1. Requirement Analysis for Student Management System

a) Stakeholder identification:

University Administration: Needs to manage student records, handle, enrollments and maintain academic records

students: Require an interface to enroll in courses, register for class & view grades

Faculty: Need to manage course offering, track student progress and submit grades.

IT department: Responsible for system maintenance, security & updates.

b) Functional requirements:

Enrollment management:
student profile creation and management
Online application and admission procesing
Handling of student personal information

Course Registration:
Display of available courses for each semester
course selection and registration procenes
Management of course pre requisties & corequisties

Grade Management:
Entry of grade by faculty
Calculation of GPA and other academic metric
viewing of grades by student.

User Management:
Authentication & authorization.

c) Non-function requirements:

Performance
Scalability
Security
Usability
Reliability
Maintainability
Interoperability

d) Technical Requirement:

Platform
Database
Technologies
Infrastructure
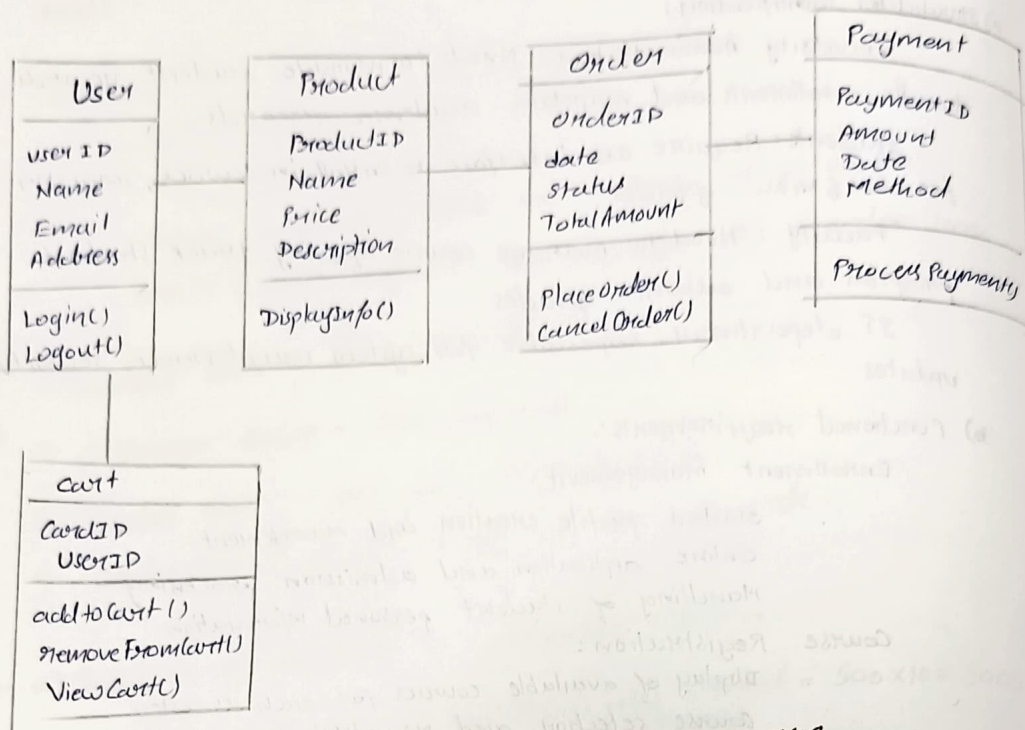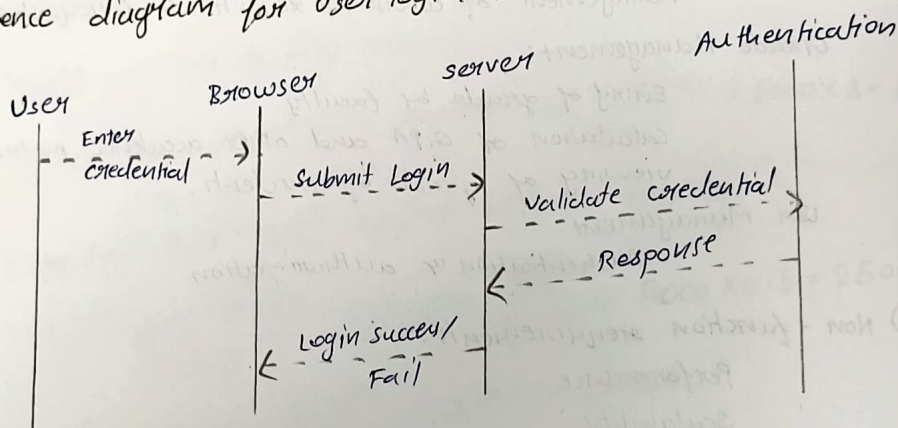
e) Implementation Plan:

Analysis
Design
Development
Testing
Deployment
Maintenance & Support

2) Class diagram for simple online shopping system

User
user ID
Name
Email
Address
Login()
Logout()

Product
ProductID
Name
Price
Description
DisplayInfo()

Order
orderID
date
status
TotalAmount
Place Order()
cancel Order()

Payment
PaymentID
Amount
Date
Method
Process Payments

Cart
CartID
UserID
add to Cart ()
remove From Cart()
View Cart()

3) Sequence diagram for user login in e-commerce

User   Browser   server   Authentication

Enter
Credential →

            Submit Login →

                        Validate credential →

                        Response ←

            Login success/
            Fail ←

4) Key testing strategy in banking system

   1. Functional Testing :
        Unit testing
        Integration testing
        System testing

   2. Security Testing :
        Vulnerable scanning
        Penetration testing
        Access Control testing
        Data Encryption testing

3. Performance testing:
   load testing
   stress testing
   Scalability testing

4. Usability Testing
   User interface testing
   Accessibility testing

5. Compilance testing
   Regulatory compilance testing

6. Recovery Testing
   Backup and restore testing
   Disaster recovery testing

7. User acceptance testing
   Alpha testing
   Beta testing.