CE343 SOFTWARE ENGINEERING

Chapter 5 Software Design

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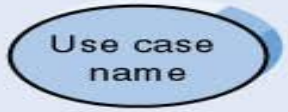
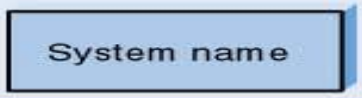
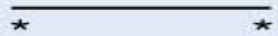
What is Use case Diagram?

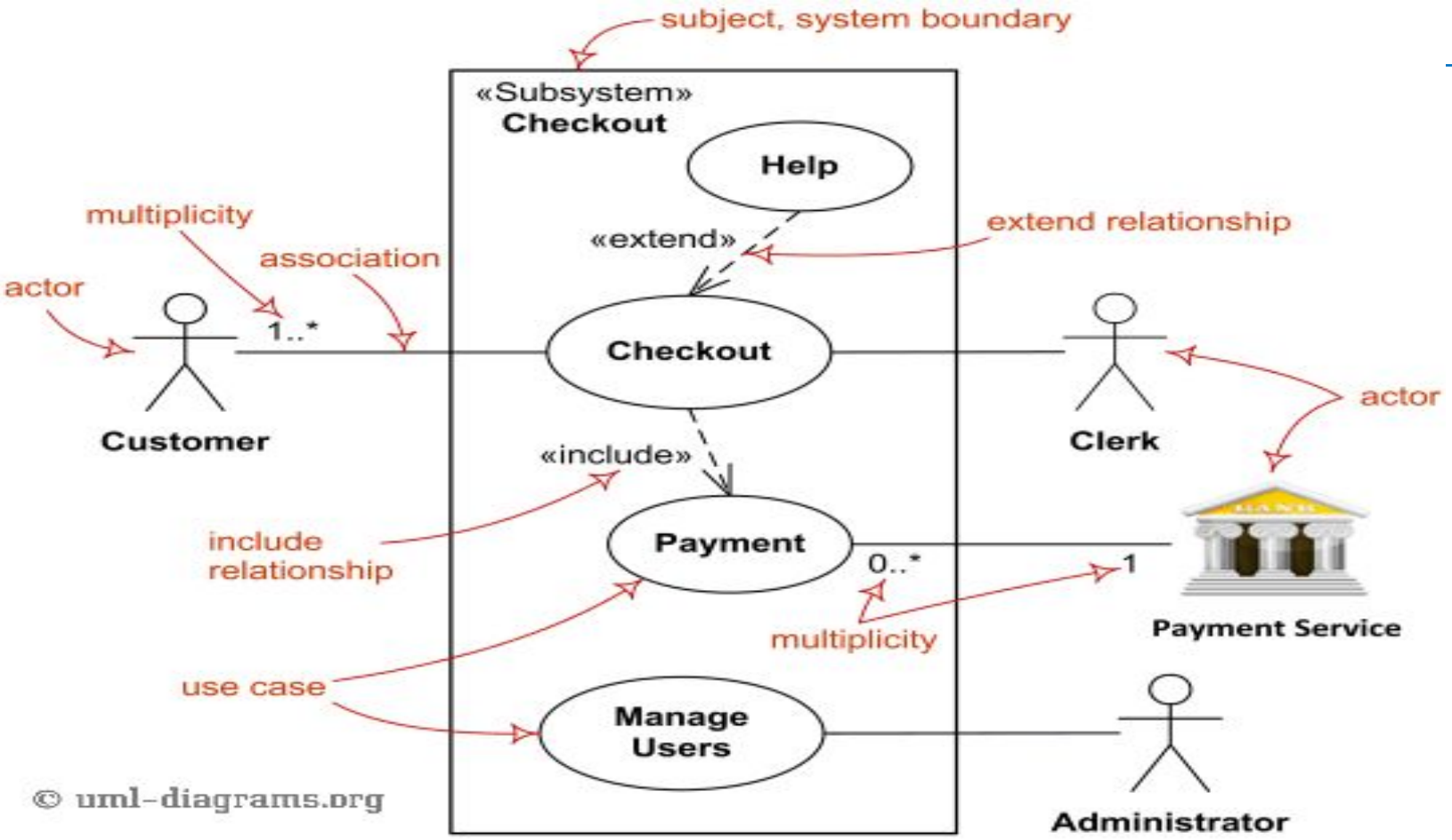
- Use case diagram represent the overall Scenario of the system.
- A scenario is nothing but a sequence of steps describing an interaction between a user and a system.
- ex:
  - *In library, student searches the book in catalog, finds book, reserves the book. He returns a book or pays fine for a book-all these activities constitute a scenario.*

Syntax for Use Case Diagram

Term and Definition	Symbol
An actor ■ Is a person or system that derives benefit from and is external to the system ■ Is labeled with its role ■ Can be associated with other actors using a specialization/superclass association, denoted by an arrow with a hollow arrowhead ■ Are placed outside the system boundary	 Actor role name
A use case ■ Represents a major piece of system functionality ■ Can extend another use case ■ Can use another use case ■ Is placed inside the system boundary ■ Is labeled with a descriptive verb–noun phrase	 Use case name
A system boundary ■ Includes the name of the system inside or on top ■ Represents the scope of the system	 System name
An association relationship ■ Links an actor with the use case(s) with which it interacts	 * *

Steps in Creating the Use Case Diagram

1. Identify Use Cases
2. Draw the system boundary
3. Place Use Cases on the diagram
   - Group Use Cases into packages
   - Add special Use Case associations
4. Identify the actors
5. Add associations


subject, system boundary
«Subsystem»
Checkout
Help
«extend»
extend relationship
multiplicity
association
actor
1..*
Checkout
Customer
Clerk
actor
«include»
include
relationship
Payment
0..*
1
multiplicity
Payment Service
use case
Manage
Users
Administrator
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- **Association:**
- It identifies an interaction between actors and use cases. Each association represents a dialog.
- **Include Relationship:**
- Identifies a reusable use case that is unconditionally required for the execution of another use case.
    - The decision about when and why to use the included use case is taken by the calling use case.
- **Extend Relationship:**
- Identifies a reusable use case that conditionally interrupts the execution of another use case by using its functionality.
    - The decision of when the extending use case should be used is taken by the extending use case itself.
- **Generalization:**
- Identifies an inheritance relationship between actors or between use cases.

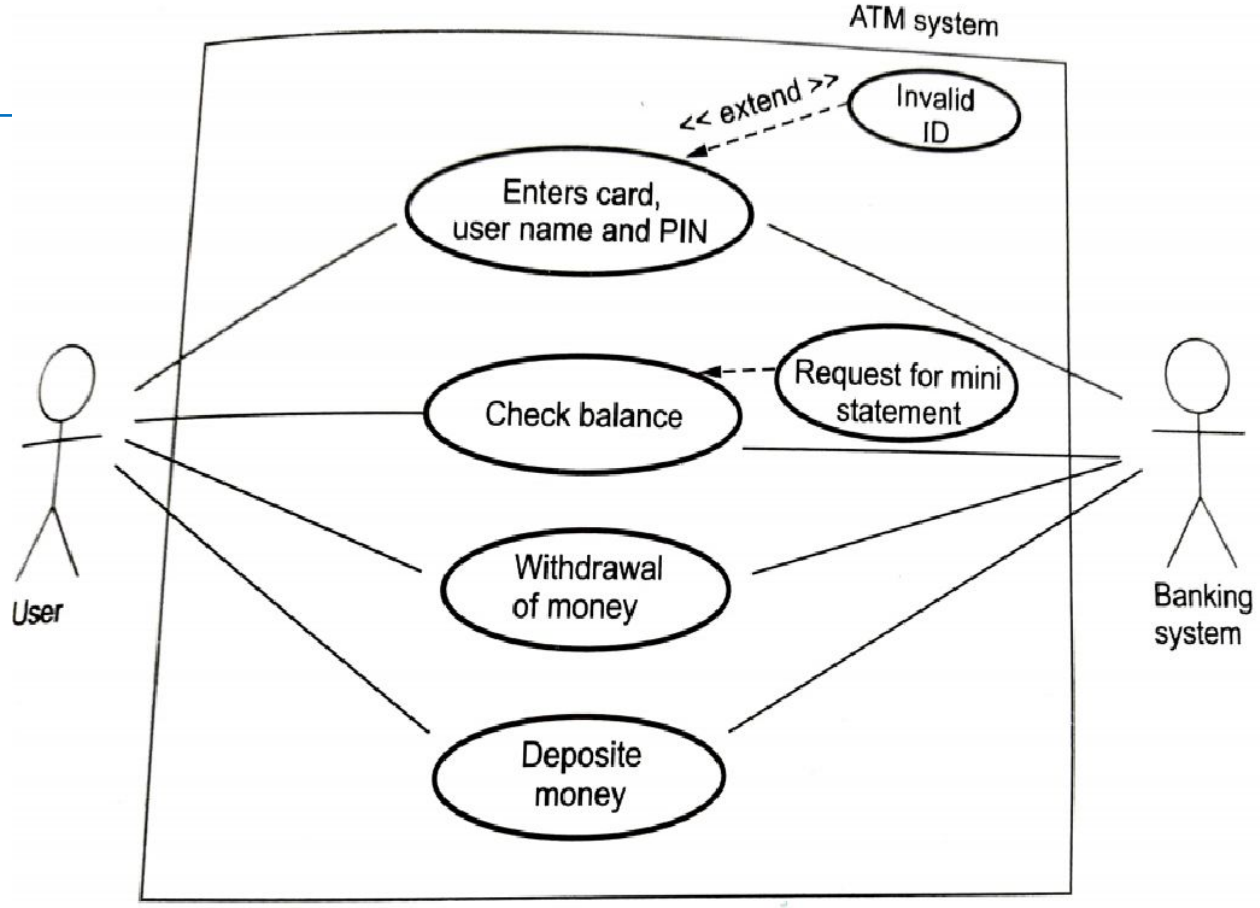


Fig. 3.26 Use case diagram for ATM system

Example 3.3 : *Draw a use case diagram for booking a ticket in a reservation system*

Solution :

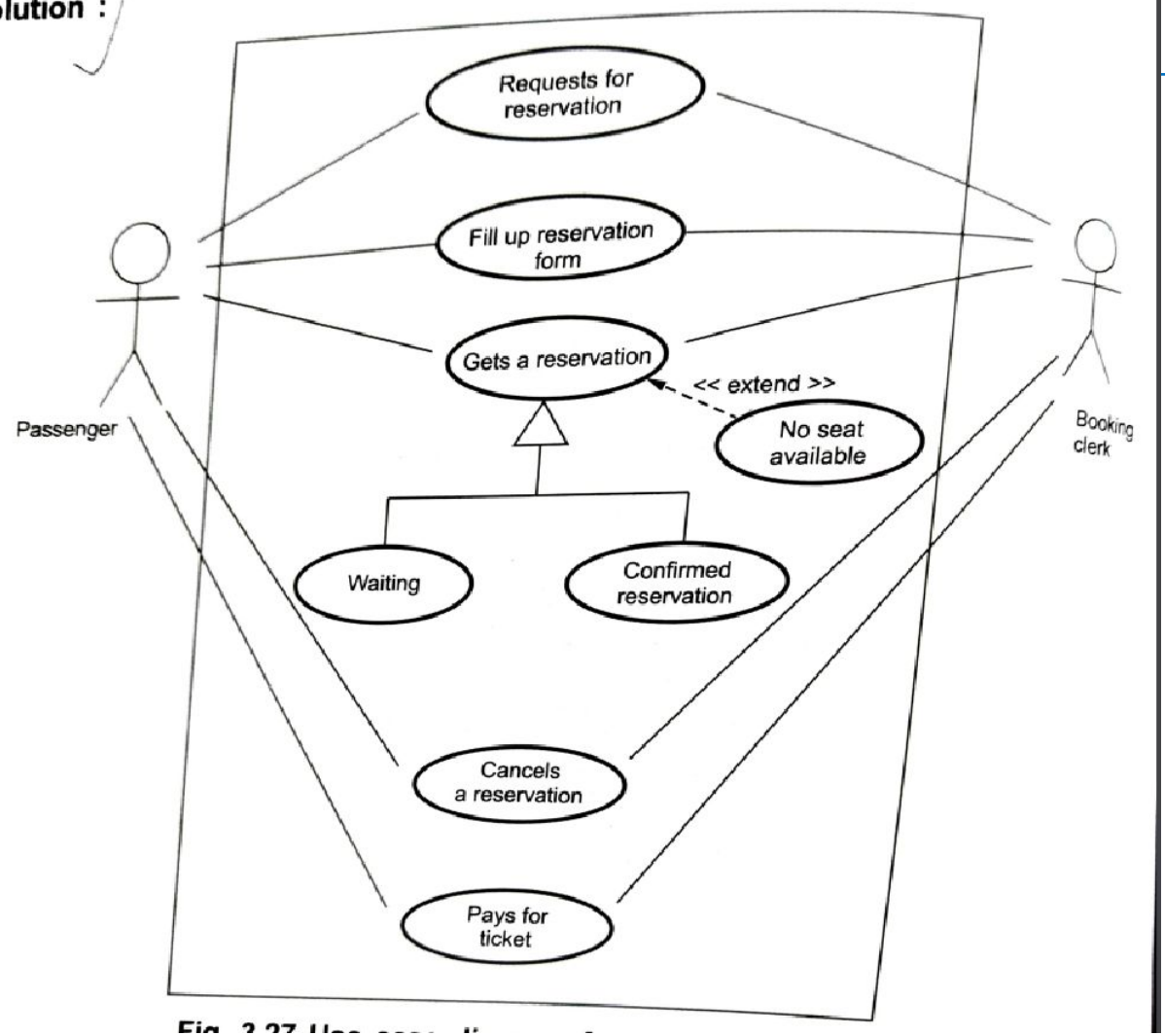


Fig. 3.27 Use case diagram

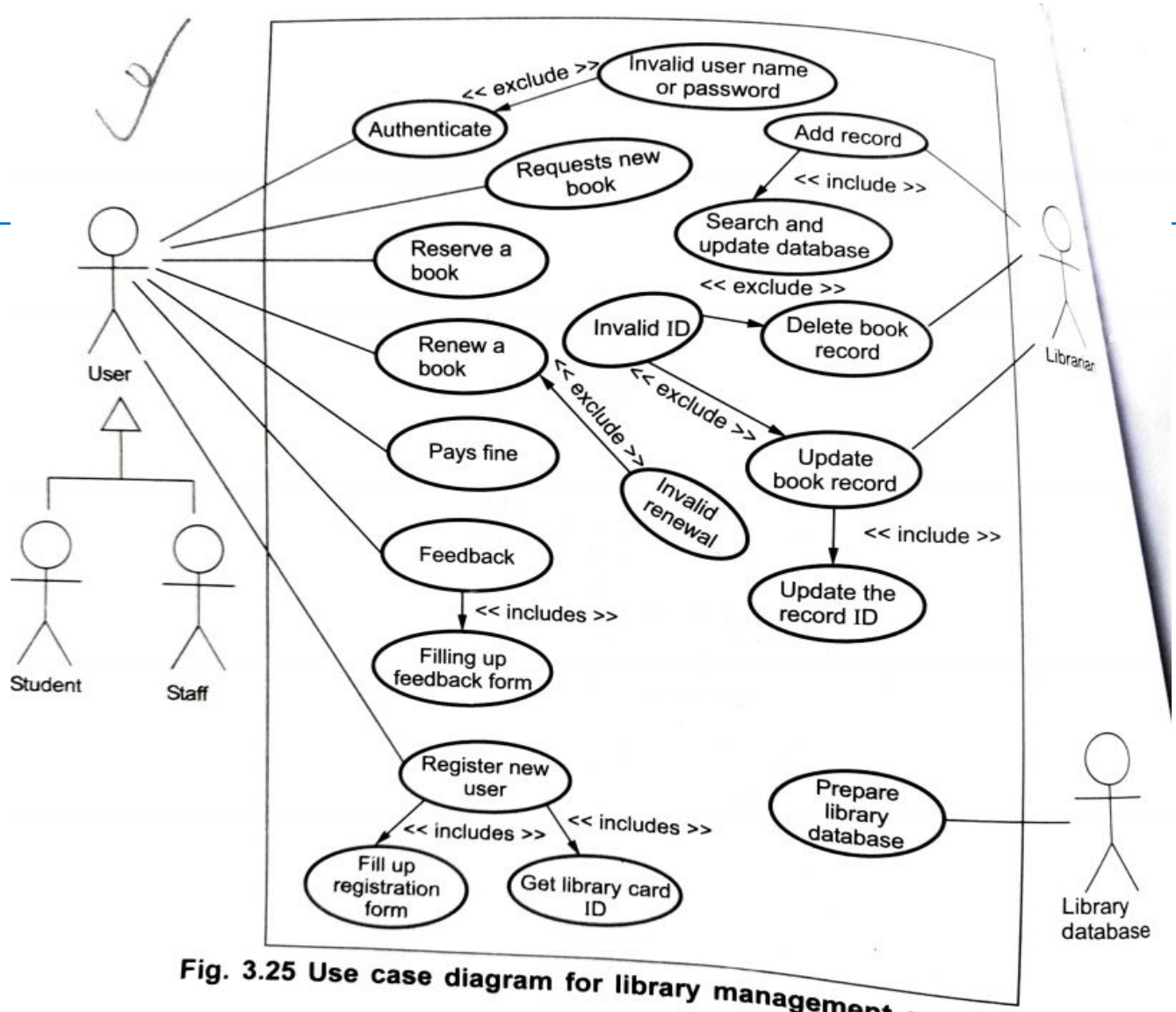
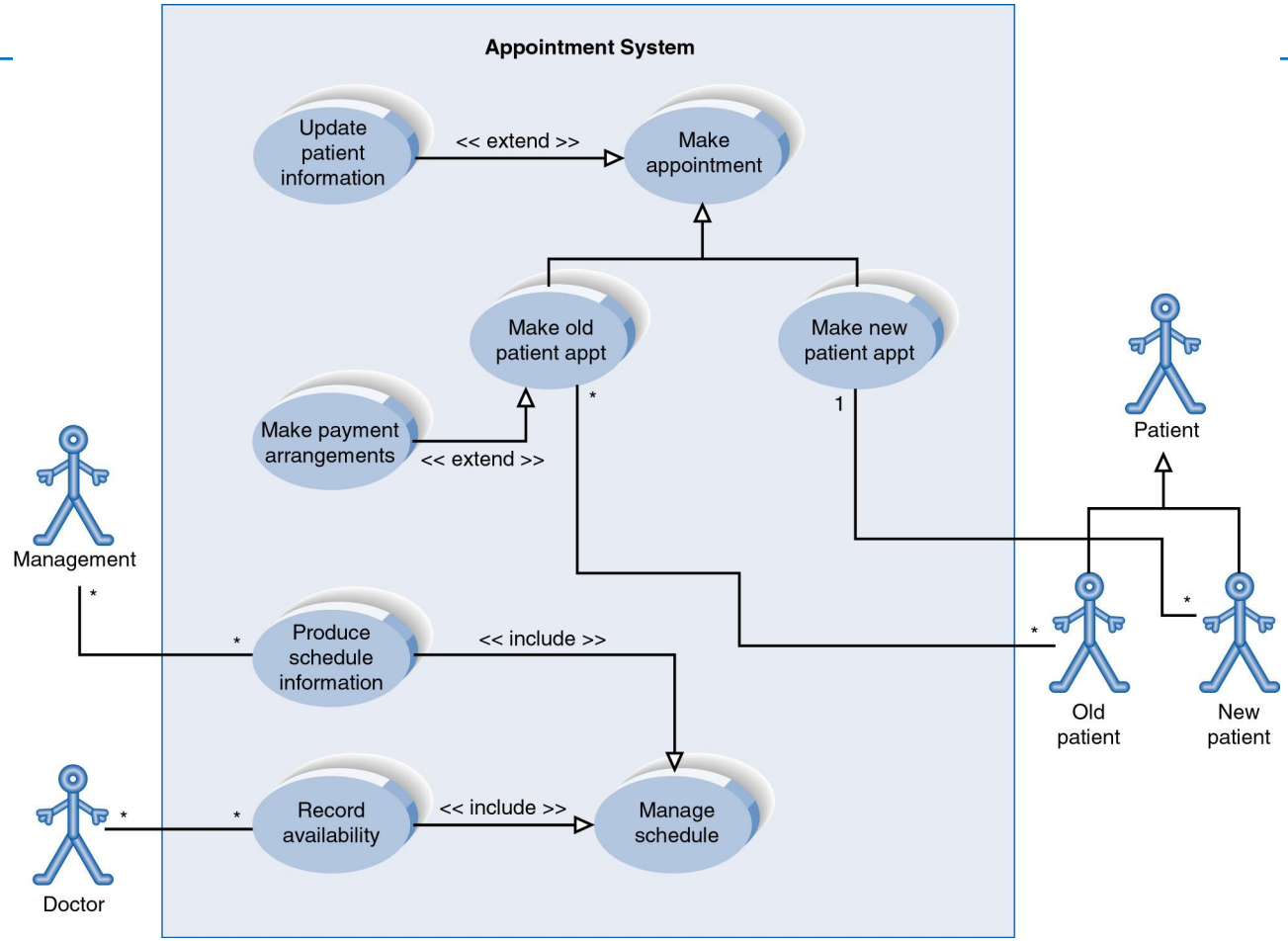
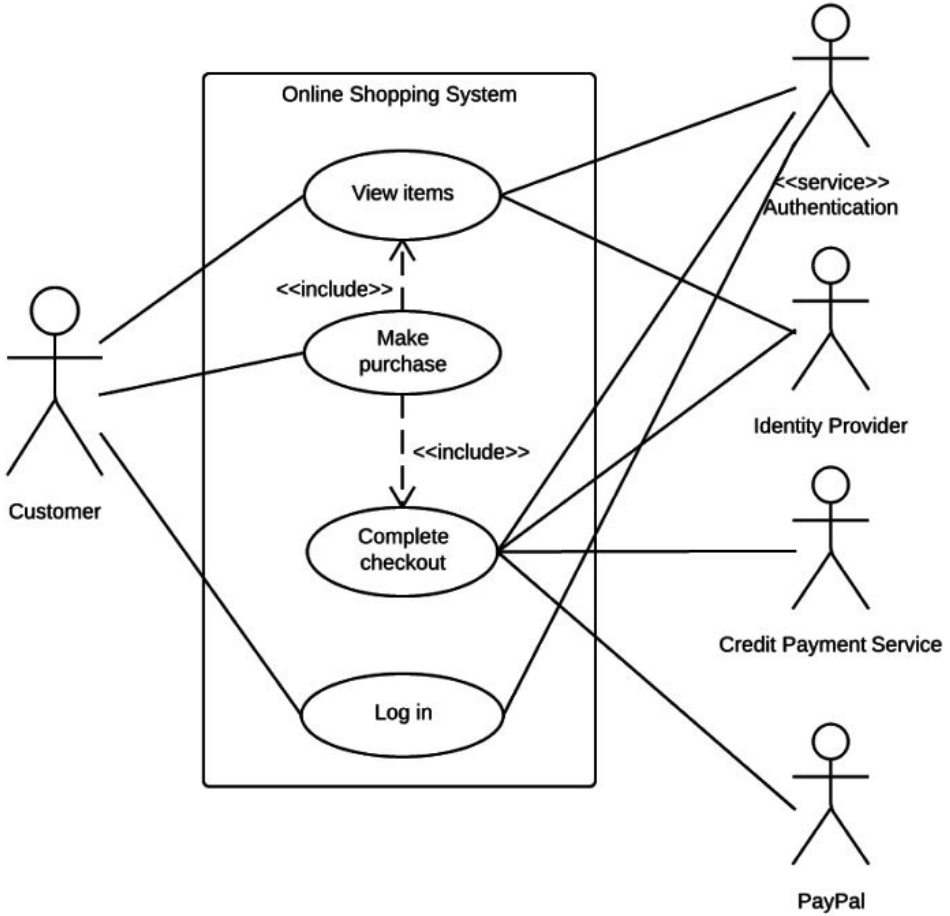


Fig. 3.25 Use case diagram for library management system


Appointment System
Update patient information
<< extend >>
Make appointment
Make old patient appt
Make new patient appt
Make payment arrangements
<< extend >>
Management
Patient
Produce schedule information
<< include >>
Old patient
New patient
Record availability
<< include >>
Manage schedule
Doctor



ONLINE SHOPPING SYSTEM

Use case Narrative

- Name of system
- Use case
- Actors
- Preconditions
- Data
- Post conditions
- Open Issues

Name of the System	ATM
Use case	Withdraw money
Actors	Customer, Bank system
Preconditions	The bank customer must have an ATM card The network connection to the bank system must be active The system should posses sufficient amount of cash that can be dispensed. The withdraw money option should be available.
Data	The customer first inserts the ATM card into the system. The system starts the **ATM session** for reading the card. First of all system authenticates customer by reading the card and PIN number entered by the customer. If the authentic customer is present then system displays the different service options. The customer selects **withdraw cash** option. He then enters the required amount. The system performs transaction. It ejects ATM card. the customer takes the card from the machine. The system dispenses the requested amount to the customer. The system records transaction log entry for withdrawal. The customer takes the amount and close the session.
Postconditions	When the ATM has returned the card and amount to the customer, the withdrawal should be registered in customers account. When the ATM returns the card simply and if there occurs no withdrawal then there should not be any registration of withdrawal in customers account. If the ATM do not return card and no withdrawal takes place then the customer should be notified with further contact information.
Open issues	None