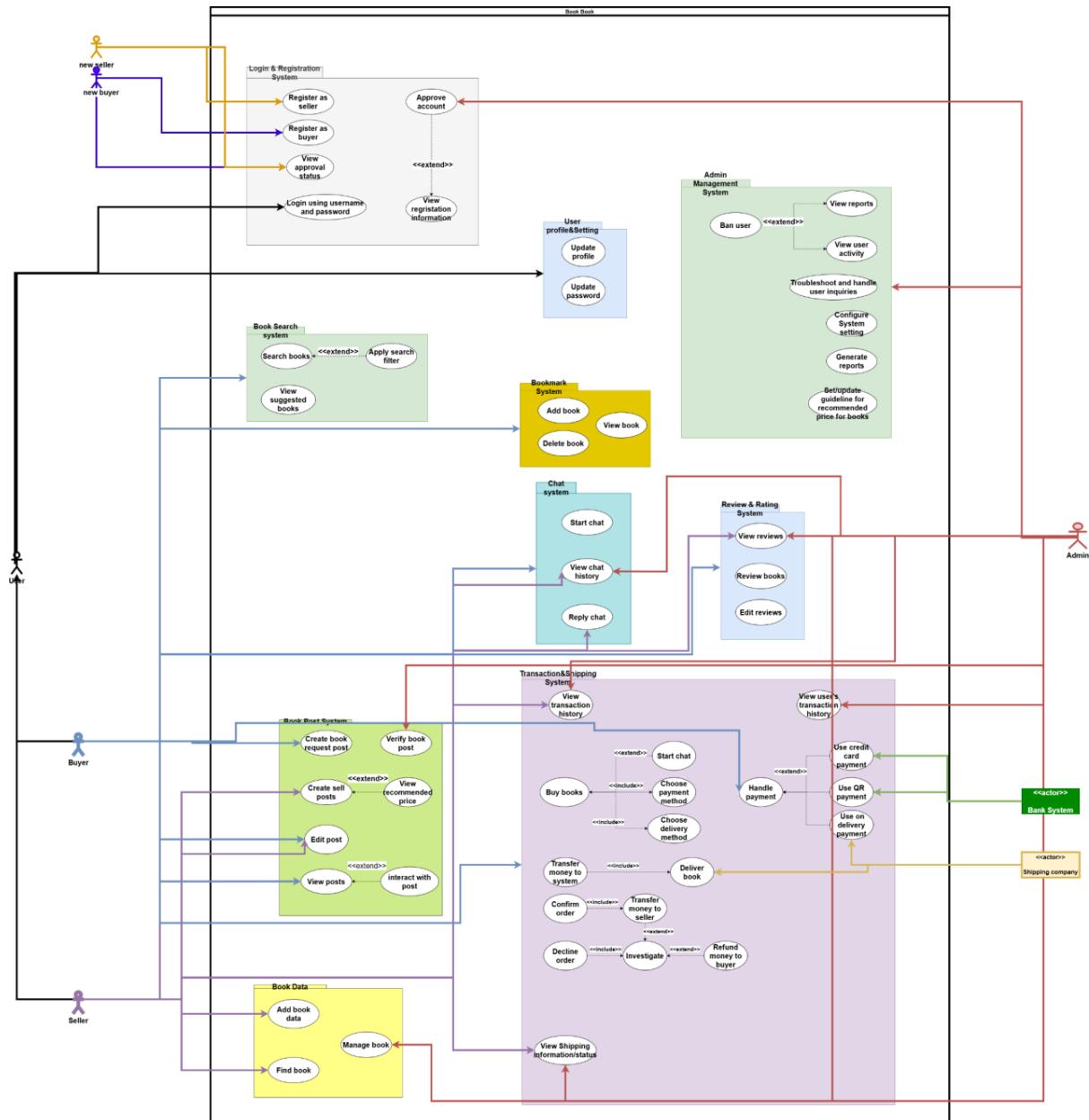


Figure 25 Verifying and Validating the Structural Model 2

17.3. Verifying and Validating the Behavioral Model

17.3.1. Consistency of actor between models

- All classes appearing in the Sequence Diagram are consistent with those in the Class Diagram.
- The interactions in the Sequence Diagram align with the relationships defined in the Class Diagram.

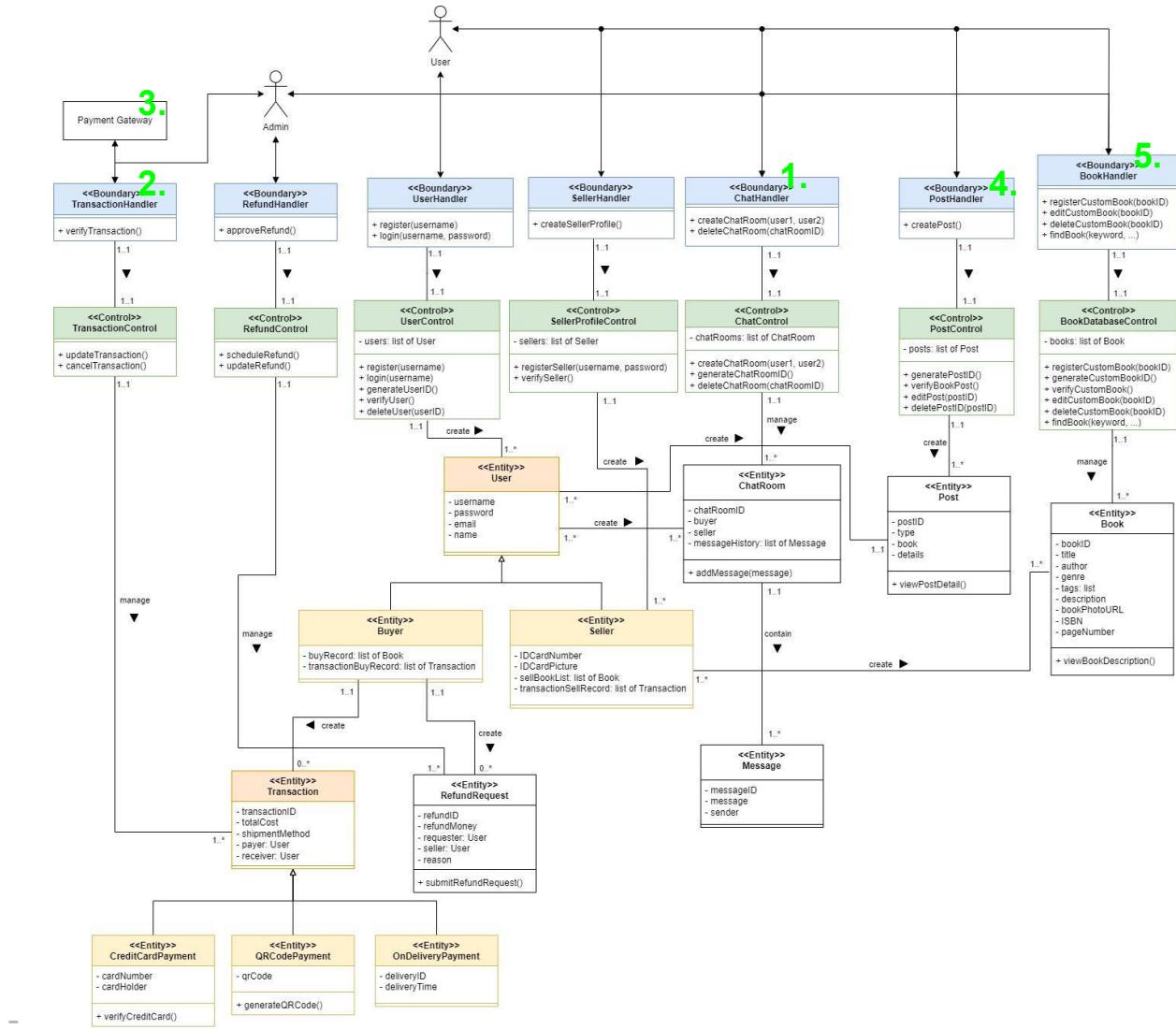


Figure 26 Verifying and Validating the Behavioral Model 1

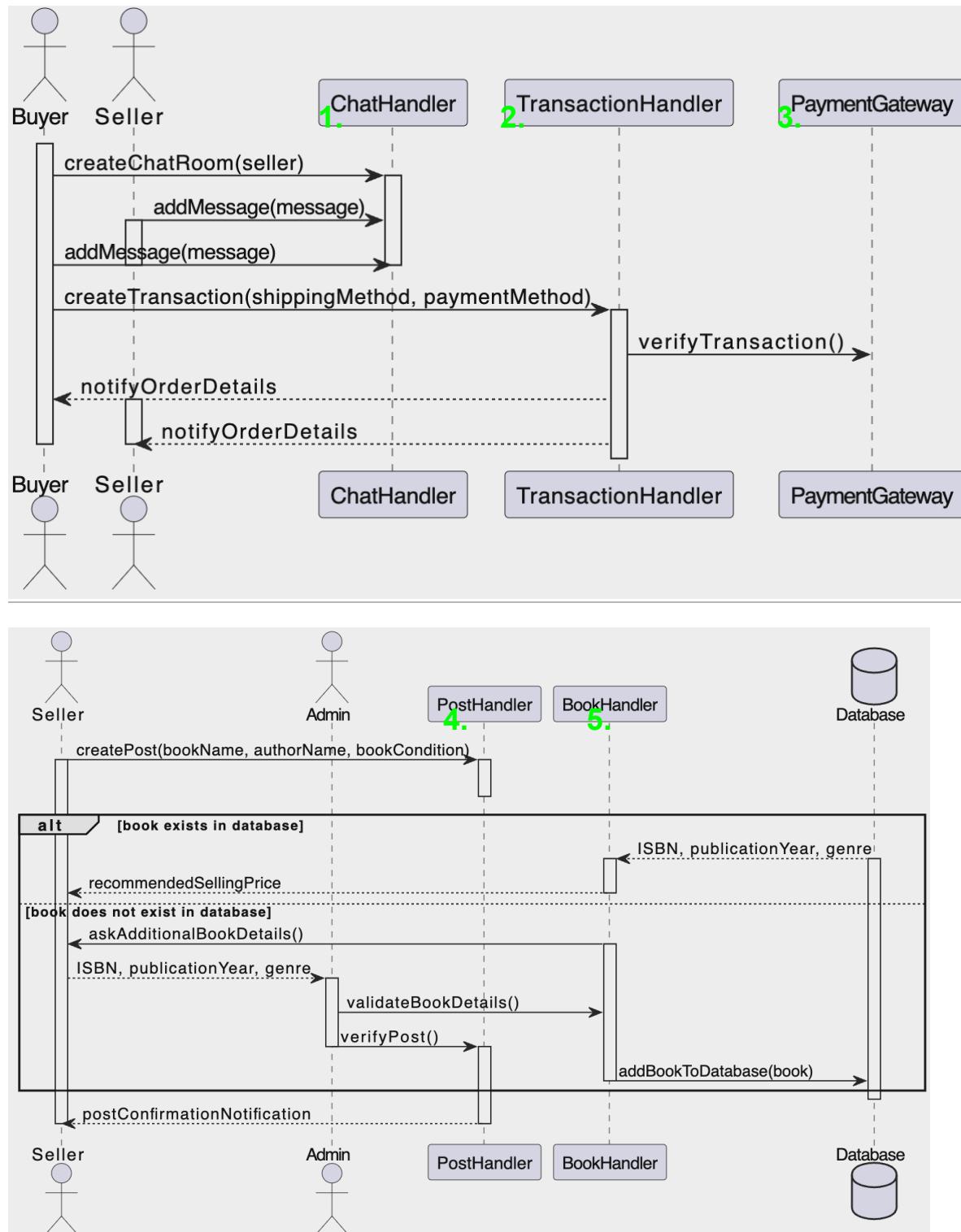


Figure 27 Sequence Diagram for Verifying and Validating the Behavioral Model 1

17.3.2 State Machine Diagram and Use Case Description

The sequence of events outlined in the Use Case Description is not aligned with the sequence depicted in the State Machine Diagram.

Use Case: Buy books

Normal Flow of Event:

1. Buyer Chat with seller

1. If buyer wants to chat with seller to negotiate or ask more details, execute S1

2. Buyer confirms purchase

1. Buyer chooses shipping method and select payment method (Execute S2 and S3)
2. Buyer confirms purchase with seller

3. Buyer transfers money

1. Buyer transfer money to the system with the selected method

4. System notifies buyer and seller

1. If the money is transferred to the system, the system notifies both seller and buyer

Sub flow:

S1: Chat with seller

- The buyer initiates a chat with the seller to ask questions or negotiate terms.
- Buyer and seller exchange messages until all questions are answered, or terms are agreed upon.

S2: Choose shipping method

- Buyer views available shipping options provided by the seller.
- Buyer selects the preferred shipping method based on factors like delivery time, cost, or shipping provider.

S3: Select payment method

- Buyer views available payment methods, such as credit card, QR payment, or on delivery payment.
- The buyer selects the desired payment method to complete the purchase.

Alternate/Exceptional Flows:

E1: Retry payment or select alternative method

- If the payment is unsuccessful, the system will inform the buyer to retry the payment or select an alternative method.

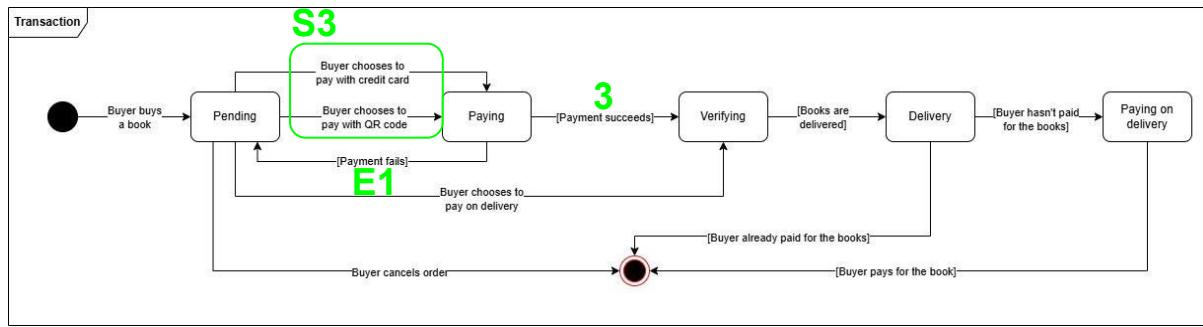


Figure 28 State Machine Diagram for Verifying and Validating the Behavioral Model 2

After Fix

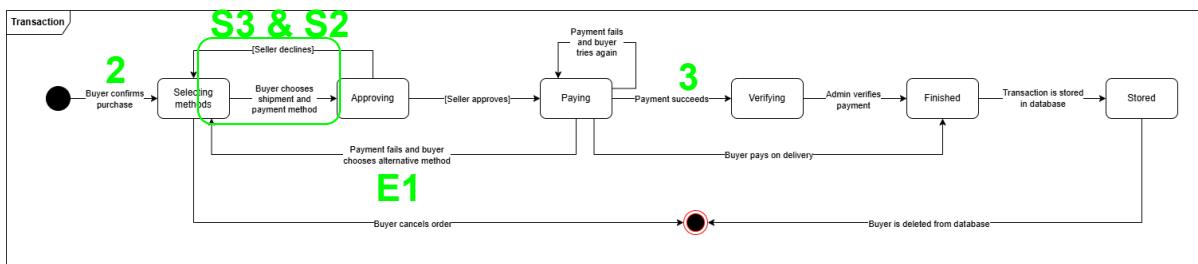


Figure 29 State Machine Diagram for Verifying and Validating the Behavioral Model 3 (After Fix)

18. List of teammates

Name	Responsibility	Level of Achievement
Peneik Sitthimongkhon	<ul style="list-style-type: none">• Reference Documents• Use Case Description• Formatting	3
Yuatyong Chaichana	<ul style="list-style-type: none">• Behavior modeling• Sequence Diagram• Table of Contents	3
Puvamin Tanakittanon	<ul style="list-style-type: none">• Presentation Slides• Activity Diagram• Use Case Diagram	3
Peemdej Chancharoen	<ul style="list-style-type: none">• List of Requirements• Reference Documents• Functional Requirements	3
Tapaneeya Odmung	<ul style="list-style-type: none">• Definitions• List of Requirements• Verify and Validating	3

Name	Responsibility	Level of Achievement
Pranesh Ingkanunt	<ul style="list-style-type: none">• Introduction• Structural Modeling• Behavior State Machine Diagram	3
Wasutha Sukkrasanti	<ul style="list-style-type: none">• To-be System• Overview of the to-be system• Constrains	3
Naphon Tangtrongpairoj	<ul style="list-style-type: none">• To-be System• Project Objective• Constrains	3
Nutthapong Dissanont	<ul style="list-style-type: none">• As-is System• Introduction• Non-functional Requirements	3

Table 3 List of teammate

Appendix A

Section 1: General Information

ช้อมูลเบื้องต้น

ท่านเคยซื้อหรือขายหนังสือมือสอง *

- เคยซื้อหนังสือมือสอง
- เคยขายหนังสือมือสอง
- เคยทั้งซื้อและขายหนังสือมือสอง
- ไม่เคยซื้อหรือขายหนังสือมือสอง

Back Next Clear form

แบบสอบถามการซื้อขายหนังสือมือสอง

ใช้ประกอบโครงการรายวิชา Software Engineering I และ Database Systems
จัดทำโดยนิสิตภาควิชาวิศวกรรมคอมพิวเตอร์ คณะวิศวกรรมศาสตร์ จุฬาลงกรณ์
มหาวิทยาลัย

tontooy@gmail.com [Switch account](#)  Draft saved 

* Indicates required question

อายุ *

20

ระดับการศึกษาสูงสุด หรือที่กำลังศึกษาอยู่หากเป็นนักเรียนหรือนักศึกษา *

- ประถมศึกษาหรือต่ำกว่า
- มัธยมศึกษาตอนต้นหรือเทียบเท่า
- มัธยมศึกษาตอนปลายหรือเทียบเท่า
- อนุปริญญาหรือเทียบเท่า
- ปริญญาตรีหรือเทียบเท่า
- สูงกว่าปริญญาโทหรือเทียบเท่า

รายได้ต่อเดือน *

- 0-5,000 บาท
- 5,001-10,000 บาท
- 10,001-20,000 บาท
- 20,001-30,000 บาท
- 30,001-40,000 บาท
- 40,001-50,000 บาท
- มากกว่า 50,000 บาท

Section 2: Secondhand book buyer**กรณีซื้อหนังสือมือสอง**ท่านซื้อหนังสือมือสอง บ่อยเพียง ได้ *

- เดียวเพียงครั้งเดียวหรือเพียงไม่กี่ครั้ง
- ซื้อเป็นประจำ โดยเฉลี่ยปีละ 1-2 ครั้ง
- ซื้อเป็นประจำ โดยเฉลี่ยปีละ 3-4 ครั้ง
- ซื้อเป็นประจำ โดยเฉลี่ยปีละมากกว่า 4 ครั้ง

จำนวนหนังสือที่ซื้อ โดยเฉลี่ยต่อการซื้อ 1 ครั้ง *

- 1-2 เล่ม
- 3-4 เล่ม
- 5-6 เล่ม
- มากกว่า 8 เล่ม

ท่านเคยซื้อหนังสือมือสองผ่านช่องทางใด *(เลือกได้มากกว่า 1 ช่อง)

- ร้านขายหนังสือ
- งานกิจกรรมหรือเวทีงานต่าง ๆ
- Shopee
- Facebook
- X (Twitter)
- Other: _____

ท่านซื้อรับเงินและรับหนังสือผ่านวิธีการใด *(เลือกได้มากกว่า 1 ช่อง)

- นัดพบหนังสือและชำระเงินให้ผู้ขาย
- ชำระเงินผ่านช่องทางออนไลน์และรับหนังสือผ่านสู่ไฟบิการขนส่ง
- Other: _____

ในฐานะผู้ซื้อหนังสือมือสอง ท่านพึงพอใจในกระบวนการซื้อขายหนังสือมือสองที่ *มืออยู่ในปัจจุบัน โดย 1 คือ ไม่พอใจมากที่สุด และ 5 คือพึงพอใจมากที่สุด

1	2	3	4	5
☆	☆	☆	☆	☆

ในการสั่งซื้อหนังสือมือสอง ท่านให้ความสำคัญกับสิ่ง ใดมากที่สุด *

- หนังสือที่ซื้อมีราคากู มีราคามหดลดลง
- ผู้ขายมีความน่าเชื่อถือหรือมีกลไกรับประกันความน่าเชื่อถือ
- หนังสือมือสองที่ได้รับตรงตามเงื่อนไขที่ผู้ขายระบุ (ตรงปก)

ปัญหาที่ท่านเคยพบจากการซื้อหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ)

- โอนเงินให้ผู้ขายแต่ไม่ได้รับสินค้า
- ได้รับสินค้าไม่ตรงตามเงื่อนไขที่ผู้ขายระบุ (ไม่ตรงปก)
- โพสต์หัวหนังสือหรือค้นหาผู้ขายได้ยาก

ปัญหาอื่น ๆ ที่ท่านเคยพบจากการซื้อหนังสือมือสอง

Your answer _____

นอกจากการซื้อหนังสือมือสอง ท่านเคยขายหนังสือมือสองด้วยหรือไม่ *

- เคย
- ไม่เคย

Section 3: Secondhand book seller**กรณีขายหนังสือมือสอง**ท่านขายหนังสือมือสอง บ่อยเพียงใด *

- เคยขายเพียงครั้งเดียวหรือเพียงไม่กี่ครั้ง
- ขายเป็นประจำ โดยเฉลี่ยปีละ 1-2 ครั้ง
- ขายเป็นประจำ โดยเฉลี่ยปีละ 3-4 ครั้ง
- ขายเป็นประจำ โดยเฉลี่ยปีละมากกว่า 4 ครั้ง

จำนวนหนังสือมือสองที่ ส่งขายโดยเฉลี่ยต่อการขาย 1 ครั้ง *

- 1-2 เล่ม
- 3-4 เล่ม
- 5-6 เล่ม
- มากกว่า 8 เล่ม

ท่าน เคยขายหนังสือมือสองผ่านช่องทางใด *
(เลือกได้มากกว่า 1 ช่อง)

- ร้านขายหนังสือ
- งานกิจกรรมหรืออิเวนต์ต่าง ๆ
- Shopee
- Facebook
- X (Twitter)
- Other: _____

ท่าน ชำนาญและร่วมมูลหนังสือผ่านวิธีการใด *
(เลือกได้มากกว่า 1 ช่อง)

- นัดรับหนังสือและส่งมอบหนังสือให้ผู้ซื้อ
- รับชำระเงินผ่านช่องทางออนไลน์และส่งหนังสือผ่านไปรษณีย์ให้บริการขนส่ง
- Other: _____

ในฐานะผู้ขายหนังสือมือสอง ท่านพึงพอใจในกระบวนการซื้อขายหนังสือมือสอง *
ที่มีอยู่ในปัจจุบัน โดย 1 คือ ไม่พอใจมากที่สุด และ 5 คือพึงพอใจมากที่สุด

1 2 3 4 5

☆ ☆ ☆ ☆ ☆

ในการขายหนังสือมือสอง ท่านให้ความสำคัญกับสิ่ง ใดมากที่สุด *

- กำไรจากการขาย
- จำนวนเงินหนังสือที่ขายได้
- ความรวดเร็วและสะดวกในการขายหนังสือ

ปัญหาที่ท่าน เคยพบ จากการขายหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ)

- ผู้ซื้อหัวใจว่าหนังสือไม่ตรงตามเงื่อนไข (ไม่ตรงปก) โดยปัญหานี้ได้เกิดจาก ผู้ซื้อขาย
- ต้องเสียรายละเอียดหรือเสียเวลา不少 เพื่อเป็นจำนวนมาก
- ต้องซื้อสิ่งของสื่อจานวนมากไปยังสถานที่ที่ซื้อ
- หนังสือมีคุณสมบัติพิเศษ เช่น มีลายเซ็นผู้เขียน แต่ไม่สามารถปรับราคาขาย ในระบบได้

ปัญหานี้ ๆ ที่ท่าน เคยพบ จากการขายหนังสือมือสอง

Your answer _____

Section 4: Neither buyer nor seller**กราฟไม่เคยทั้งซื้อหรือขายหนังสือมือสอง**

เหตุใดท่านจึงไม่ซื้อหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ) *

- ไม่ชอบอ่านหนังสือเป็นปกติอยู่แล้ว
- ไม่ชอบการซื้อหนังสือหรือสินค้ามือสอง ชอบซื้อแบบมือหนึ่งมากกว่า
- การซื้อหนังสือมือสองผ่านช่องทางออนไลน์มีความเสี่ยงถูกโกง
- การซื้อหนังสือมือสองอาจได้รับหนังสือคุณภาพดี
- การซื้อหนังสือมือสองยุ่งยาก ซับซ้อน ไม่สะดวก
- Other: _____

สมมติว่าท่านต้องการซื้อหนังสือมือสอง หากมีช่องทางการซื้อขายหนังสือมือสอง *

เกิดขึ้นใหม่ เพื่อแก้ปัญหาที่ท่านพบในข้อก่อนหน้า ท่านมีแนวโน้มจะซื้อหนังสือมือสองผ่านช่องทางนี้ในระดับใด (5 คือ มีแนวโน้มสูงที่สุด และ 1 คือ มีแนวโน้มต่ำที่สุด)

1 2 3 4 5



เหตุใดท่านจึงไม่ขายหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ) *

- ไม่มีหนังสือในครอบครองอยู่แล้ว
- การขายหนังสือมือสองมักได้ราคาไม่ดี
- การขายหนังสือมือสองไม่คุ้มค่ากับเวลาที่ต้องใช้
- การขายหนังสือมือสองยุ่งยาก ซับซ้อน ไม่สะดวก
- Other: _____

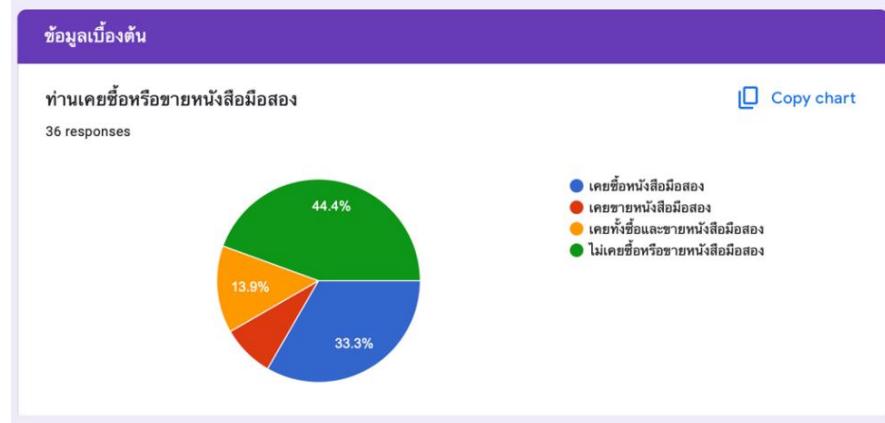
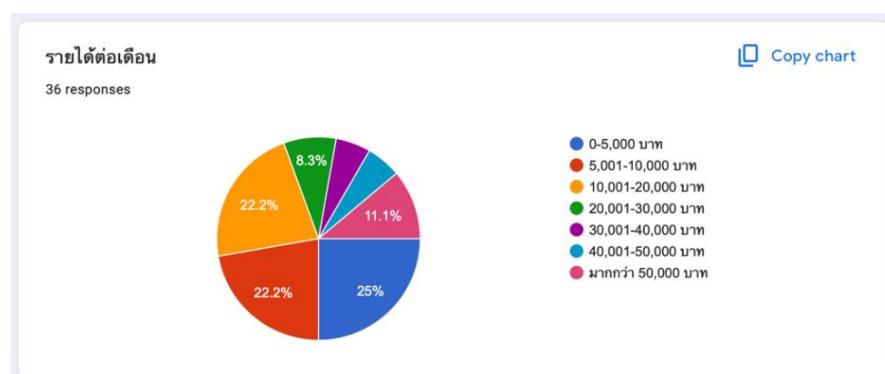
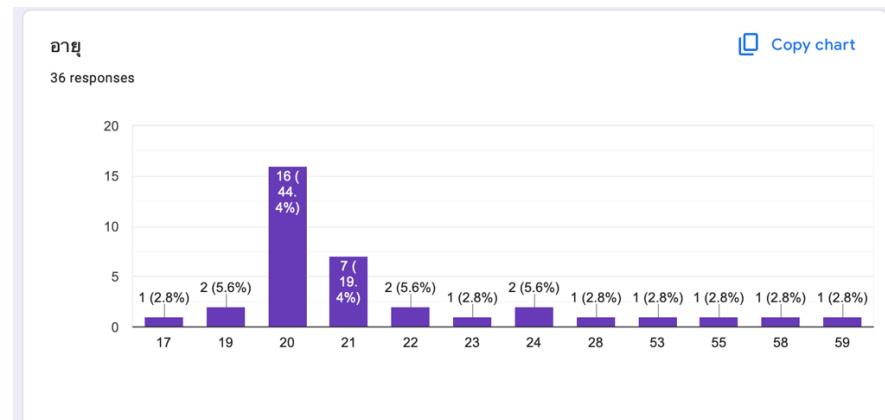
สมมติว่าท่านต้องการขายหนังสือมือสอง หากมีช่องทางการซื้อขายหนังสือมือสอง *

เกิดขึ้นใหม่ เพื่อแก้ปัญหาที่ท่านพบในข้อก่อนหน้า ท่านมีแนวโน้มจะซื้อหนังสือมือสองผ่านช่องทางนี้ในระดับใด (5 คือ มีแนวโน้มสูงที่สุด และ 1 คือ มีแนวโน้มต่ำที่สุด)

1 2 3 4 5



Section 1 Responses

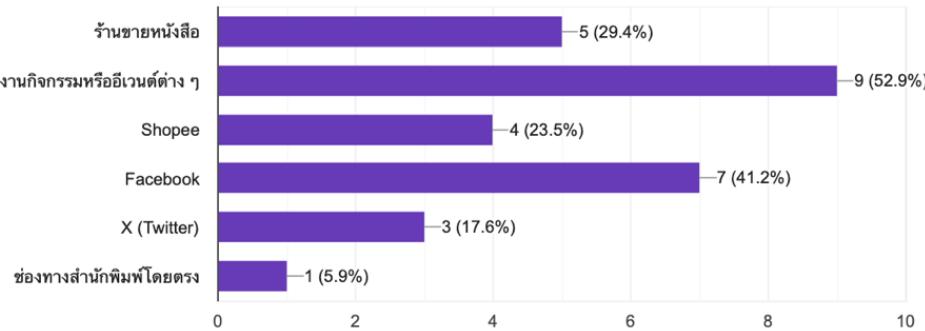


Section 2: Responses

ท่านเคยซื้อหนังสือมือสองผ่านช่องทางใด
(เลือกได้มากกว่า 1 ข้อ)

[Copy chart](#)

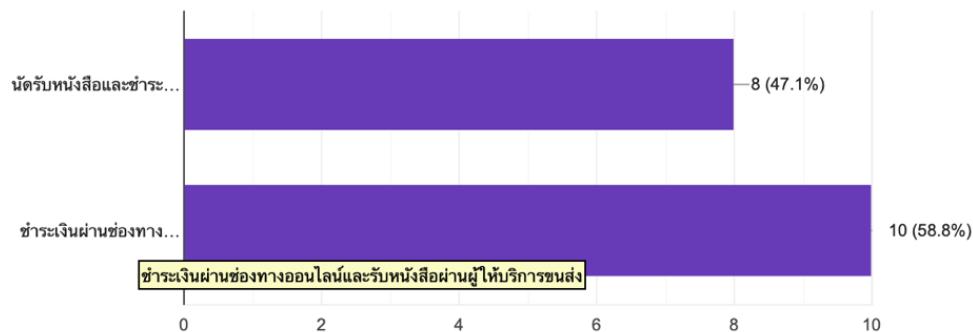
17 responses



ท่านชำระเงินและรับหนังสือผ่านวิธีการใด
(เลือกได้มากกว่า 1 ข้อ)

[Copy chart](#)

17 responses

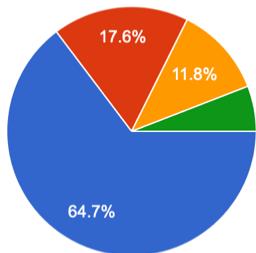


กราฟีชื่อหนังสือมือสอง

ท่านซื้อหนังสือมือสอง บ่อยเพียง ได

17 responses

Copy chart

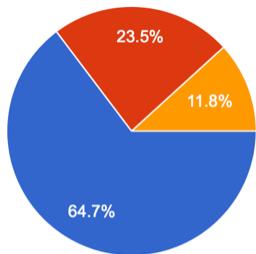


- บ่อยเพียงครั้งเดียวหรือเพียงไม่ถ้วน
- ซื้อเป็นประจำ โดยเฉลี่ยปีละ 1-2 ครั้ง
- ซื้อเป็นประจำ โดยเฉลี่ยปีละ 3-4 ครั้ง
- ซื้อเป็นประจำ โดยเฉลี่ยปีละมากกว่า 4 ครั้ง

จำนวนหนังสือที่สั่งซื้อ โดยเฉลี่ยต่อการซื้อ 1 ครั้ง

17 responses

Copy chart



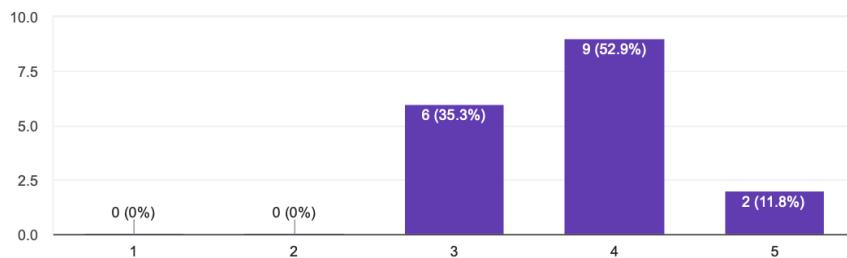
- 1-2 เล่ม
- 3-4 เล่ม
- 5-6 เล่ม
- มากกว่า 8 เล่ม

ในฐานะผู้ซื้อหนังสือมือสอง ท่านพึงพอใจในกระบวนการซื้อขายหนังสือมือสองที่มีอยู่ในปัจจุบัน โดย 1 คือ ไม่พอใจมากที่สุด และ 5 คือพึงพอใจมากที่สุด

17 responses

Copy chart

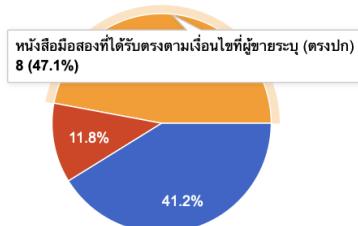
Average rating (3.76)



ในการสั่งซื้อหนังสือมือสอง ท่านให้ความสำคัญกับสิ่งใดมากที่สุด

17 responses

Copy chart

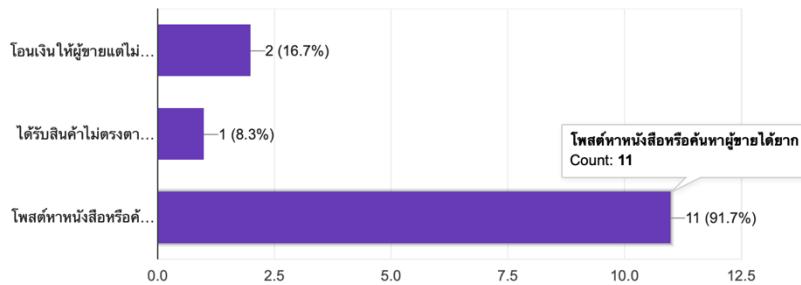


- หนังสือที่รับรองโดยสถาบันฯ มีความน่าเชื่อถือและมีกลไกรับประกัน
- ผู้ขายมีความน่าเชื่อถือหรือมีกลไกรับประกัน
- หนังสือมือสองที่ได้รับการดูแลดี

ปัญหาที่ท่านเคยพบจากการซื้อหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ)

[Copy chart](#)

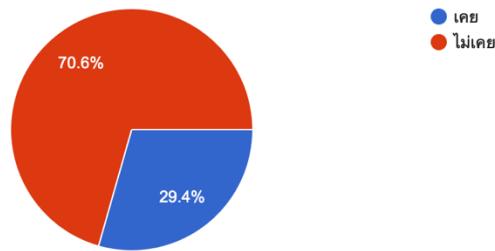
12 responses



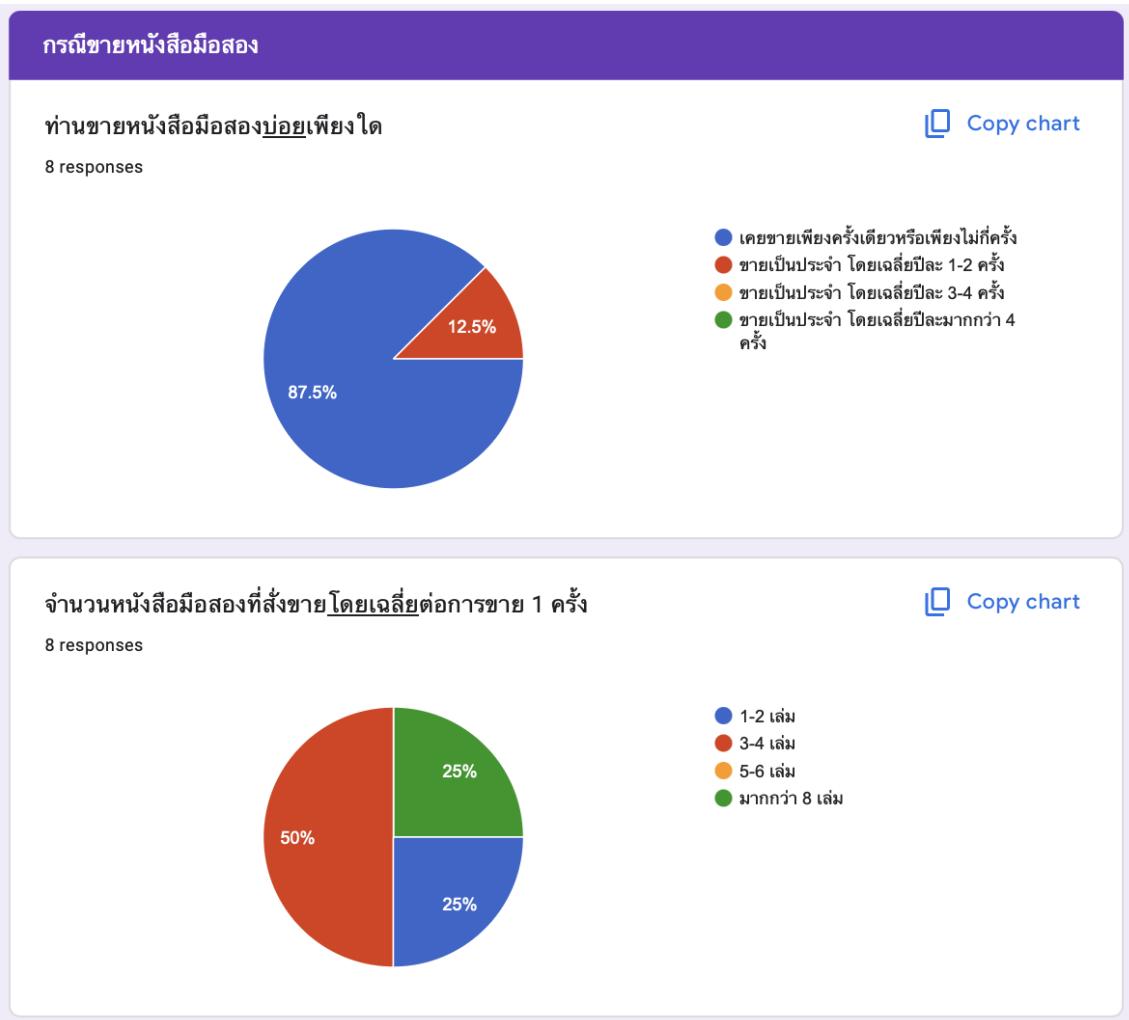
นอกจากการซื้อหนังสือมือสอง ท่านเคยขายหนังสือมือสองด้วยหรือไม่

[Copy chart](#)

17 responses

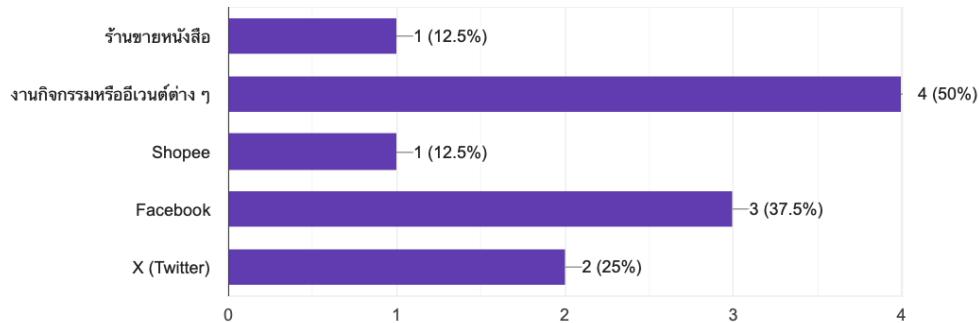


Section 3 Responses



**ท่านเคยขายหนังสือมือสองผ่านช่องทางใด
(เลือกได้มากกว่า 1 ข้อ)**

8 responses

[Copy chart](#)

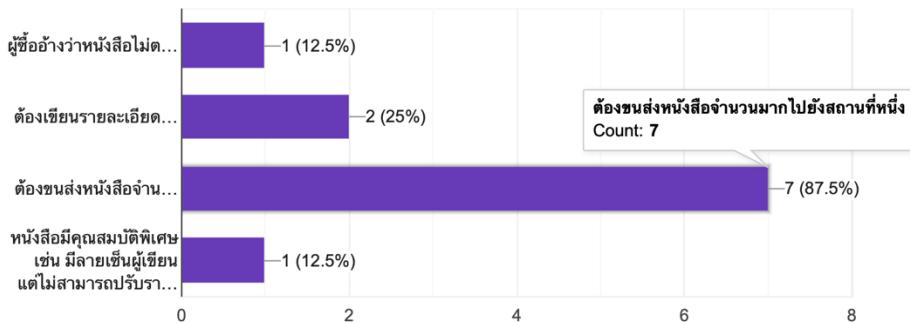
**ท่านชำระเงินและส่งมอบหนังสือผ่านวิธีการใด
(เลือกได้มากกว่า 1 ข้อ)**

8 responses

[Copy chart](#)

ปัญหาที่ท่าน~~เคย~~พบจากการขายหนังสือมือสอง (ตอบได้มากกว่า 1 ข้อ)

8 responses

[Copy chart](#)

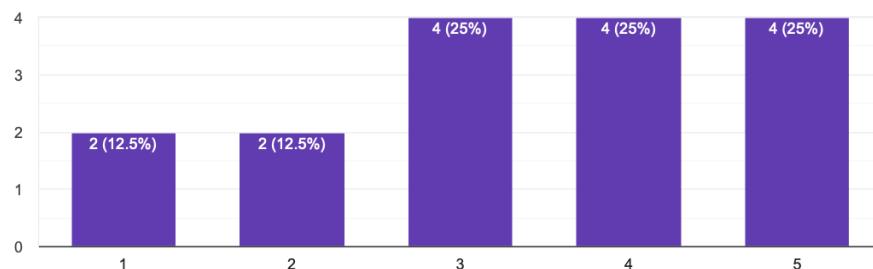
Section 4 Responses

สมมติว่าท่านต้องการซื้อหนังสือมือสอง หากมีช่องทางการซื้อขายหนังสือมือสองเกิดขึ้นใหม่ เพื่อแก้ปัญหาที่ท่านพบในข้อก่อนหน้า ท่านมีแนวโน้มจะซื้อหนังสือมือสองผ่านช่องทางนี้ในระดับใด (5 คือ มีแนวโน้มสูงที่สุด และ 1 คือ มีแนวโน้มต่ำที่สุด)

16 responses

[Copy chart](#)

Average rating (3.38)



สมมติว่าท่านต้องการขายหนังสือมือสอง หากมีช่องทางการซื้อขายหนังสือมือสองเกิดขึ้นใหม่ เพื่อแก้ปัญหาที่ท่านพบในข้อก่อนหน้า ท่านมีแนวโน้มจะซื้อหนังสือมือสองผ่านช่องทางนี้ในระดับใด (5 คือ มีแนวโน้มสูงที่สุด และ 1 คือ มีแนวโน้มต่ำที่สุด)

16 responses

[Copy chart](#)

Average rating (3.75)

