B.M.S. COLLEGE OF ENGINEERING BENGALURU
Autonomous Institute,Affiliatedto VTU

Lab Record

Object-Oriented Modeling – 23CS5PCOOM
Submitted in partial fulfillmentfor the 5th Semester Laboratory

Bachelor of Engineering
in
Computer Science and Engineering

Submitted by:

Vansh Santoki

1BM23CS363

Department of ComputerScience and Engineering
B.M.S. Collegeof Engineering Bull Temple Road,
Basavanagudi, Bangalore 560 019 August 2025-
December 2025

B.M.S. COLLEGE OF ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND ENGINEERING

CERTIFICATE

This is to certify that the Object-Oriented Modeling(23CS5PCOOM) laboratory has been carried out by Vansh Santoki(1BM23CS363) during the 5th Semester August 2025-December 2025

.

Signature of the Faculty Incharge:

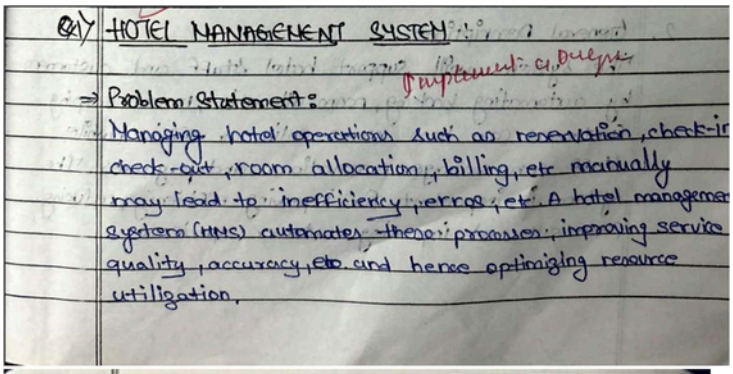
Dr. Adarsha Sagar H V Assistant ProfessoR

Department of Computer Science and Engineering B.M.S. College of Engineering, Bangalore

Tables Content:

1. Hotel Management System

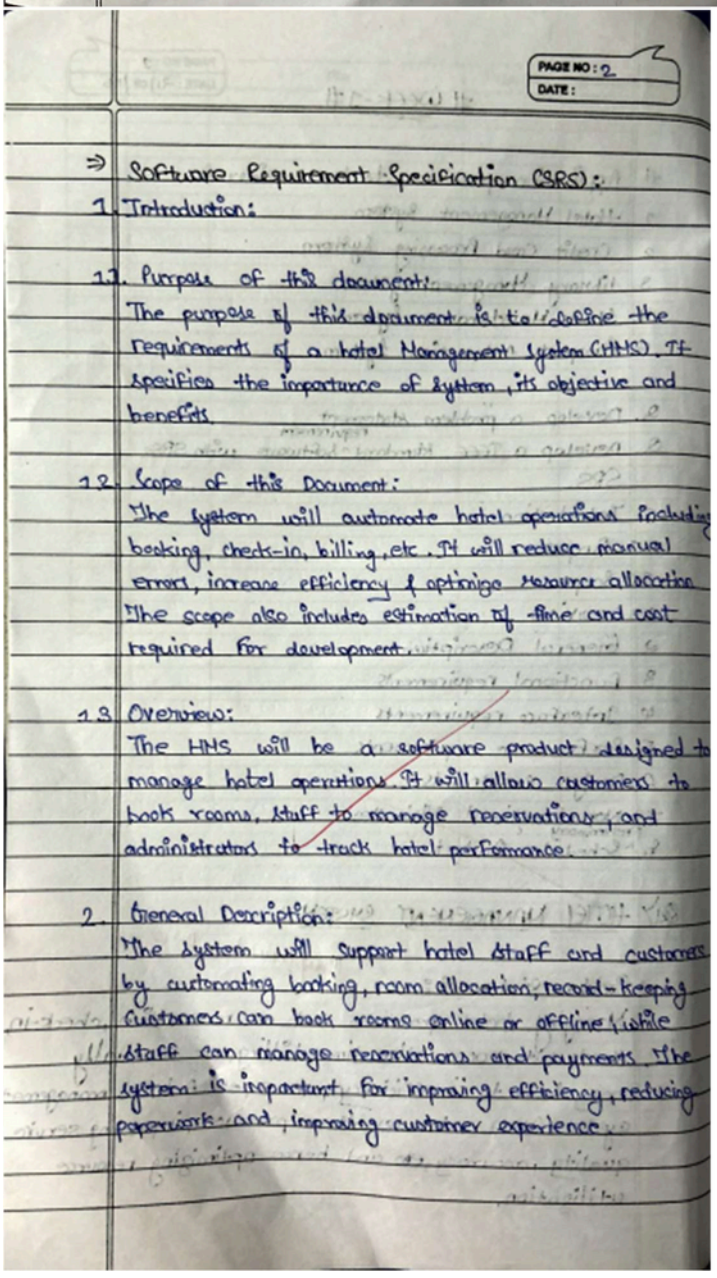
SRS:



Q1) HOTEL MANAGEMENT SYSTEM

⇒ Problem Statement:

Managing hotel operations such as reservation, check-in check-out, room allocation, billing, etc manually may lead to inefficiency, errors, etc. A hotel management system (HMS) automates these processes, improving service quality, accuracy, etc. and hence optimizing resource utilization.



PAGE NO: 2
DATE:

⇒ Software Requirement Specification (SRS):

1. Introduction:

1.1. Purpose of this document:

The purpose of this document is to define the requirements of a hotel Management System (HMS). It specifies the importance of system, its objective and benefits.

1.2. Scope of this Document:

The system will automate hotel operations including booking, check-in, billing, etc. It will reduce manual errors, increase efficiency & optimize resource allocation. The scope also includes estimation of time and cost required for development.

1.3. Overview:

The HMS will be a software product designed to manage hotel operations. It will allow customers to book rooms, staff to manage reservations, and administrators to track hotel performance.

2. General Description:

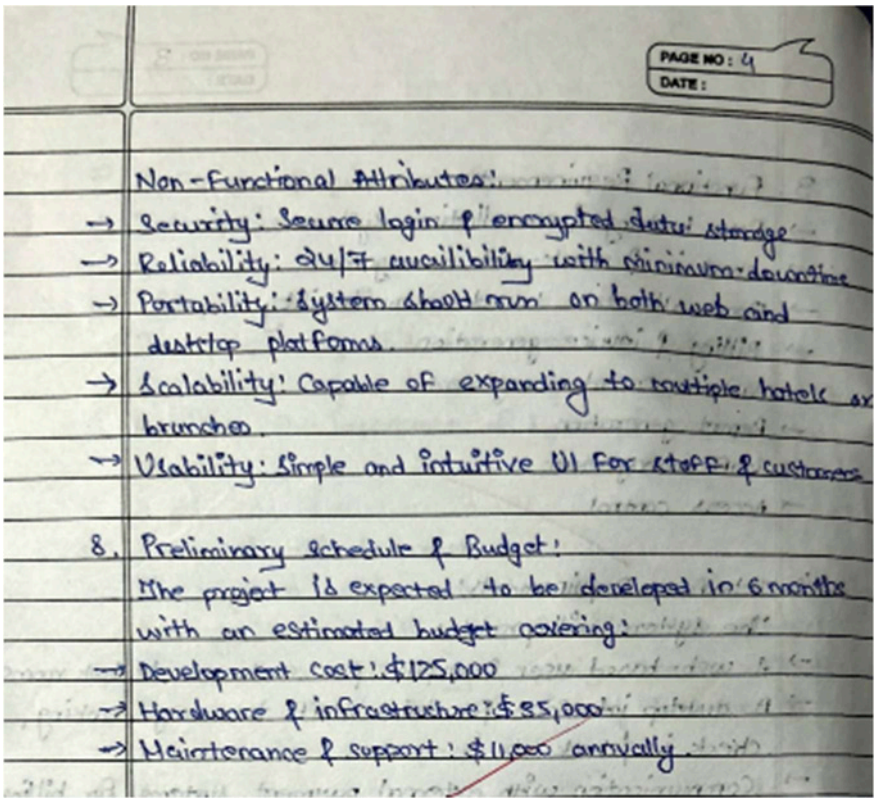
The system will support hotel staff and customers by automating booking, room allocation, record-keeping. Customers can book rooms online or offline while staff can manage reservations and payments. The system is important for improving efficiency, reducing paperwork and improving customer experience.

3. Functional Requirements:
→ Room booking & cancellation systems
→ check-in & check-out management
→ Room allocation based on availability
→ Billing & invoice generation
→ Customer record management
→ Report generation
→ Staff management
→ Access control

4. Interface Requirements:
The system will provide:
→ A web-based user interface for customers to book rooms
→ A desktop interface for hotel staff to manage booking, check-ins / check-outs
→ Communication with external payment systems for billing

5. Performance Requirements:
→ The system must support at least 100 concurrent users
→ Data must be stored securely and retrieved quickly
→ The system must operate at 99% efficiency.
→ Error rate in transaction must not exceed 1%.

6. Design constraints:
→ System must run on windows / linux with database support (MySQL / SQL Server)
→ Limited budget and hardware availability
→ Must comply with data protection policies.



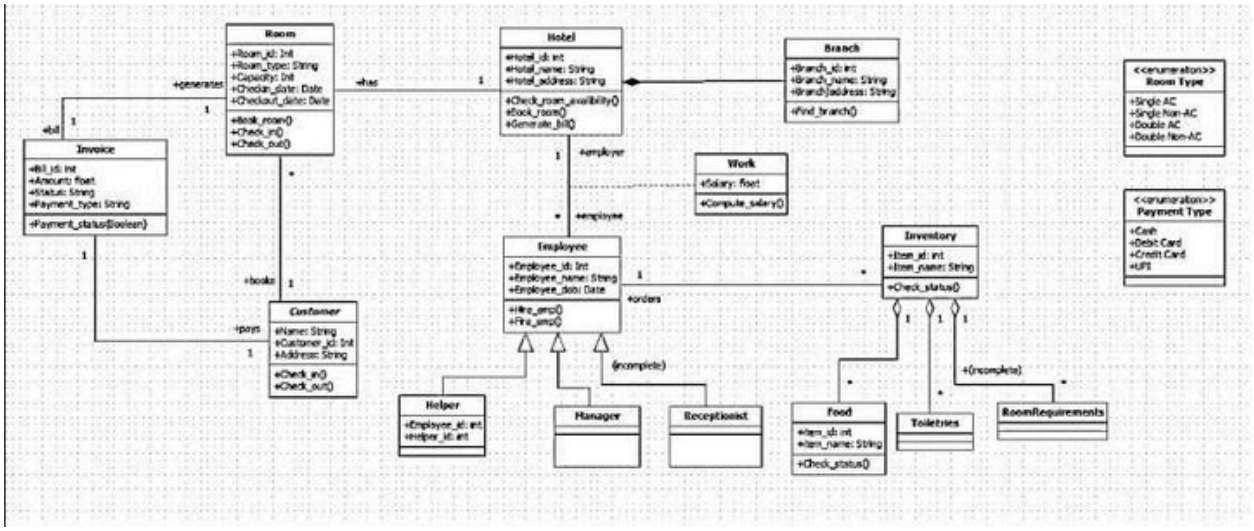
PAGE NO : 4
DATE :

Non-Functional Attributes:

→ Security: Secure login & encrypted data storage
→ Reliability: 24/7 availability with minimum downtime
→ Portability: System should run on both web and desktop platforms.
→ Scalability: Capable of expanding to multiple hotels or branches.
→ Usability: Simple and intuitive UI for staff & customers

8. Preliminary Schedule & Budget:
The project is expected to be developed in 6 months with an estimated budget covering:
→ Development cost: $125,000
→ Hardware & infrastructure: $35,000
→ Maintenance & support: $11,000 annually.

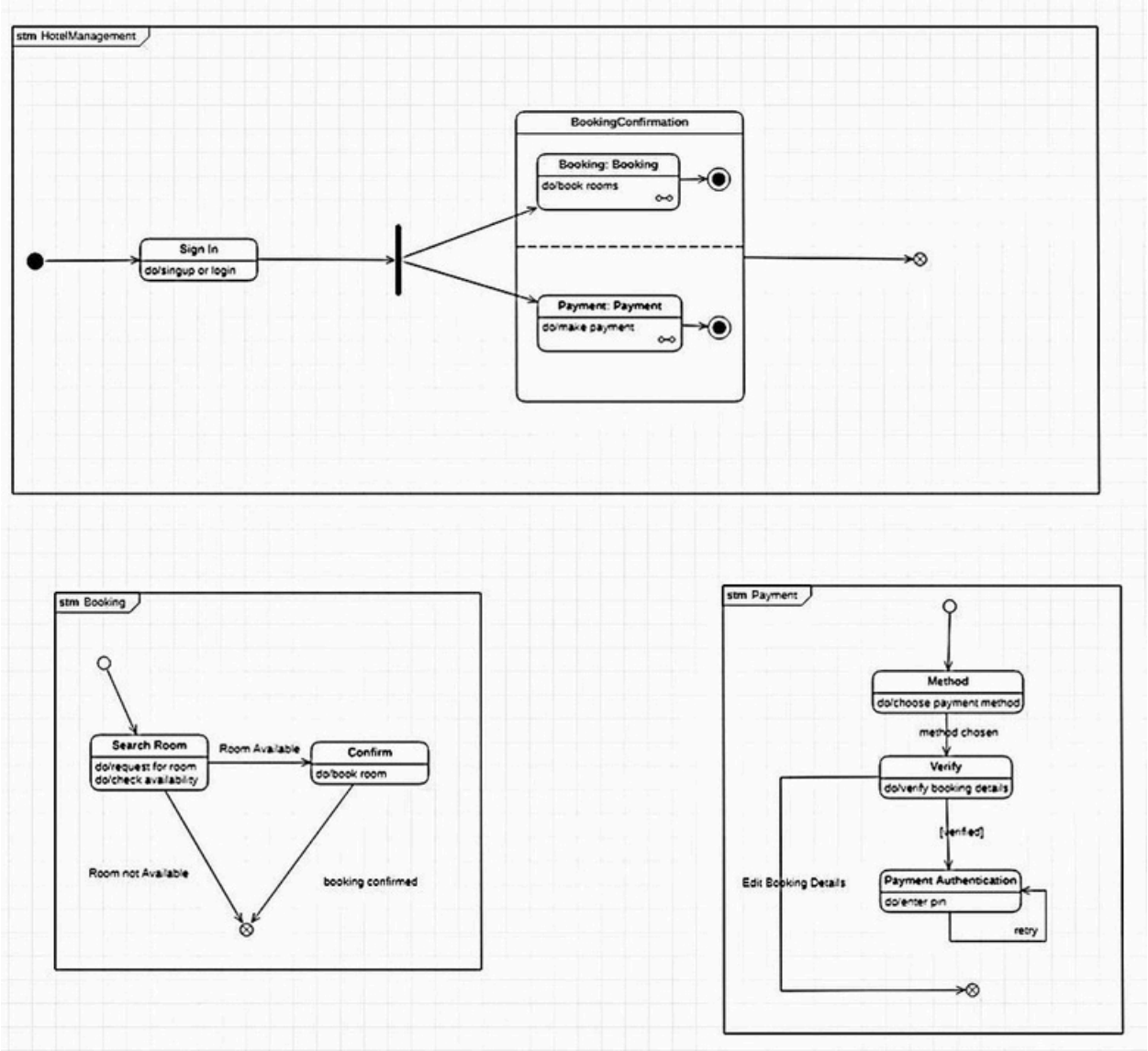
Class Diagram:



Explanation:

The class diagram for a Hotel Management System provides a detailed structure of the system by defining core classes—Hotel, Branch, Customer, Room, Employee, Payment, FoodItem, and Stock—alongside their attributes, methods, and intricate relationships. A hotel manages multiple branches, each with its own specifics, while customers can book various types of rooms, such as bedrooms or suites, and make secure payments. Employees are organized by roles like chef, manager, or receptionist, streamlining hotel operations, customer service, and food preparation. Additional components track food items and stock, ensuring an integrated approach to inventory and service management. Enumerations for room types and payment modes help standardize and automate bookings and transactions. By capturing both inheritance (e.g., specialized rooms and employee roles) and composition relationships, the diagram ensures a robust and adaptable design for managing hotel workflows efficiently.

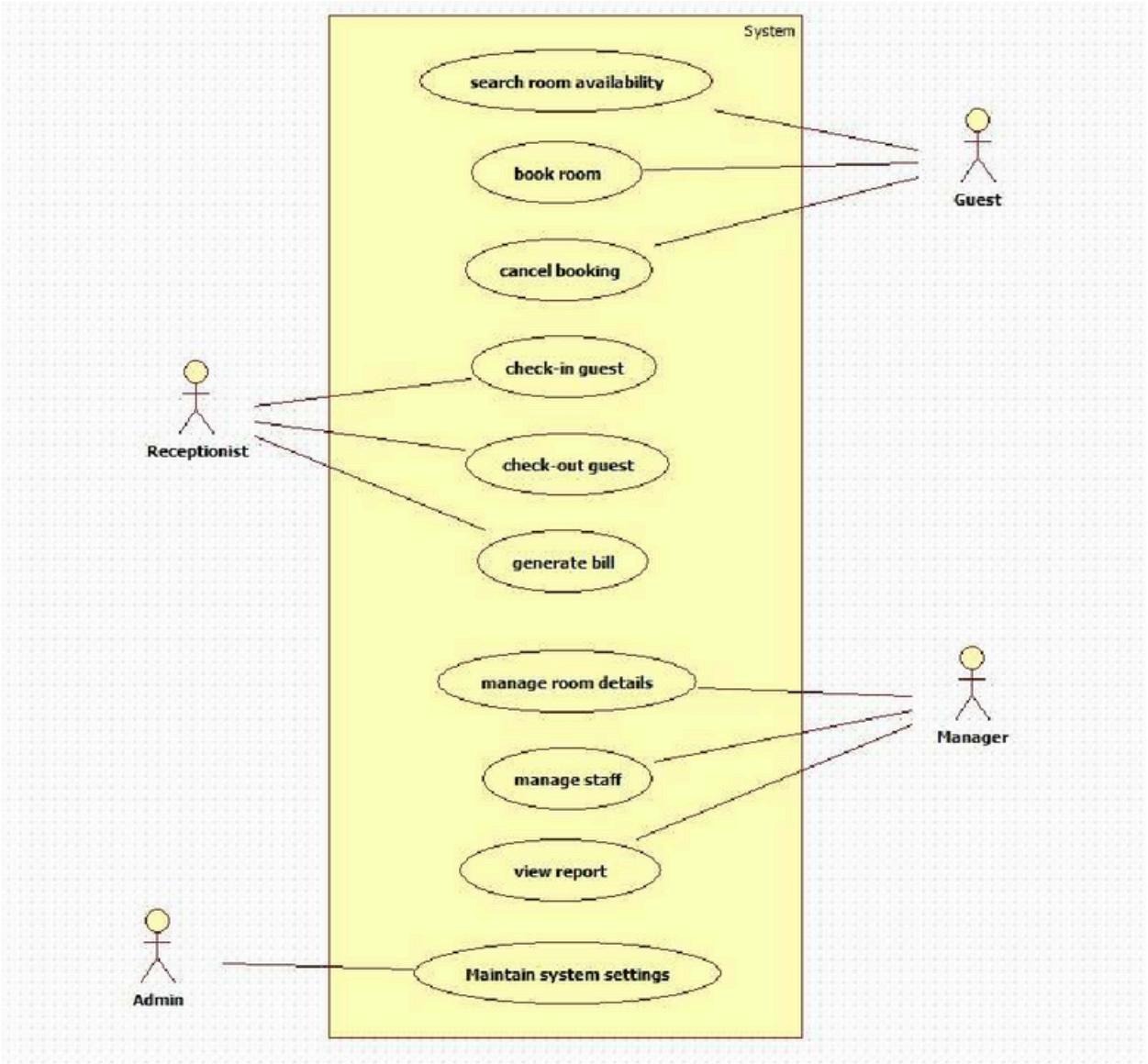
State Diagram



Explanation:

The advanced state diagram explains the entire hotel room management process. It begins with the system waiting for the user. When a room is booked, the system handles reservation details and then moves to the check-in process, where customer information is recorded and a room is assigned. During the guest's stay, the system enters the Room Occupied state, which includes billing and guest services like food delivery or housekeeping. After the guest checks out, the room goes through cleaning and, if needed, maintenance. Once completed, the room becomes available again. This diagram shows the full cycle of a room—from booking to check-in, stay, check-out, cleaning, and maintenance—providing a deeper view of hotel operations.

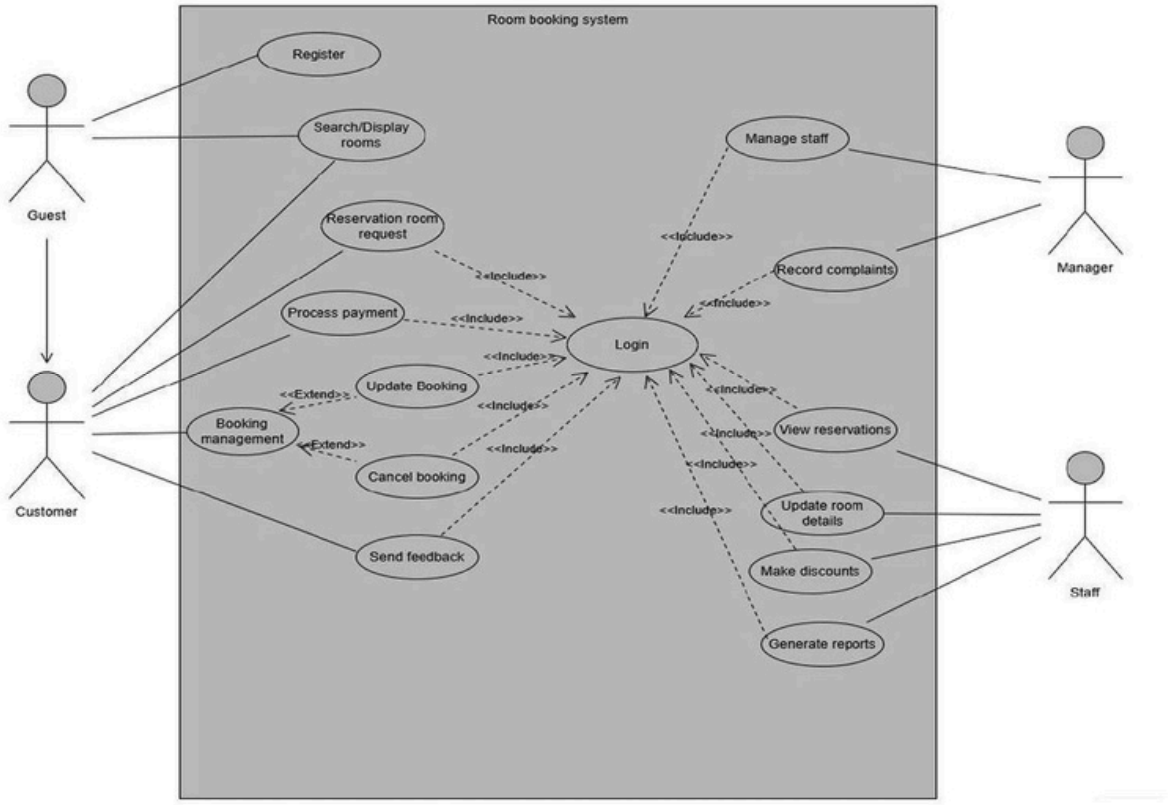
Use Case Diagram(Simple):



Explanation:

The simple use case diagram shows the basic everyday functions of the Hotel Management System. It involves four main actors: Customer, Receptionist, Manager, and the external Payment System. The Customer can perform common tasks like booking a room, checking in, ordering food, making payments, and checking out. The Receptionist handles bookings, assigns rooms, and prepares bills. The Manager has administrative responsibilities such as managing employees, handling rooms, and viewing reports. The Payment System helps process customer payments. Overall, this diagram focuses only on the essential hotel operations and is easy to understand because it highlights basic interactions between users and the system.

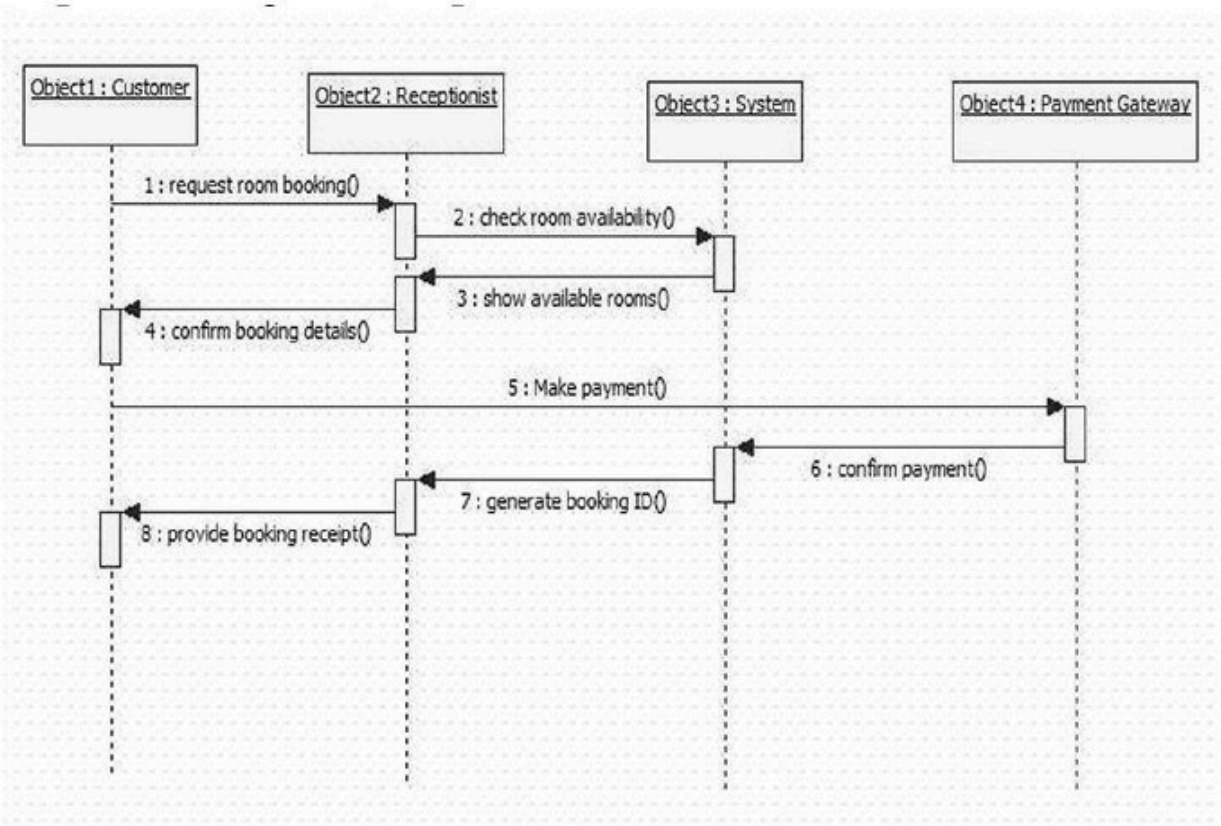
Use Case Diagram(Advanced):



Explanation:

The advanced use case diagram shows a more detailed view of how hotel staff and users interact with the system. It includes both Admin and User roles along with all supporting processes.The Admin can make reservations, view bookings, handle check-ins and check-outs, calculate bills, and process payments. These actions may involve additional steps such as choosing room types, selecting customers, filtering available rooms, or finalizing a reservation.The User can create customer profiles, check available rooms, view customer lists, and select reservations. These use cases support the admin's work and help the system run smoothly.This diagram gives a clearer picture of the system's internal workflow, showing how different tasks are connected and how the hotel manages the entire reservation and payment process.

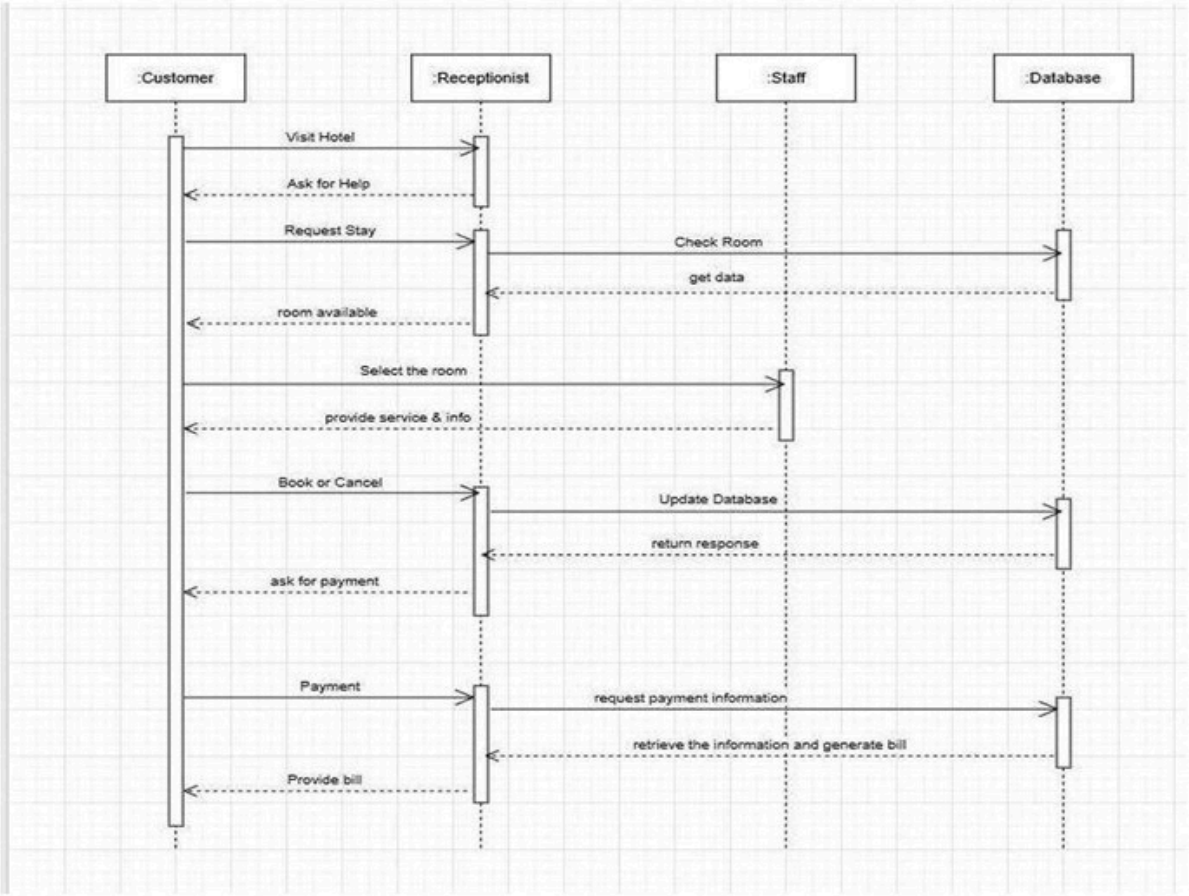
Sequence Diagram(Simple):



Explanation:

The simple sequence diagram explains the basic steps involved in booking a room. The process begins when the Customer asks the Receptionist to book a room. The receptionist checks availability by sending a request to the System, which returns a list of available rooms. After seeing the options, the customer confirms the booking.Next, the customer proceeds to make the payment. The receptionist sends the payment request to the Payment Gateway, which verifies the transaction and returns the result. If the payment is successful, the system creates a booking ID, and the receptionist gives the customer a booking receipt.This diagram focuses only on the key tasks—checking rooms, confirming booking, and processing payment—without showing extra steps or internal system details.

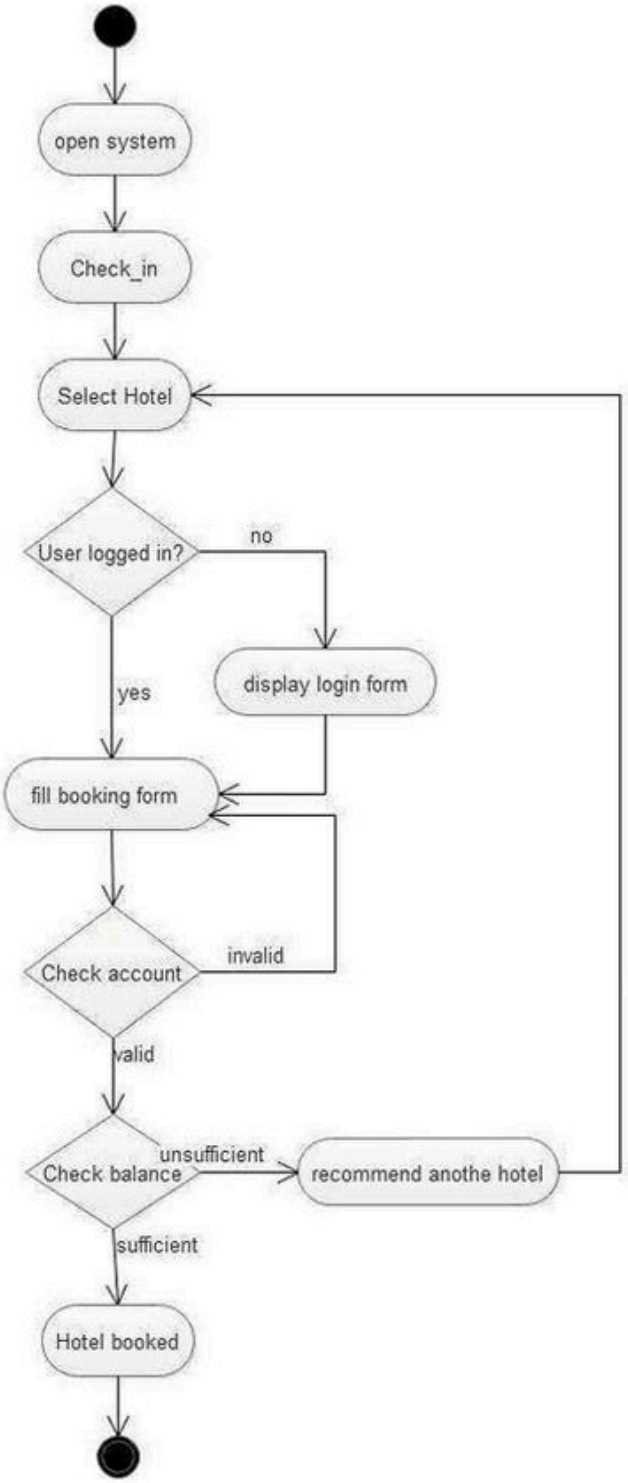
Sequence Diagram(Advanced):



Explanation:

The advanced sequence diagram provides a more complete picture of the hotel booking process. It starts when the Customer approaches the Receptionist for help. The customer requests a room, and the receptionist forwards this request to the Staff, who checks room availability by interacting with the Database. The database returns the room information, and the receptionist shares it with the customer. The customer selects a room, and the receptionist provides the required details or services. If the customer decides to book or cancel, the receptionist updates the Database, which stores the new booking status and returns confirmation. After the booking is confirmed, the receptionist asks the customer for payment. The receptionist retrieves payment details from the database and prepares the final bill for the customer. This advanced diagram shows the full workflow—from request to billing—highlighting the roles of staff and database operations behind the scenes.

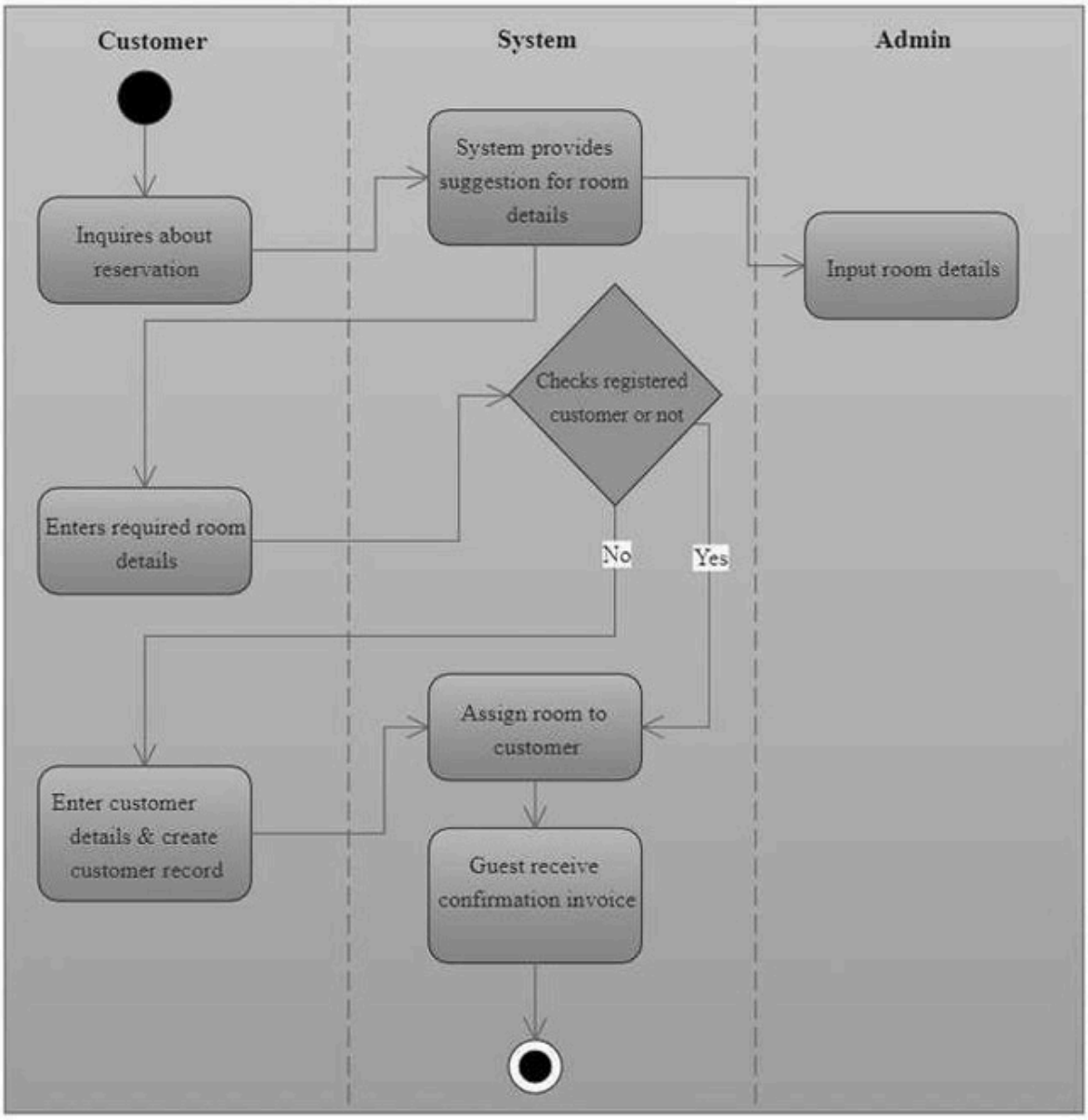
Activity Diagram(Simple):



Explanation:

The advanced sequence diagram provides a more complete picture of the hotel booking process. It starts when the Customer approaches the Receptionist for help. The customer requests a room, and the receptionist forwards this request to the Staff, who checks room availability by interacting with the Database. The database returns the room information, and the receptionist shares it with the customer. The customer selects a room, and the receptionist provides the required details or services. If the customer decides to book or cancel, the receptionist updates the Database, which stores the new booking status and returns confirmation. After the booking is confirmed, the receptionist asks the customer for payment. The receptionist retrieves payment details from the database and prepares the final bill for the customer. This advanced diagram shows the full workflow—from request to billing—highlighting the roles of staff and database operations behind the scenes.

Activity Diagram(Advanced):



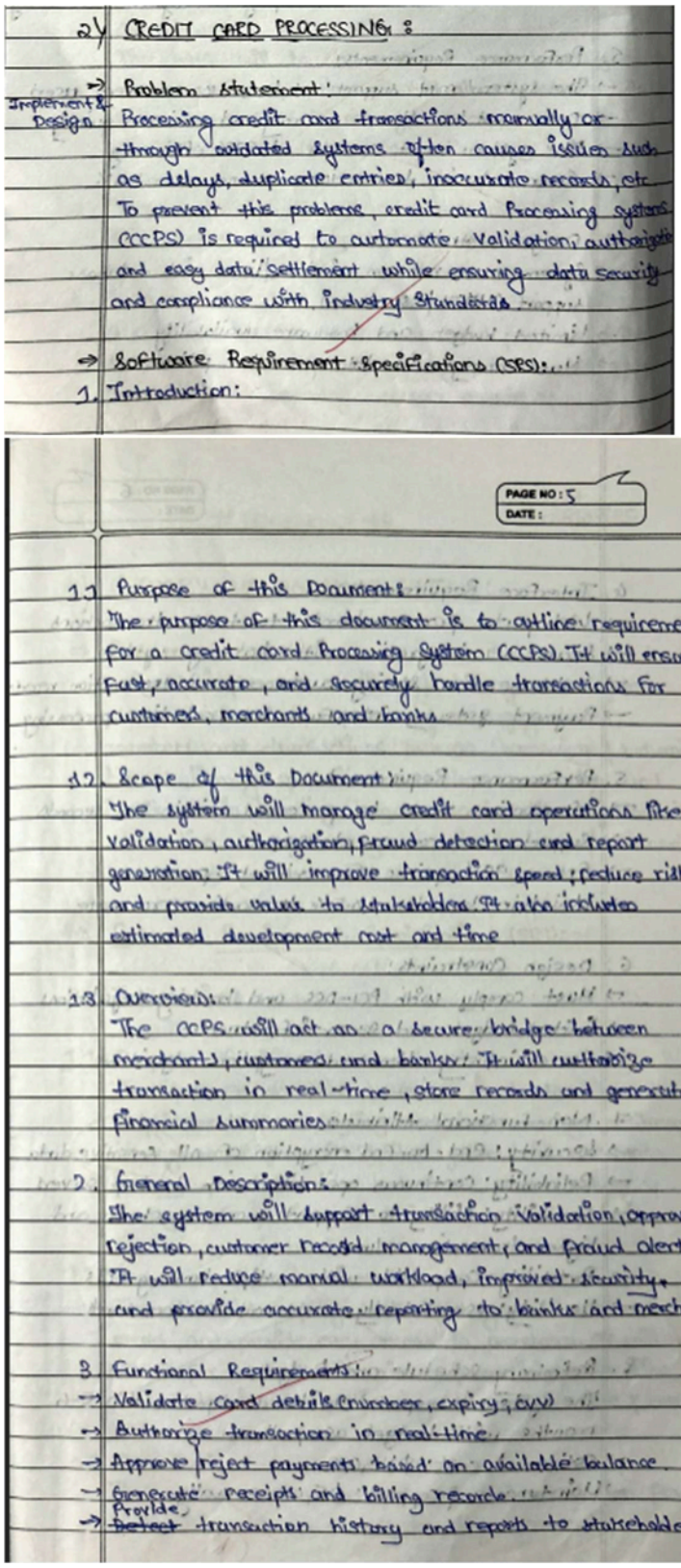
Explanation:

The advanced activity diagram shows the same process in more detail and separates the actions into three swimlanes: Customer, Database, and Payment.

- In the Customer section, the user logs in, books a room, and makes the payment.
- In the Database section, the system checks if rooms are available and reserves the room when possible.
- In the Payment section, the system calculates the total amount, processes the payment, and generates the bill.

2. Credit Card Processing

SRS:



2) CREDIT CARD PROCESSING :

→ Problem Statement:

Implement & Design

Processing credit card transactions manually or through outdated systems often causes issues such as delays, duplicate entries, inaccurate records, etc. To prevent this problems, credit card Processing system (CCPS) is required to automate validation, authorization and easy data settlement while ensuring data security and compliance with industry standards.

→ Software Requirement Specifications (SRS):

1. Introduction:

PAGE NO : 5
DATE :

1.1 Purpose of this Document:

The purpose of this document is to outline requirements for a credit card Processing System (CCPS). It will ensure fast, accurate, and securely handle transactions for customers, merchants and banks.

1.2 Scope of this Document:

The system will manage credit card operations like validation, authorization, fraud detection and report generation. It will improve transaction speed, reduce risks and provide value to stakeholders. It also includes estimated development cost and time.

1.3 Overview:

The CCPS will act as a secure bridge between merchants, customers and banks. It will authorize transaction in real-time, store records and generate financial summaries.

2. General Description:

The system will support transaction validation, approval/rejection, customer record management, and fraud alerts. It will reduce manual workload, improved security, and provide accurate reporting to banks and merchant.

3. Functional Requirements:

→ Validate card details (number, expiry, cvv)
→ Authorize transaction in real-time
→ Approve/reject payments based on available balance
→ Generate receipts and billing records
→ Provide/Detect transaction history and reports to stakeholder

4. Interface Requirements:
→ Web portal for merchants to track transactions
→ Secure API integration with banking system.
→ Database for storing customer and transaction rec
→ Payment gateway interface for real-time processing

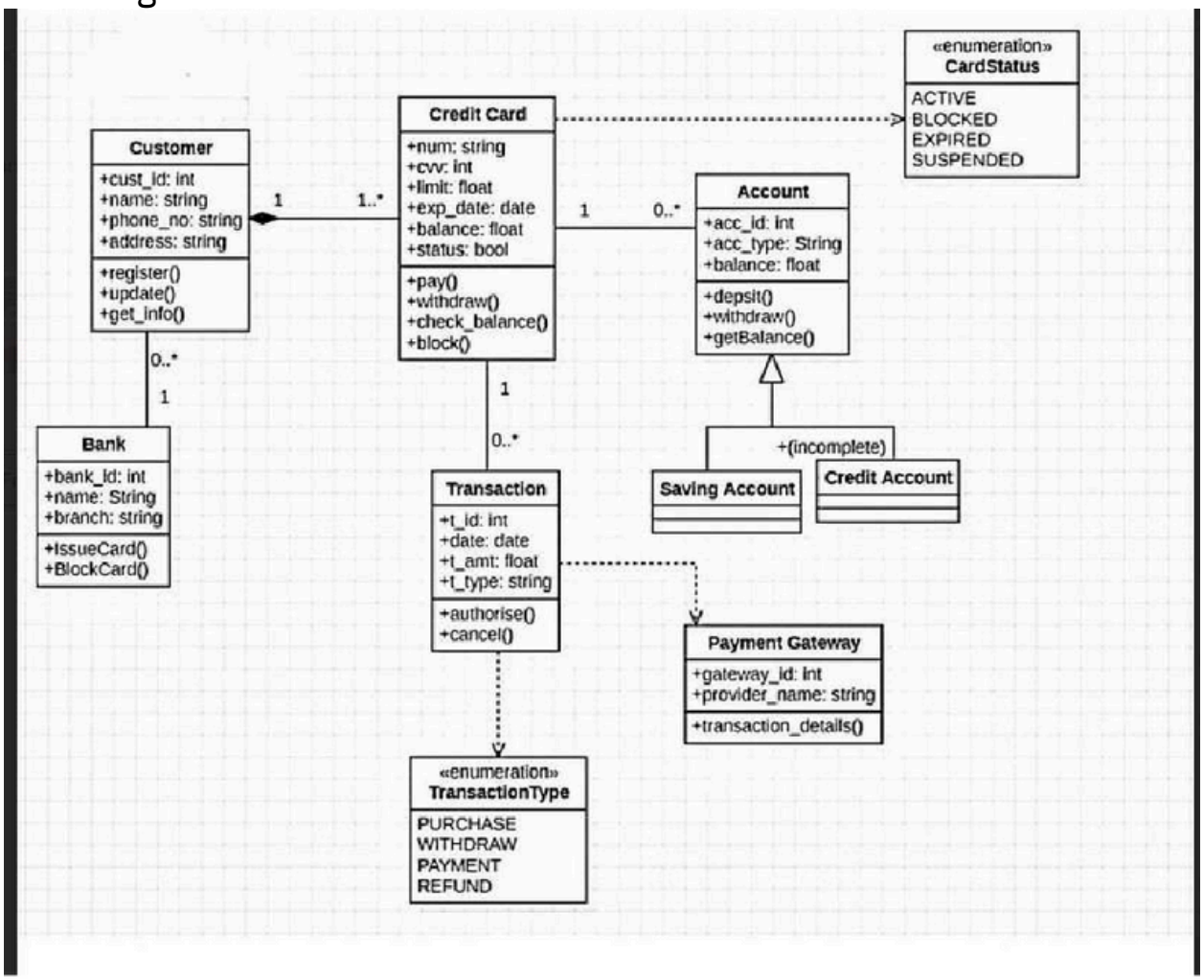
5. Performance Requirements:
→ Transactions must be processed within 2-3 seconds
→ Support 1000+ concurrent users
→ Ensure 99% uptime for critical operations
→ Maintain less than 0.5% transaction error rate

6. Design Constraints:
→ Must comply with PCI-DSS and banking regulations
→ Limited budget and server infrastructure.
→ Use of industry standard encryption algorithms

7. Non-functional Attributes:
→ Security: End-to-end encryption of all sensitive data
→ Reliability: Continuous operation with backup servers
→ Scalability: Ability to support more merchants and higher transaction volume.
→ Portability: Compatible with multiple banking APIs
→ Usability: User-friendly dashboard for merchants.

8. Preliminary Schedule and Budget:
The system is expected to be developed within 5-6 months with budget as follows:
→ Estimated cost: $110,000
→ Maintenance & Support: $5,000 annually

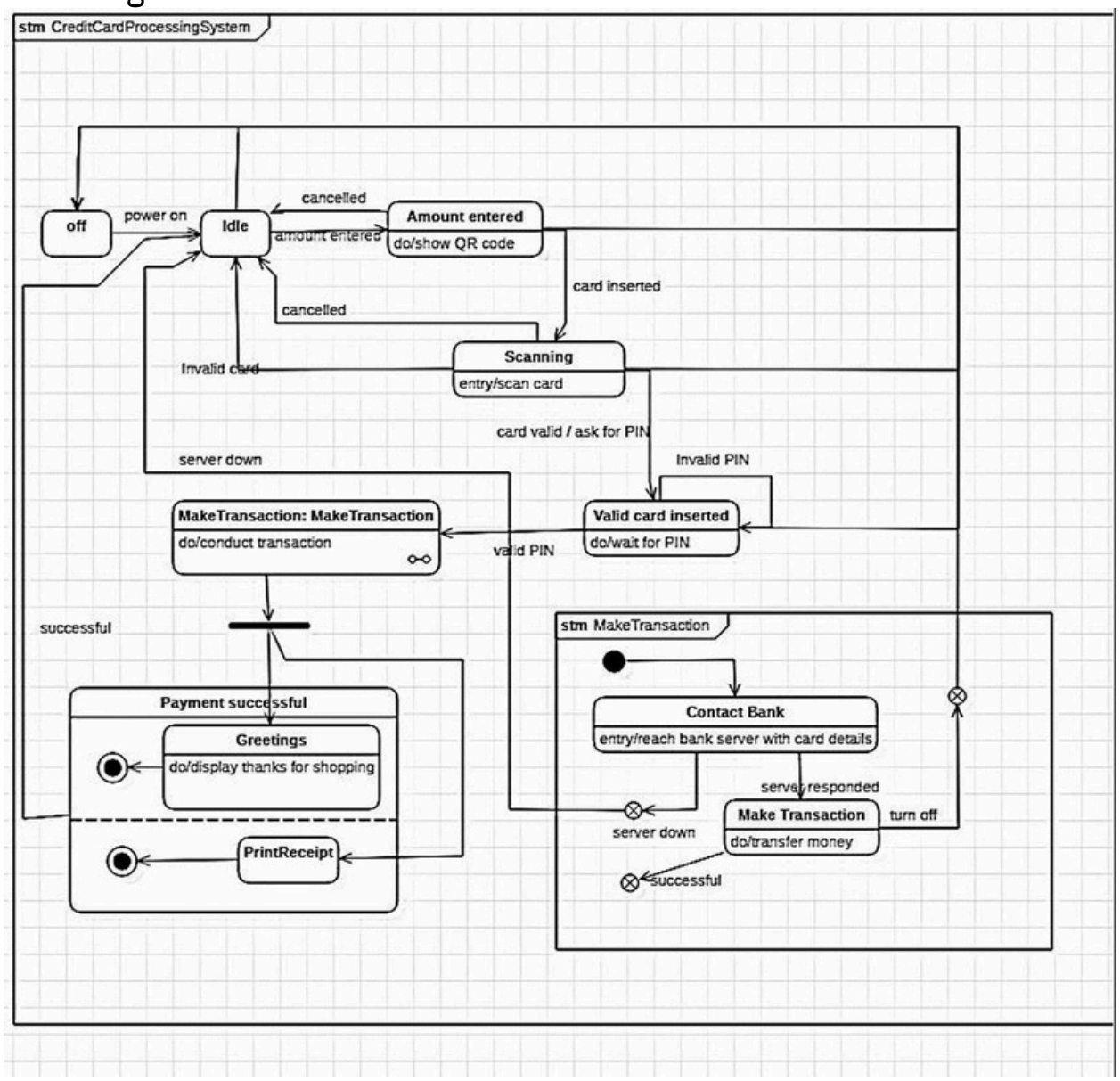
Class Diagram:



Explanation

The class diagram represents an online payment processing system that manages customers, merchants, banks, and transactions. The Customer initiates payments using their card, which is linked to a Bank Account. A Transaction is created for each payment, containing details such as amount, date, status, and authorization code. The Bank authorizes and settles payments, while the PaymentGateway facilitates communication between the customer's bank and the merchant. The Merchant receives payments, issues refunds, and handles chargebacks. Additional classes such as Authorization and Refund manage fraud checks, verification, and money returns. Supporting entities like Person, Payment, and the status enumeration define basic attributes and types used throughout the system. Overall, the diagram shows how different components work together to process, validate, and complete electronic payment transactions securely.

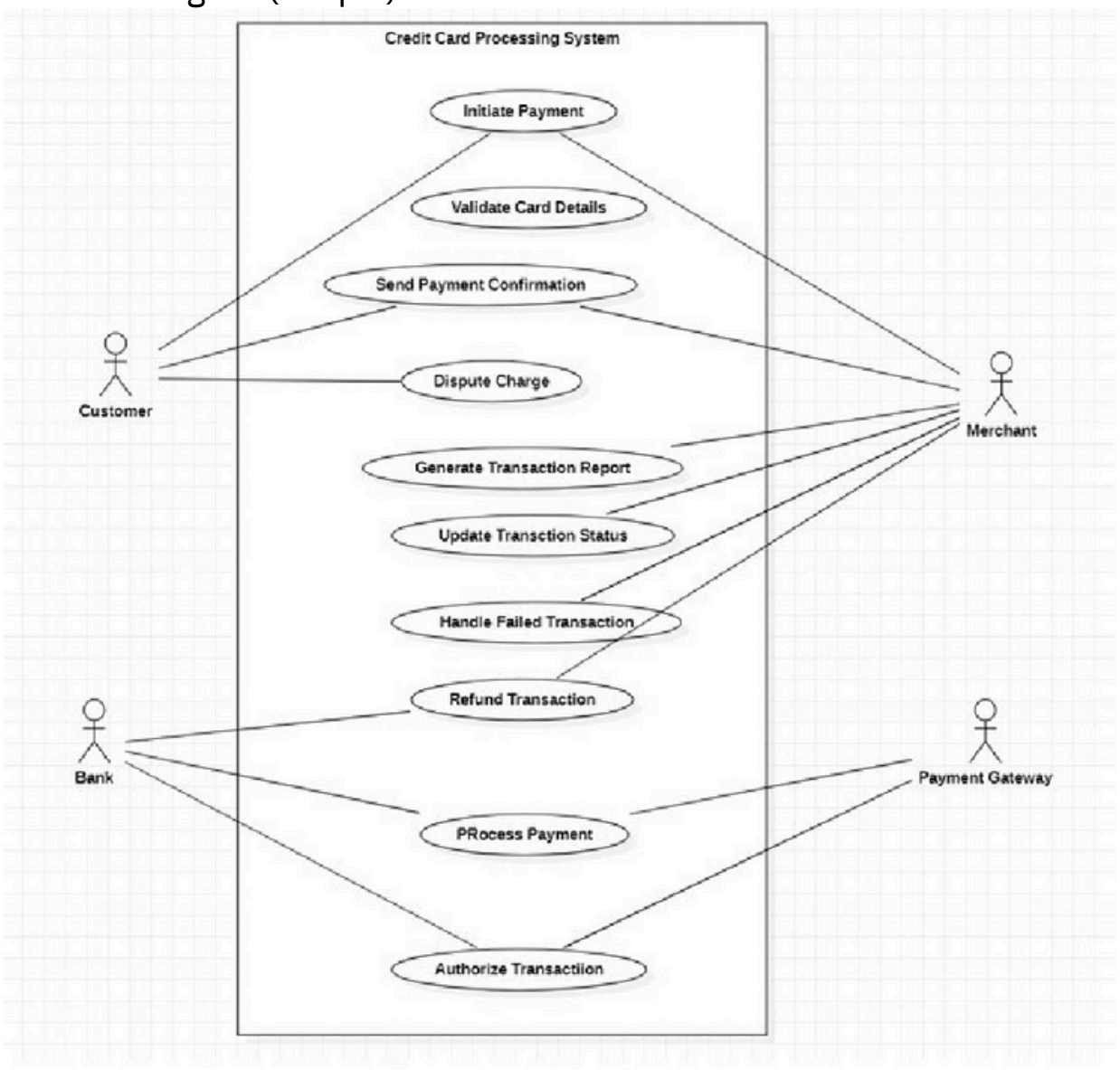
State Diagram:



Explanation:

The advanced state diagram describes a more detailed and realistic payment or ATM terminal process. It begins in an Idle state, where the terminal waits for input. A user either enters an amount (for QR payment) or inserts a card. The system validates the card through a scanning process. If the card is valid, the terminal asks for the PIN and moves to the Valid Card Inserted state. After the correct PIN is entered, the process moves to Make Transaction, where the transaction is conducted and sent to the bank for approval. The Control Bank state checks card details and verifies the transaction. If the bank responds successfully, the terminal processes the payment and shows a greeting message, followed by printing a receipt. The diagram also includes multiple exceptional paths such as invalid PIN, invalid card, server down, or cancelled actions. This advanced diagram shows a complete, realistic workflow including scanning, PIN verification, bank communication, success/failure handling, and receipt printing.

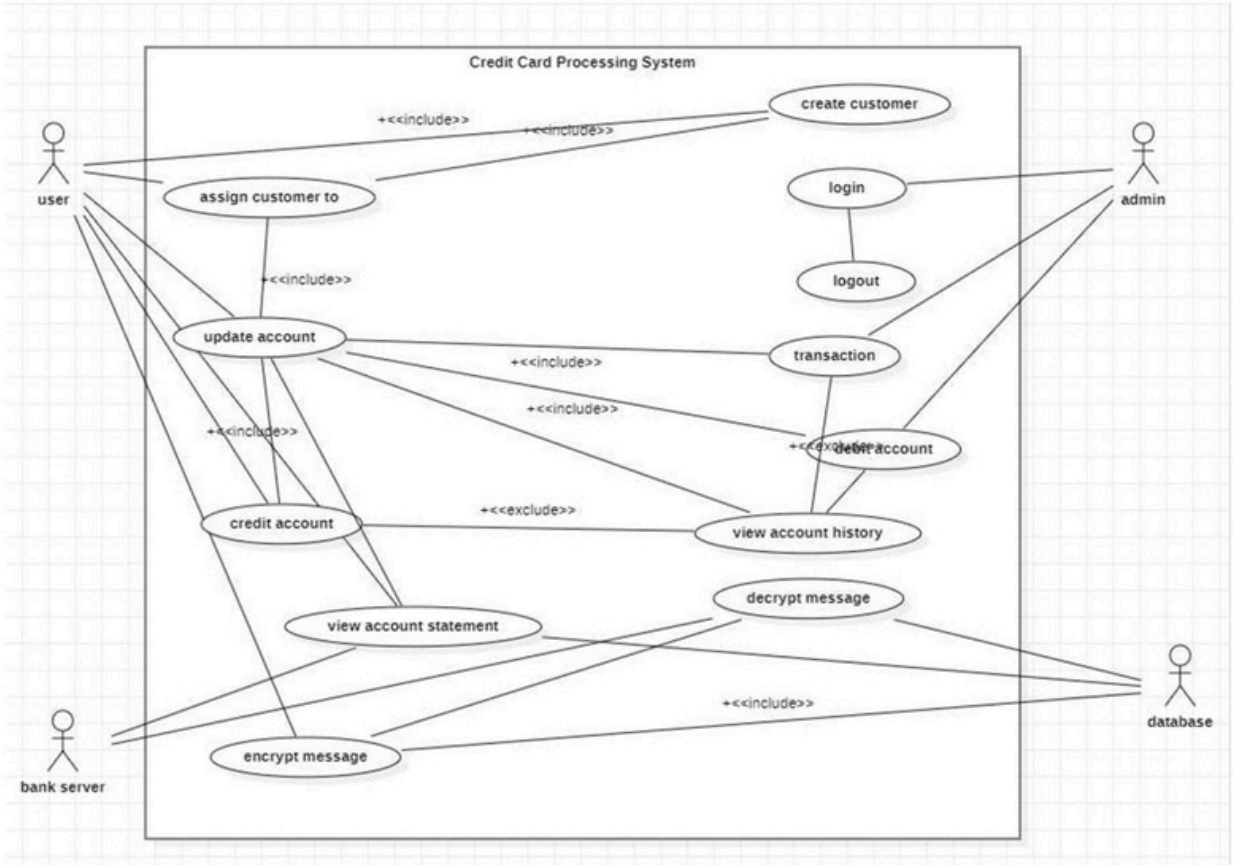
Use Case Diagram(Simple):



Explanation:

The simple use case diagram focuses on the main functions involved in credit card processing between a merchant and the banks. The primary actor is the Merchant's Credit Card Processing System, which communicates with both the Merchant's Bank and the Customer's Credit Card Bank. The system performs core actions such as Authorizing, Capturing, Crediting, Voiding, and Verifying transactions. These actions represent the essential steps required to approve a payment, capture funds, issue credit, reverse a payment, or validate card details. Since the diagram only shows the main operations without detailing internal workflows, it provides an easy-to-understand overview of how basic credit card transactions are handled.

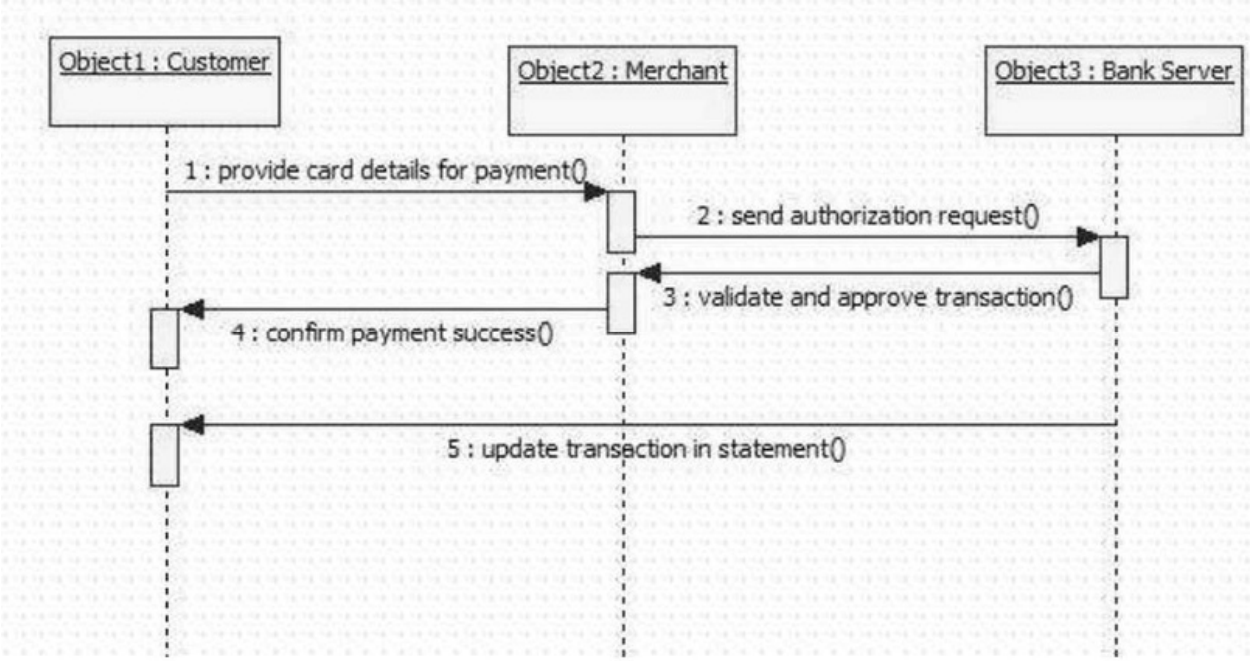
Use Case Diagram(Advanced):



Explanation:

The advanced use case diagram presents a much more detailed view of how users and administrators interact with a banking system. Multiple actors participate: the Admin, Customer (User), Bank Server, and Database. The system supports a wider set of processes such as Creating Customer, Assigning Customer ID, Updating Account, Crediting and Debiting Accounts, Viewing Statements and Account History, Transactions, Login/Logout, and secure processes like Encrypting and Decrypting Messages. Many relationships use *include* and *extend*, showing how smaller actions support larger processes. This diagram provides a complete picture of how customer accounts are managed, how transactions flow through the system, and how security is maintained. It shows internal system behavior more clearly than the simple diagram.

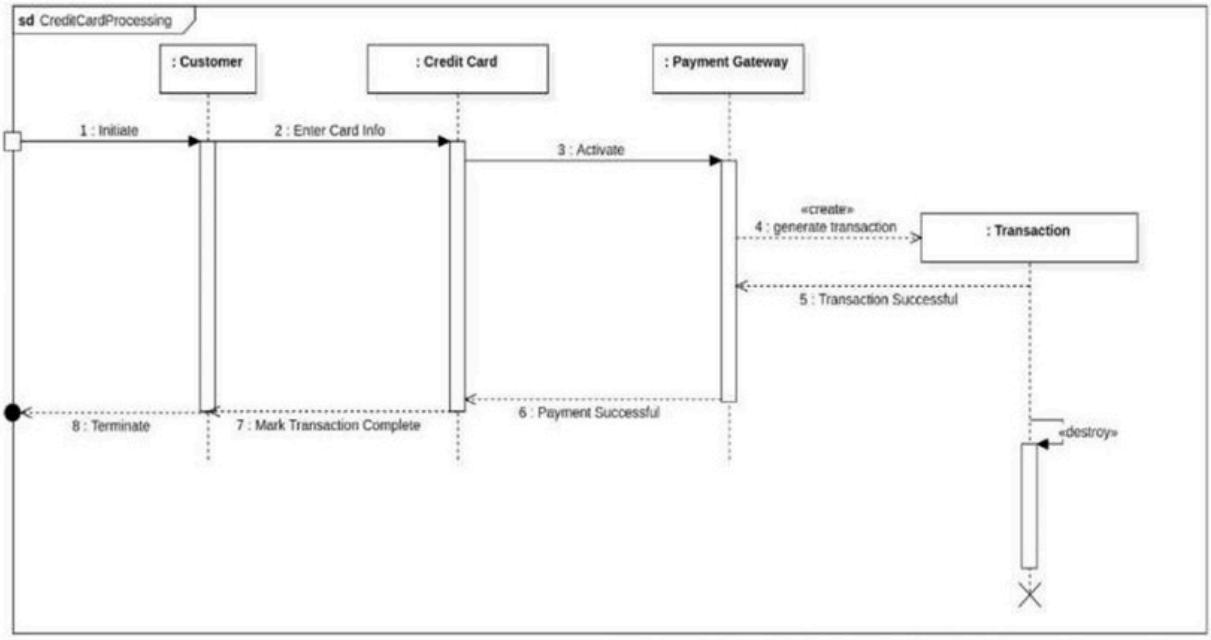
Sequence Diagram(Simple):



Explanation:

The simple sequence diagram shows the basic steps involved when a customer makes a payment using a credit card. The process starts when the Customer enters card information, which is then sent to the Credit Card system. The credit card activates the request and sends it to the Payment Gateway. The payment gateway generates the transaction and forwards it to the internal processing object. Once the transaction is approved, a Transaction Successful message is sent back through the payment gateway to the credit card system. The credit card then informs the customer that the payment is successful, and the transaction is marked as complete. This diagram only focuses on the essential steps: entering card data, verifying payment, and completing the transaction.

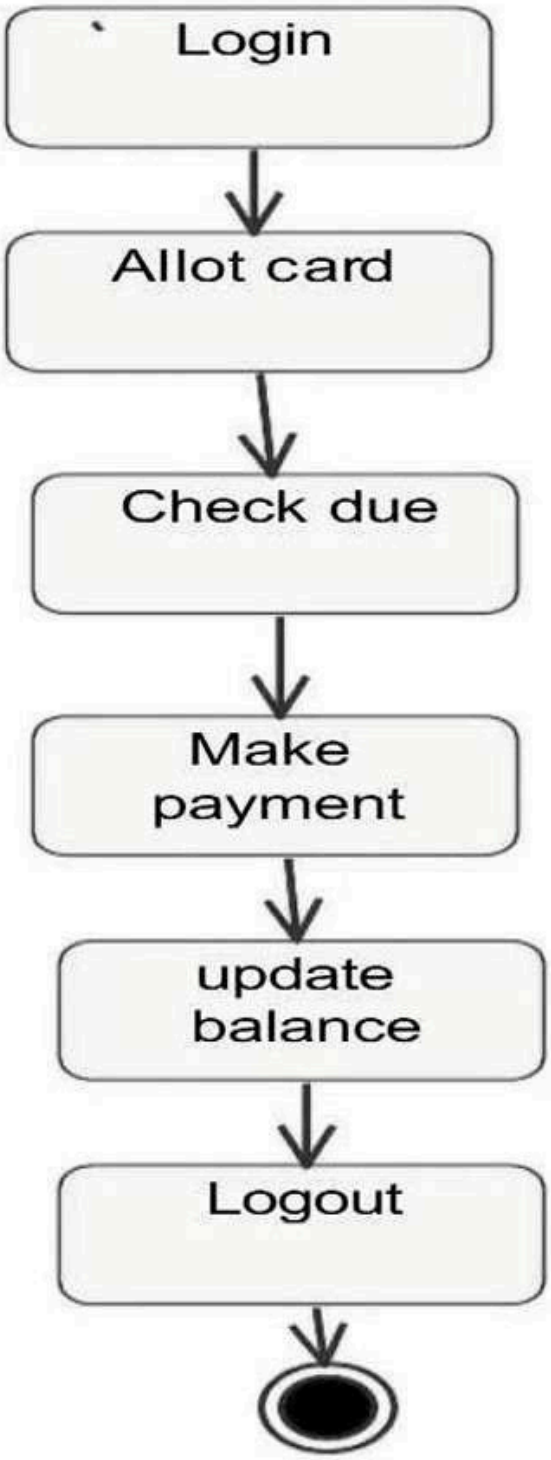
Sequence Diagram(Advanced):



Explanation:

The advanced sequence diagram provides a more detailed view of how a credit card payment is handled behind the scenes. It begins when the Customer provides card details to the Merchant for payment. The merchant then sends an authorization request to the Bank Server. The bank server validates the card information, checks the account status, and approves or denies the transaction. If approved, the bank sends back a confirmation to the merchant, who then informs the customer that the payment was successful. Finally, the merchant updates the customer's statement or transaction history. This advanced diagram shows a more complete workflow, including authorization, validation, approval, and transaction recording.

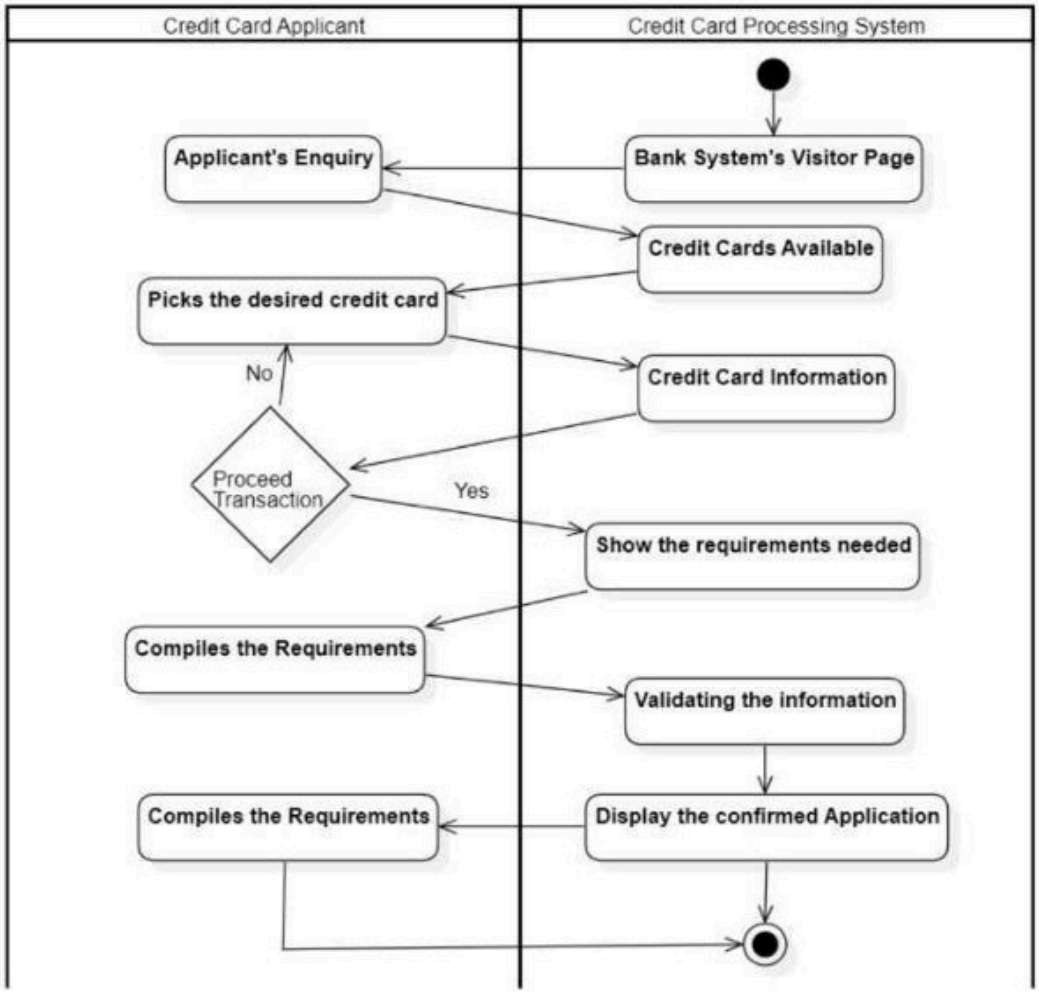
Activity Diagram(Simple):



Explanation:

The simple activity diagram explains the basic steps in completing a credit card payment. The process starts when the customer enters card details and submits a payment request. The system then validates the details. If the card information is invalid, the system immediately displays a payment failure message. If the details are valid, the request is sent to the issuer bank, where the system checks the customer's available credit. If the bank does not authorize the payment, failure is shown again. If everything is correct, the bank authorizes the transaction, and the amount is transferred to the merchant. Finally, the user is shown a payment successful message. This diagram focuses only on the main steps—entering details, validating, checking credit, and approving or rejecting the payment.

Activity Diagram(Advanced):

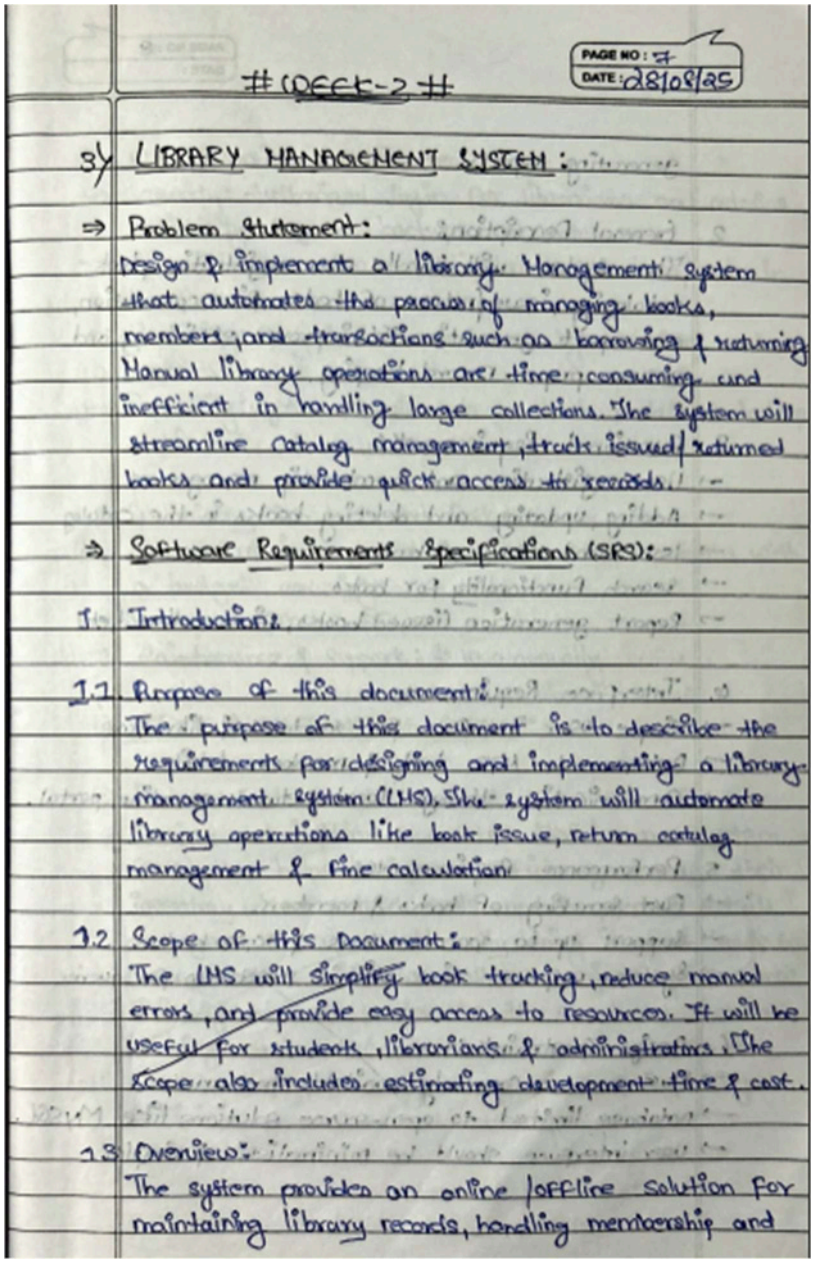


Explanation:

The advanced activity diagram presents a more detailed workflow of how a credit card application is handled. It begins when an applicant makes an inquiry about credit cards. The credit card processing system responds by displaying available card options. The applicant then selects a card and decides whether to proceed. If they continue, the system shows the required documents and information needed for application. The applicant gathers and submits these requirements. The system then validates the submitted information, checking eligibility criteria. Once everything is confirmed, the system displays the approved or completed application. This diagram covers more steps and interactions compared to the simple one and offers a clearer view of how credit card applications are processed from inquiry to validation.

3. Library Management System

SRS:



#WEEK-2#

PAGE NO: 7
DATE: 28/08/25

3) LIBRARY MANAGEMENT SYSTEM:

⇒ Problem Statement:
Design & implement a library Management system that automates the process of managing books, members, and transactions such as borrowing & returning. Manual library operations are time consuming and inefficient in handling large collections. The system will streamline catalog management, track issued/returned books and provide quick access to records.

⇒ Software Requirements Specifications (SRS):

1. Introduction:

1.1 Purpose of this document:
The purpose of this document is to describe the requirements for designing and implementing a library management system (LMS). The system will automate library operations like book issue, return, catalog management & fine calculation.

1.2 Scope of this Document:
The LMS will simplify book tracking, reduce manual errors, and provide easy access to resources. It will be useful for students, librarians & administrators. The scope also includes estimating development time & cost.

1.3 Overview:
The system provides an online/offline solution for maintaining library records, handling membership and

generating reports.

2. General Description:
The system will handle user registration, book cataloging, issue/return of books, fine calculation, and report generation. It improves efficiency and ensures proper record-keeping.

3. Functional Requirements:
→ User registration and membership management
→ Adding, updating and deleting books in the catalog
→ Issue and return of books
→ Search functionality for books
→ Report generation (issued books, fines collected, etc)

4. Interface Requirements
→ Simple user interface for students & librarians
→ Database to store book & member details
→ Communication through local network or online portal

5. Performance Requirements:
→ Fast searching of books & members.
→ Support up to 1000 members & 10,000 books
→ System response time within 2 seconds for queries

6. Design Constraints:
→ Must run on commonly available hardware.
→ Database limited to open-source solutions like MySQL
→ User interface should be minimalistic & simple.

PAGE NO : 9
DATE :

7. Non-Functional Attributes :

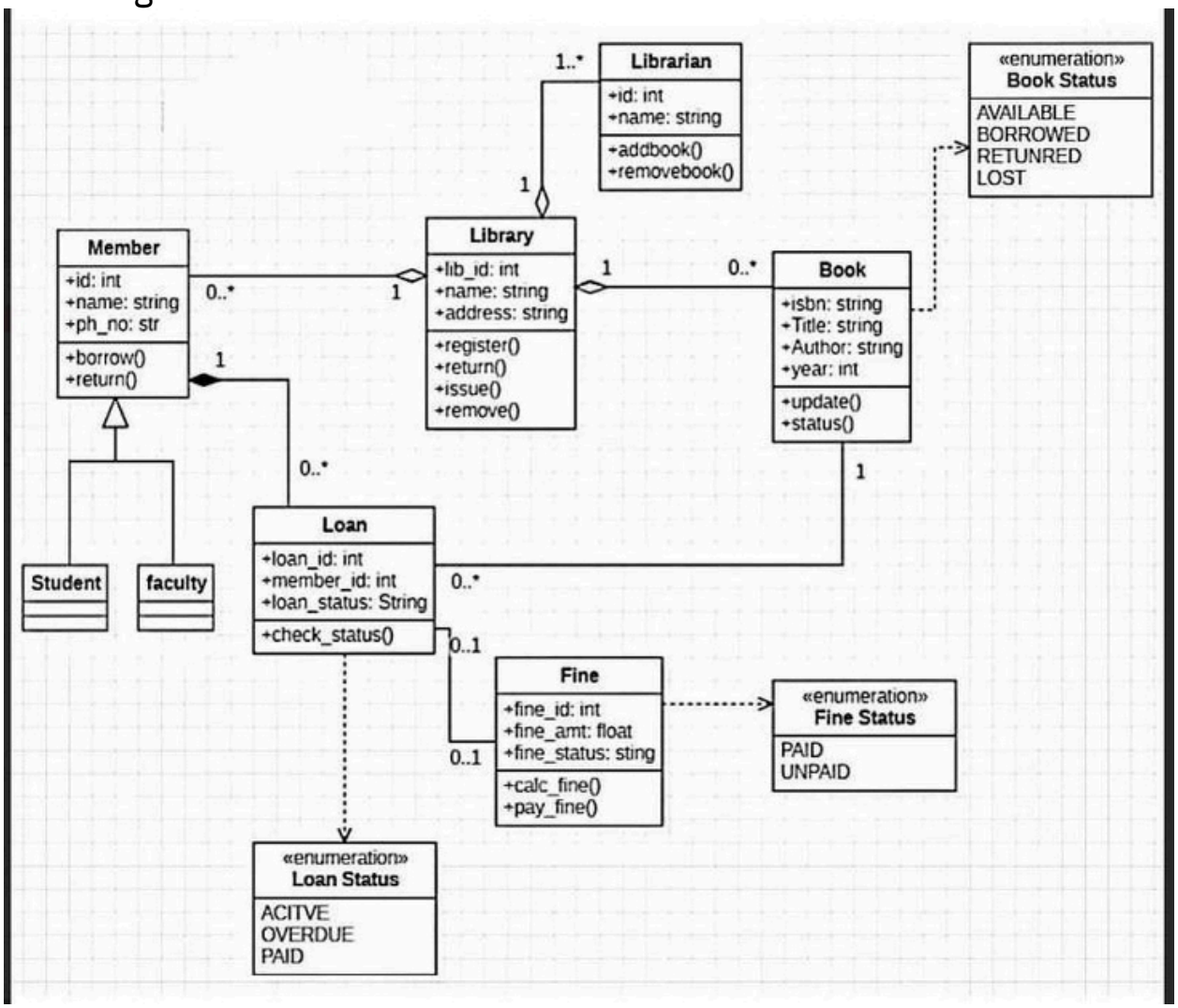
→ Security : Authorized login for librarians and admins
→ Reliability : Regular backups of database.
→ Scalability : Capable of adding more members/books in the future.
→ Usability : Easy to learn and use by librarians and students.
→ Portability : System should run on both web and desktop platform.

8. Preliminary Schedule and Budget :

Development is expected to take about 4 months with a budget covering :

→ Development cost : $5,000.
→ Maintenance & Support : $ 1000 annually

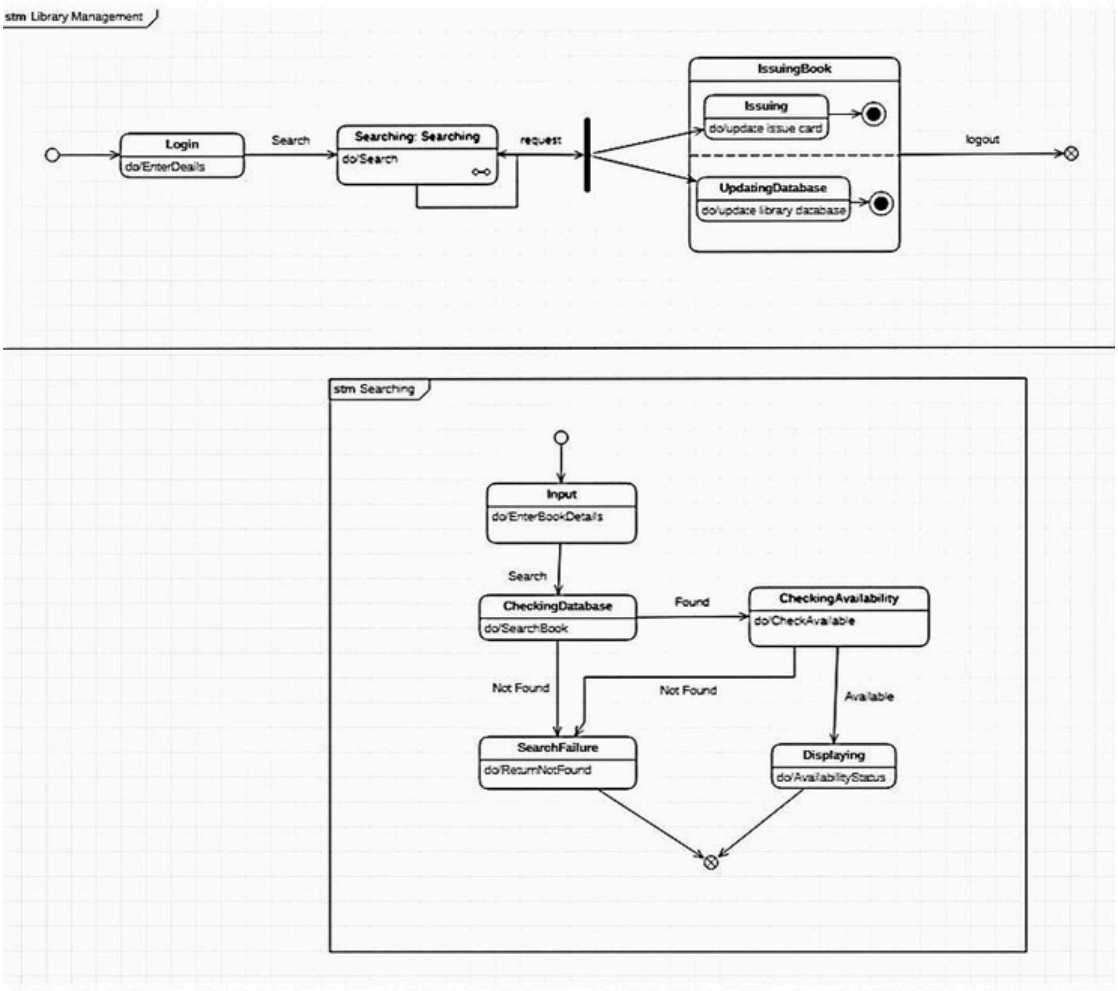
Class Diagram:



Explanation:

The class diagram represents a Library Management System where books, members, librarians, and transactions interact to manage library operations. The Book class stores details such as author, edition, price, and purchase date, and it is specialized into different types like Journals, Magazines, and Subject Text through inheritance. Members of the library—categorized as Students and Faculty—send book requests and borrow books. The Librarian plays a central role by searching books, verifying members, issuing books, calculating fines, and handling book returns. The librarian also updates the status of books and ensures that library policies like issuing limits are followed.

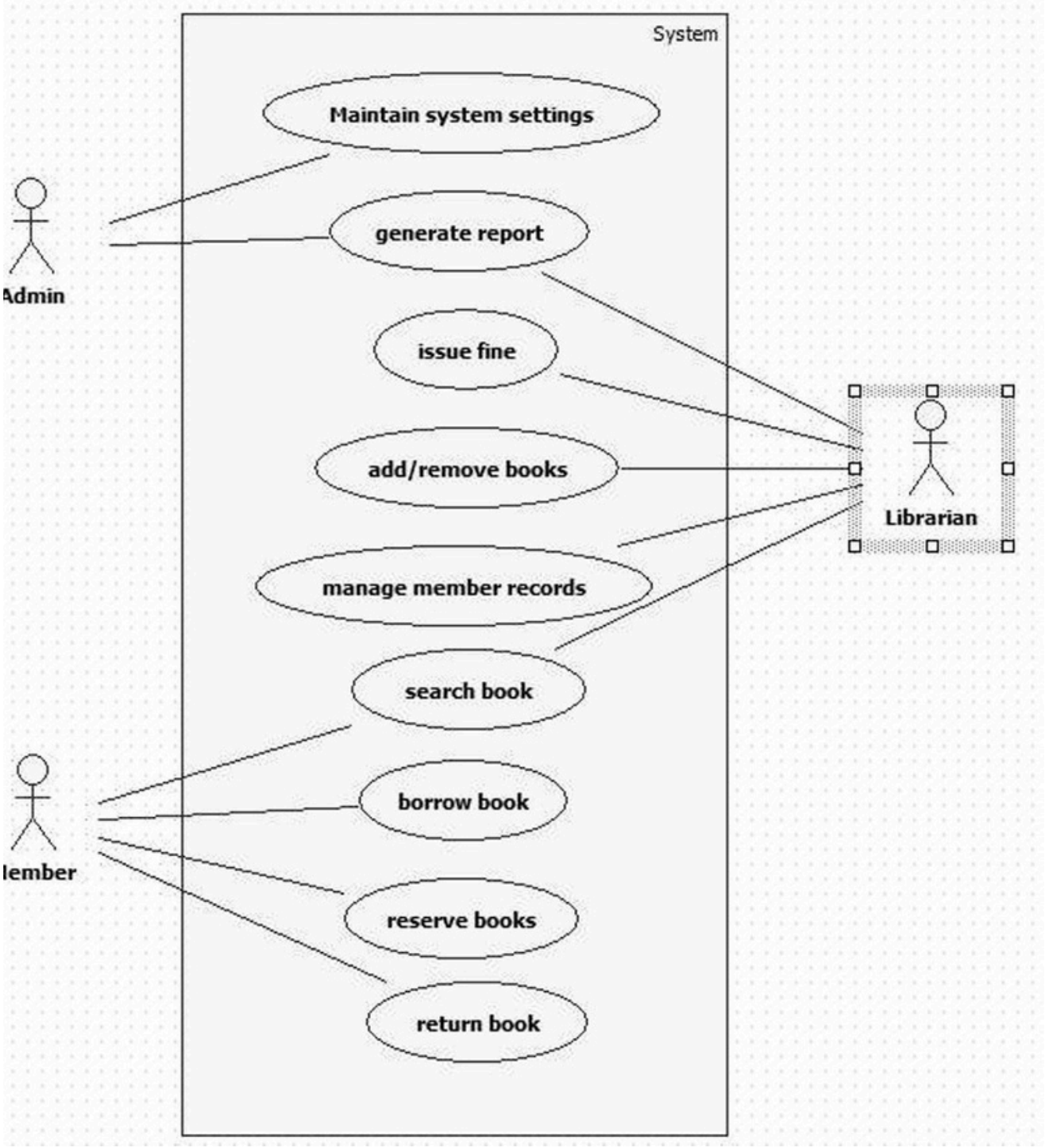
State Diagram:



Explanation:

The advanced state diagram provides a more complete picture of the library's book issuing and returning process. It starts with the user searching for a book. If the book is available, the system verifies stock and moves to the issue state, where member and library records are updated. If the book is unavailable, the system places the user in a waitlist and notifies them when the book becomes available. Once issued, the system moves into the Borrowed state, where the due date is monitored. From here, the user may renew the book or return it. Upon returning, the system checks for damage or late return and computes fines if applicable. If a fine exists, the user proceeds to Fine Payment; otherwise, the process ends. This diagram captures the full lifecycle of a borrowed book—from search and waitlist to issuing, borrowing, returning, renewal, and fine

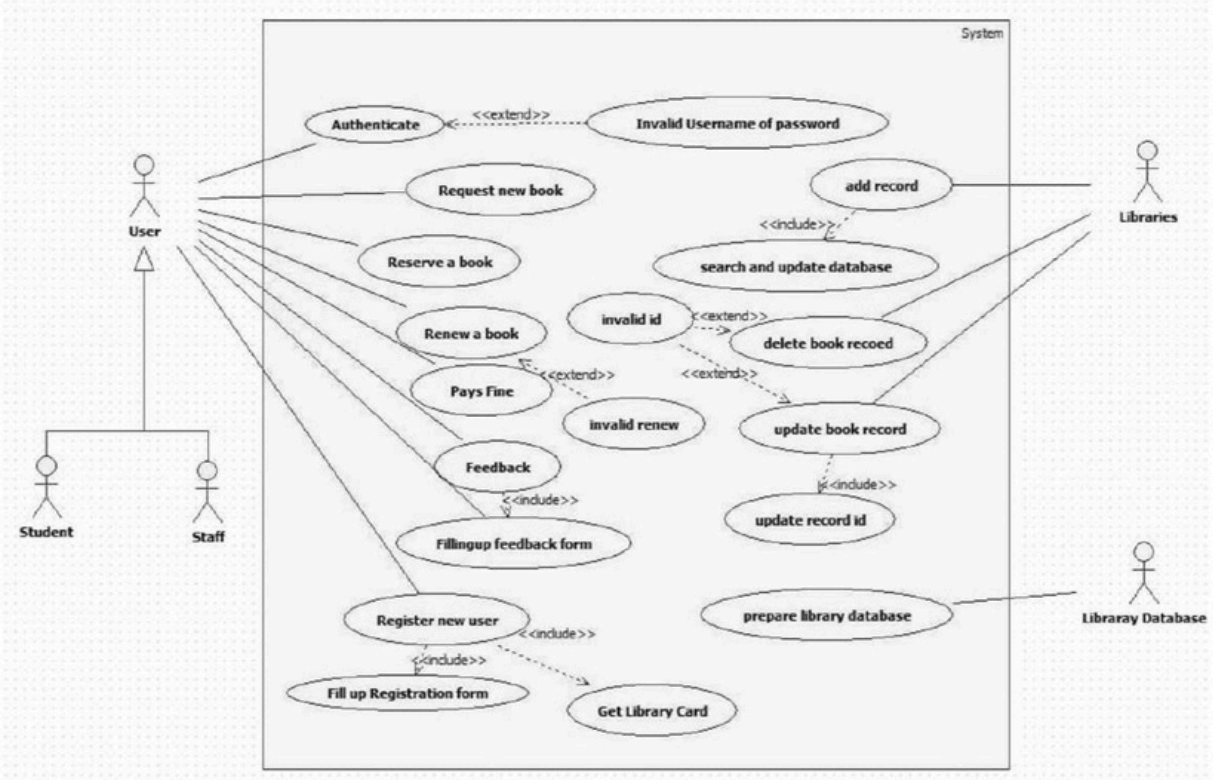
Use case diagram(Simple):



Explanation:

The simple use case diagram focuses on the core interactions in the Library Management System between the Librarian and the Student. The librarian performs essential tasks such as Searching Books, Adding Books, Updating Book Details, Requesting Books, and Issuing Books. Many of these actions include interactions with the Management System, such as checking membership and updating records. The student mainly interacts through the system to request or search for books. The diagram highlights only the fundamental operations that support the basic flow of library activities—finding, adding, updating, and issuing books—making it easy to understand the primary responsibilities of the librarian and how students request books.

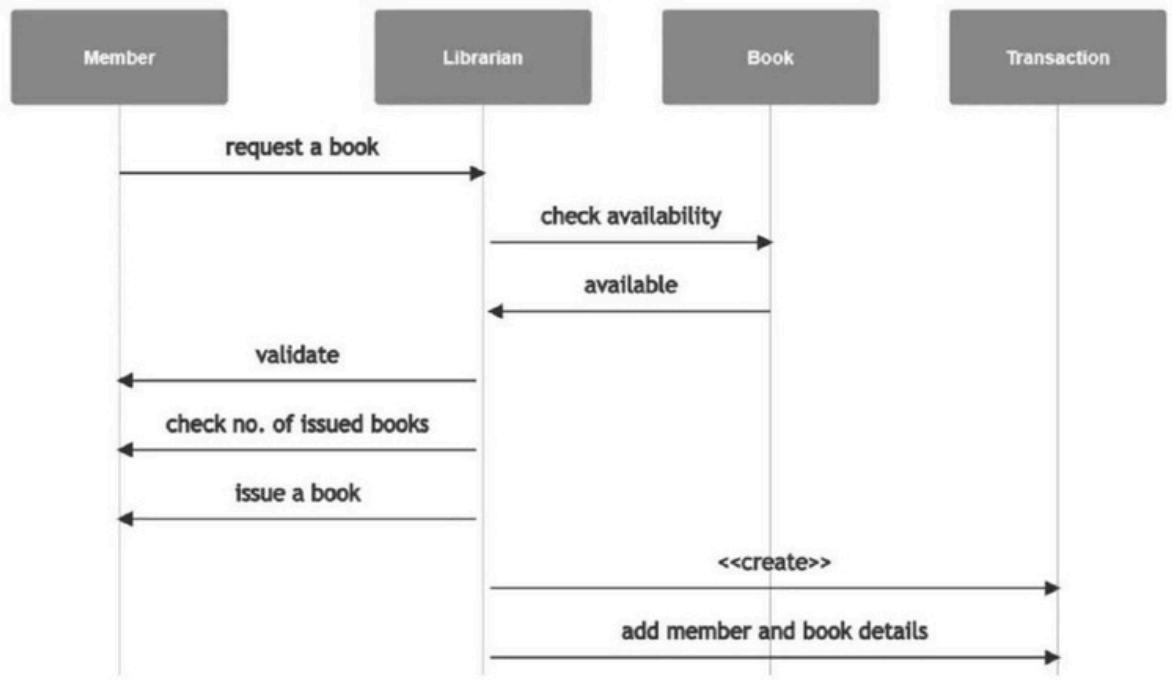
Use Case Diagram(Advanced):



Explanation:

The advanced use case diagram presents a more detailed and comprehensive view of the library system by involving multiple actors—User (Student/Staff), Libraries, and the Library Database. It includes a wider range of use cases such as Authentication, Requesting New Books, Reserving Books, Renewing Books, Paying Fines, Providing Feedback, Registering New Users, and Filling Forms. The system also manages book records using operations like Adding, Updating, and Deleting Records, as well as preparing the library database. Several use cases use *include* and *extend* relationships to show dependencies and optional behaviors such as invalid login, invalid ID, or invalid renewal. This advanced diagram gives a full picture of how users interact with the system, how library data is maintained, and how operations extend beyond simple issuing and returning of books.

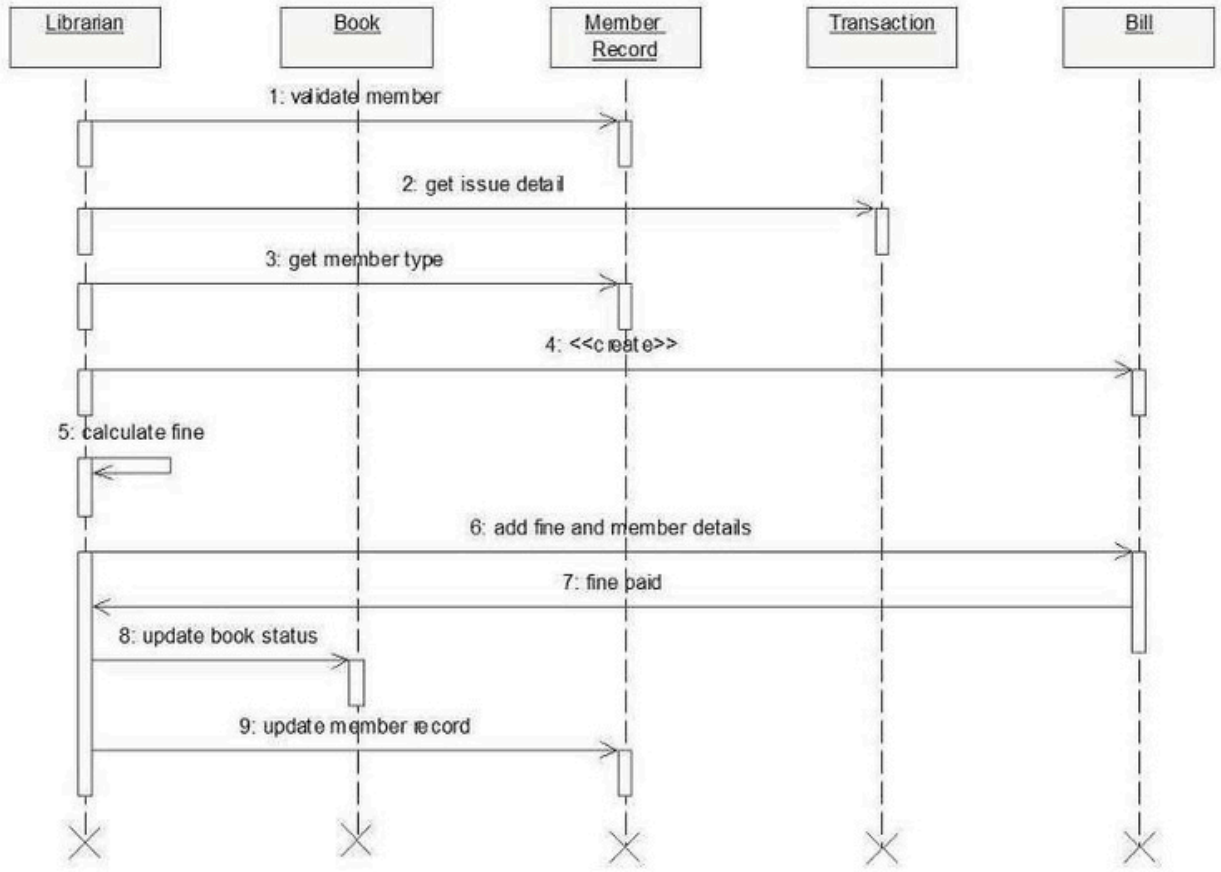
Sequence Diagram(Simple):



Explanation:

The simple sequence diagram shows the basic process of borrowing a book in the library. The interaction begins when the Member requests to borrow a book. The Librarian receives this request and sends a command to the System to search for the book. The system returns the book details, after which the librarian proceeds to issue the book to the member. Once the book is issued, the librarian updates the library database, and finally the member receives the issued book. This diagram focuses only on the essential steps—requesting, searching, issuing, and updating—making it easy to understand how a book is borrowed in a simple workflow.

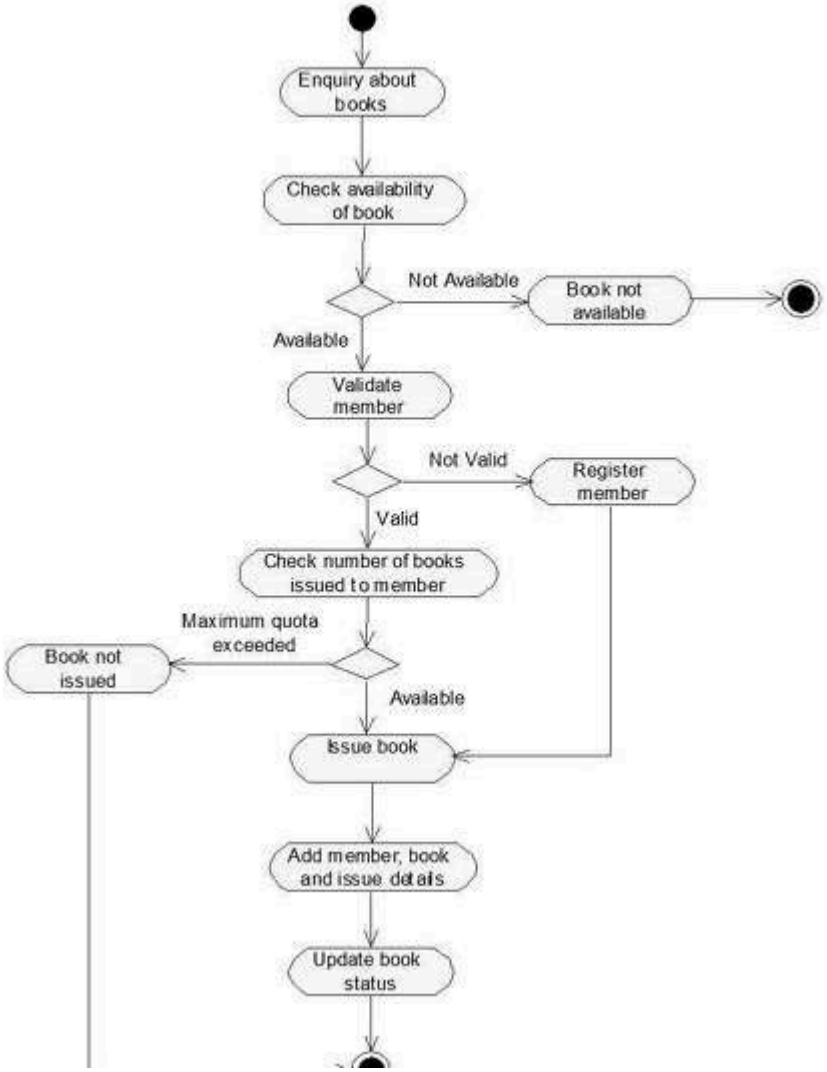
Sequence Diagram(Advanced):



Explanation:

The advanced sequence diagram provides a more detailed view of the book-issuing process. It starts when the Librarian checks the availability of a selected book. The Book object responds with availability status. The librarian then validates the member and checks how many books the member has already borrowed. If issuing is allowed, a Transaction record is created, containing details of the member and the book. The librarian then updates the book status, marking it as issued, and updates the member's record to reflect the new loan. This detailed diagram shows all internal checks—availability, member validation, issuing limits—and the creation of proper records, giving a complete view of how the system handles book issuing behind the scenes.

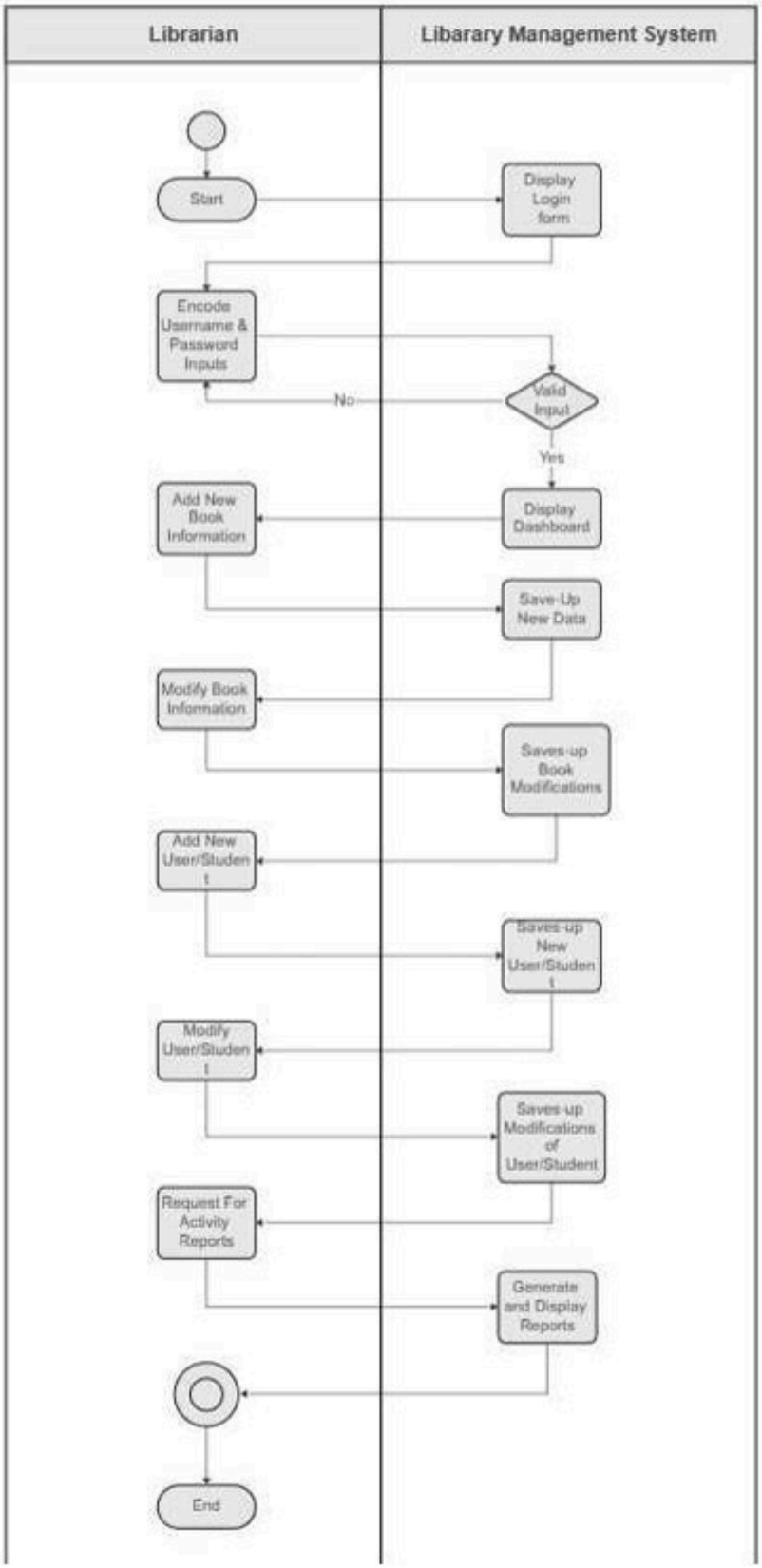
Activity Diagram(Simple):



Explanation:

The simple activity diagram shows the basic steps followed when a user wants to issue a book. The process starts with an inquiry about the book, followed by checking book availability. If the book is not available, the process ends. If it is available, the system then validates the member. If the member is not valid, they are asked to register. After validation, the system checks how many books the member has already borrowed. If the maximum limit is exceeded, the book is not issued. Otherwise, the book is issued, and the system updates the book status. This simple diagram covers only the main flow of requesting, verifying, and issuing a book.

Activity Diagram(Advanced):

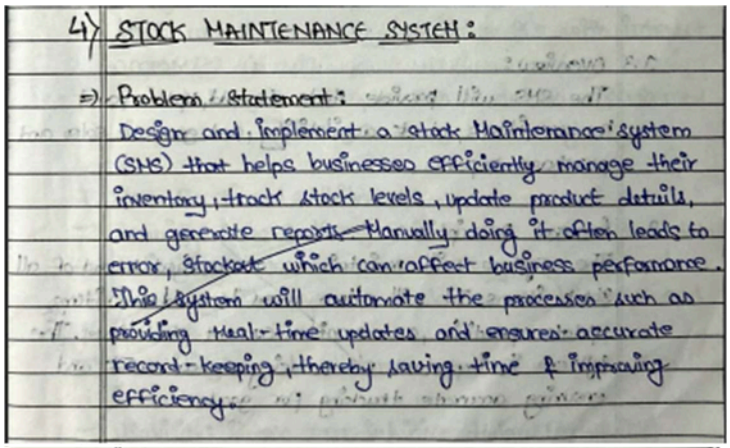


Explanation:

The advanced activity diagram provides a more detailed and complete view of the book-issuing workflow. In addition to checking availability and validating the member, it clearly shows decision points such as book unavailability, invalid member status, and quota limits. It also includes additional actions like adding member book issue details, updating the complete book record, and handling both "Book not issued" and "Issue Books" outcomes. By showing all alternative paths and internal updates, the advanced diagram presents the full operational logic of how the library processes book inquiries, member eligibility, quota checks, issuing actions, and record maintenance. It reflects the complete backend process of issuing a book in a real library system.

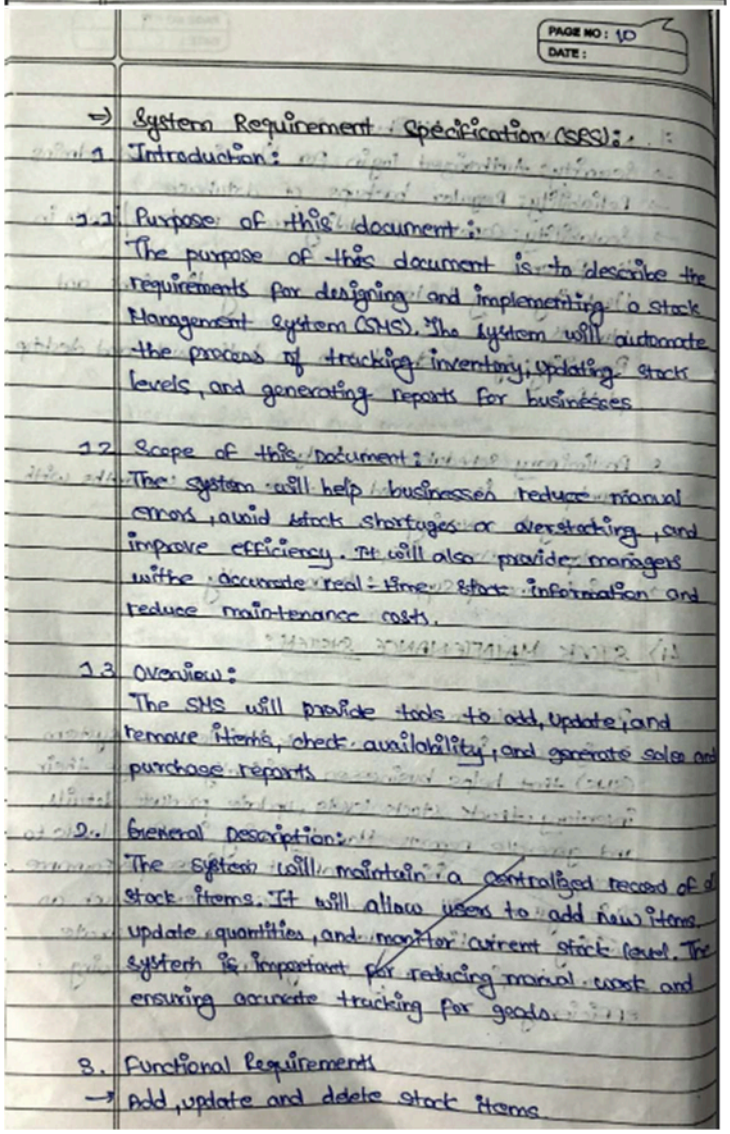
4. Stock Maintenance System

SRS:



4) STOCK MAINTENANCE SYSTEM:

=) Problem Statement:
Design and implement a stock Maintenance system (SMS) that helps businesses efficiently manage their inventory, track stock levels, update product details, and generate reports. Manually doing it often leads to error, stockout which can affect business performance. This system will automate the processes such as providing real-time updates and ensures accurate record-keeping, thereby saving time & improving efficiency.



PAGE NO: 10
DATE:

=) System Requirement Specification (SRS):

1. Introduction:

1.1 Purpose of this document:
The purpose of this document is to describe the requirements for designing and implementing a stock Management System (SMS). The system will automate the process of tracking inventory, updating stock levels, and generating reports for businesses.

1.2 Scope of this document:
The system will help businesses reduce manual errors, avoid stock shortages or overstocking, and improve efficiency. It will also provide managers with accurate real-time stock information and reduce maintenance costs.

1.3 Overview:
The SMS will provide tools to add, update, and remove items, check availability, and generate sales and purchase reports.

2. General Description:
The system will maintain a centralized record of all stock items. It will allow users to add new items, update quantities, and monitor current stock level. The system is important for reducing manual work and ensuring accurate tracking for goods.

3. Functional Requirements
→ Add, update and delete stock items.

→ Track available quantities of each product.
→ Generate stock reports (daily, monthly, yearly)
→ Notify low stock levels.
→ Manage purchase & sales records

4. Interface Requirements:
→ User interface for staff to manage stock
→ Database to store product and transaction details
→ Reports accessible in PDF/Excel formats.

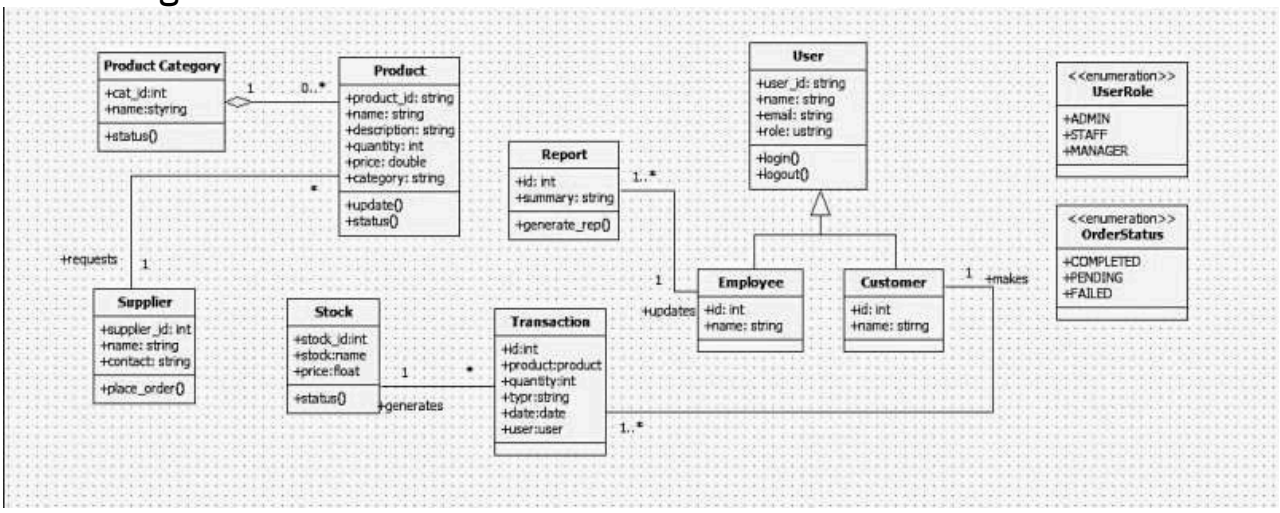
5. Performance Requirements:
→ Must support atleast 1,000 stock items
→ Fast search & update (within 2 seconds)
→ Real-time updates for stock changes

6. Design Constraints:
→ Must run on commonly available PCs with internet access
→ limited budget and open-source database preferred
→ Simple and lightweight design for easy use.

7. Non-Fonctional Attributes:
→ Security: Only authorized staff can access stock data
→ Reliability: Data backup and recovery supported
→ Portability: The system should run on both web and desktop.
→ Scalability: Can handle more products and branches in future.
→ Usability: Simple and intuitive design for quick training.

8. Preliminary Schedule and Budget
Development is expected within 4-5 months with a development cost of 1$81,000.

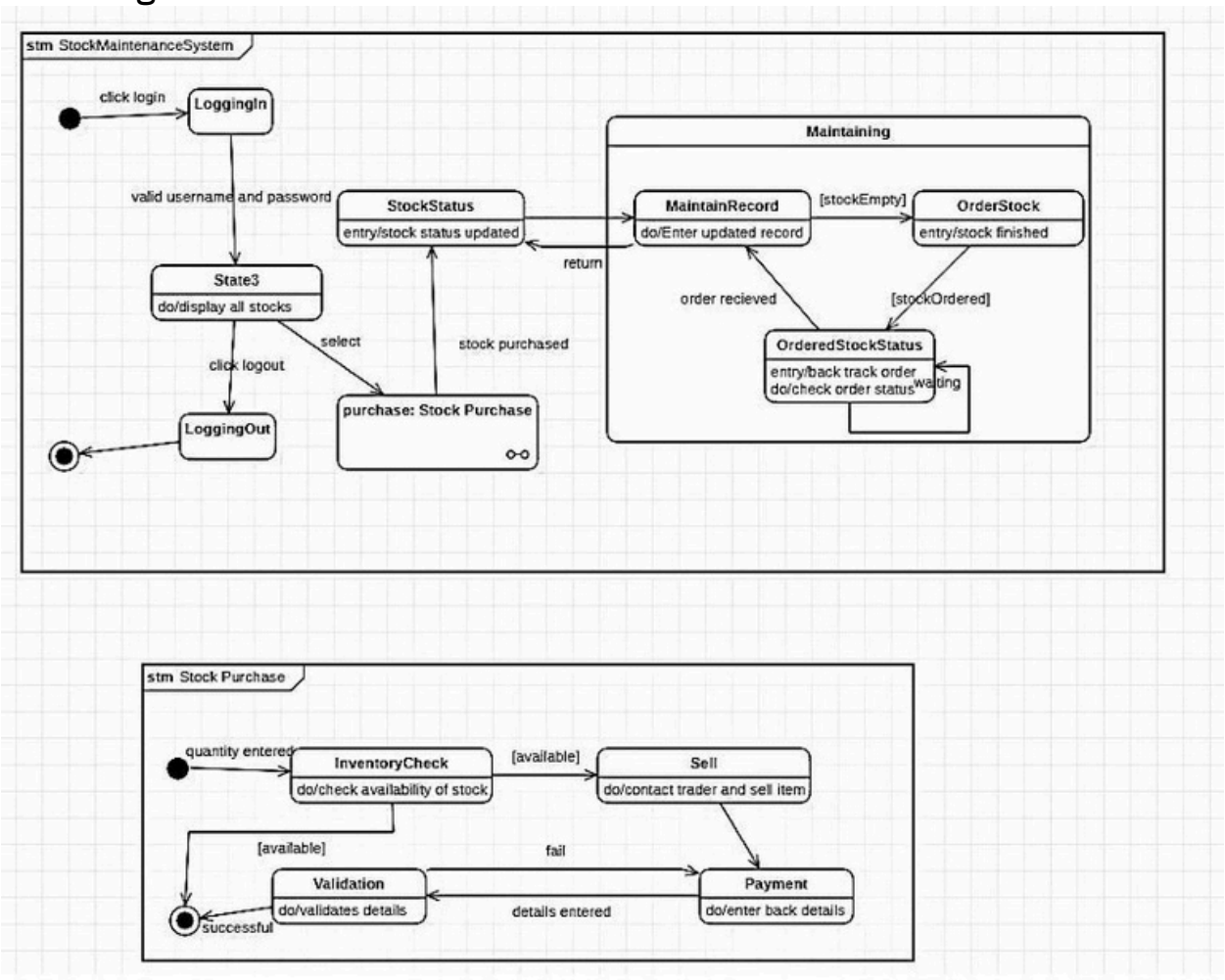
Class Diagram:



Explanation:

This class diagram visually represents the key entities and their relationships in a Sales Management System, showing how different objects such as Users, Customers, Admins, Suppliers, Stocks, Products, Transactions, and Sales interact within the system. Each class is defined with specific attributes and methods, and the arrows indicate relationships—such as Customers making Transactions, Admins managing Stocks and contacting Suppliers, and Sales being associated with Customers—highlighting the flow of information and control throughout the platform. This structure helps ensure efficient handling of sales, inventory, user actions, and supplier coordination, forming a cohesive framework for managing business operations digitally.

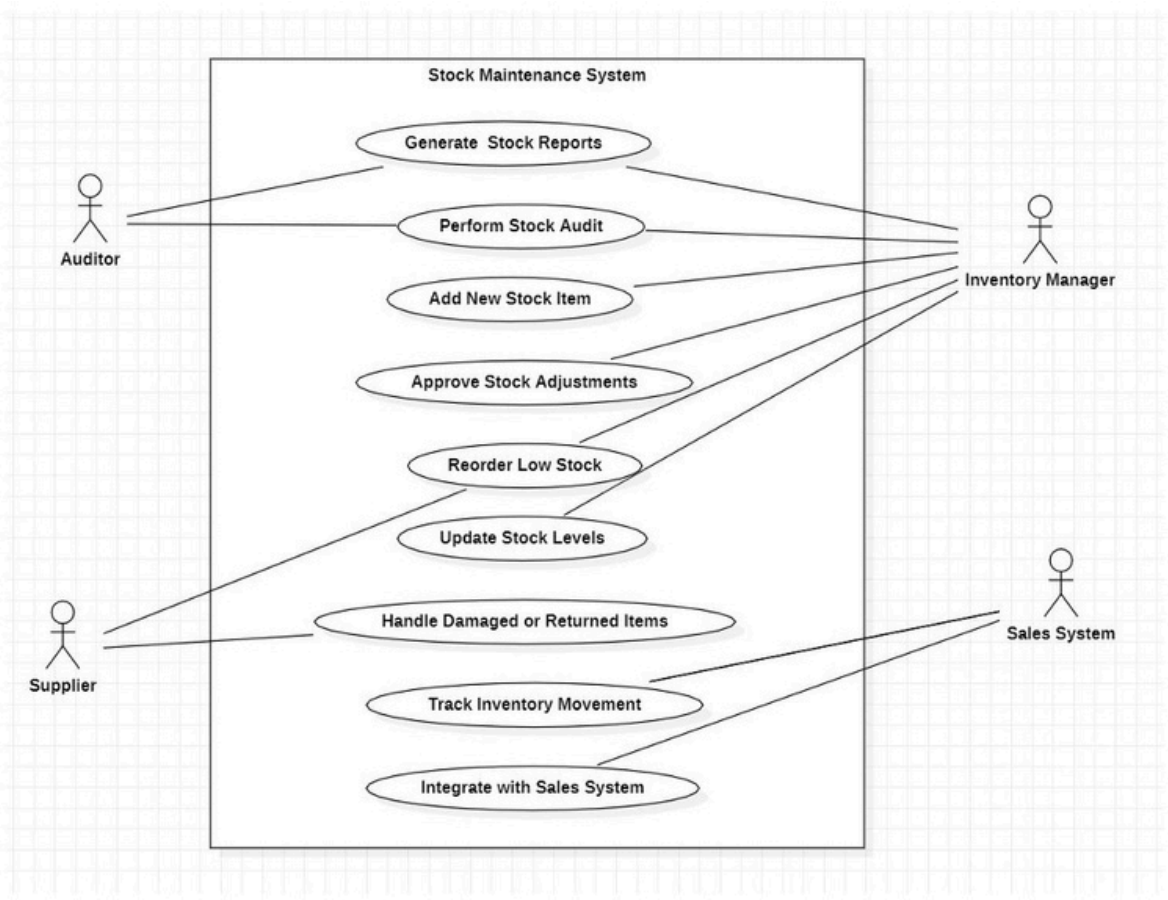
State Diagram:



Explanation:

This advanced state diagram models the Stock Maintenance System, focusing on two core processes: managing overall stock status and handling stock purchase transactions. The top section illustrates user actions like logging in, navigating the homepage to view stocks, initiating stock purchases, and logging out. Once inside the maintenance area, states transition between updating records, ordering new stock if inventory runs out, and tracking the status of those orders—ensuring stock levels remain sufficient through cyclic monitoring and updating.

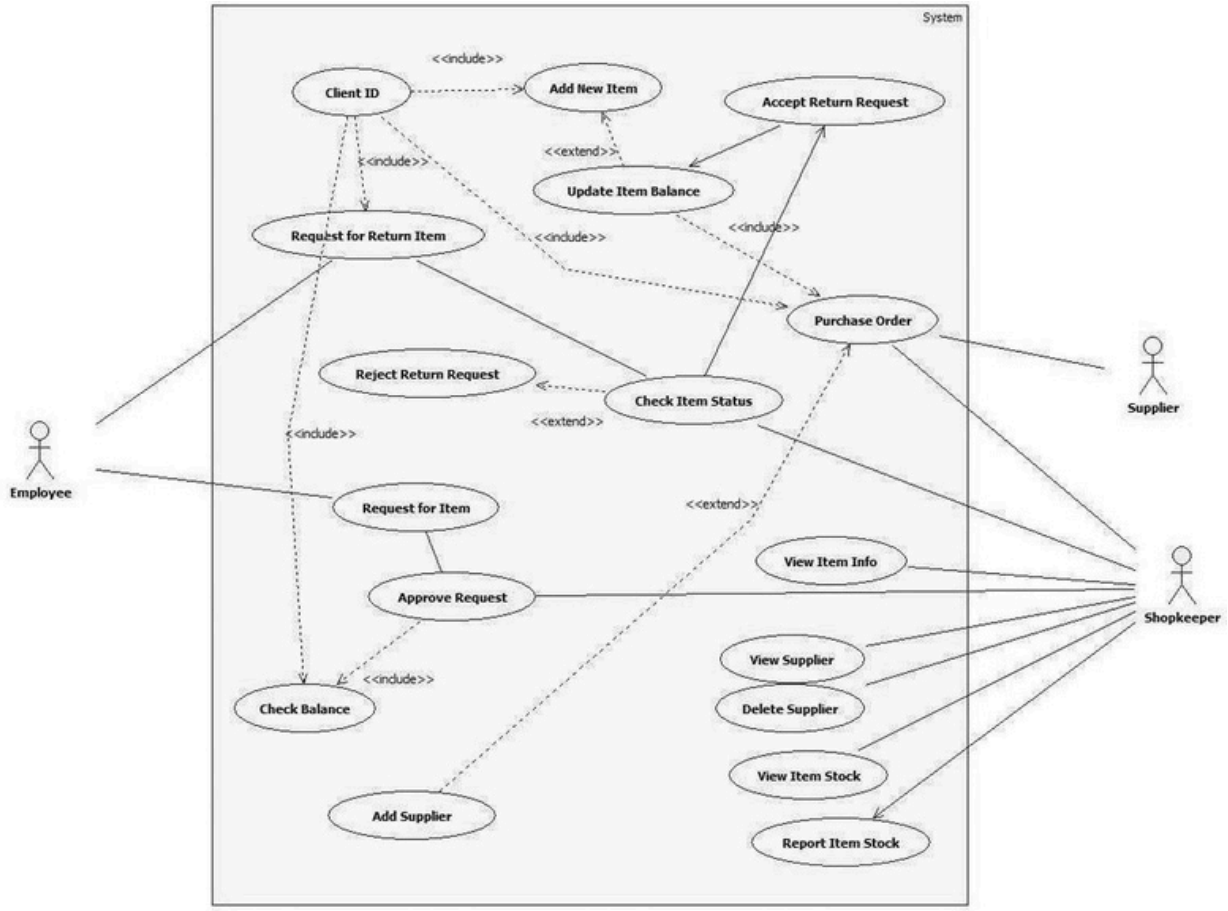
Use case diagram(Simple):



Explanation:

This use case diagram illustrates the interactions between two primary actors—Store Manager and Supplier—in a stock management system. The Store Manager handles inventory operations such as adding, updating, and viewing stock levels, as well as generating reports for analysis. The Supplier is responsible for requesting supply and delivering stock to the store. Each actor is linked to specific system functions, clarifying their roles and responsibilities. This visual representation helps in understanding system requirements, streamlining workflows, and guiding software development. It ensures that all user interactions are captured, making the system more efficient, user-centric, and aligned with business objectives.

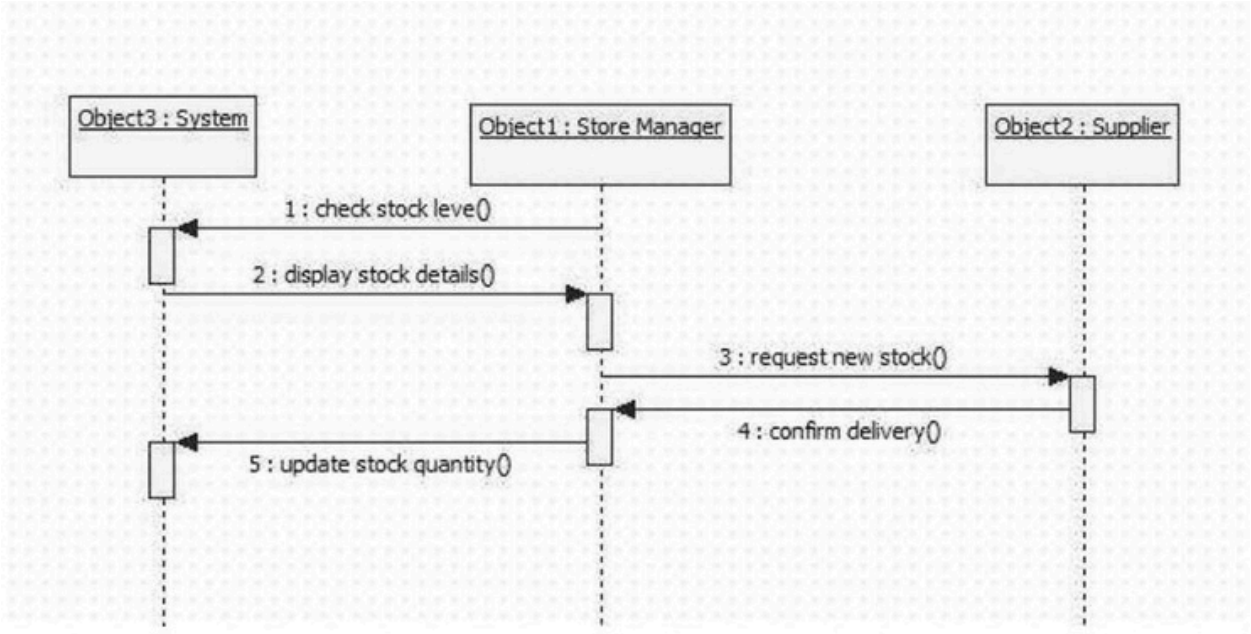
Use Case Diagram(Advanced):



Explanation:

This use case diagram outlines the roles of Manager, Store Staff, and Supplier in a retail system. The Manager oversees buying stock, making payments, and supervising staff. Store Staff handle inventory reporting, product quality checks, and selling stock. The Supplier delivers orders, receives payments, and manages quality issue reports. Relationships like <> and <> show dependencies—for example, buying stock includes giving payment and may extend to reporting quality issues, which in turn includes returning damaged goods. This structured view clarifies responsibilities, enhances system design, and ensures smooth coordination among stakeholders for efficient inventory and supply chain management.

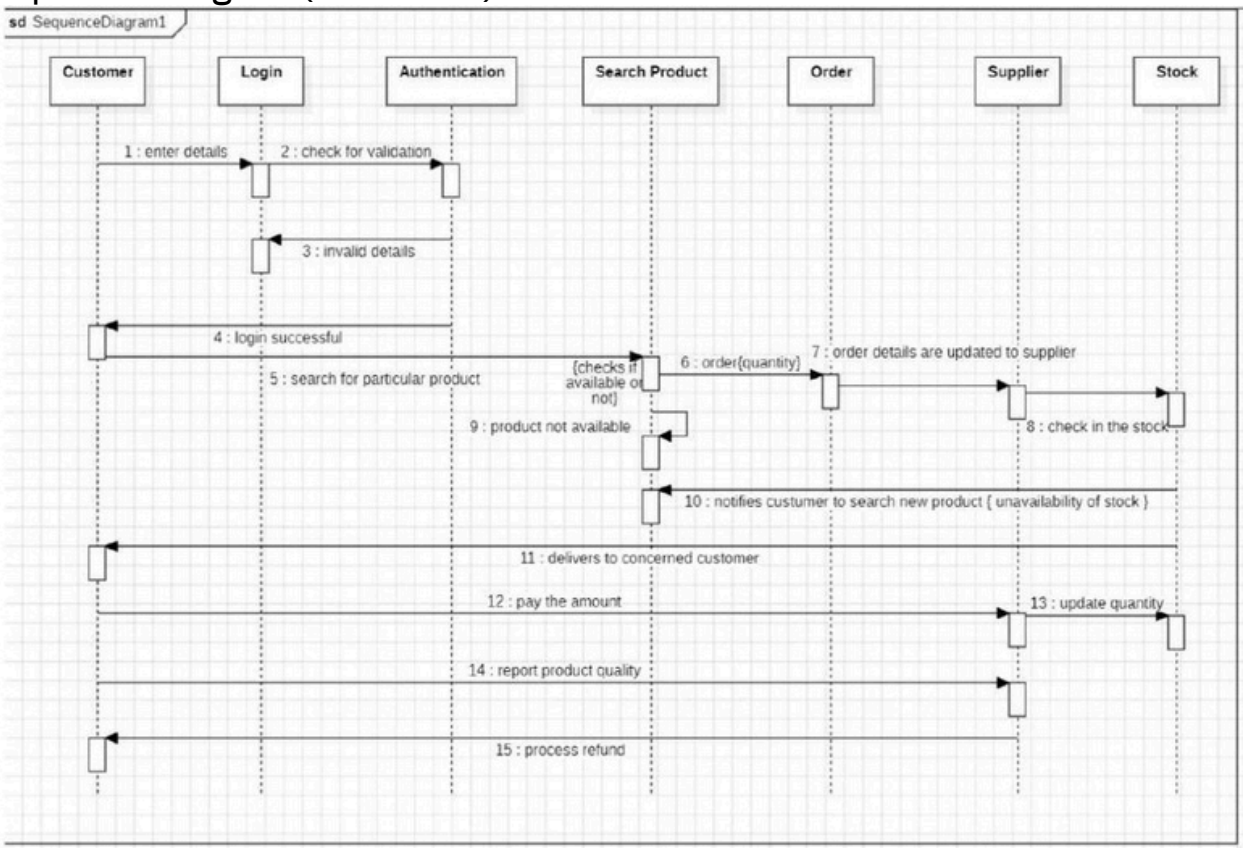
Sequence Diagram(Simple):



Explanation:

This UML sequence diagram illustrates the interaction between the Store Manager, Supplier, and System in a stock management workflow. The Store Manager initiates the process by checking stock levels through the System, which responds by displaying stock details. If stock is insufficient, the Manager requests new stock from the Supplier, who confirms delivery. Following this, the Manager updates the stock quantity in the System to reflect the new inventory. This sequence clearly outlines the communication flow and operational dependencies among the actors and system components, helping developers understand system behavior and ensuring accurate implementation of inventory-related functionalities.

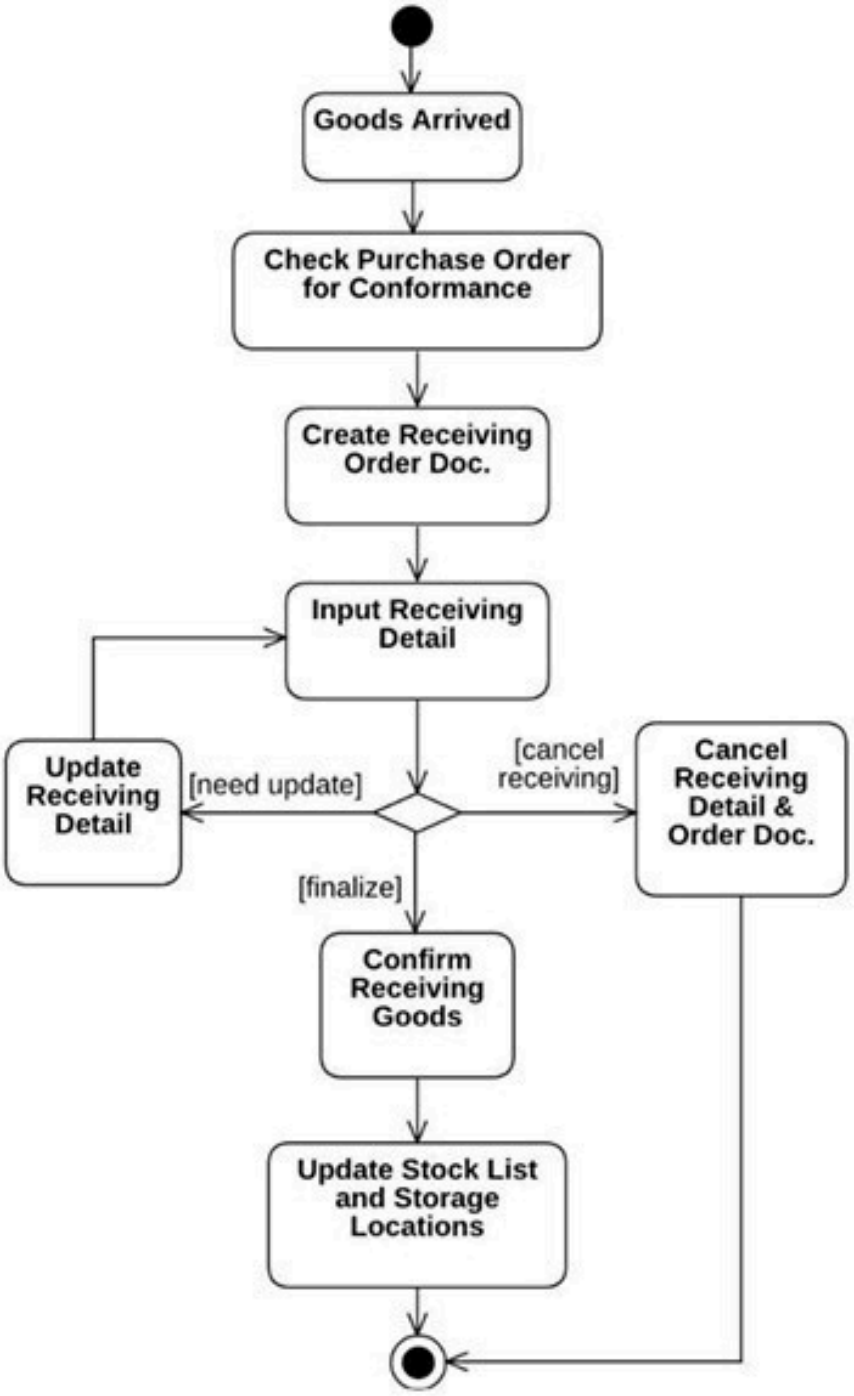
Sequence Diagram(Advanced):



Explanation:

This UML sequence diagram for the Old Stock Management System outlines the step-by-step interaction between entities like Customer, Login, Authentication, Search Product, Order, Supplier, and Stock. The process begins with customer detail entry and validation. Upon successful login, the customer searches for a product and checks its quantity. If unavailable, the system prompts them to search for alternatives. Once an order is placed, the supplier is notified, and delivery is arranged. The customer pays, stock quantities are updated, and any quality issues can be reported, triggering a refund process. This flow ensures efficient order handling, inventory tracking, and customer satisfaction.

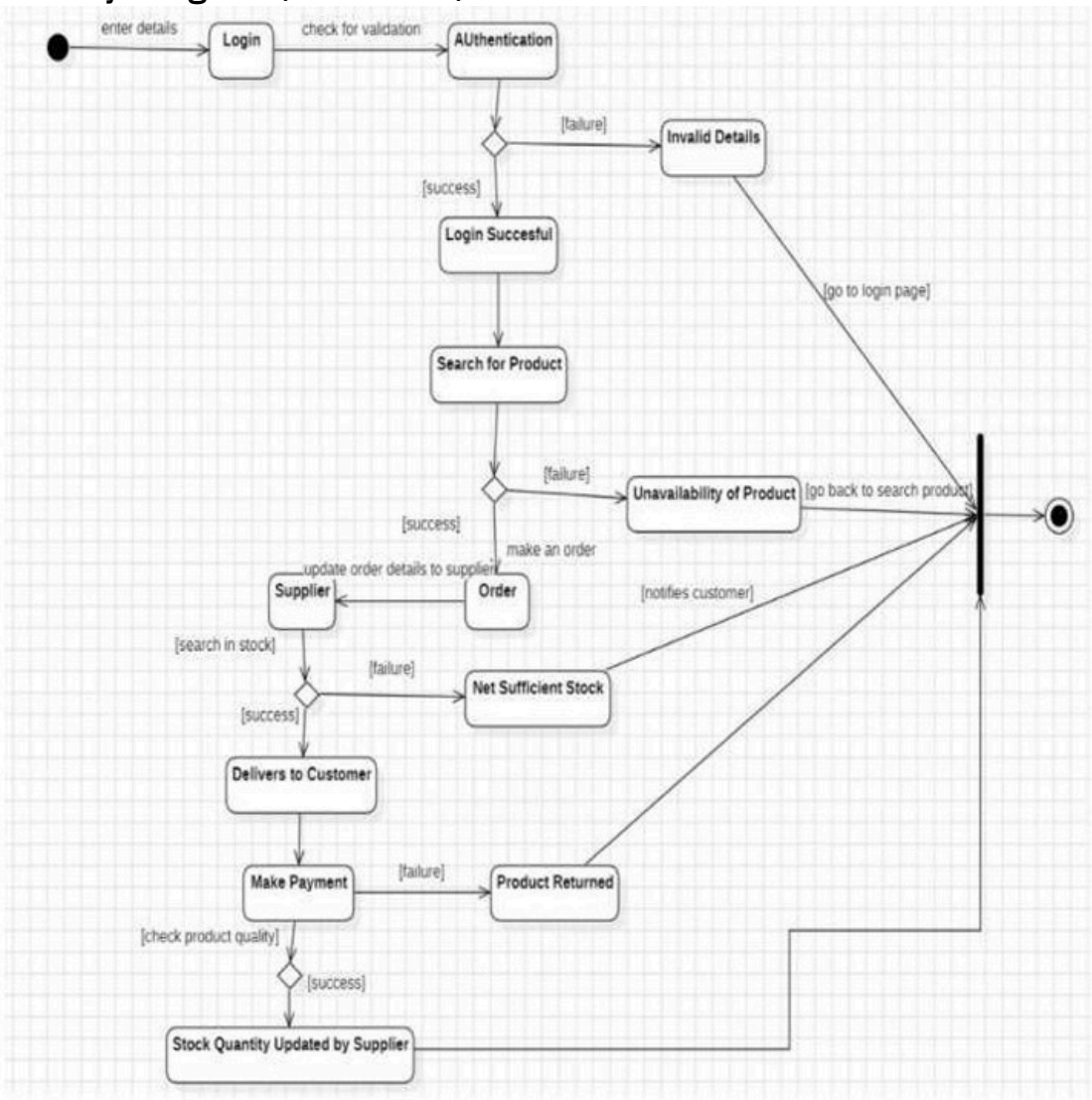
Activity Diagram(Simple):



Explanation:

This flowchart illustrates the complete journey of a customer in an online shopping system, starting from entering login details to receiving the product. The process begins with authentication, where invalid credentials redirect the user back to the login page. Upon successful login, the customer searches for a product. If the product is unavailable, they are prompted to search again. Once a product is selected, the system checks stock availability. If stock is insufficient or the product is returned, the customer is notified. This structured flow ensures that only valid users proceed and that product availability is verified before order placement.

Activity Diagram(Advanced):

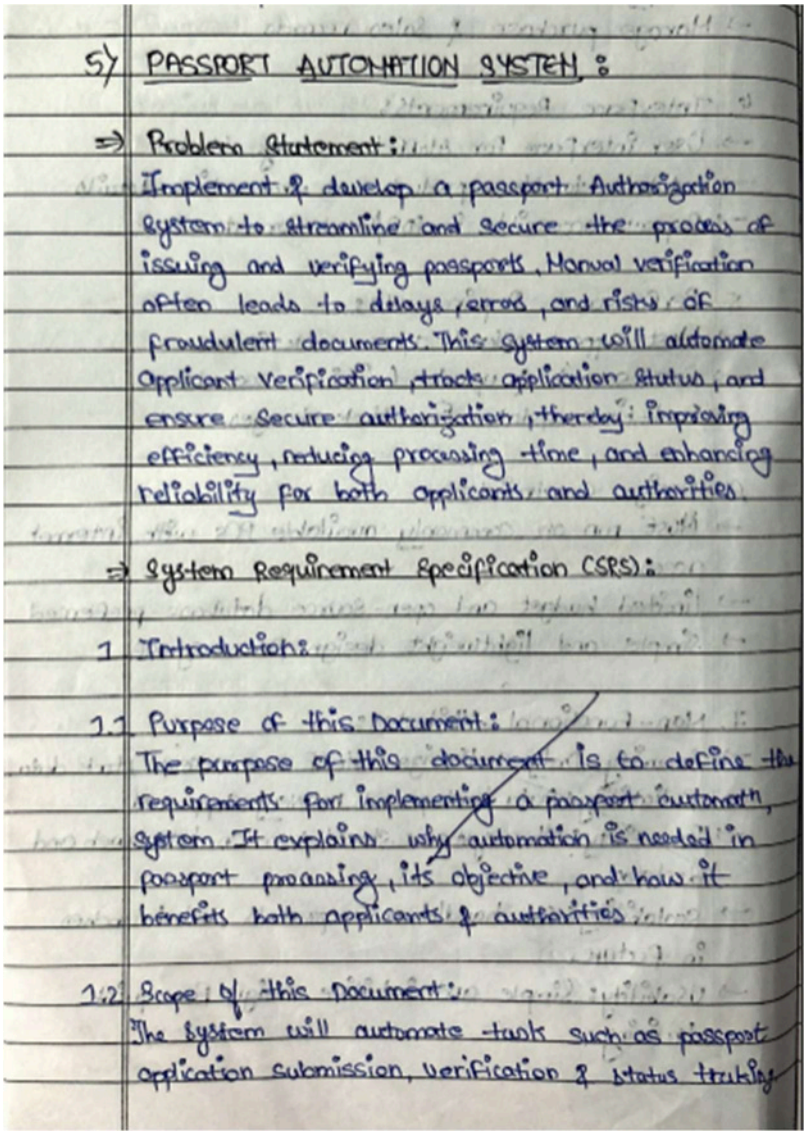


Explanation:

After the order is successfully placed, the system interacts with the supplier to fetch stock and order details. The supplier searches inventory and updates the system accordingly. If delivery fails, the customer is notified immediately. Successful deliveries lead to the payment phase, where transaction failures are also communicated. This decision-based flow ensures transparency and error handling at each step. The supplier plays a critical role in maintaining stock accuracy and fulfilling orders. The system's ability to notify users at every failure point enhances customer experience and operational reliability, making the process robust and user-friendly.

5.Passport Automation System

SRS:



5) PASSPORT AUTOMATION SYSTEM :

=> Problem Statement :
Implement & develop a passport Authorization System to streamline and secure the process of issuing and verifying passports. Manual verification often leads to delays, errors, and risks of fraudulent documents. This system will automate applicant verification, track application status, and ensure secure authorization, thereby improving efficiency, reducing processing time, and enhancing reliability for both applicants and authorities.

=> System Requirement Specification (SRS):

1 Introduction:

1.1 Purpose of this Document:
The purpose of this document is to define the requirements for implementing a passport automation system. It explains why automation is needed in passport processing, its objective, and how it benefits both applicants & authorities.

1.2 Scope of this Document:
The system will automate tasks such as passport application submission, verification & status tracking

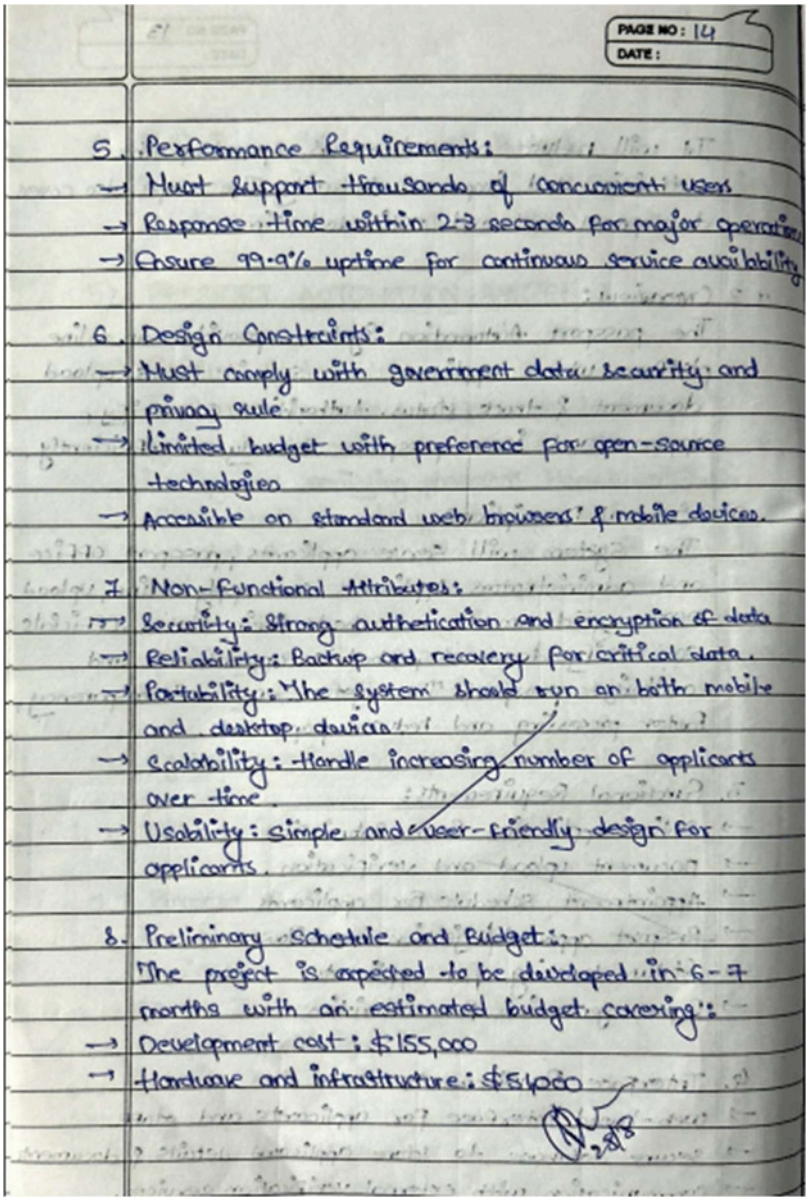
It will reduce manual errors, speed up the authorities and improved security. The scope also covers development cost and estimated time.

1 3. Overview:
The passport Automation System provides an online platform where applicants can submit forms, upload document & track status. Authorities can verify, approve and issue passports securely and efficiently.

2. General Description:
The System will serve applicants, passport office and administrators. Applicants can apply online, upload necessary documents and checks their status. Officials can verify document, schedule appointments and authorize passports. The system ensures transparency, faster processing and reduced paperwork.

3. Functional Requirements:
→ Online application forms submission
→ Document upload and verification
→ Appointment schedule for applicants
→ Passport approval/rejection workflow
→ Status tracking for applicants
→ Report generation for authorities

4. Interface Requirements
→ Web-based interface for applicants and staff
→ Secure database to store applicant details & documents
→ Communication with external verification services.



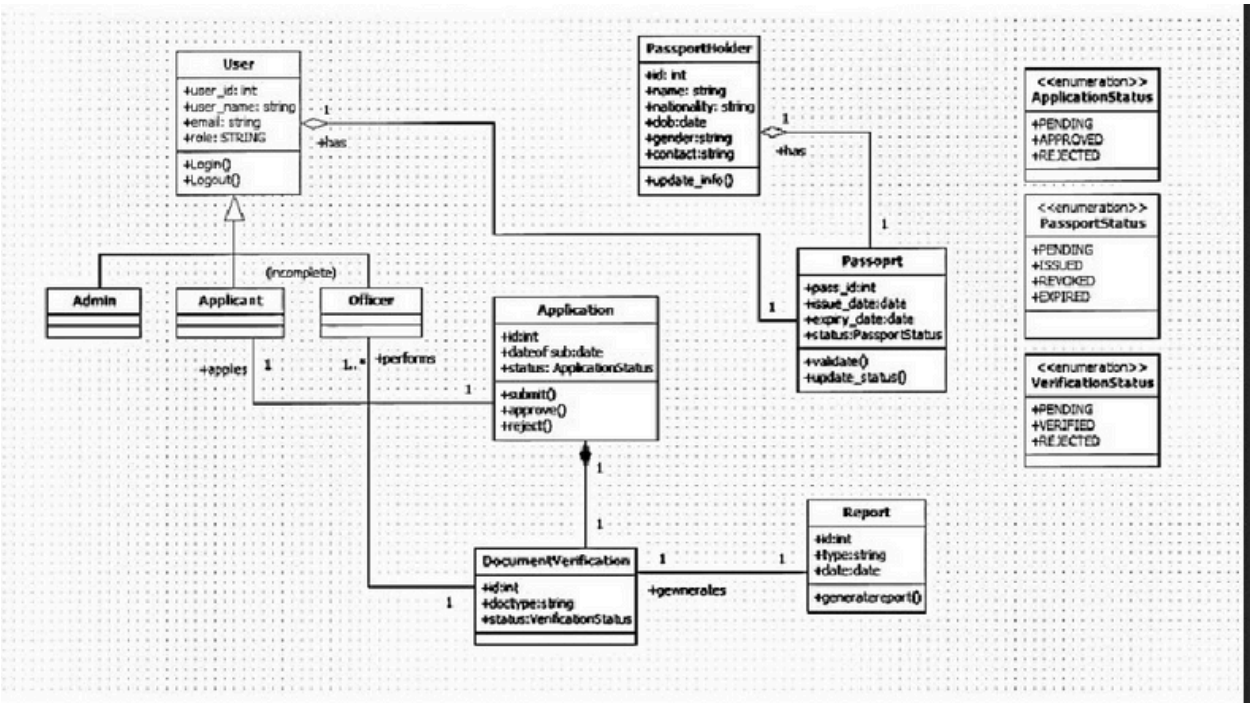
5. Performance Requirements:
→ Must support thousands of concurrent users
→ Response time within 2-3 seconds for major operations
→ Ensure 99.9% uptime for continuous service availability

6. Design Constraints:
→ Must comply with government data security and privacy rule
→ Limited budget with preference for open-source technologies
→ Accessible on standard web browsers & mobile devices.

7. Non-Functional Attributes:
→ Security: Strong authentication and encryption of data
→ Reliability: Backup and recovery for critical data.
→ Portability: The system should run on both mobile and desktop devices
→ Scalability: Handle increasing number of applicants over time.
→ Usability: Simple and user-friendly design for applicants.

8. Preliminary Schedule and Budget:
The project is expected to be developed in 6-7 months with an estimated budget covering:
→ Development cost: $155,000
→ Hardware and infrastructure: $5,000

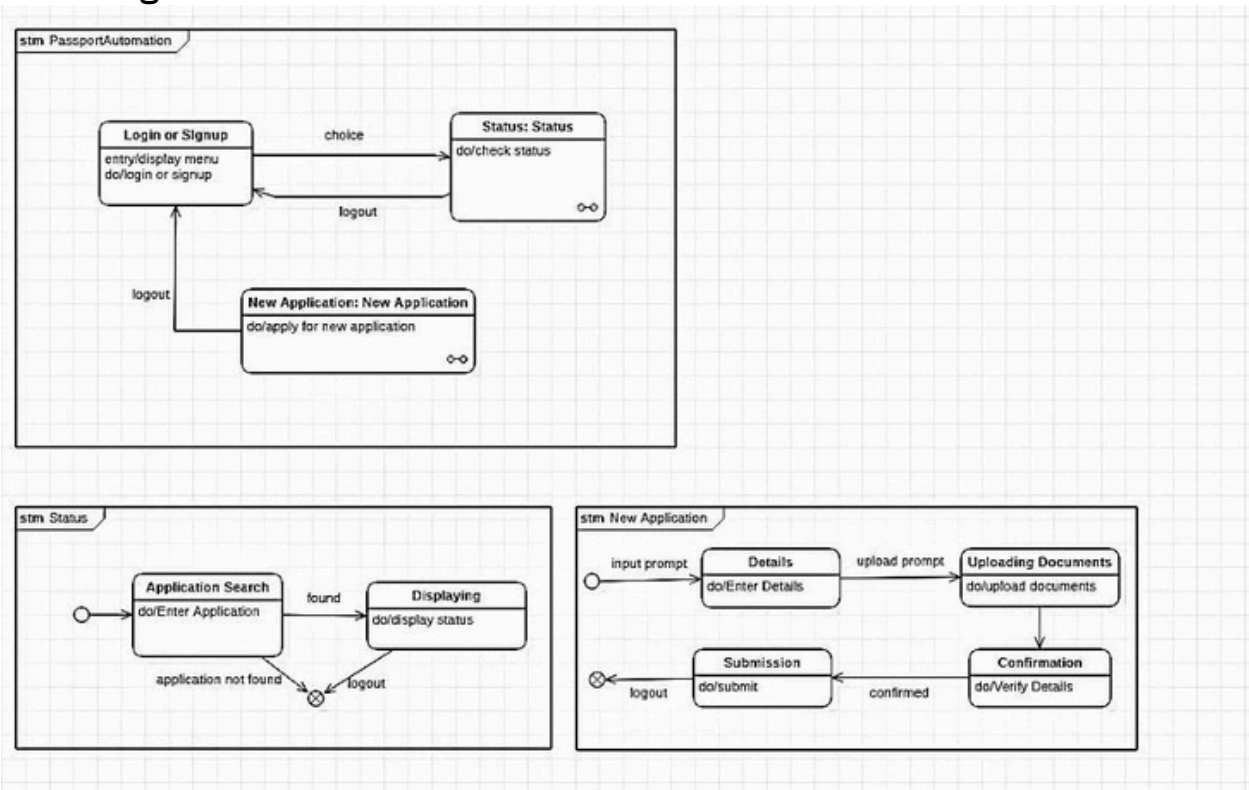
Class Diagram:



Explanation:

This class diagram represents an online Passport Automation System. An Applicant (inheriting basic details from Person and Registration) fills and submits an Application, which an Administrator validates, approves, or declines. Once approved, the applicant books an Appointment for document verification. At the center, Document Verification staff verify the applicant's original documents (docType, place, etc.) during the scheduled slot. The system maintains applicant info, tracks application status, manages appointments, and logs all actions (register, update, cancel, reschedule) while ensuring only verified and approved applicants proceed to the final appointment stage.

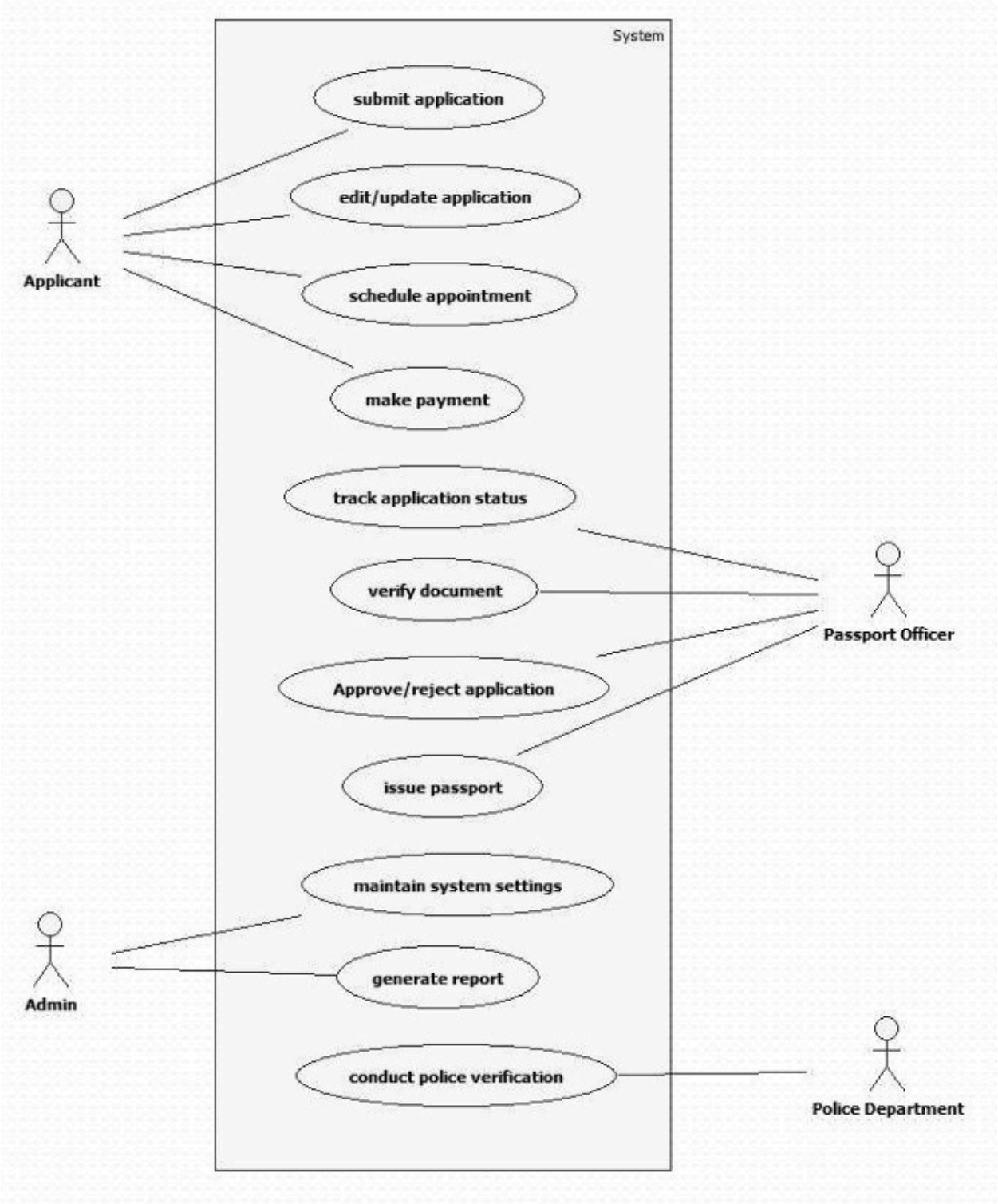
State Diagram:



Explanation:

The activity diagram presents the main menu of a Passport Automation System, where users begin by logging in or signing up. After successful authentication, they are prompted to choose between two primary options: checking the status of an existing application or starting a new passport application. The “Status” path allows users to enter their Application ID; if the record is found, the current status is displayed instantly. If not found, the process terminates gracefully with a logout. This streamlined design enables applicants to quickly track progress without re-submitting documents, enhancing user convenience and reducing support queries.

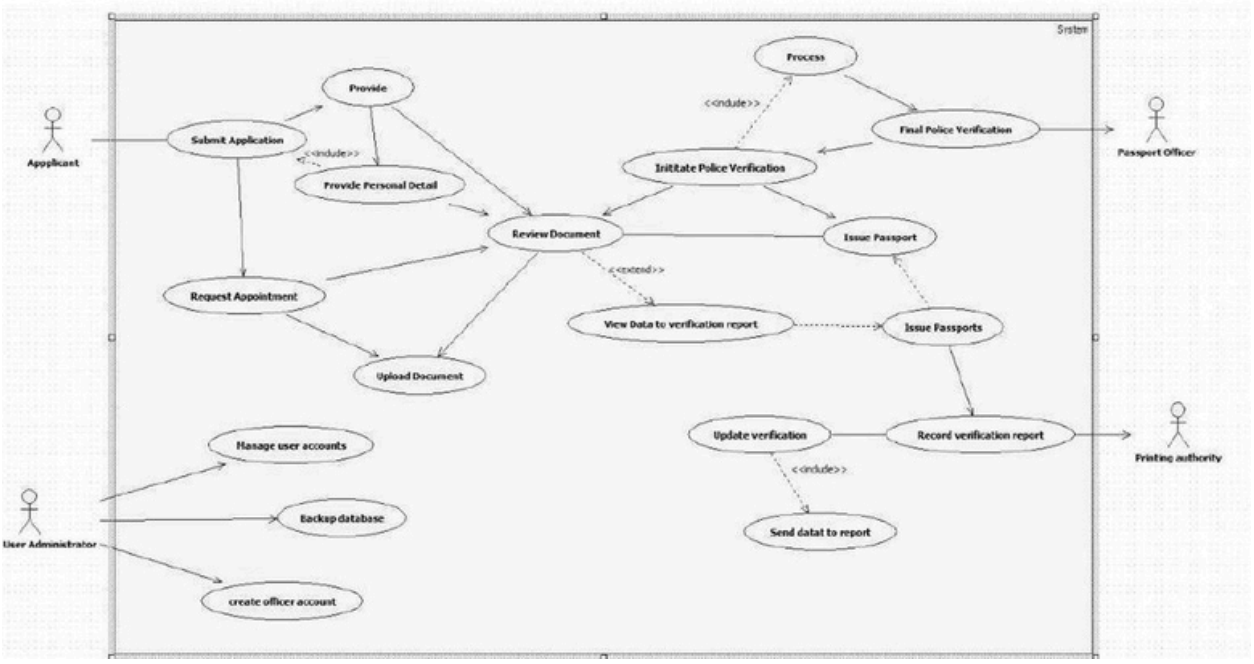
Use case diagram(Simple):



Explanation:

This use case diagram represents a Passport Automation System involving three actors: Applicant, Passport Officer, and Admin. The Applicant can Apply for Passport, Schedule Appointment for document verification, and Check Status of their application anytime. The Passport Officer is responsible for Verify Documents during the appointment and subsequently Issue or Reject the Passport based on authenticity and police verification reports. The Admin handles administrative tasks by managing user accounts (Manage Users) and updating application statuses (Update Application Status) throughout the process. The diagram clearly separates citizen-facing, officer-level, and administrative functions, ensuring smooth, role-based interaction with the system.

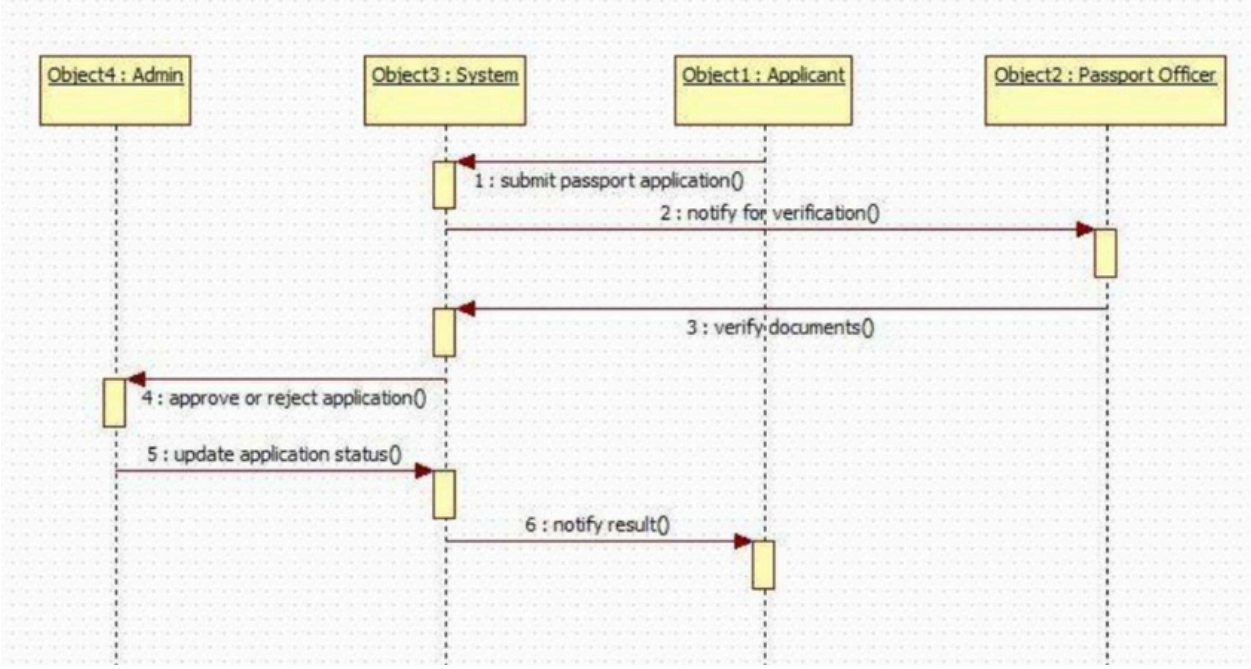
Use Case Diagram(Advanced):



Explanation:

The use case diagram outlines a comprehensive Passport Automation System with four actors. The Applicant registers on the portal, logs in, fills the application form, pays fees via an external Payment Gateway, tracks status, and schedules an appointment. The "Schedule Appointment" use case includes receiving notifications and mandatory document verification. The Passport Officer verifies documents, conducts interviews, and approves or rejects the application. The Police actor performs background verification and submits the police report. This citizen-centric flow ensures online submission, transparent tracking, and seamless integration of payment and notification services.

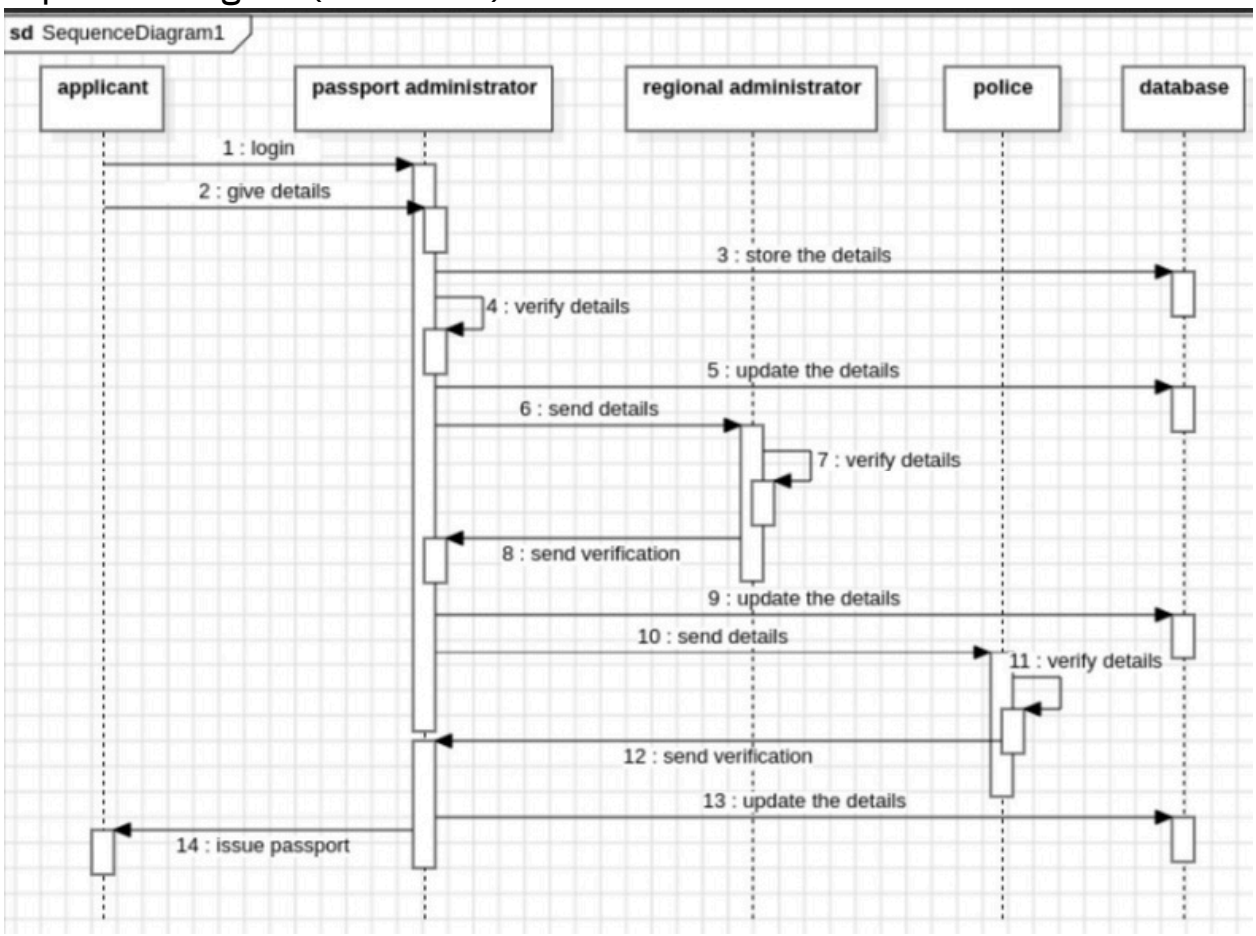
Sequence Diagram(Simple):



Explanation:

This sequence diagram illustrates the interaction flow in a Passport Automation System. The Applicant (Object1) initiates by submitting the passport application to the System (Object3). The System immediately notifies the Passport Officer (Object2) for verification. The Officer verifies the documents and sends the approval/rejection decision back to the System. The System then forwards this decision to the Admin (Object4) to update the official application status. Finally, the System notifies the Applicant about the result (approved or rejected). This clear, step-by-step message exchange ensures transparent communication, proper verification, and timely status updates among applicant, officer, system, and admin.

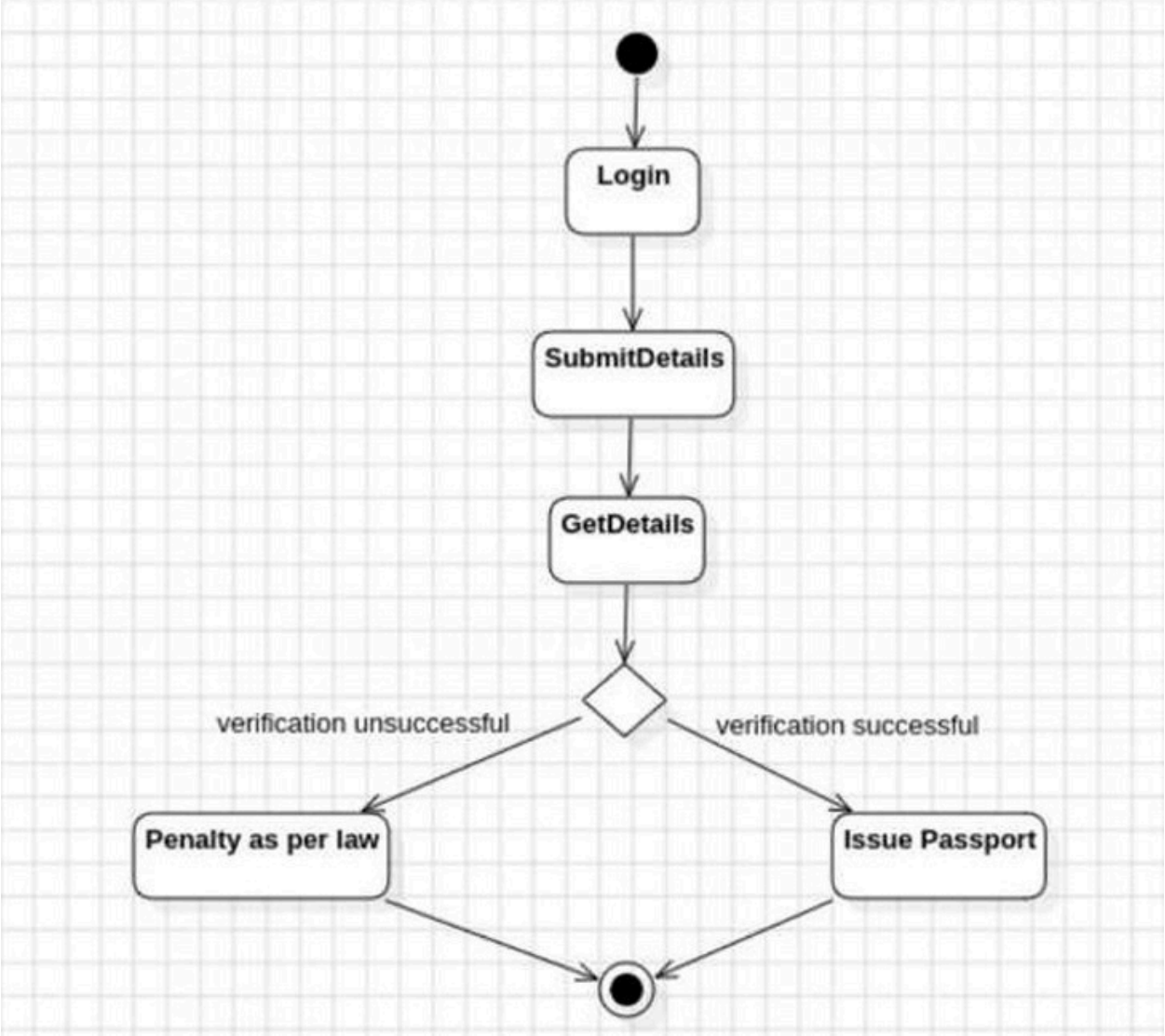
Sequence Diagram(Advanced):



Explanation:

The sequence diagram depicts the complete passport application verification process. The Applicant first logs in and submits personal details to the Passport Administrator. The Administrator verifies the details, stores them in the Database, and forwards them to the Regional Administration. The Regional Administration updates the Database and sends the details to the Police for background verification. After the Police verify and return the report, the Regional Administration updates the Database again and notifies the Passport Administrator. This multi-level verification involving local, regional, and police authorities ensures thorough scrutiny of applicant information before final processing.

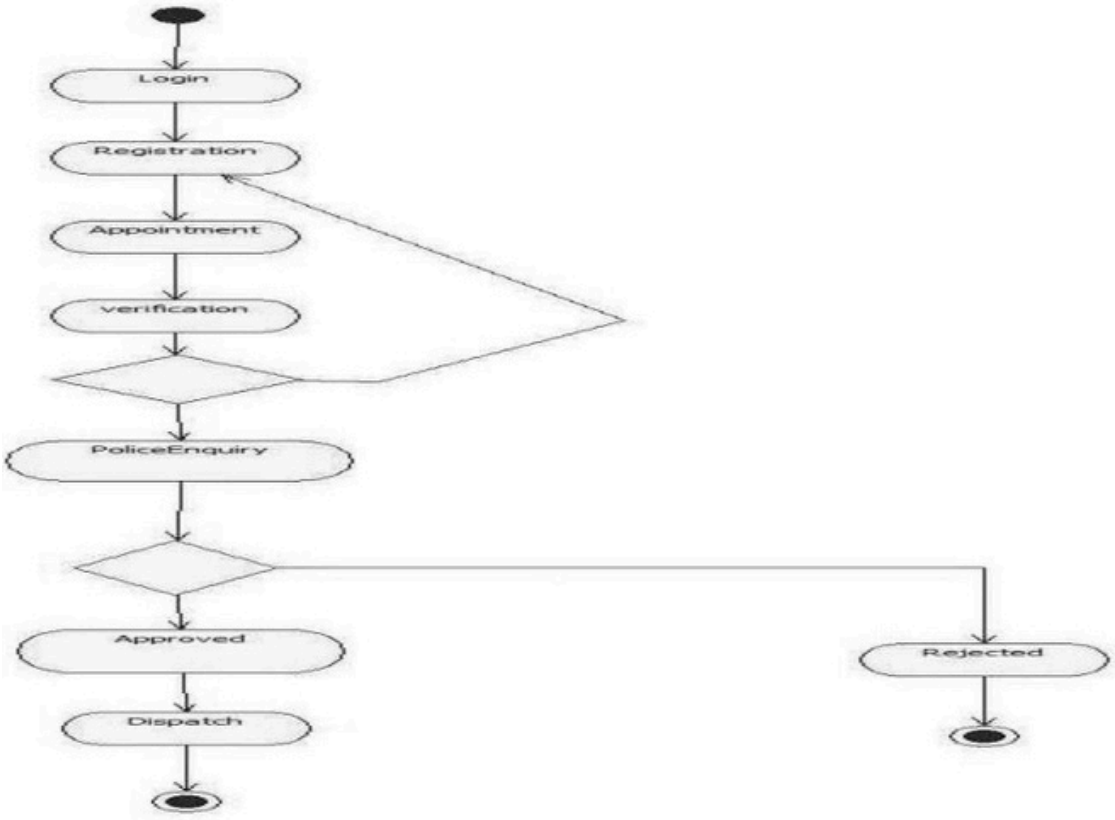
Activity Diagram(Simple):



Explanation:

This activity diagram illustrates the passport renewal/issuance process under strict verification. The applicant begins by logging in, submits personal and supporting details, and the system retrieves and verifies the stored information. A decision node checks verification outcome: if successful, the passport is issued immediately; if unsuccessful (due to discrepancies, criminal record, or invalid documents), a penalty is imposed as per law. The simple, linear flow with a single critical decision point emphasizes automated background checks and legal compliance, ensuring only eligible applicants receive passports while enforcing penalties for fraudulent or ineligible cases.

Activity Diagram(Advanced):



Explanation:

The activity diagram outlines the complete passport application lifecycle. It begins with user Login followed by Registration of personal details. The applicant then books an Appointment for document verification, after which physical Verification takes place at the passport office. A crucial decision point follows verification: if documents and identity are valid, the process continues; otherwise, it may loop back or terminate. The flow then proceeds to Police Enquiry for background and criminal record checks, ensuring eligibility. This structured sequence guarantees that only verified applicants advance to the final approval stage.