

Department of Computer Science and Engineering
University of Barishal

3rd Year 1st Semester, 2nd Midterm Exam, Session: 2021-22

Course Code: CSE 3103, Course Title: Software Engineering & Information System Design

Time: 30 minutes

Marks: 20

Answer any TWO questions from the followings.

A bookstore plans to develop a Book Store Management System (BSMS) to streamline both in store and online operations. The system will allow customers to browse books, search by title, author, or category, view detailed information, add selected books to a shopping cart, place orders, make online payments, and track their order status from placement to delivery. Customers will also be able to submit reviews and feedback on purchased books. Store employees will use the system to manage daily tasks such as adding new books to the catalog, updating stock quantities, processing customer orders by confirming, packing, and shipping them, handling complaints, and managing returns or refunds. The system will maintain several key data stores, including customer profiles, book catalog details, supplier information, order histories, payment records, and inventory levels. The BSMS is expected to efficiently support workflows such as order processing, inventory restocking, supplier management, and return or refund operations, ensuring smooth interaction between customers, employees, and administrators.

1. a) Identify any five major use cases for the BSMS from the perspective of different actors. [10]
b) Draw a Use Case Diagram showing the actors and their interactions with the system.
2. Prepare class-based modeling for the Book Store Management System by identifying [10]
potential classes using proper selection criteria, creating class cards with attributes and operations, and drawing the corresponding class diagram.
3. What is a Data Flow Diagram (DFD)? Explain its purpose in requirements modeling and [10]
draw DFD up to Level-2 for the BSMS showing major processes, data stores, and external entities.
4. a) Develop a detailed Sequence Diagram for the BSMS that depicts the interaction among [10]
the Customer, System, Payment Service, and Store Employee during the complete online book ordering process, covering steps such as book selection, adding to cart, order placement, payment verification, order confirmation, and notification.
b) Prepare a comprehensive State Transition Diagram for the Order Lifecycle in the BSMS, illustrating all major states and the transitions triggered by user actions or system events.

use case Scenario table

Label	Level-1	Level-2	Actor
BSMS	Authentication	Login	customer, employee
		Logout	
		Registration	
	Browse books	search book	customer
		view book details	
	Manage cart & order	Add to cart	customer
		check out	
		order confirmation make payments	
	Manage review	Submit Review	customer
		View Reviews	
	Manage inventory	Add new book	employee
		update stock	
	Manage order	Order placement	employee
		Pack Item	
		update status	

USE CASE 1: USER Authentication

Primary Actors: customer, Admin

Goal: To register, login, and logout of the BSMS

Preconditions:

1. user interface for authentication available
2. user must be registered (for login/logout)

Trigger:

- user needs to access or exit the system.

Use Case Scenario

1. User visits authentication page.
2. For Registration user enters detail → system account is not registered.
3. Login if user already registered
4. Logout

Exceptions:

- invalid input or wrong credentials

Priority: Essential

Availability: First Release

mid-2 question:

1. Use Case: Browse & Search Books

Primary Actor: customer

Goal: To find books by Browsing or Searching.

Precondition: Book Catalog must be available.

Trigger: Customer wants to explore or

Search for a books

Scenario

1. open catalog

2. Search by title/author/category

3. view book details

Exception: No results/invalid search text

Priority: Essential

2. Use Case: Add to cart and place order

Primary Actor: customer

Goal: To purchase books for the store

Precondition: customer logged in & books available

Trigger: customer decides to buy select books

Scenario:

1. Add books to cart

2. proceed to checkout.

3. Provide delivery info

4. make payment

5. Receive confirmation

Exceptions: payment failure, out of stock

Priority: Essential

When available: First increment

3. Use case: Submit Review/Feedback

Primary Actor: customer

Goal: To share experience

Precondition: Book must be previously purchased

Trigger: customer wants to post a review

Scenario:

1. Open Purchased book page

2. Enter Rating and comment

3. Submit Review

Exception: No purchase record, invalid content

Priority: Medium

When available: Second increment

4. Use Case: Manage Inventory (Add/Update Books)

Primary Actor: Store Employee

Goal: To update catalog and stock levels

Precondition: Employee logged in.

Trigger: New Stock arrived or book data needs change

1. Open inventory page

2. Add or edit book details

3. update stock

4. save changes

Exception: Invalid data, duplicate entries

Priority: Essential

5. Use Case: Process order (confirm, pack, ship)

~~2~~ Primary Actor: Store employee.

Goal: To handle customer orders

Precondition: An order must be placed

Trigger: New order notification appears.

1. View pending order

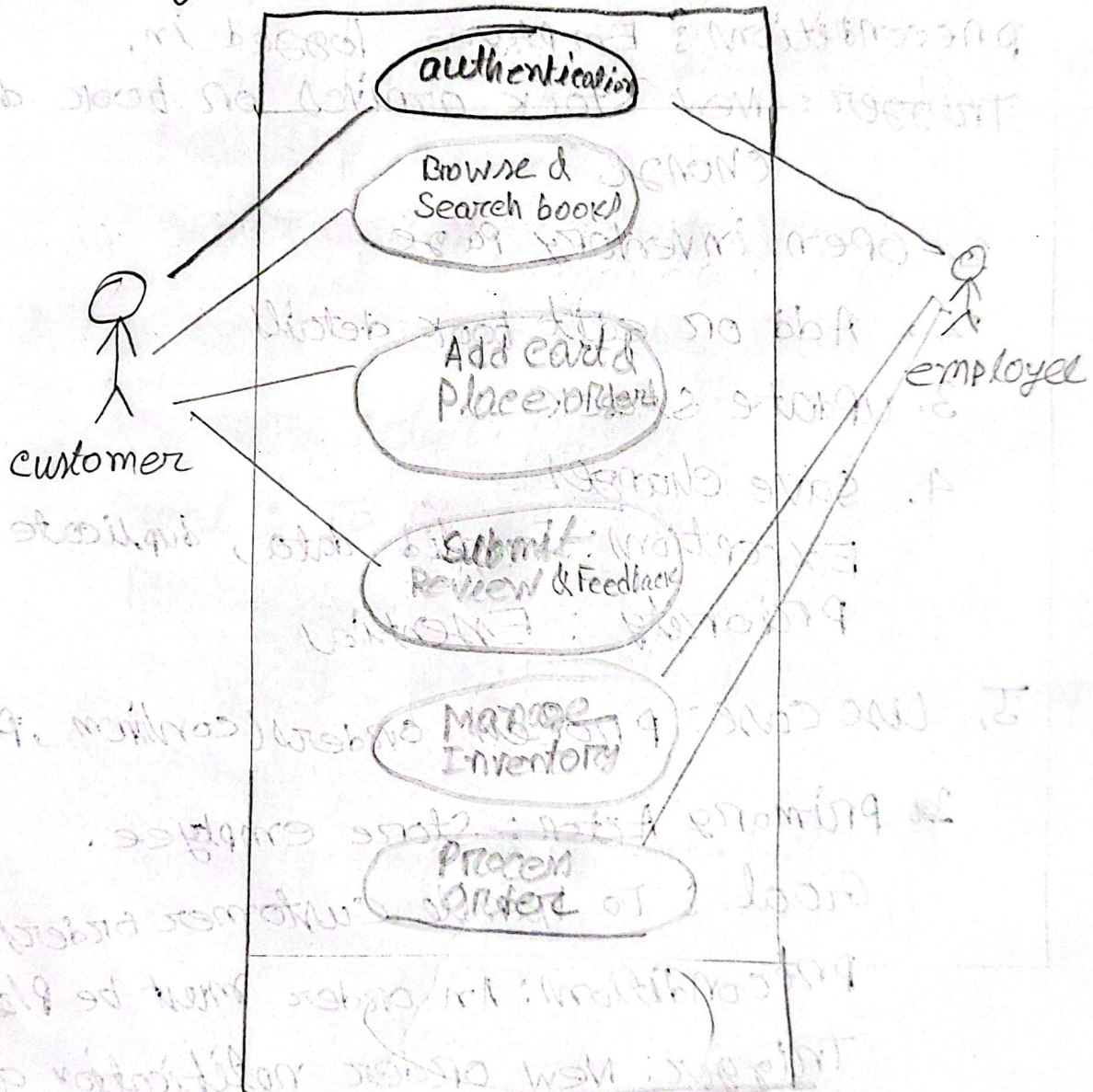
2. confirm order

3. pack item

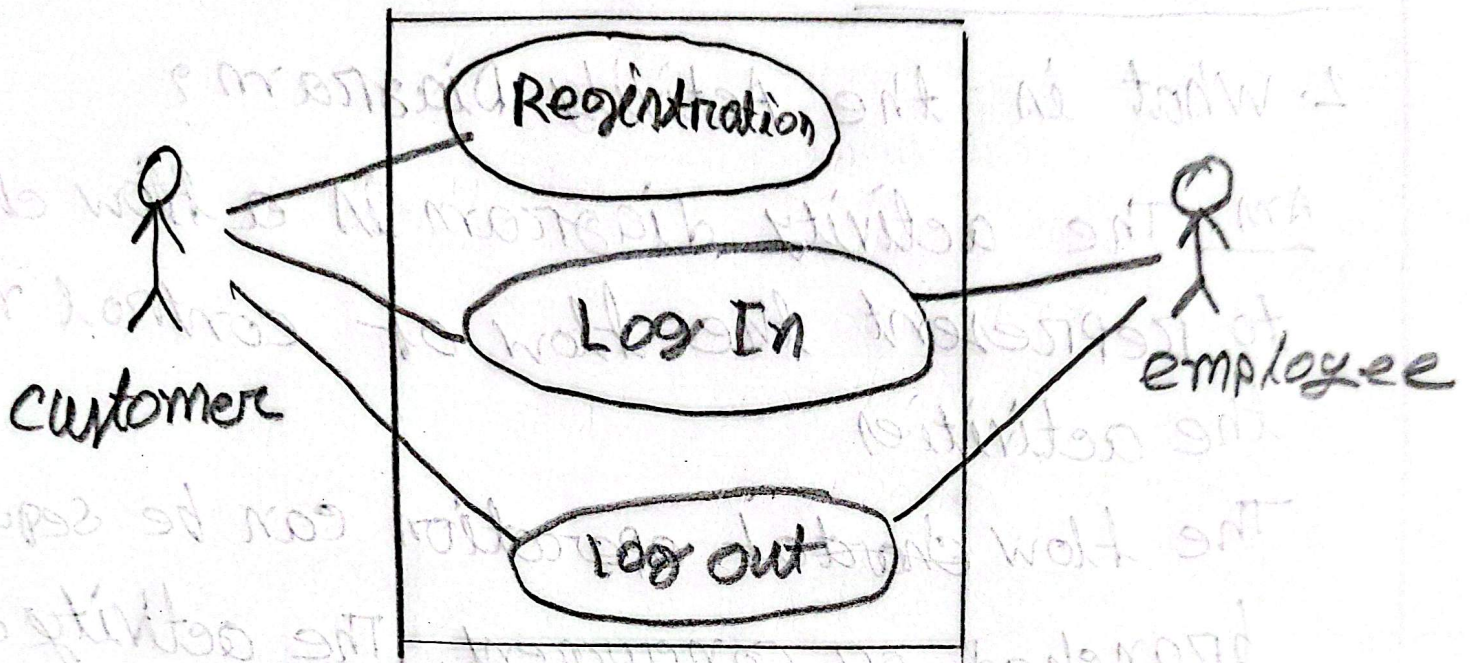
4. update status.

Exception: Stock mismatch, Wrong address, order cancellation

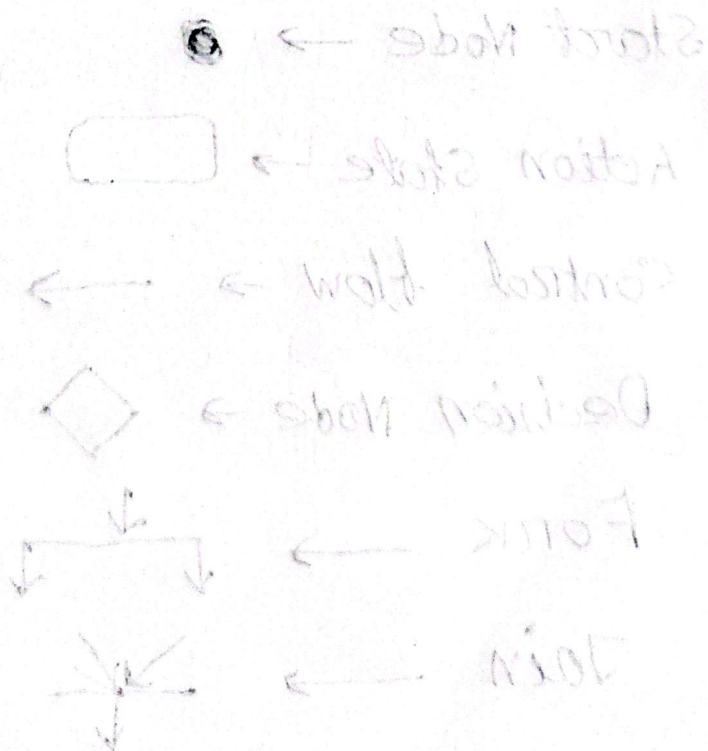
Priority: Essential

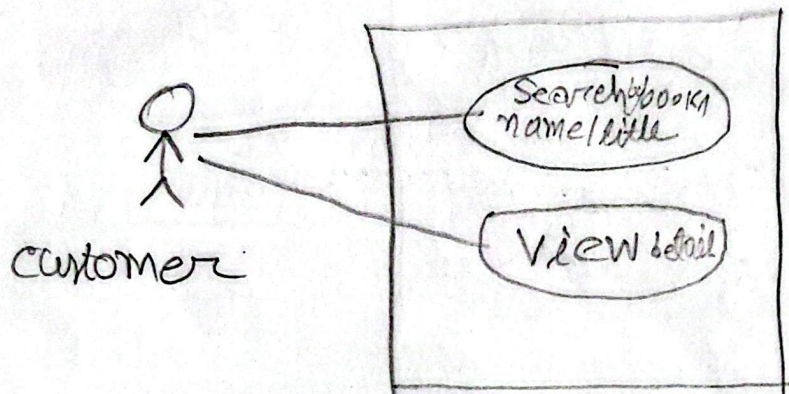


Level: 0 for BMS

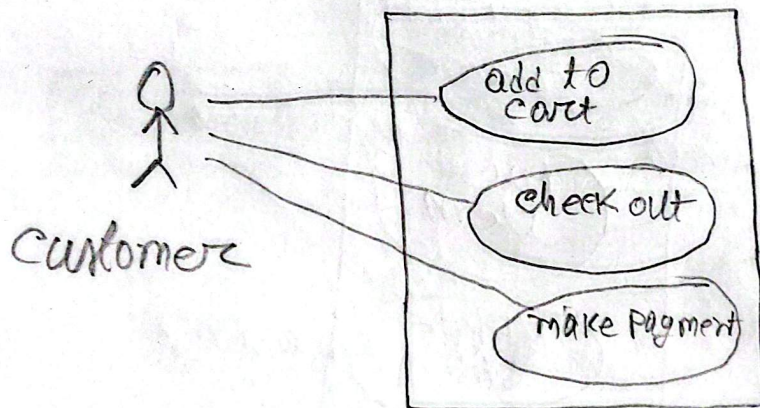


Level 1.1 Authentication

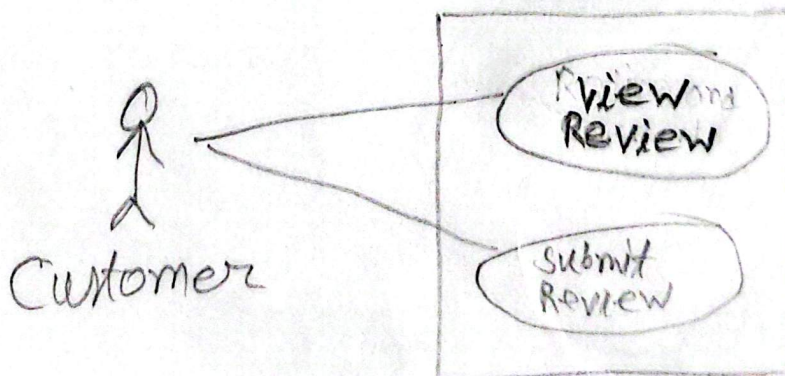




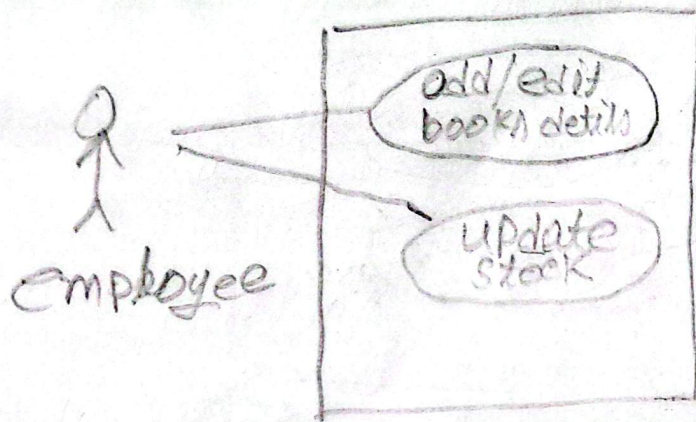
Level : 1.2 (browse book) for BSMS



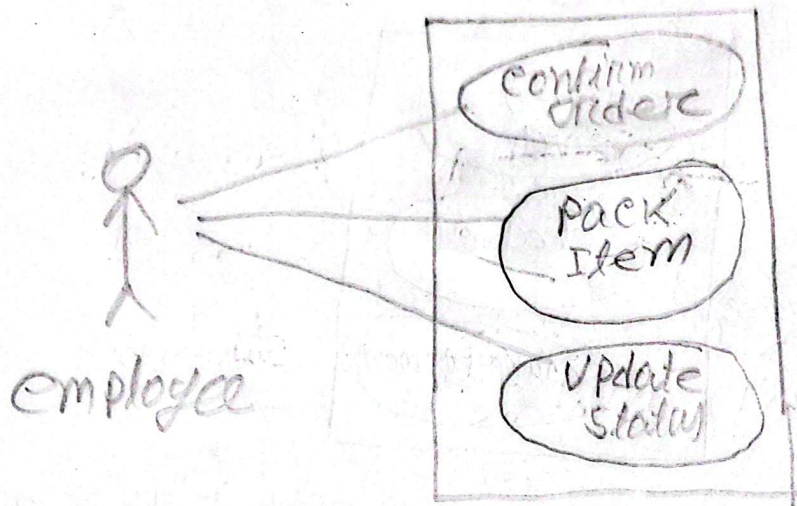
Level : 1.3 (Add cart & place order) for BSMS



Level : 1.4 (Review & feedback) for BSMS



Level : 1.5 (manage Inventory) for BSMs



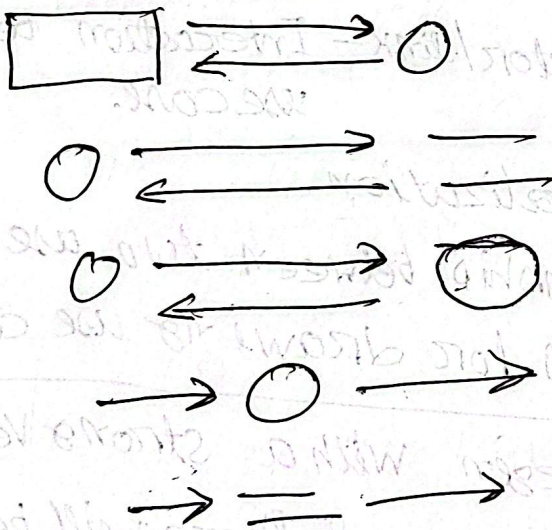
Level : 1.6 (process order) for BSMs

Data Flow modeling

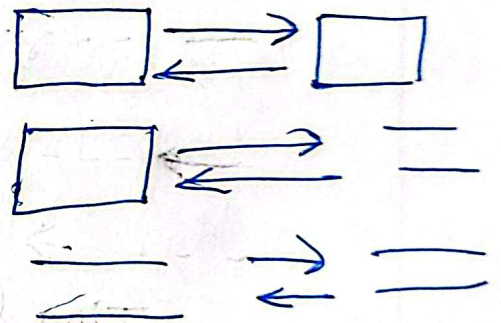
A Data Flow diagram is a graphical representation of the flow of data in a system. It shows:

- Processes (that transform data) ○
- External entities (source and destination of data) □
- Data Storages (where data is held) =
- Data flow → (connecting all these components)

Valid case

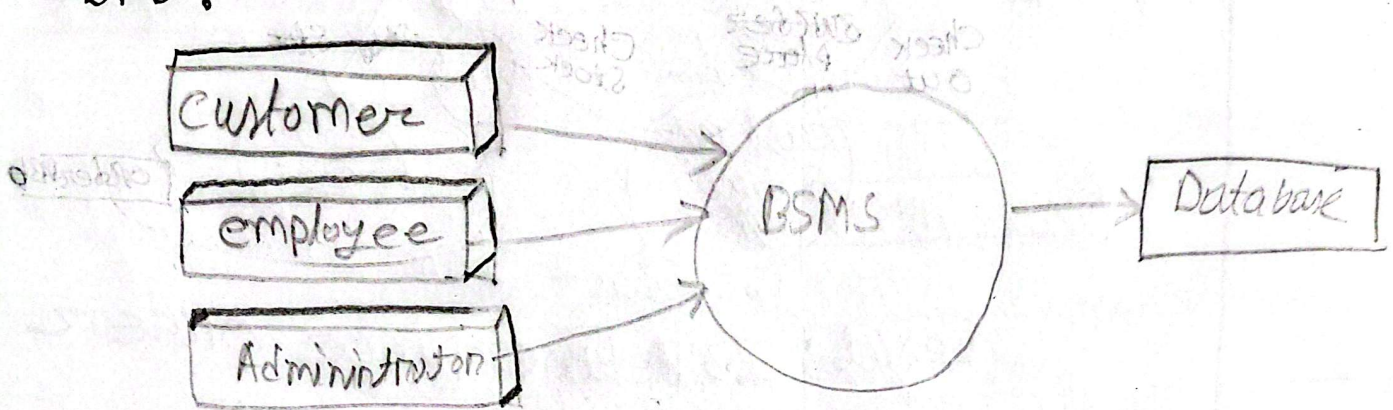


Invalid case

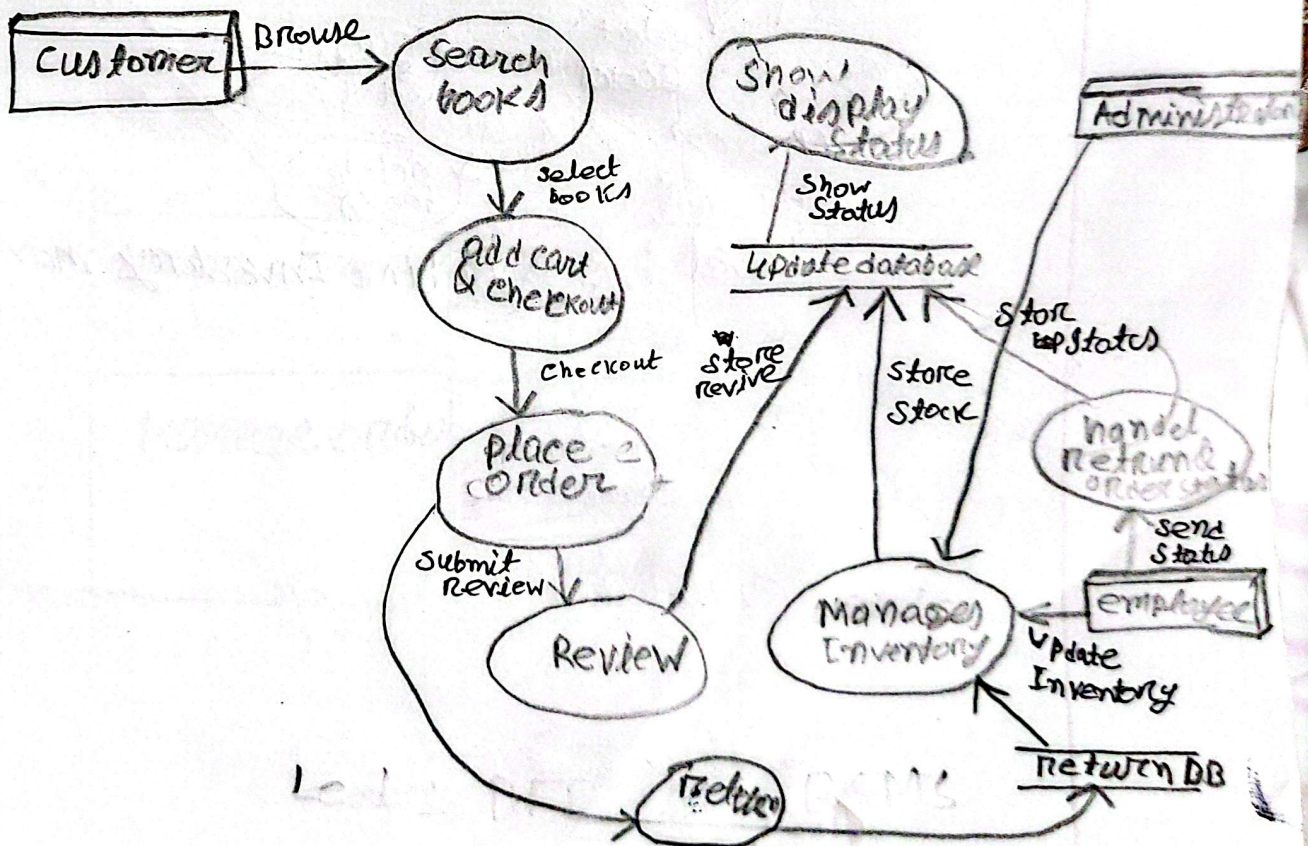


- DFD is presented in a hierarchical fashion
- It starts with a context diagram which represents whole system
- Then ~~we~~ break it down into Level 1, Level 2 etc.
- Represent only data flow, not control flow
- Focus on what happens, not how it happens
- Avoid implementation details (no loops, condition, if statements)

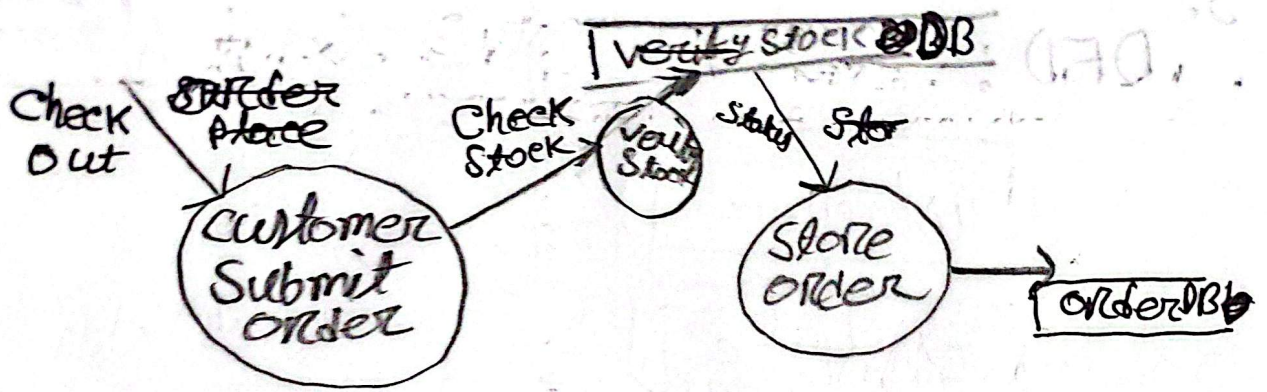
3. DFD :



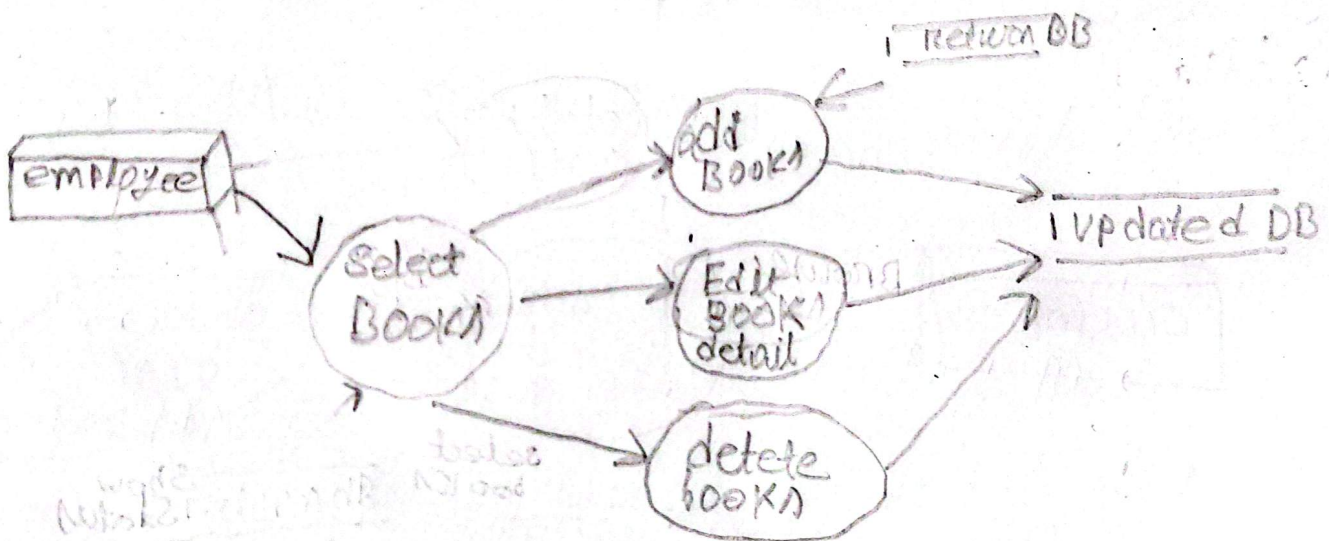
Level 0 For BSMS



Level:1 DFD for BSMS



Level : 2.3 Refine place order



Level : 2.6 Refine Inventory management

Activity diagram

2. What is the Activity Diagram?

Am: The activity diagram is a flow chart to represent the flow of control among the activities.

The flow chart operation can be sequential, branched or concurrent. The activity diagram is sometimes considered as the flow chart. Although the diagrams look like a flow chart they are not.

Start Node → 

Action State → 

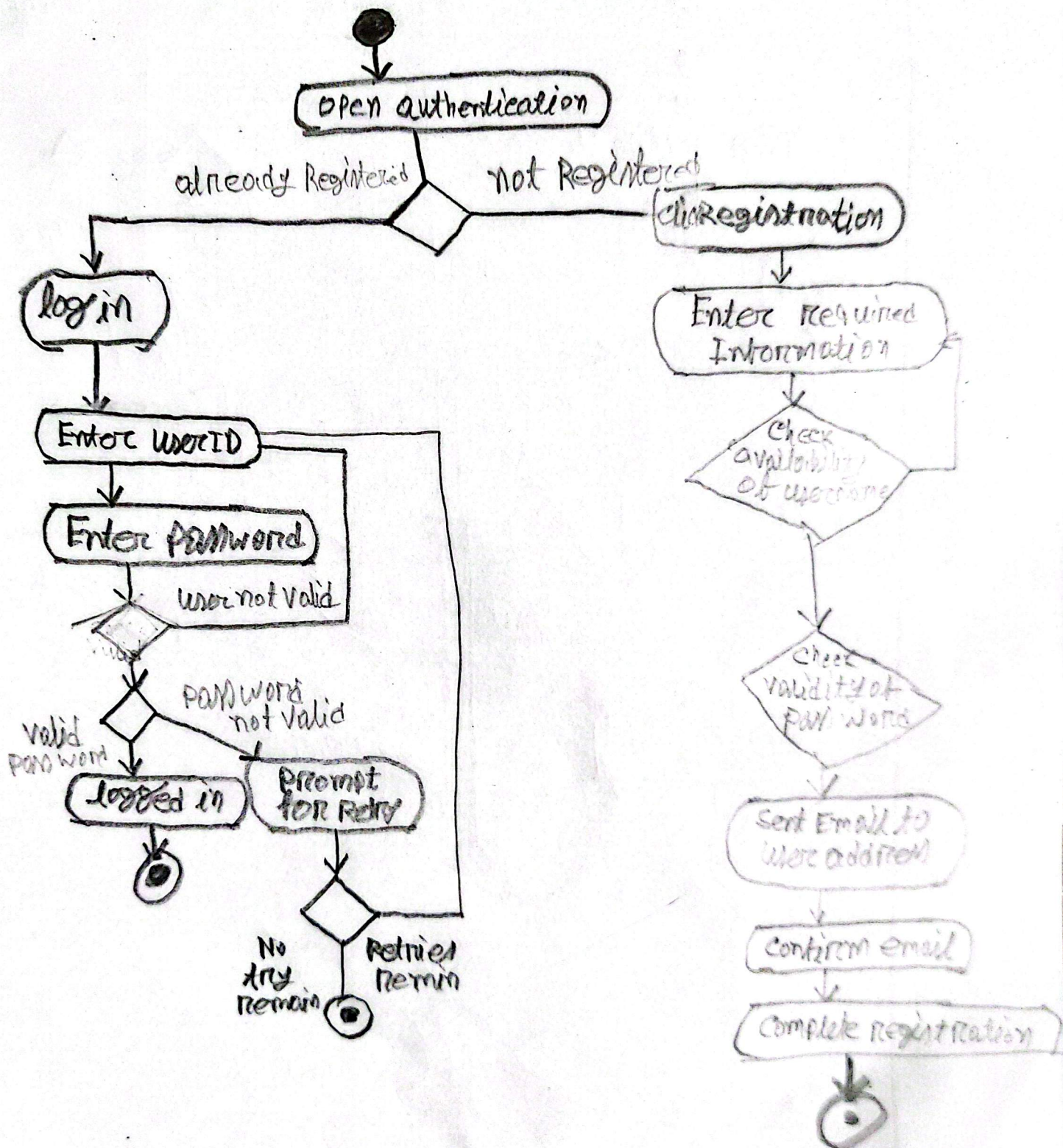
Control flow → 

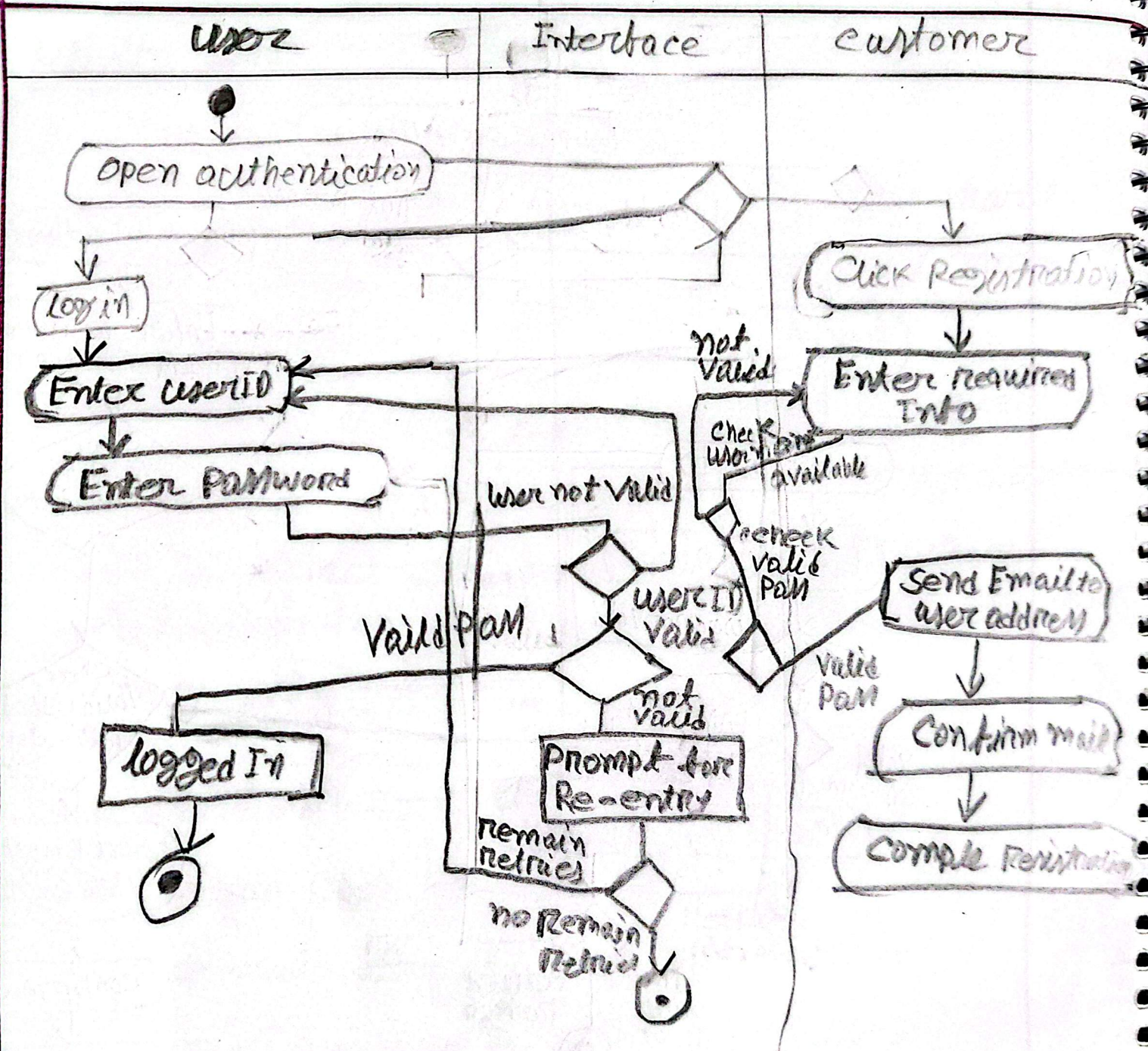
Decision Node → 

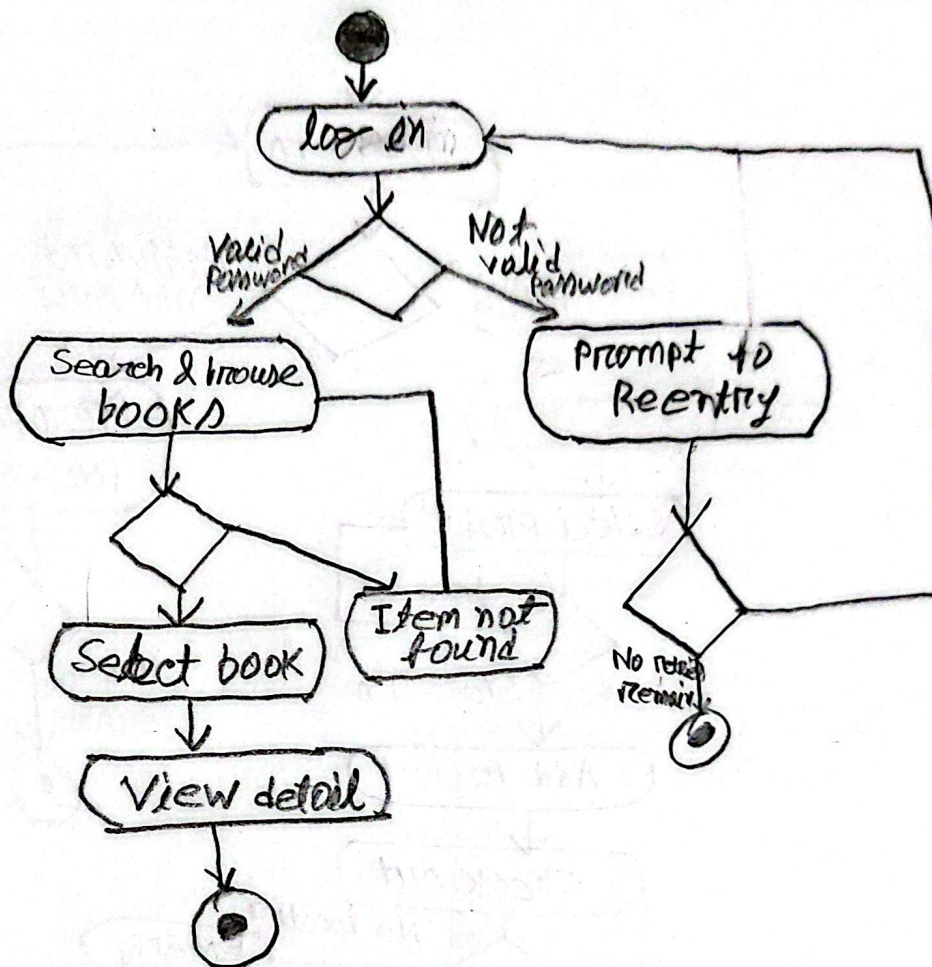
Fork → 

Join → 

End state → 

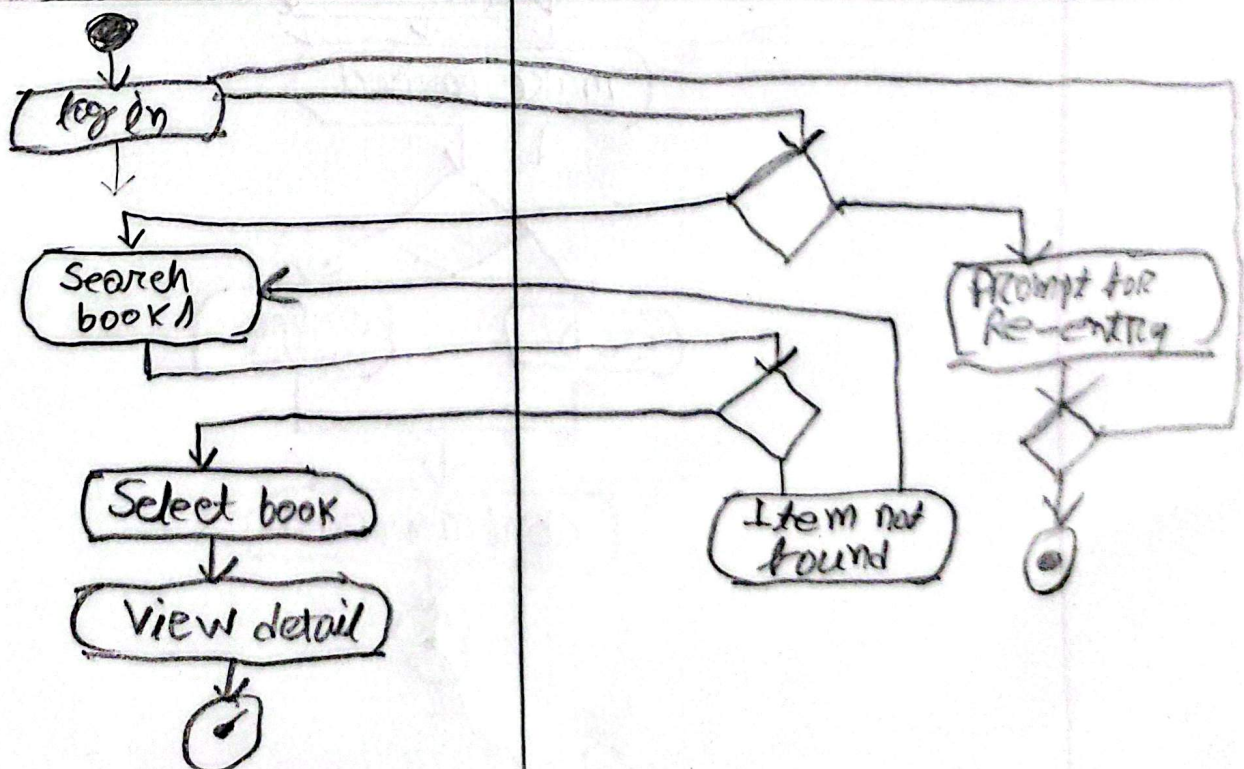






Customer

Interface



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