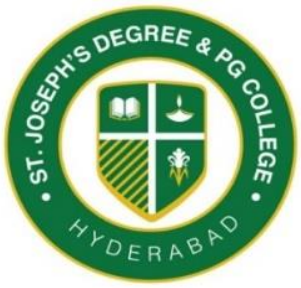
Department of Computer Science



St. Joseph's Degree & P.G College

(Autonomous), Affiliated to Osmania University
Re-accredited by NAAC with A Grade with CGPA 3.49
A Catholic Christian Minority Institution
King Koti Road, Hyderabad.

Lab Manual

Program : B.Sc [MPCs/MSCs/MECs] III Year Semester V

Course : System Analysis & Design

Course code : BS.07.201.11.P

B.Sc. (Computer Science)
III - YEAR/ V - SEMESTER
THEORY PAPER - V
System Analysis & Design
(w.e.f 2017-18)

Scheme of Instruction	**Scheme of Examination**
Total durations Hrs : 60	Max. Marks : 100
Hours/Week : 06(4T+2P)	Internal Examination :30
Credits : 5	SBT : 10
Instruction Mode: Lecture +practical	External Examination :60
Course Code : BS.07.201.13.T	Exam Duration : 3 Hrs
Course Objectives:	
To prepare the students to develop the skills necessary to handle software projects. To make the students aware of the importance of software engineering principles in designing software projects	
Course Outcomes:	
On completion of the course the student will ➢ Understand the importance of the stages in the software life cycle. ➢ Understand the various process models. ➢ Be able to design software by applying the software engineering principles.	

Unit – I:Introduction to Systemand Approaches to System development

Introduction to System: System, Information System, Types of Information System

Approaches to System development: Software Development Life cycle, Software Development Models:Waterfall model, Iterative Model, RAD model, Incremental model, Spiral model.

Unit - II:**Project management and Planning**

Project management Concepts: The management Spectrum: People, The Problem, The Process

Software Project Planning: Project planning objectives, Software Scope, Resources, Software Project estimation, The Make-Buy decision, softwarerisks.

Unit - III:Analysis Concepts, Principles and Modeling

Analysis Concepts and Principles: Requirement Analysis, Communication techniques: Initiating the Process, Facilitated Application Specification techniques, Quality Function development.

Analysis Principles: The Information Domain, Modeling, Partitioning, Software Requirement Specification.

Analysis Modeling: Data Modeling: Data objects, Attributes and relationships, cardinality and modality. Data flow diagrams, Entity-Relationship Diagrams, The Data Dictionary.

Unit - IV: Design Concepts & Principles and Effective Modular design

Design Concepts & Principles: Software Design and software Engineering, the design process, the design principles, Design Concepts: Abstraction, Refinement, Modularity, Software architecture, Control hierarchy, Structural Partitioning, Data Structure, Software procedure, Information Hiding.

Effective Modular design: Functional independence, Cohesion, Coupling. User Interface Design: the Golden rules, User Interface and Design Process, Interface analysis.

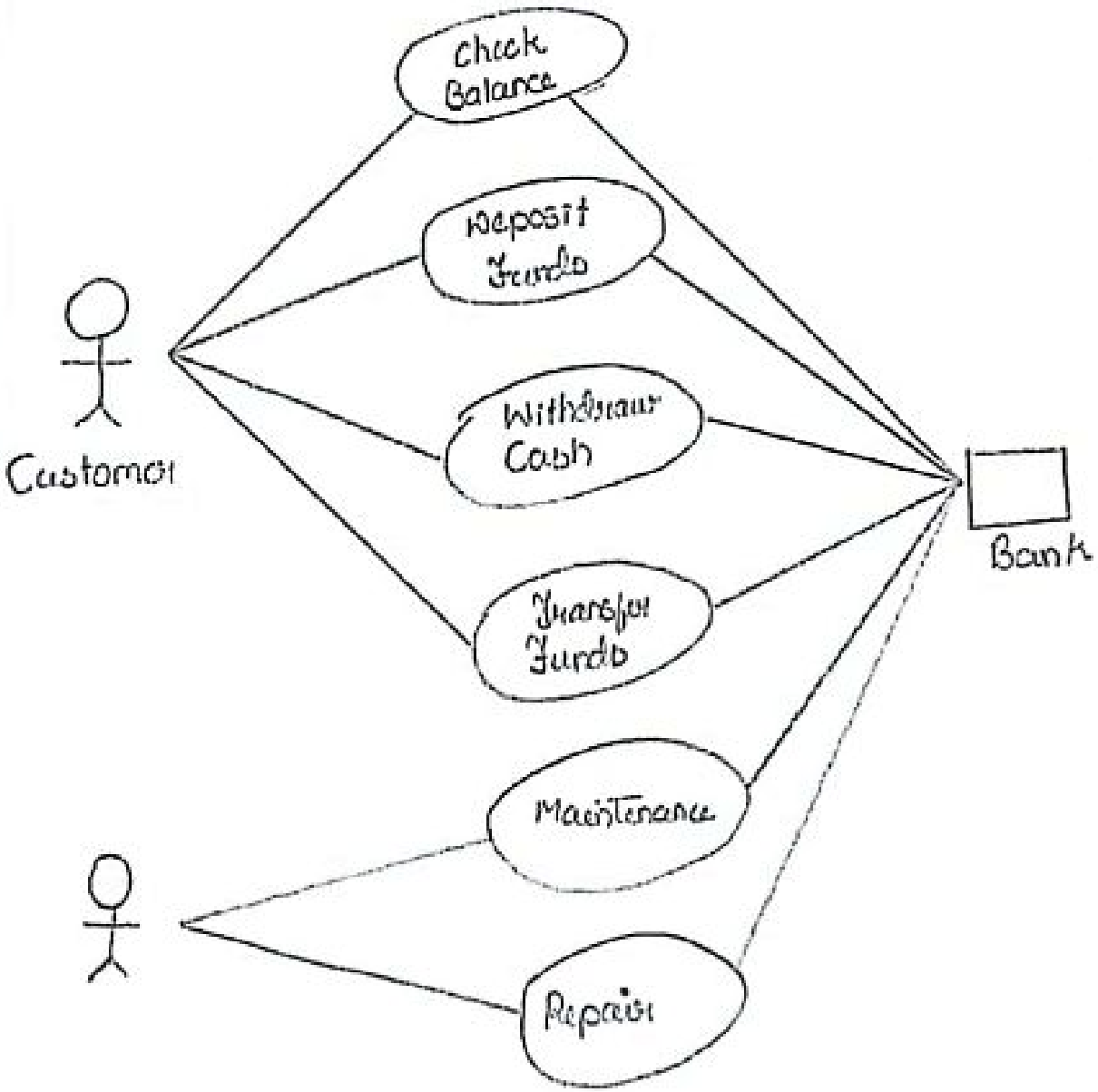
References:

1) Software Engineering – A Practitioners approach, Fourth Edition, Roger S. Pressman, MGH.
2) An Integrated Approach to Software Engineering,Second Editon, Pankaj Jalote.
3) "System Analysis and Design" by Dennis, Wixon and Roth – John Wiley

B.Sc. (Computer Science)
III - YEAR/ V - SEMESTER
PRACTICAL PAPER - V
System Analysis & Design Lab

Course Objectives:
To prepare the students to develop the skills necessary to develop different diagrams. To make the students aware of the importance of software engineering principles in designing software projects
Course Outcomes:
On completion of the course the student will ➢ Students can able to develop standard SRS document ➢ Students can able to develop different Diagrams for given software.

1. Develop a problem statement.
2. Develop an IEEE standard SRS document.
3. Discuss the tool to draw different types of diagram throughout the analysis & design.
4. Develop Data Flow Diagrams
5. Identify Usecases and develop Usecase model
6. Develop Activity Diagram
7. Develop State Diagram
8. Develop Sequence Diagram
9. Develop Collaboration Diagram
10. Develop Entity Relationship Diagram
11. Develop Usecases, Sequence diagram and Activity Diagram for Event management system
12. Develop Usecases, Sequence diagram and Activity Diagram for Payroll management system
13. Develop DFD, ERD and Usecases, for Student Feedback System
14. Develop DFD, ERD and Usecases, for Inventory Management System
15. Develop DFD, ERD, Usecases, Sequence diagram and Activity Diagram for Attendance Management System



USECASE DIAGRAMS

Case Study 1 : Design usecase diagrams for ATM system

Explanation :

No. of actors : 2.

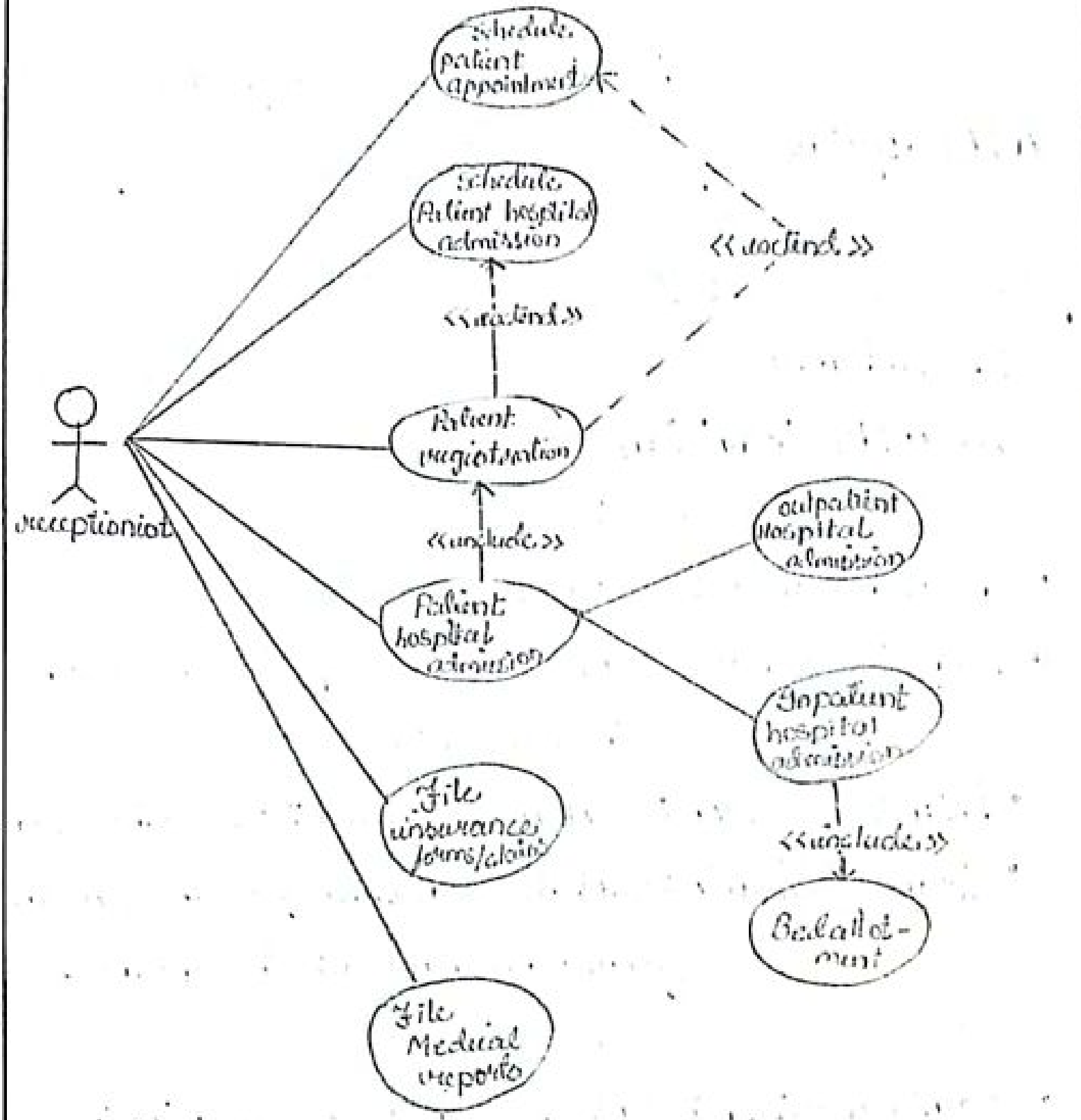
1. Customer
2. ATM Technician

Usecases of Customer :

- Check Balances : Customer can view balance
- Deposit Funds : Customer can deposit the cash in account.
- Withdraw Cash : Customer can withdraw the cash.
- Transfer Funds : Customer can transfer the amount from one account to another.

Usecases of ATM Technicians :

- Maintenance : This use case includes replenishing ATM with cash, ink or printer paper
- Repair : Technician can repair an ATM machine.



Case Study 2 : Design usecase diagram for Hospital Reception System.

Explanation :

No. of actors : 1

1. Receptionist

Usecases of Receptionist :

- Patient Hospital Admission : Patient can get admitted in the hospital. This usecase includes patient registration and has two subusecases :

1. Outpatient hospital admission : Outpatients can get admitted.

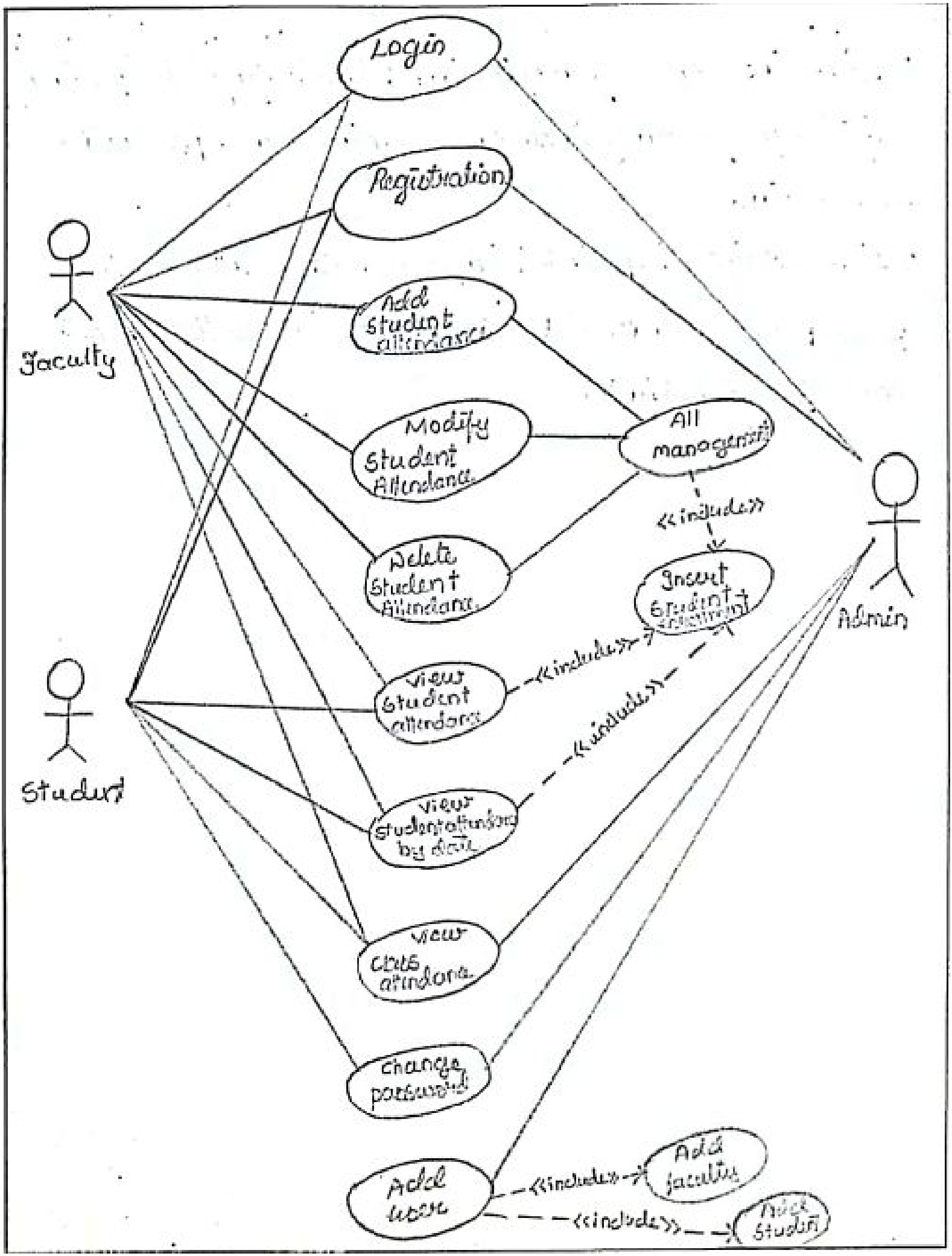
2. Inpatient hospital admission : Inpatients can get admitted. This also includes bed allotment.

- Patient Registration : Patient can get registered as a new user by providing necessary details

- Schedule Patient Hospital Admission : Admission of the patient can be scheduled.

- Schedule Patient Appointment : Appointment of patient with a doctor can be scheduled.

- File insurance forms/claims: Validating the patient's eligibility for any insurance claim and processing the claim.
- File Medical Reports: Filing all the test results, prescriptions, summaries, etc to provide better health care to the patient.



Case Study 3: Design a use case diagram for student attendance management system

Explanation:

No. of actors: 3

1. Admin
2. Faculty
3. Student.

Usecases of Admin:

- Login: Admin can login
- Register: Admin can register
- View Class Attendance: Admin can view class attendance
- Change Password: Admin can change password.
- Add User: Admin can add user. This includes adding faculty or student.

Usecases of Faculty:

- Login: Faculty can login
- Registration: Faculty can register
- Add Student Attendance: Faculty can add student

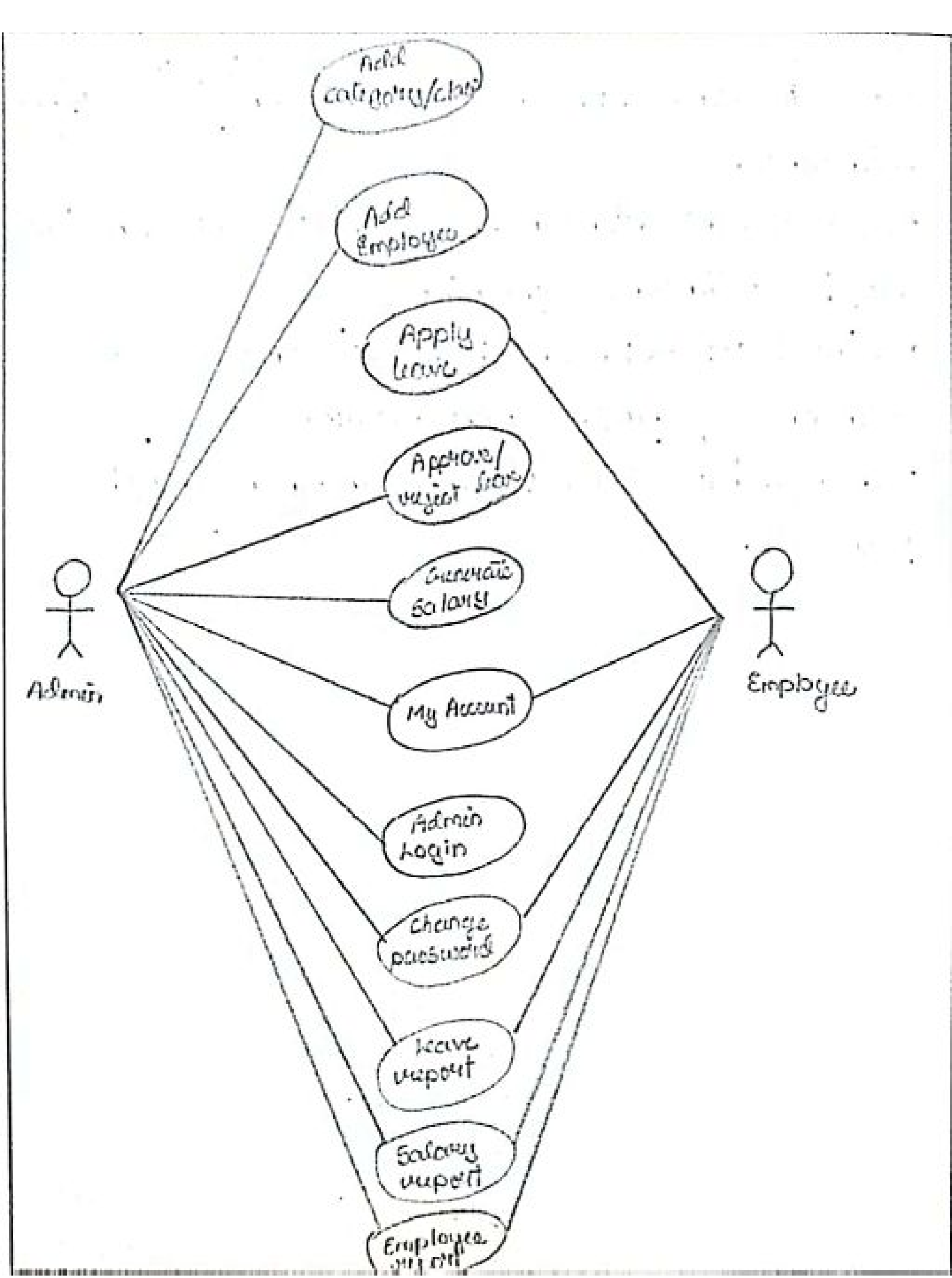
attendance.

- Modify Student Attendance: Faculty can modify student attendance.
- Delete Student Attendance: Faculty can delete a student's attendance.
- All Management: Adding, modifying and deleting a student's attendance is done by all management which also includes inserting student attendance.
- Insert Student Attendance: Adding, modifying or deleting student attendance.
- View Student Attendance: Faculty can view overall student's attendance.
- View Student Attendance by Date: Faculty can view a more detailed student attendance.
- View Class Attendance: Faculty can view attendance of whole class.

Usecases of Student:

- Login: Student can login.
- Registration: Student can register.

- View Student Attendance: Student can view his/her attendance.
- View Student Attendance by Date: Student can view his/her attendance by date.
- View Class Attendance: Student can view the attendance of his/her whole class.
- Change Password: Student can change his/her password.



Case Study 4 : Design usecase diagram for payroll system

Explanation :

No. of Actors : 2

1. Admin
2. Employee

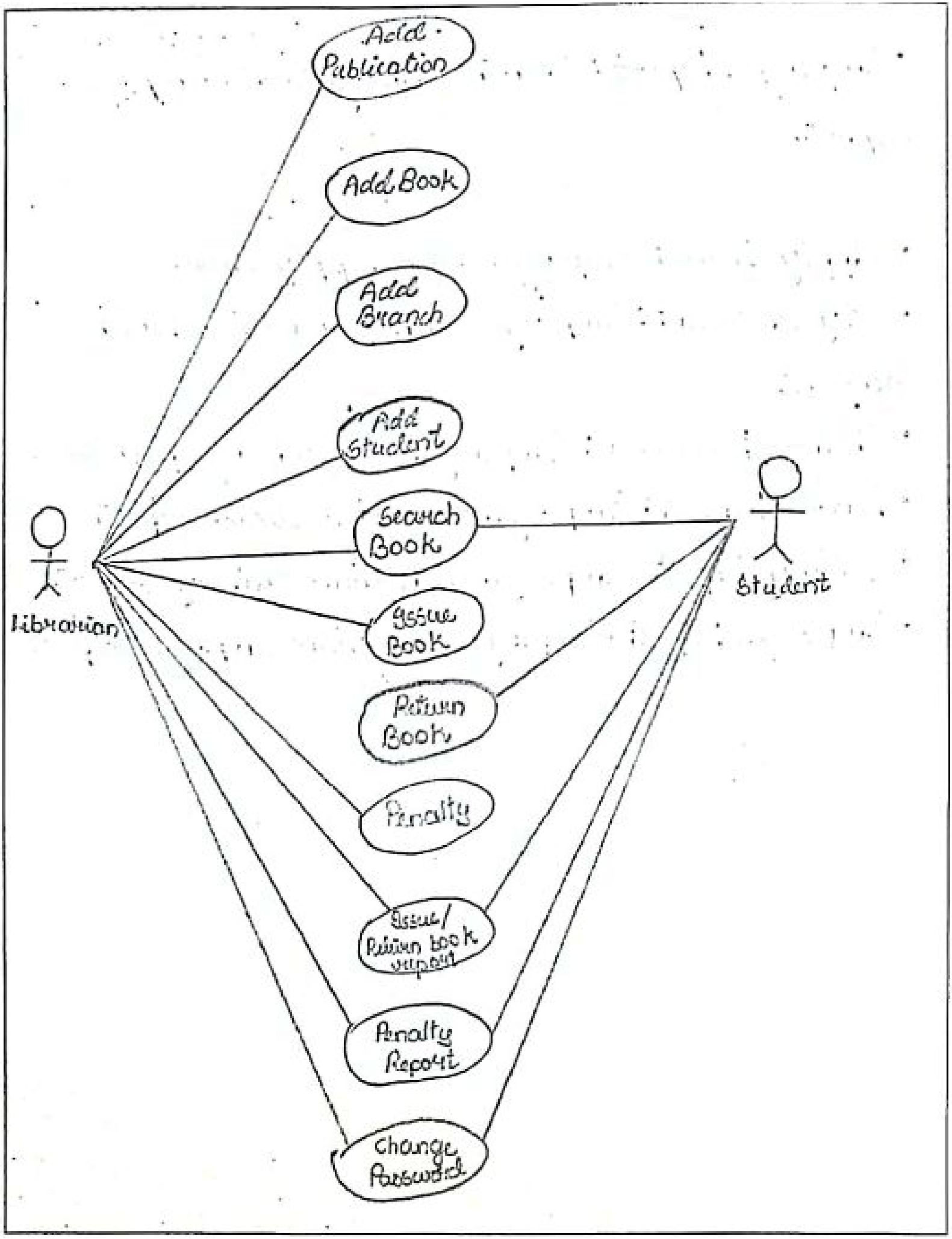
Usecases of Admin :

- Add Category / Class : Admin can add a category of employees.
- Add Employee : Admin can add an employee
- Approve / Reject leave : Admin can approve or reject a leave application.
- Generate Salary : Admin can generate salary for an employee.
- My Account : Admin can personalise his / her profile.
- Admin Login : Admin can login.
- Change Password : Admin can change password.
- leave report : Admin can generate leave report.
- Salary report : Admin can generate salary report.

- Employee Report : Admin can generate employee report.

Usecase of Employee :

- Apply Leave : Employee can apply leave
- My Account : Employee can personalize his/her account
- Change Password : Employee can change password
- Leave Report : Employee can view leave report
- Salary Report : Employee can view salary report
- Employee Report : Employee can view employee report



Case Study 5: Design usecase diagram for library Management System

Explanation:

No. of Actors: 2

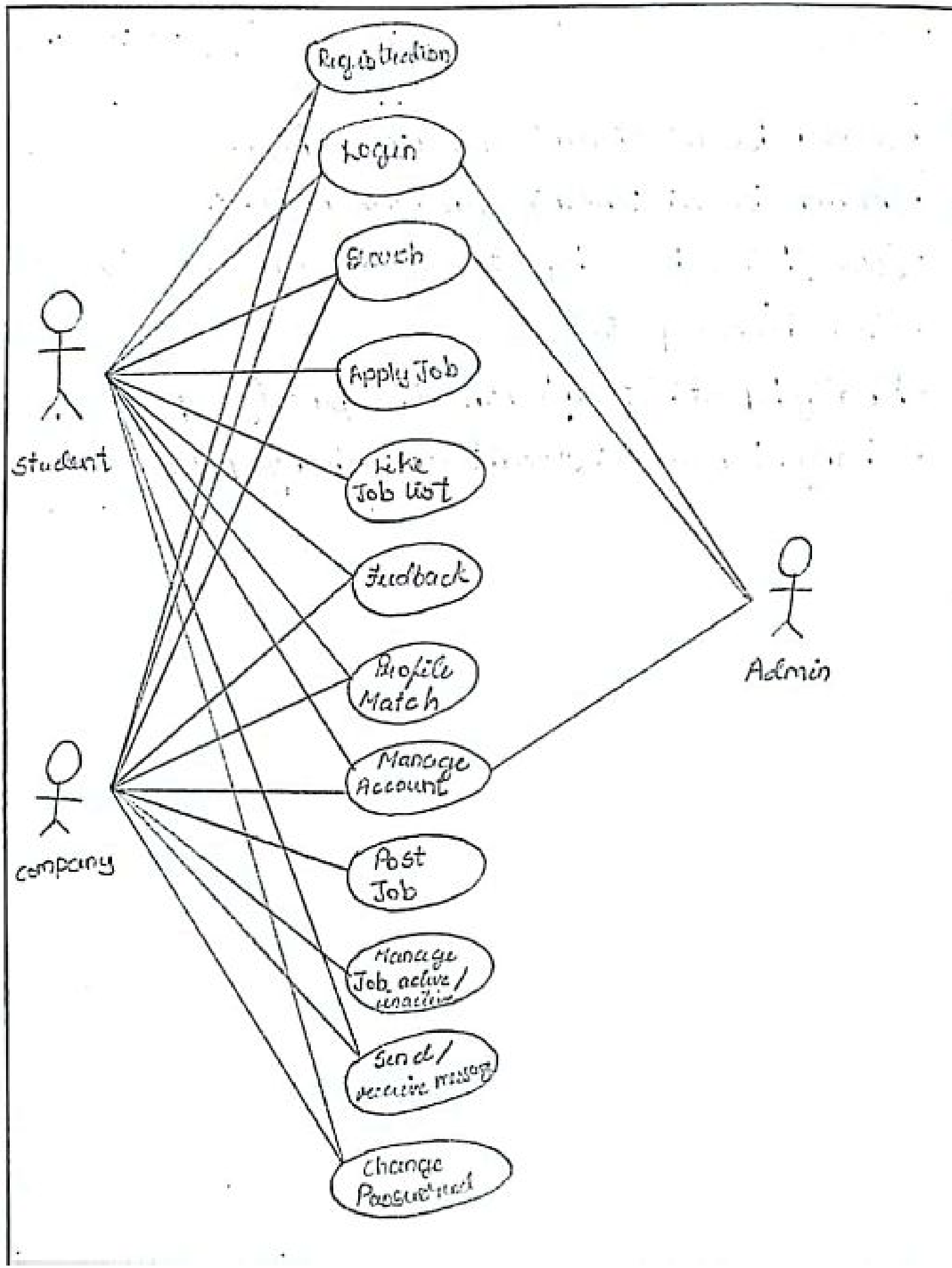
1. Librarian
2. Student

Usecases of librarian:

- Add Publication: librarian can add publication
- Add Book: librarian can add a book
- Add Branch: librarian can add a branch
- Add Student: librarian can add a student
- Search Book: librarian can search a book.
- Issue Book: librarian can issue a book.
- Penalty: librarian can issue a penality
- Issue / Return Book Report: librarian can generate issue / return book report.
- Penalty Report: librarian can generate penalty report
- Change Password: librarian can change password.

Usecase of Student:

- Search Book : Student can search book
- Return Book : Student can return book
- Issue/Return Book Report : Student can view issue/return book report.
- Penalty Report : Student can view penalty report.
- Change Password : Student can change password.



Case Study 6: Design usecase diagram for Job Portal System.

Explanation:

No. of Actors: 3

1. Admin
2. Company
3. Student

Usecases of Admin:

- Login: Admin can login.
- Search: Admin can search job.
- Manage Account: Admin can manage account.

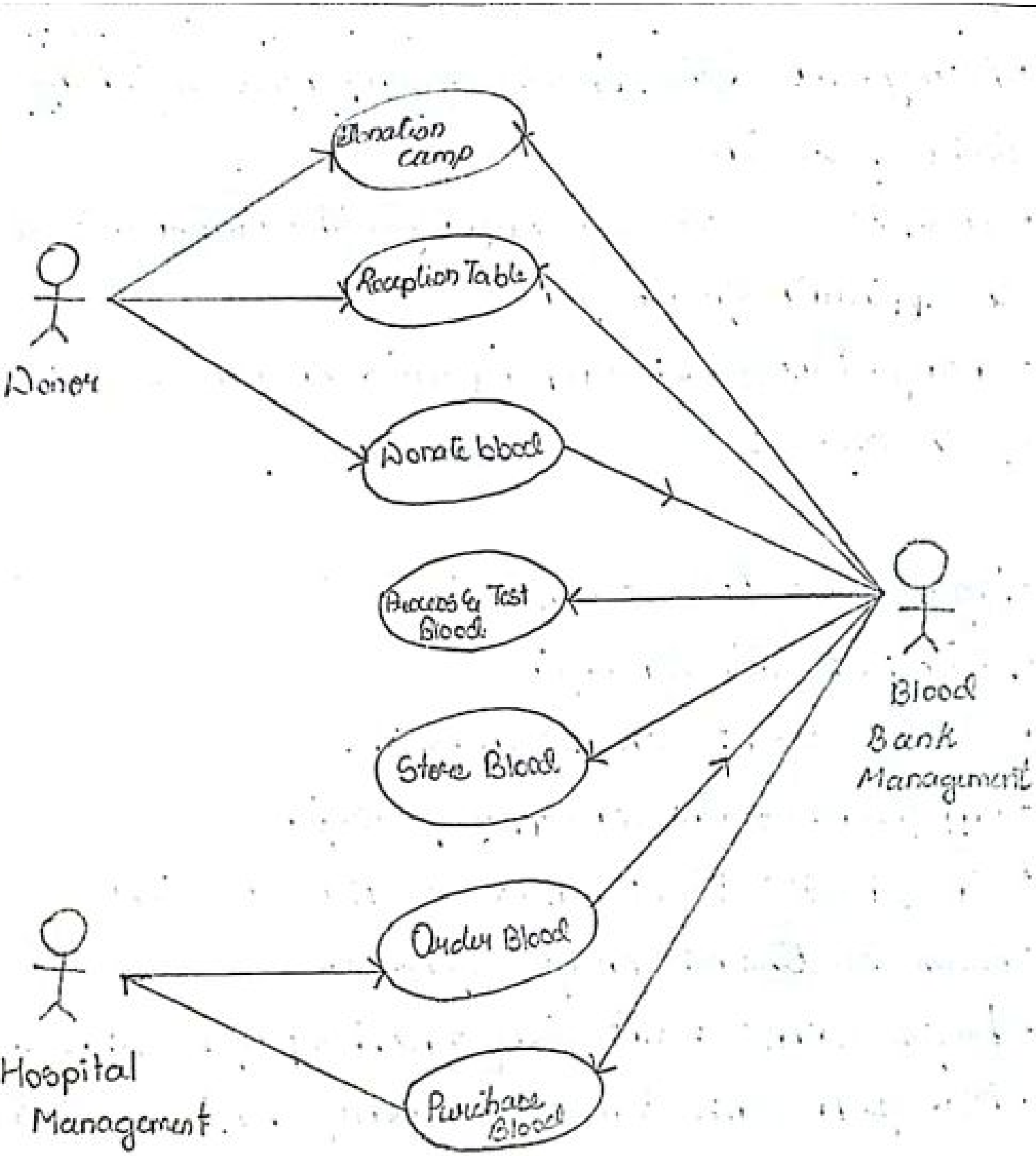
Usecases of Company:

- Registration: Company can register
- Login: Company can login
- Search: Company can search job.
- Feedback: Company will give feedback
- Profile Match: Company will get its profile matched
- Manage Account: Company will manage its account
- Post Job: Company will post a job opening

- Manage Job Active/Inactive: Company will change the status of the job
- Send/Recieve Messages: Company will communicate with its applicants for the job.
- Change Password: Company will change the password of its account.

Usecases of Student:

- Registration: Student can register
- Login: Student can login
- Search: Student can search a job.
- Apply Job: Student can apply for a job
- Like Job list: Student can get a list of liked jobs
- Feedback: Student can give feedback.
- Profile Match: Student will get his/her profile matched.
- Manage Account: Student will manage his/her account
- Send/Recieve Messages: Student can send/recieve messages
- Change Password: Student can change his/her password.



Case Study 7: Design usecase diagram for blood bank management system

Explanation:

No. of Actors: 3

1. Donor
2. Blood Bank Management
3. Hospital Management

Usecases of Donor:

- Donation Camp: Donor will go to donation camp.
- Reception Table: Donor will get details at reception table.
- Donate Blood: Donor will donate blood.

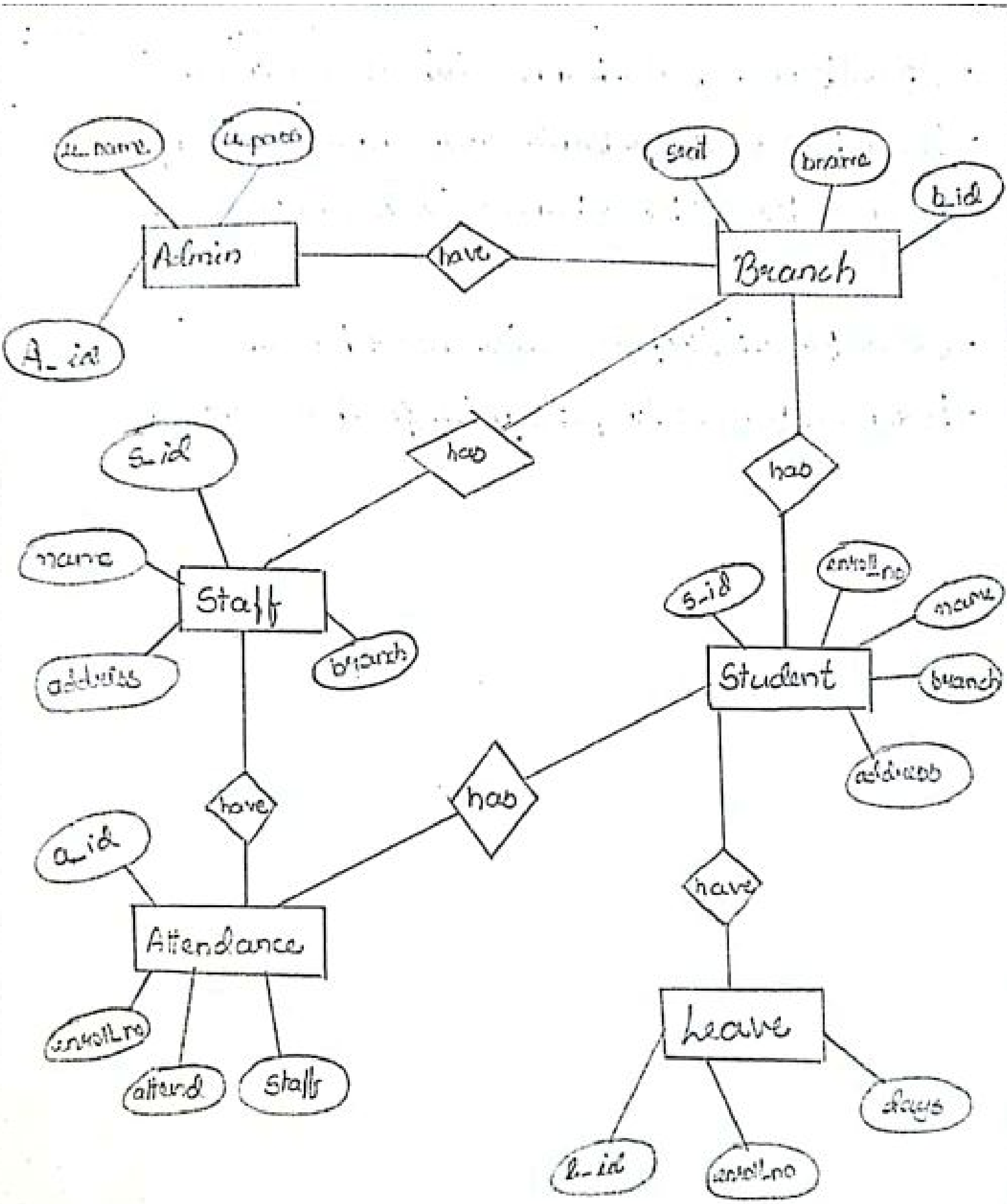
Usecases of Blood Bank Management:

- Donation Camp: Blood Bank will organise donation camp
- Reception Table: Blood Bank will set up reception table
- Donate Blood: Blood Bank will collect donated blood.
- Process & Test Blood: Blood Bank will process and test blood.

- Store Blood : Blood Bank will store blood.
- Order Blood : Blood Bank will take orders of blood.
- Purchase Blood : Blood Bank will sell blood.

Usecases of Hospital Management :

- Order Blood : Hospital will order blood.
- Purchase Blood : Hospital will purchase blood.



ER DIAGRAMS

Case Study 1: Design ER diagram for Student Attendance Management System.

Explanation:

List of Entities:

Admin

Branch

Staff

Student

Attendance

Leave

Attributes of Admin Entity:

a_name

a_pass

A_id

Attributes of Branch Entity

seat

b_name

b_id

Attributes of Staff Entity:

s_id

name

address

branch

Attributes of Student Entity:

s_id

enroll_no

name

branch

address

Attributes of Attendance Entity:

a_id

enroll_no

attend

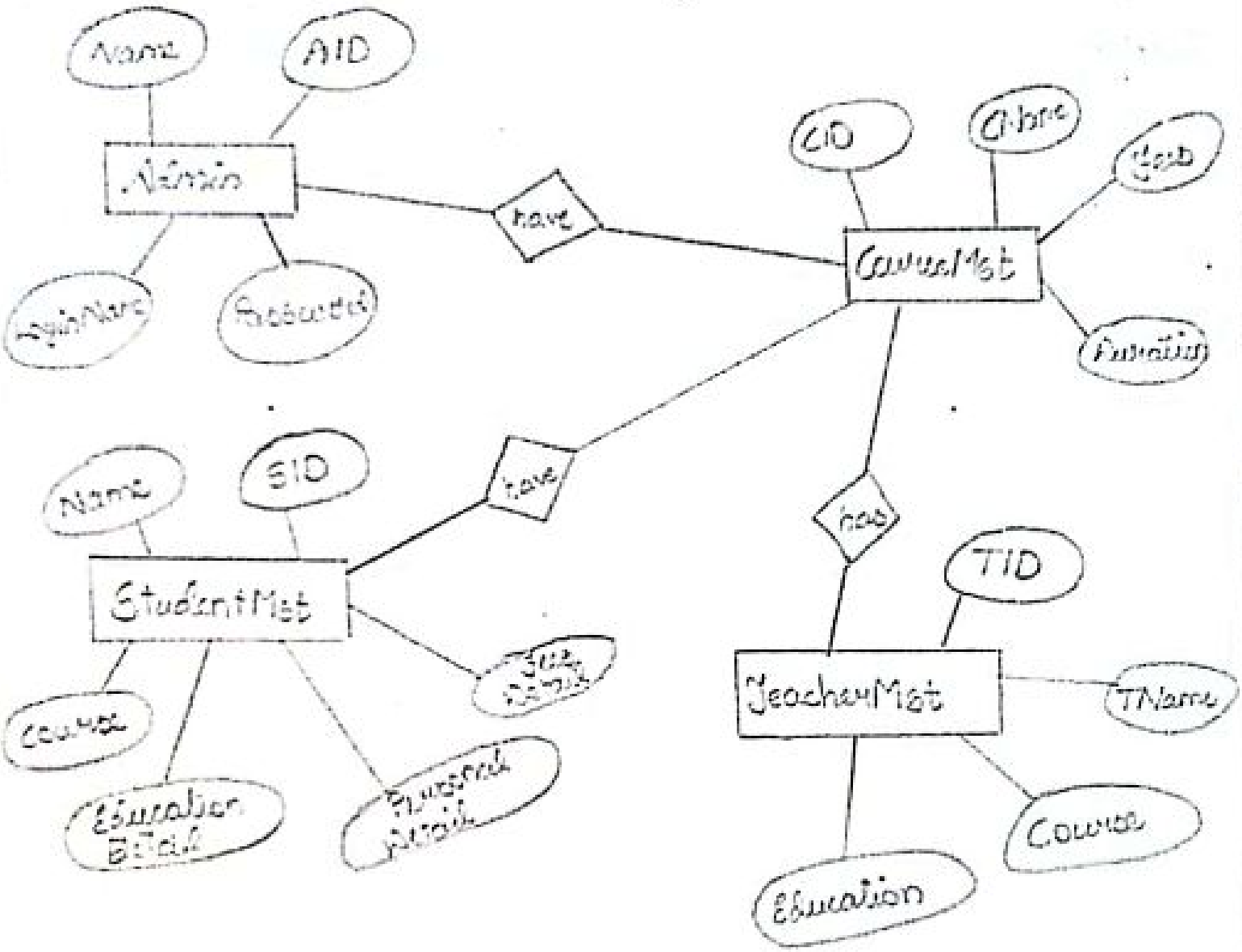
staff.

Attributes of leave Entity:

l_id

enroll_no

days



Case Study 2 : Design ER diagram for Student Management System

Explanation:

List of Entities:

Admin

CourseMst

StudentMst

TeacherMst

Attributes of Admin Entity:

AID

Name

LoginName

Password

Attributes of CourseMst Entity:

CID

CName

Fees

Duration

Attributes of StudentMst Entity:

SID

Name

Course

EducationDetails

PersonalDetails

FeeDetails

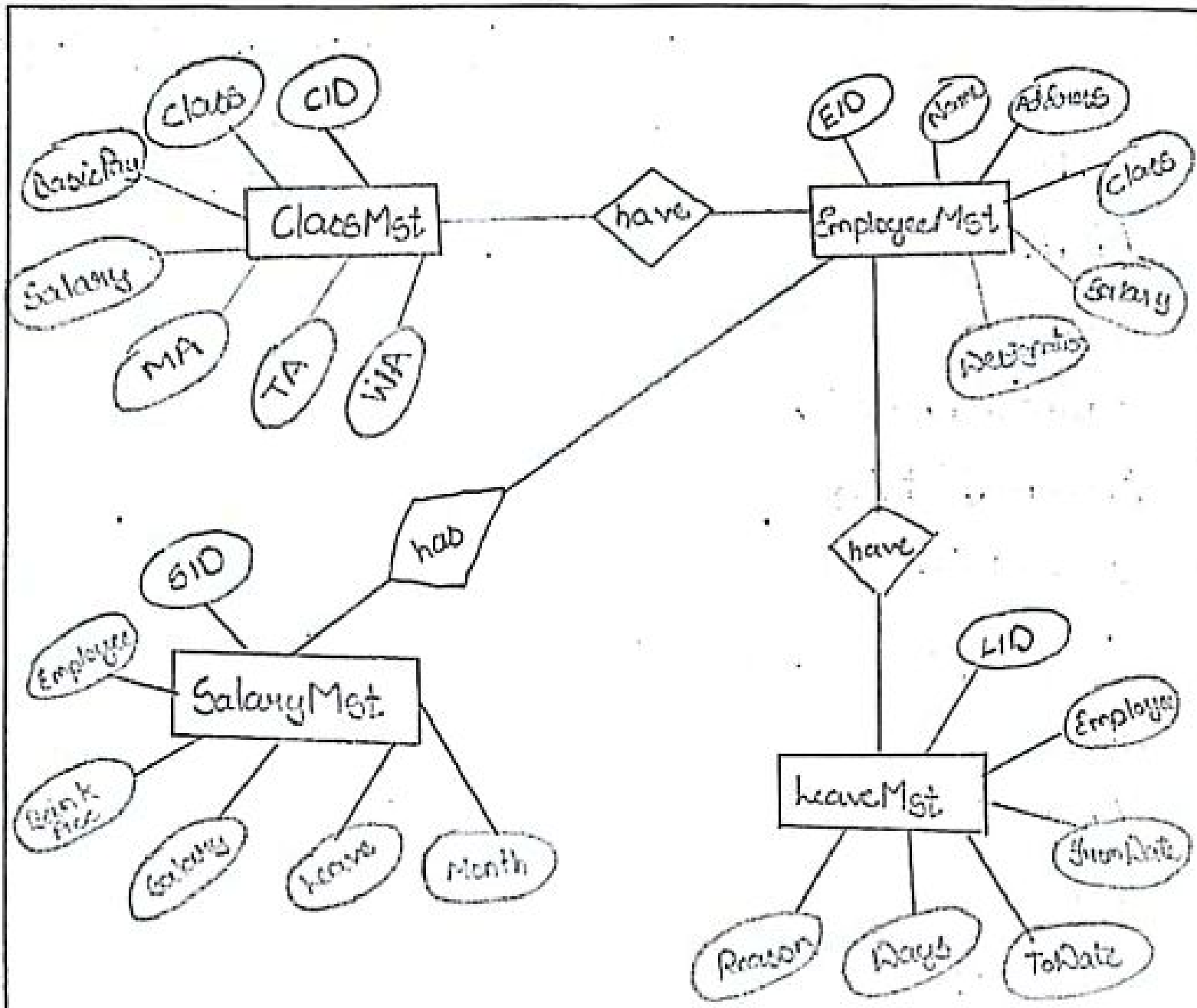
Attributes of TeacherMst Entity:

TID

TName

Course

Education



Case Study 3: Design ER diagram for Pay roll system

Explanation:

List of Entities:

ClassMst

EmployeeMst

SalaryMst

Leave Mst

Attributes of ClassMst Entity:

CID

Class

BasicPay

Salary

MA

TA

WA

Attributes of EmployeeMst Entity:

EID

Name

Address

class

salary

Designation

Attributes of SalaryMst Entity:

SID

Employee.

BankAcc.

Salary

leave

Month

Attributes of leaveMst Entity:

LID

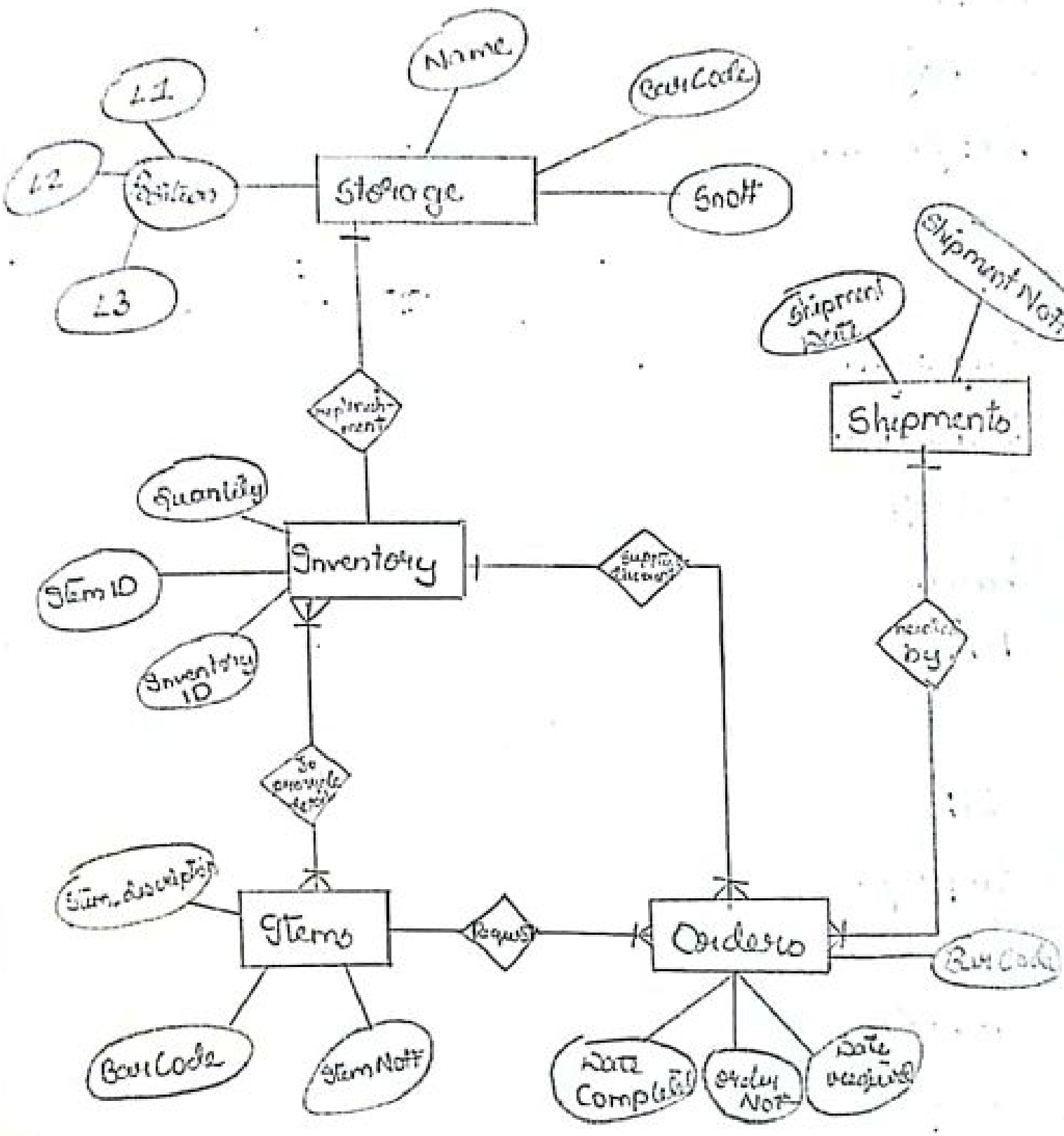
Employee

FromDate

ToDate

Days

Reason.



Case Study 4: Design ER diagram for Inventory Management System

Explanation:

List of Entities:

Storage

Inventory

Items

Orders

Shipments

Attributes of Storage Entity:

Sno#

BarCode

Name

Position

Attributes of Inventory Entity:

InventoryID

ItemID

Quantity

Attributes of Items Entity:

Item No #

Item_description

BarCode

Attributes of Order Entity:

Order No #

BarCode

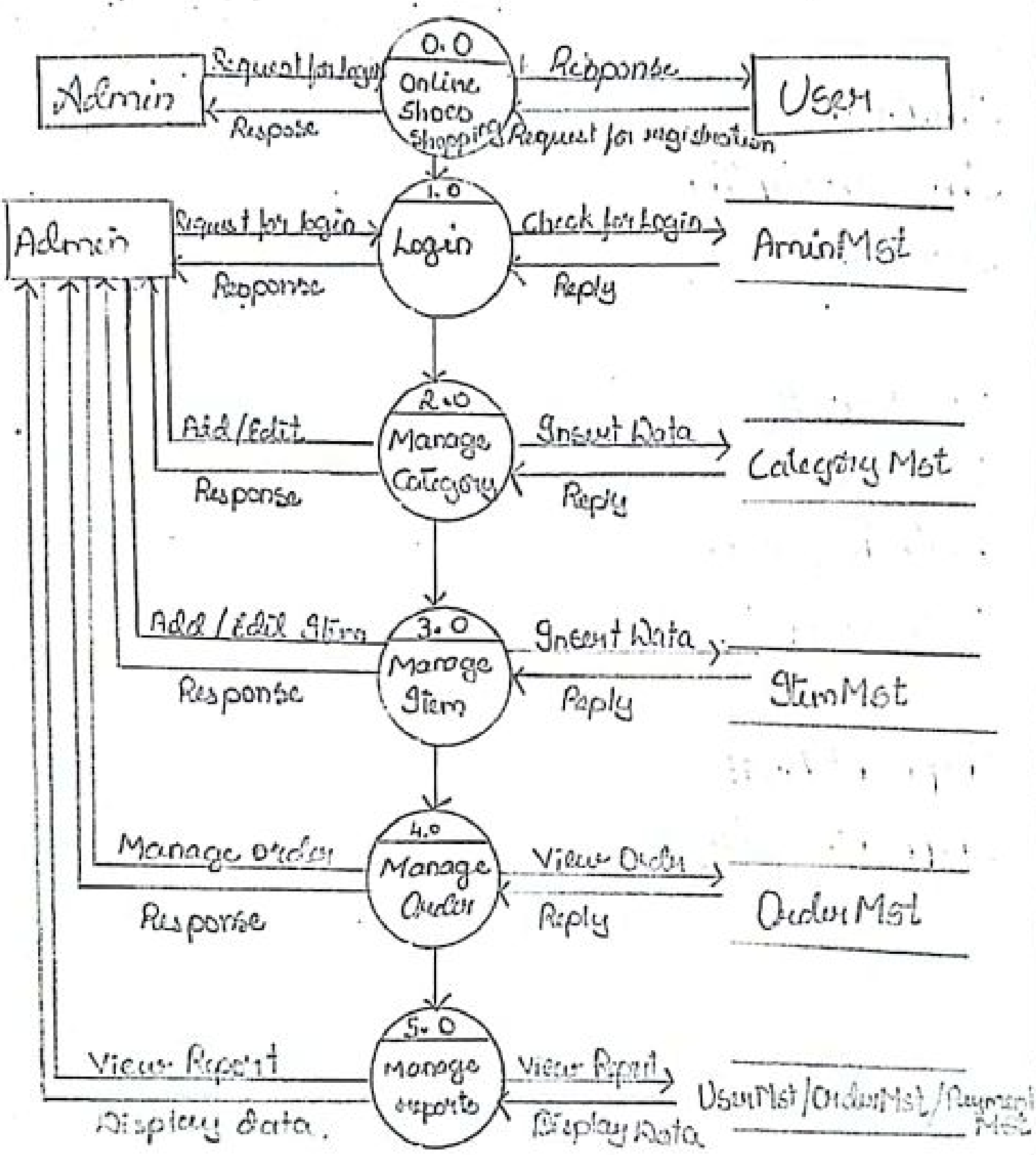
Date Required

Date Completed

Attributes of Shipment Entity:

Shipment No #

Shipment Date



DATA FLOW DIAGRAMS

Case Study 1: Design data flow diagram for online shopping

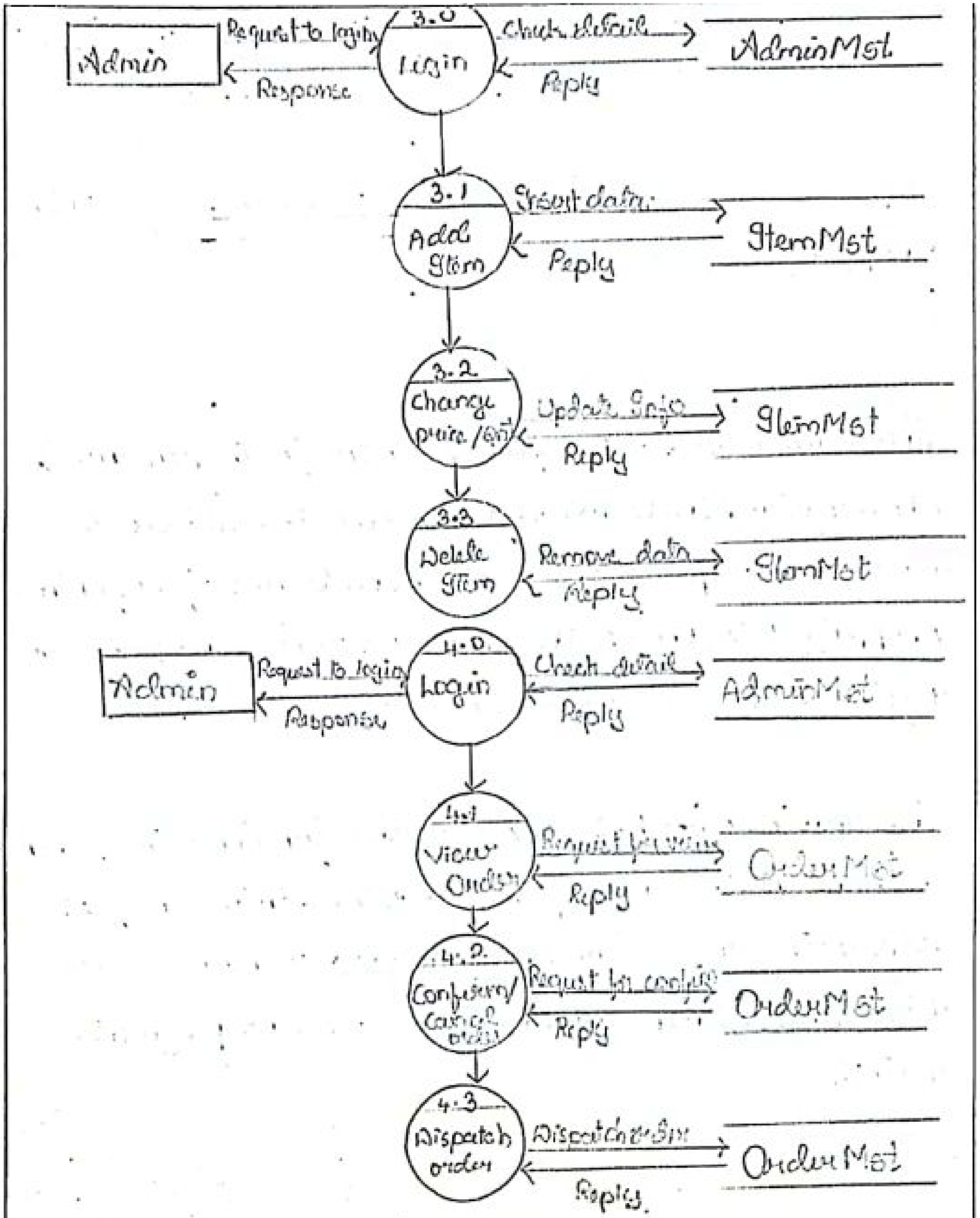
Explanation:

Context level DFD - 0 level

The context level data flow diagram is to describe the whole system. The 0 level dfd describes the all user module who operate the system. The 0 level dfd of online shopping side shows the two user who can operate the system: Admin and Member user.

1st level Admin Side DFD

The admin side DFD describe the functionality of Admin Admin is a owner of the website. Admin can first add category of item and then add items by category wise and admin can manage order and payment detail.

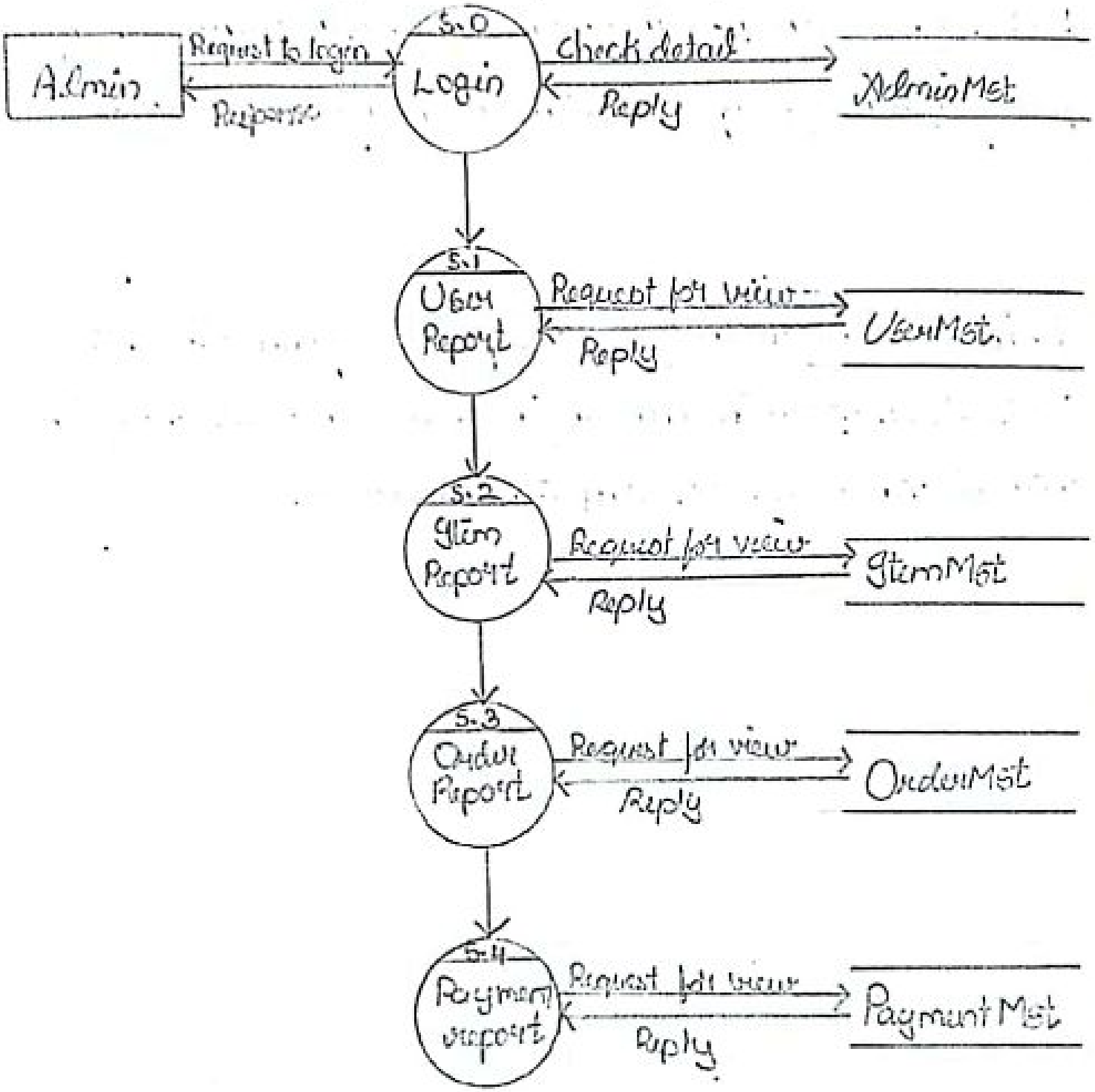


2nd Level- Admin side DFD (3.0):

This is the manage item of process from the 1st level DFD. The admin can login, add an item, change price/quantity of an item or delete an item.

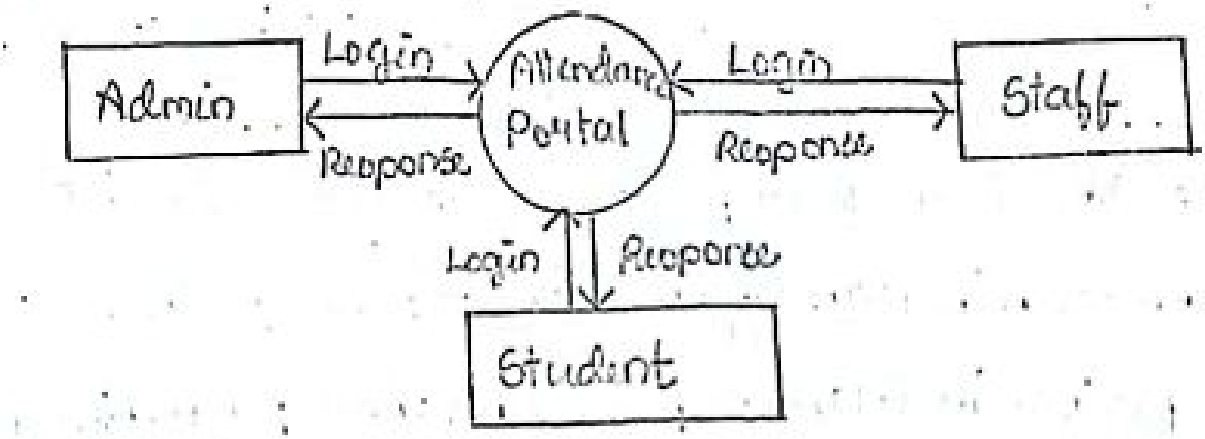
2nd Level- Admin side DFD (4.0):

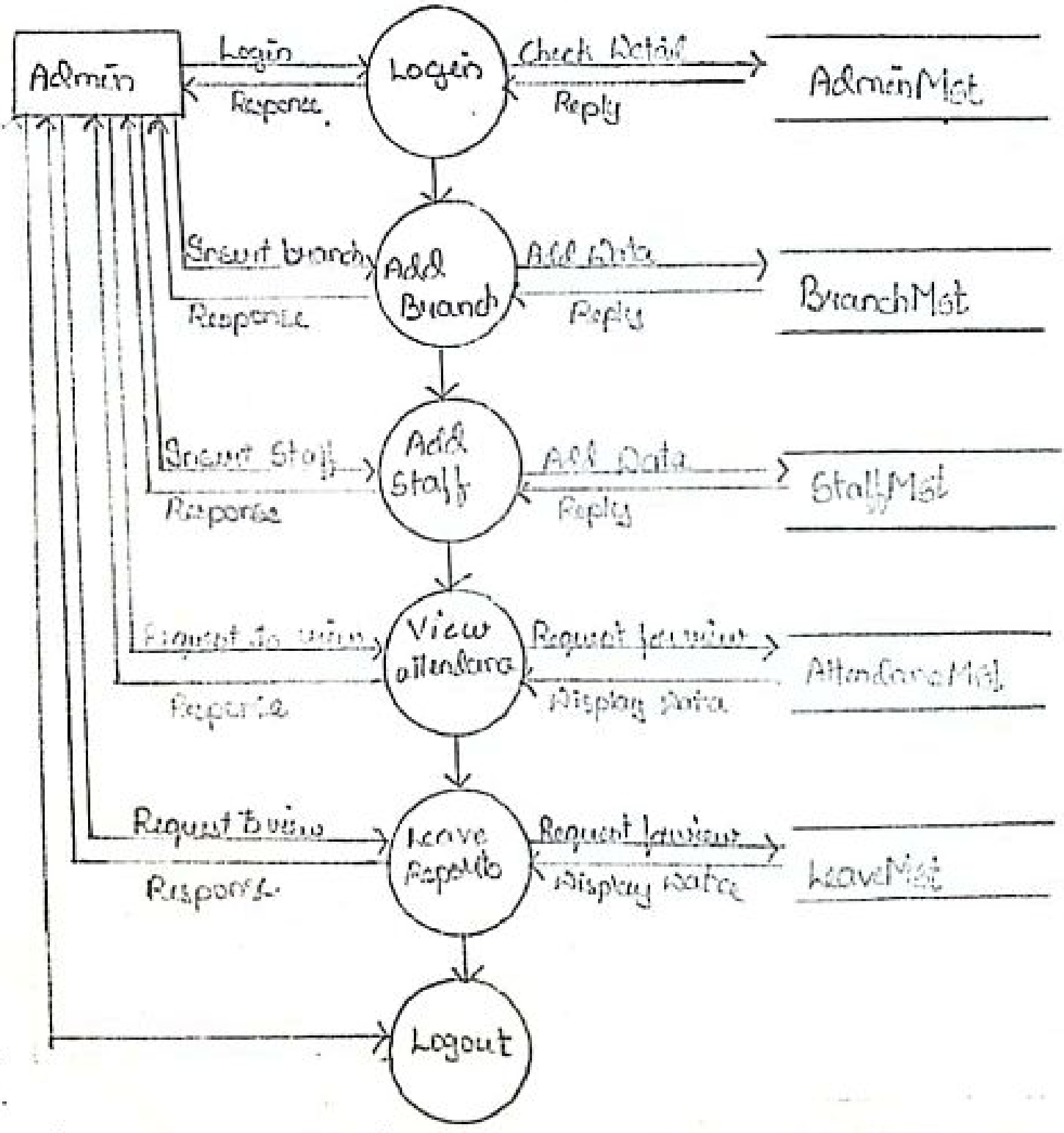
This is the manage order process from the 1st level DFD. The admin can login, view an order, confirm/cancel an order or dispatch an order.



2nd Level - Admin side DFD (5.0):

This is the manage reports process from the 1st level DFD. The admin can login, view user report, view item report, view order report and view payment report.





Case Study 2 : Design a data flow diagram for student attendance management system

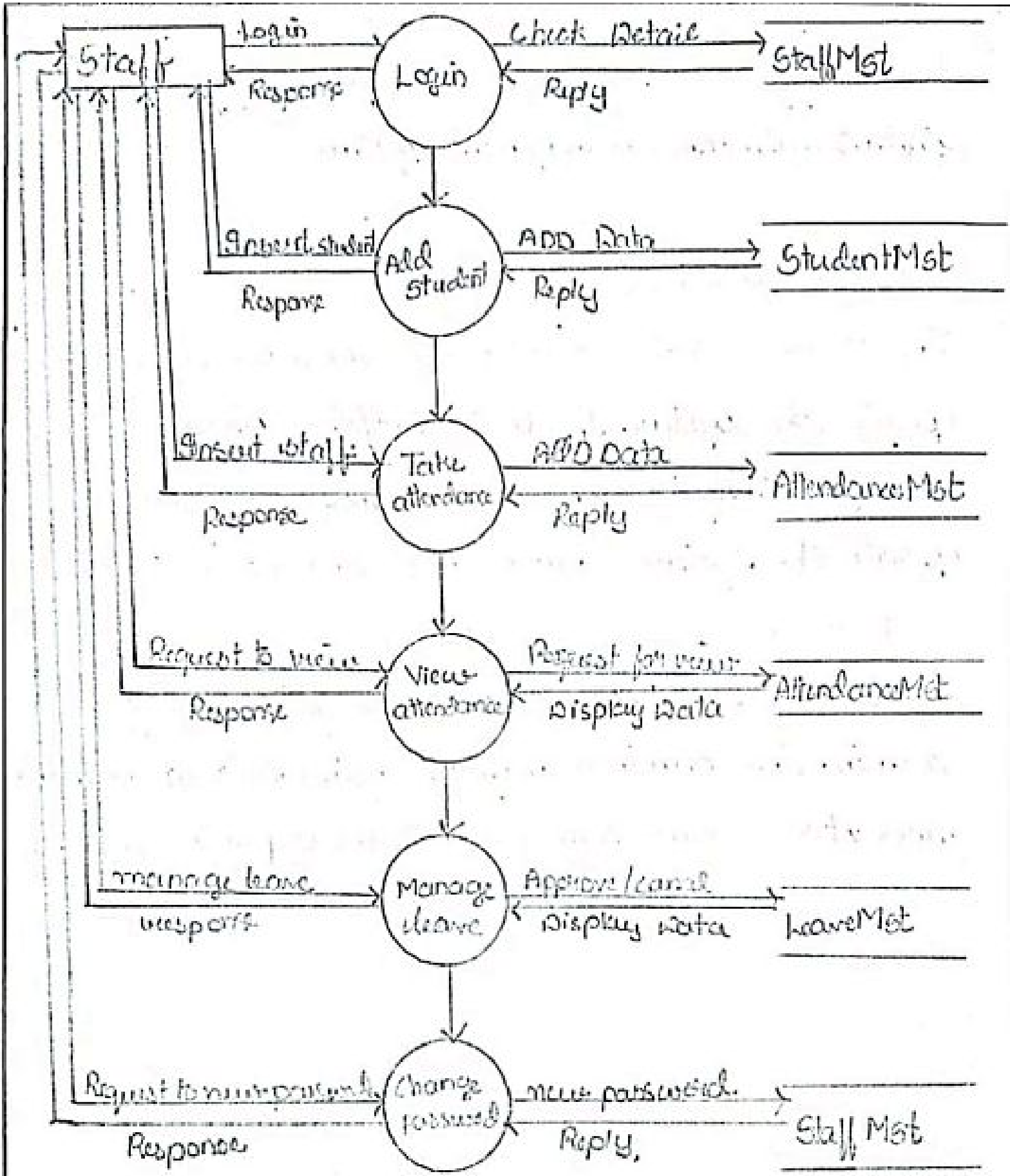
Explanation :

Context level DFD - 0 level

The 0 level dfd discribes the all user module who operate the system. The 0 level dfd of student attendance management system shows the three users who operate the system : Admin, Staff and Student.

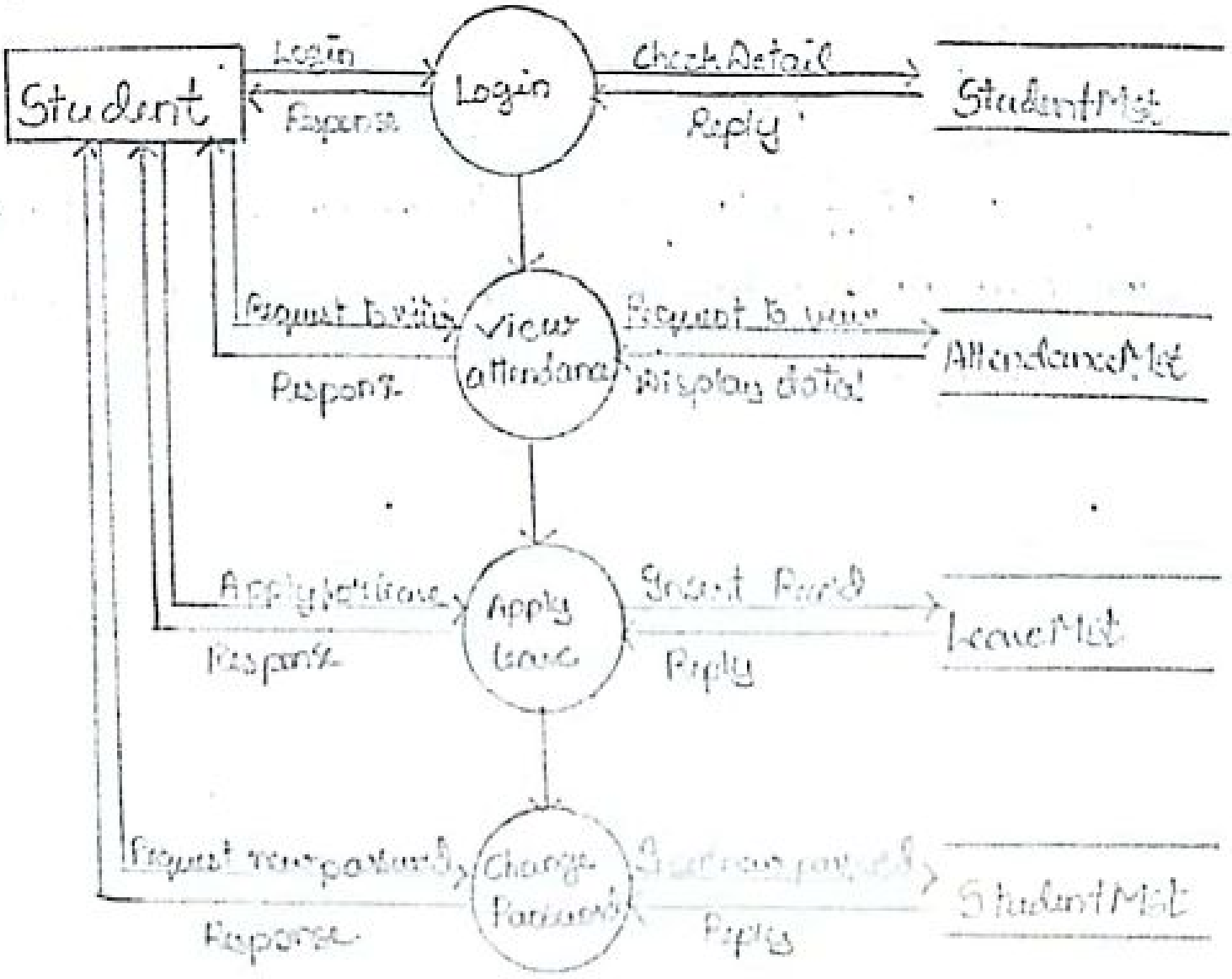
1st level Admin Side DFD

The admin side DFD discribes the functionality of admin. The admin can first login, add a branch, add staff, view attendance, leave reports and logout



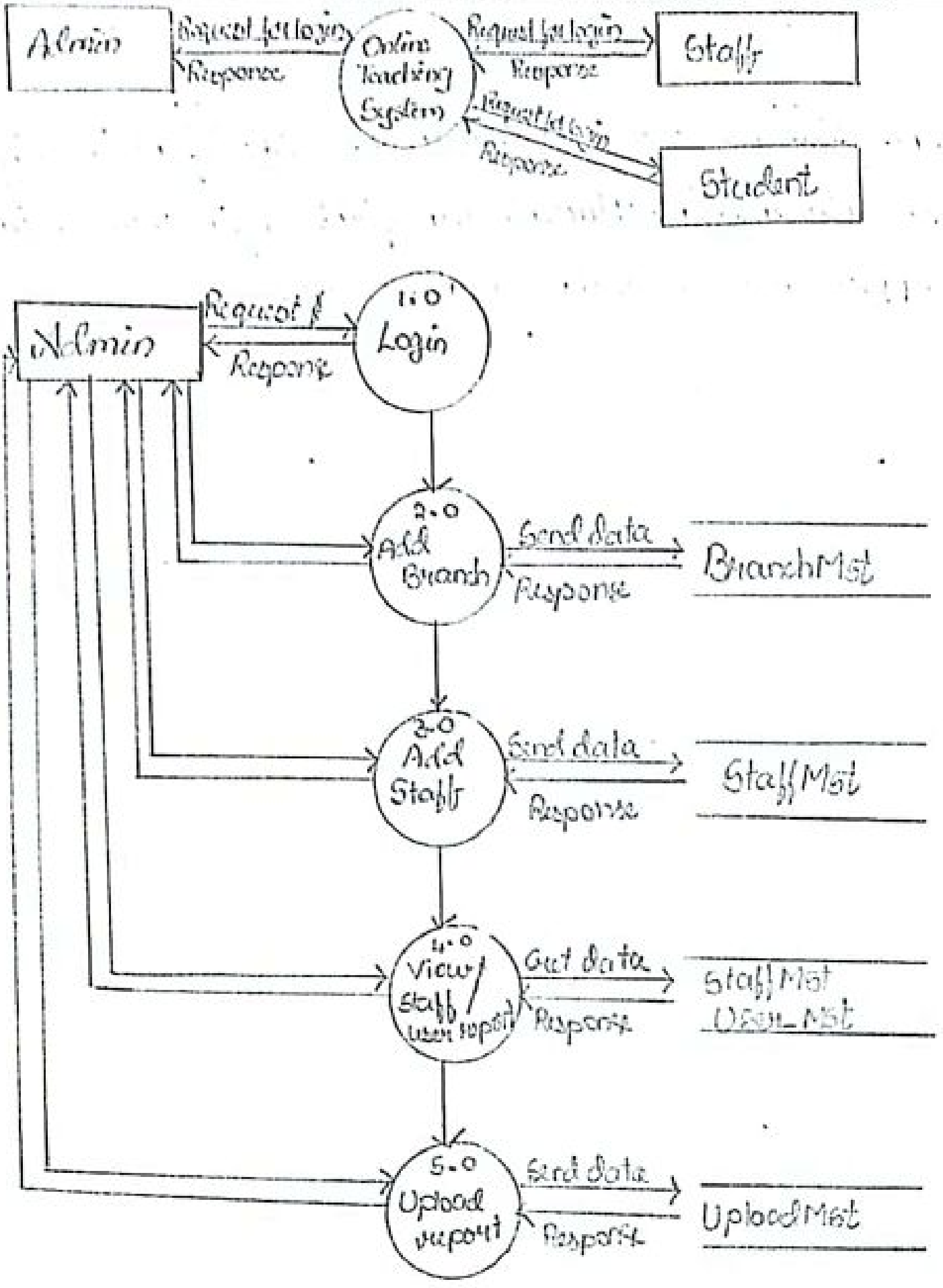
Level 1 Staff Side Data Flow Diagram:

The staff side DFD describes the functionality of the staff. The staff can first login, add a student, take the attendance, view the attendance, manage leave and change password.



Level 1 Student Side Data Flow Diagram:

The student side dfd describes the functionality of the student. The student can first login, view attendance, apply leave and change password.



Case Study 3: Design Data Flow Diagram for Online Teaching Project

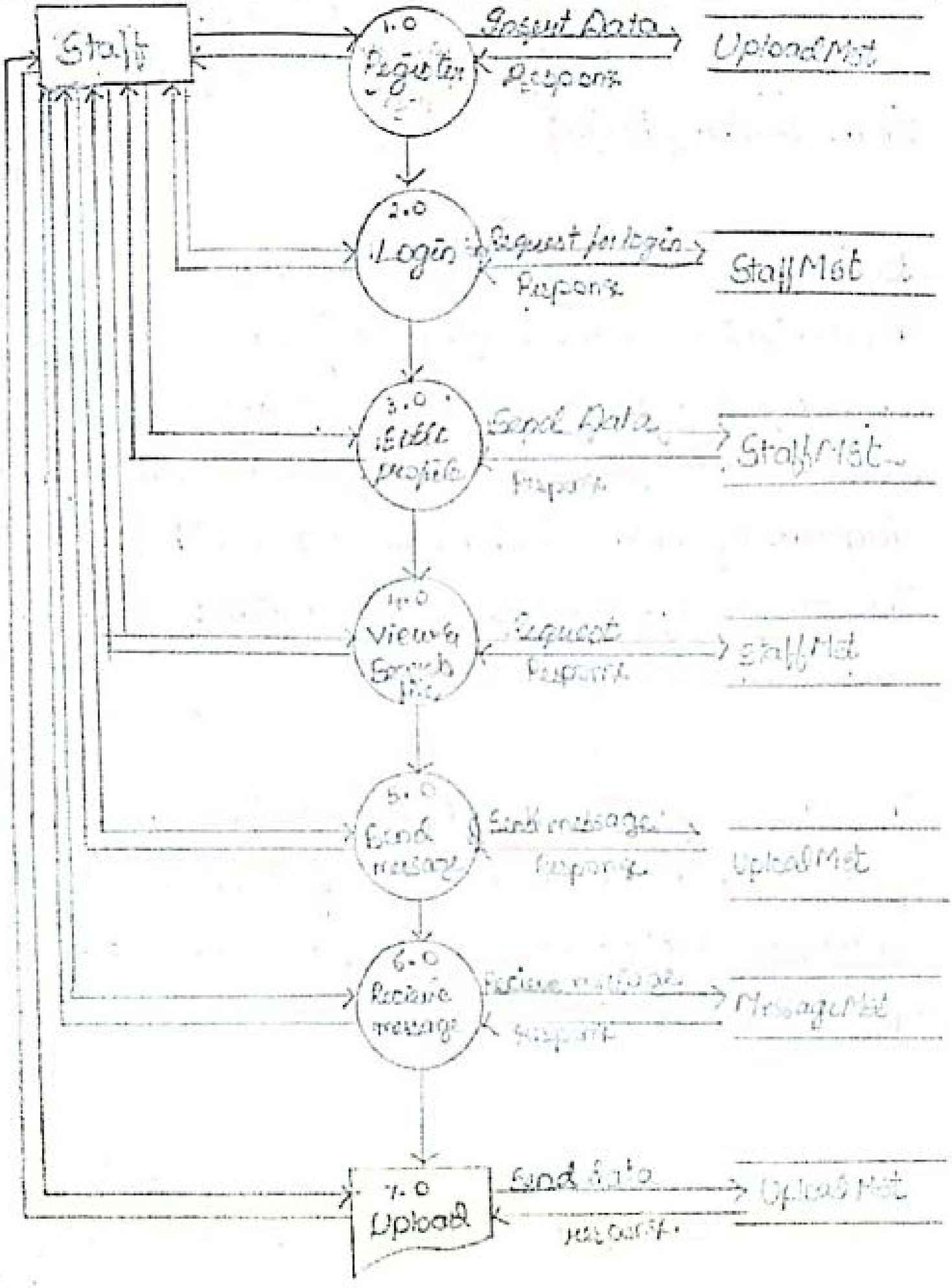
Explanation:

Context level Diagram (0 level DFD)

The context level data flow diagram describes the whole system. The 0 level DFD describes all user module who operate the system. Below data flow diagram of online teaching website which shows the three user who can operate the system: Admin, Teacher and Student.

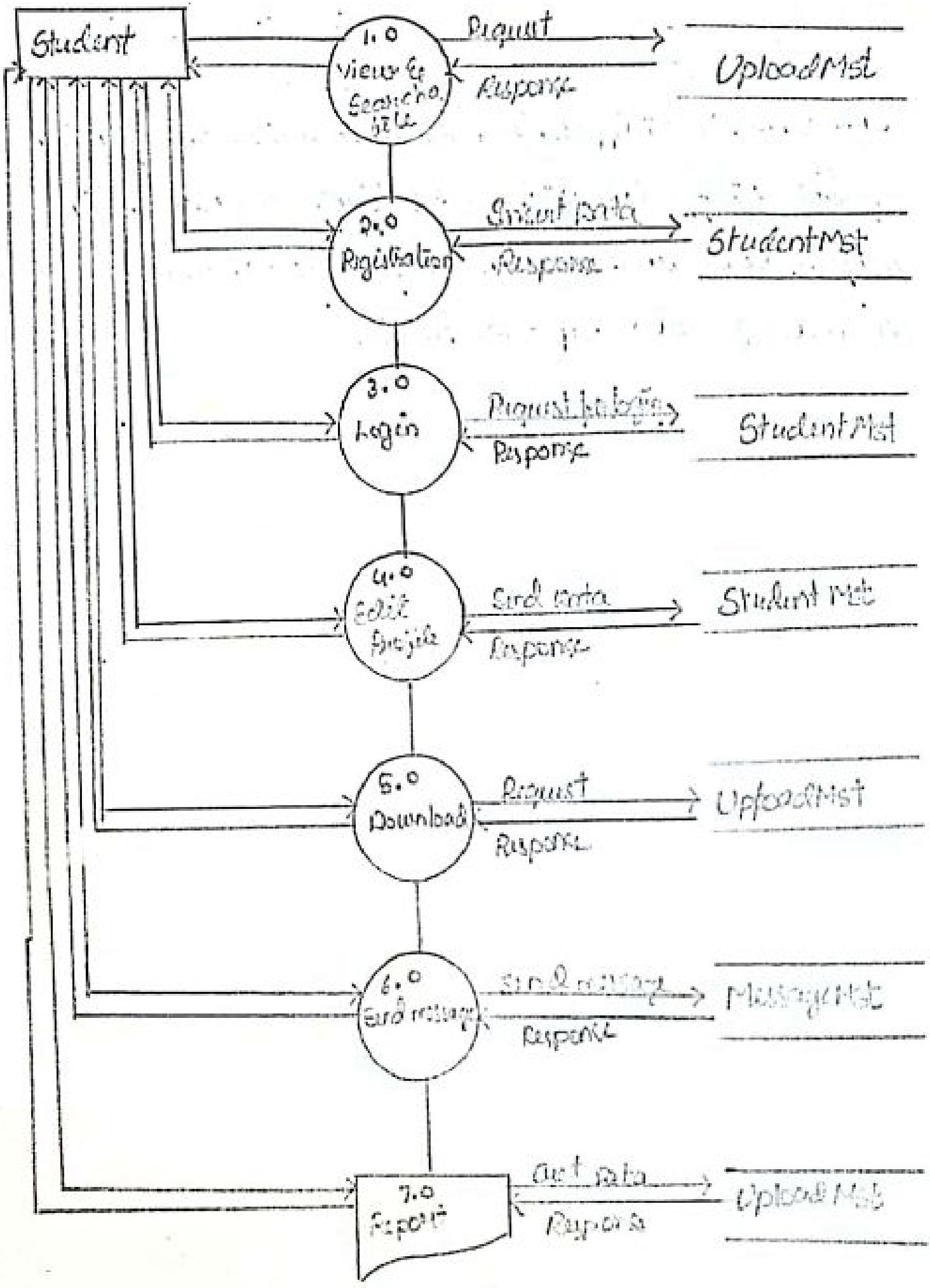
Level 1 Admin Side DFD

The level 1 Admin side DFD describes the functionality of the admin. The admin can first login, add branch, add staff, view staff/user report and upload the report.



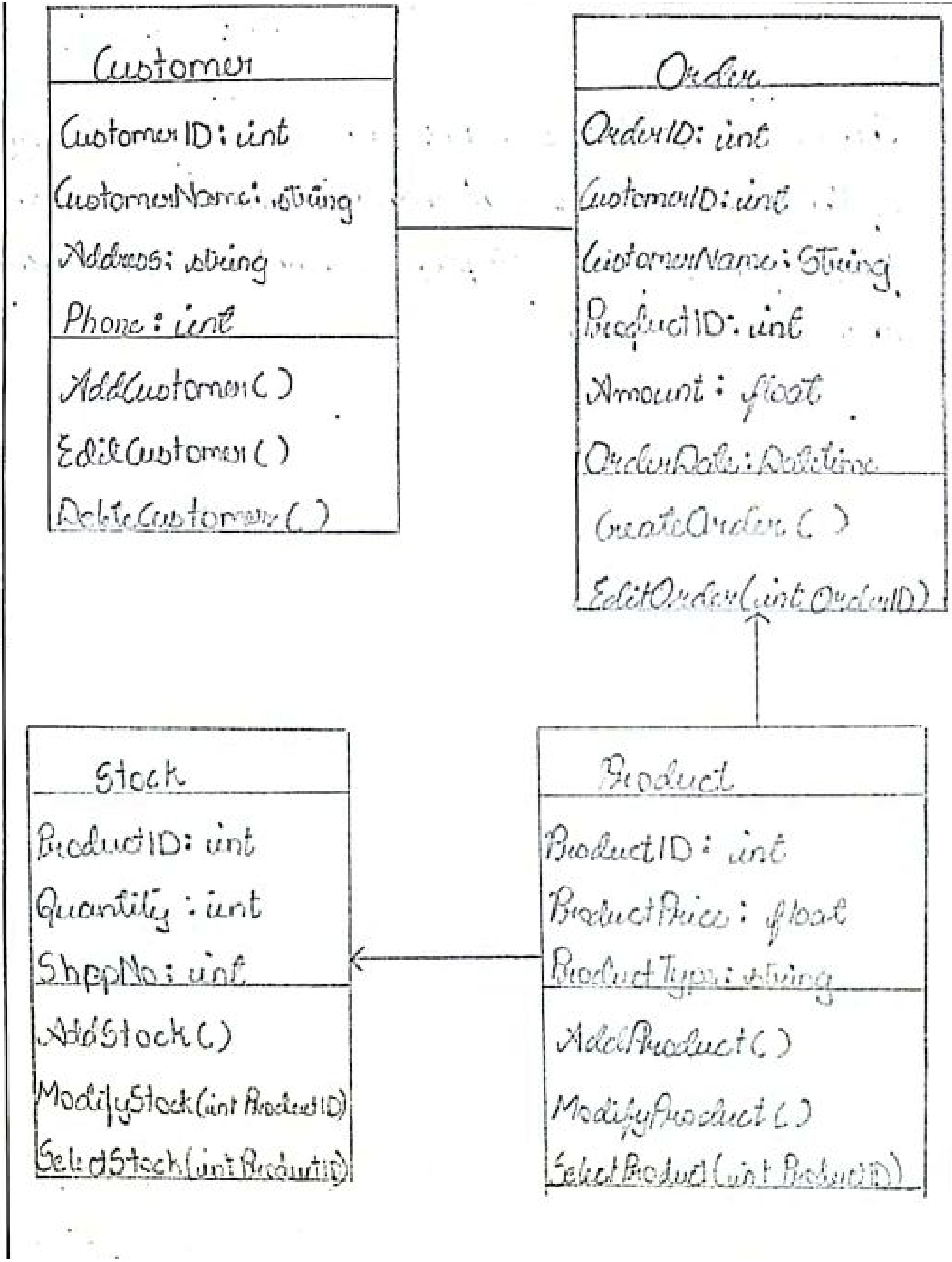
Level 1 Staff Side DFD

The level 1 staff side DFD describes the functionality of the staff. The staff will first register, login, edit profile, view and search a file, send message, receive a message and upload a file.



Level 1 Student Side DFD

The level 1 student side DFD describes the functionality of the student. The student can view and search a file, register, login, edit profile, download, send message and view a report.



CLASS DIAGRAMS

Case Study 1: Design class diagram for order processing system

Explanation:

List of Classes:

1. Customer
2. Order
3. Product
4. Stock

Attributes of Customer Class:

1. CustomerID
2. CustomerName
3. Address
4. Phone

Operations of Customer Class:

1. AddCustomer ( )
2. EditCustomer ( )
3. DeleteCustomer ( )

Attributes of Order Class:

1. OrderID
2. CustomerID
3. CustomerName
4. ProductID
5. Amount
6. OrderDate

Operations of Order Class:

1. CreateOrder ( )
2. EditOrder ( )

Attributes of Product Class:

1. ProductID
2. ProductPrice
3. Product Type

Operations of Product Class:

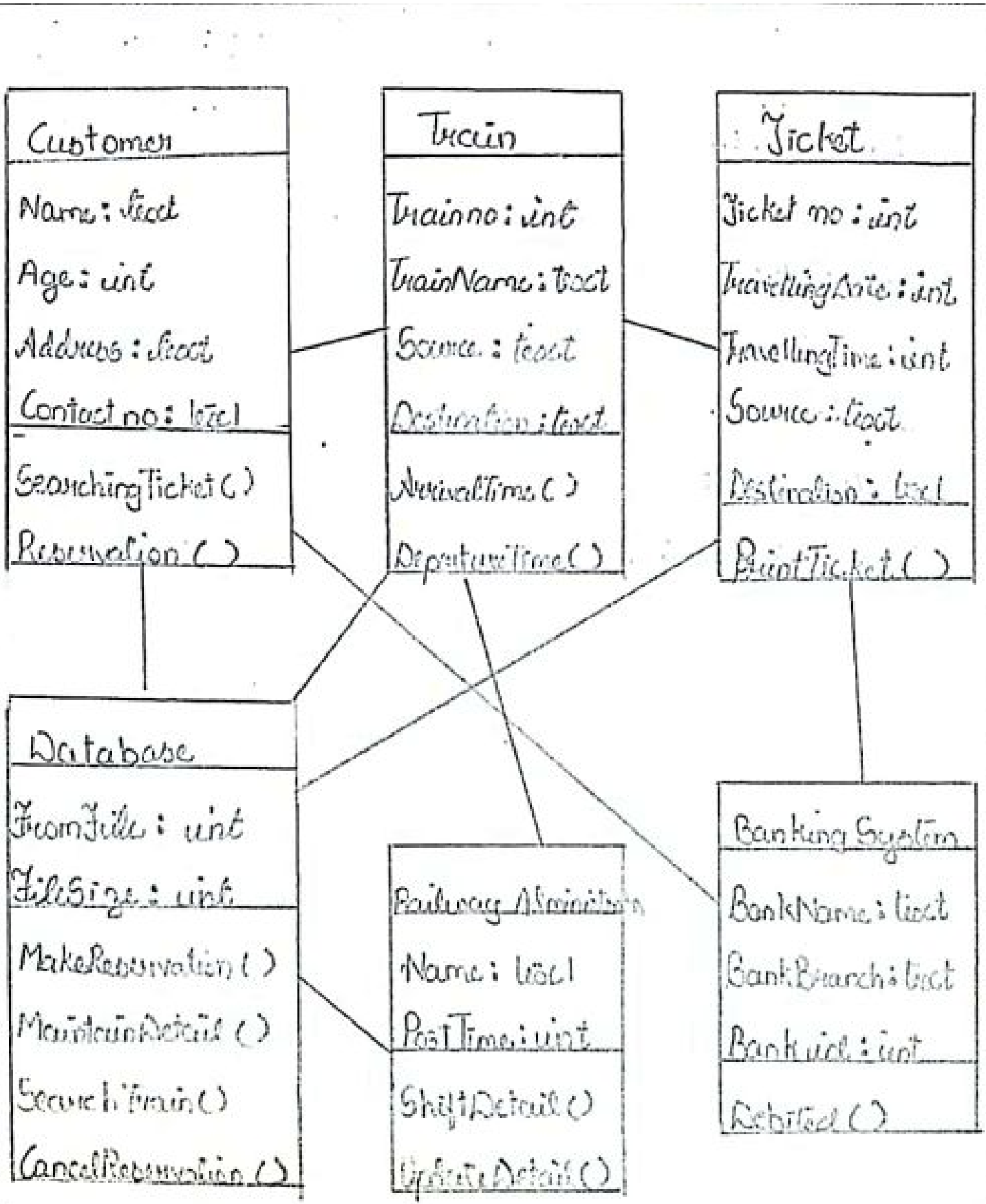
1. AddProduct ( )
2. ModifyProduct ( )
3. SelectProduct ( )

Attributes of Stock Class:

1. ProductID
2. Quantity
3. ShopNo

Operations of Stock Class:

1. AddStock ( )
2. ModifyStock ( )
3. SelectStock ( )



Case Study 2 : Design class diagram for Railway Reservation System.

Explanation :

List of Classes :

1. Customer
2. Train
3. Ticket
4. Database
5. Railway Administrator
6. Banking System

Attributes of Customer Class :

1. Name
2. Age
3. Address
4. Contact no

Operations of Customer Class :

1. SearchingTicket ()
2. Reservation ()

Attributes of Train Class:

1. Train no
2. TrainName
3. Source
4. Destination

Operations of Train Class:

1. ArrivalTime ( )
2. DepartureTime ( )

Attributes of Ticket Class:

1. Ticket no
2. TravellingDate
3. TravellingTime
4. Source
5. Destination

Operations of Ticket Class :

1. PrintTicket ( )

Attributes of Database Class:

1. FromFile
2. FileSize.

Operations of Database Class:

1. MakeReservation ( )
2. MaintainDetail ( )
3. SearchTrain ( )
4. CancelReservation ( )

Attributes of Railway Administrator Class:

1. Name
2. PostTime

Operations of Railway Administrator Class:

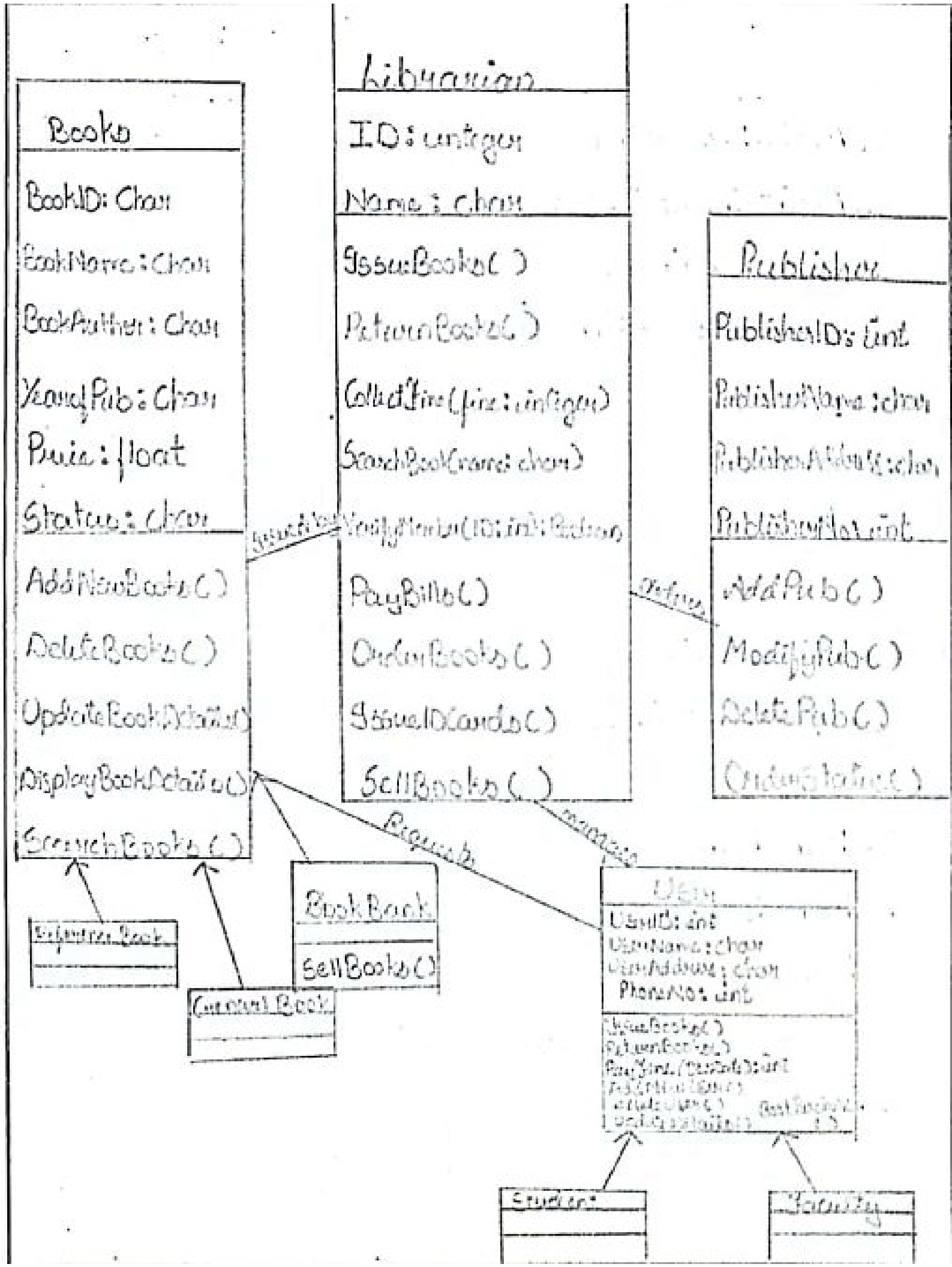
1. ShiftDetail ( )
2. UpdateDetail ( )

Attributes of Banking System Class:

1. BankName
2. BankBranch
3. Bankid

Operations of Banking System Class:

1. Debited ( )



Case Study 3: Design class diagram for Library Management System

Explanation:

List of Classes:

1. Books
2. Librarian
3. Publisher
4. User
5. Book Bank
6. General Book
7. Reference Book
8. Student
9. Faculty

Attributes of Books Class:

1. BookID
2. BookName
3. BookAuthor
4. YearofPub
5. Price

6. Status

Operations of Books Class:

1. AddNewBooks()
2. DeleteBooks()
3. UpdateBookDetails()
4. DisplayBookDetails()
5. SearchBooks().

Attributes of Librarian Class:

1. ID
2. Name

Operations of Librarian Class:

1. IssueBooks()
2. ReturnBooks()
3. CollectFine()
4. SearchBook()
5. VerifyMember()
6. PayBills()
7. OrderBooks()
8. IssueIDCards()

9. SellBooks()

Attributes of Publisher Class:

1. PublisherID
2. PublisherName
3. PublisherAddress
4. PublisherNo

Operations of Publisher Class:

1. AddPub()
2. ModifyPub()
3. DeletePub()
4. OrderStatus()

Attributes of User Class:

1. UserID
2. UserName
3. UserAddress
4. PhoneNo

Operations of User Class:

1. IssueBooks()
2. ReturnBooks()

3. PayFine ( )

4. AddNewUser ( )

5. DeleteUser ( )

6. UpdateDetails ( )

7. BookPurchase ( ).

Attributes of Book Bank Class:

Nil

Operations of Book Bank Class:

1. SellBooks ( )

Attributes of General Book Class:

Nil

Operations of General Book Class:

Nil

Attributes of Reference Book Class:

Nil

Operations of Reference Book Class:

Nil

Attributes of Student Class:

Nil

Operations of Student Class:

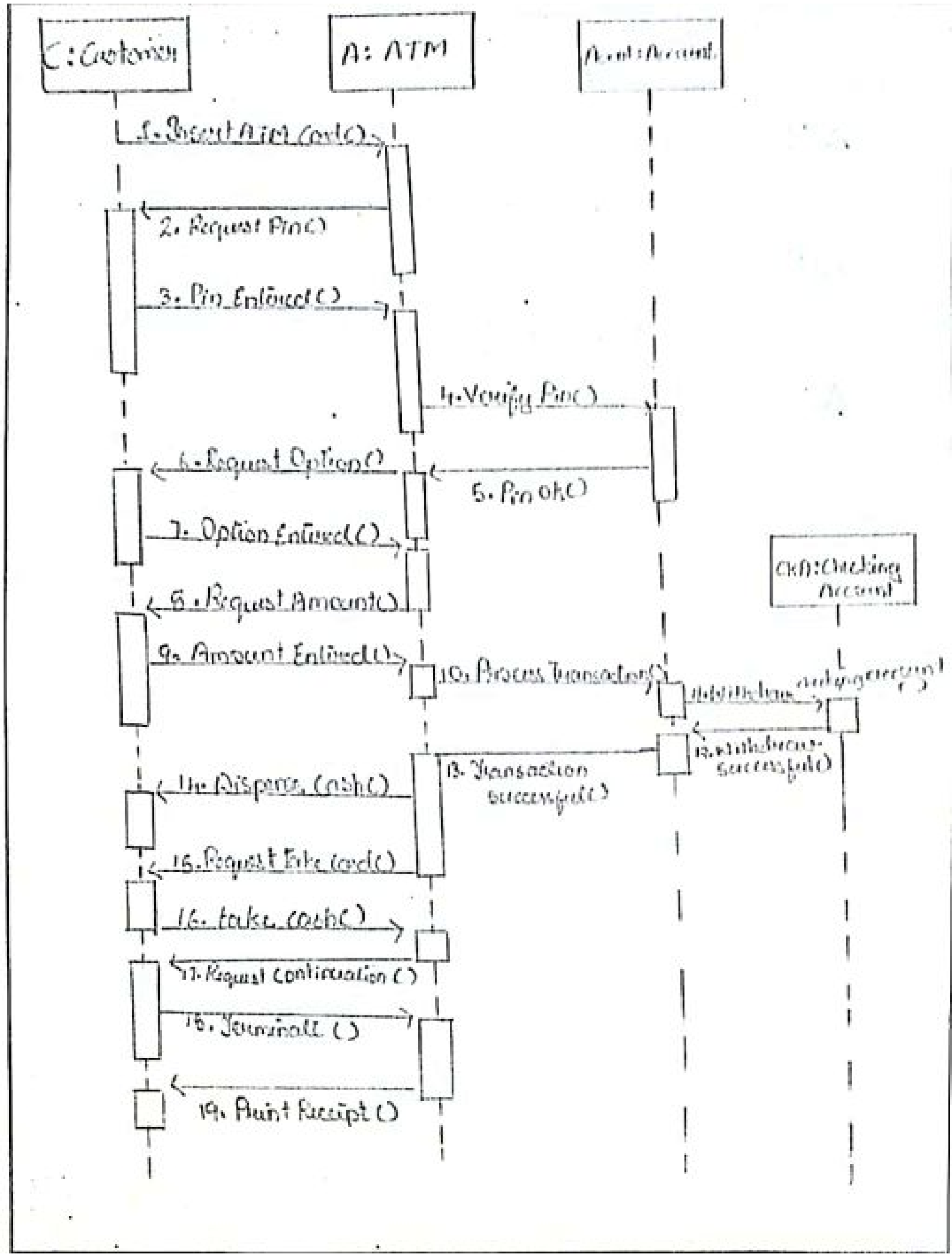
Nil

Attributes of Faculty Class:

Nil

Operations of Faculty Class:

Nil .



SEQUENCE DIAGRAMS

Case Study I : Design sequence diagram for ATM Machine

Explanation:

Message from Customer object to ATM object

- Insert ATM
- Pin Entered
- Option Entered
- Amount Entered
- Take Cash
- Terminate

Message from ATM object to Customer object

- Request Pin
- Request Option
- Request Amount
- Dispense Cash
- Request take card
- Request Continuation
- Print Receipt

Message from ATM object to Account object

- Verify Pin
- Process Transaction

Message from Account object to ATM object

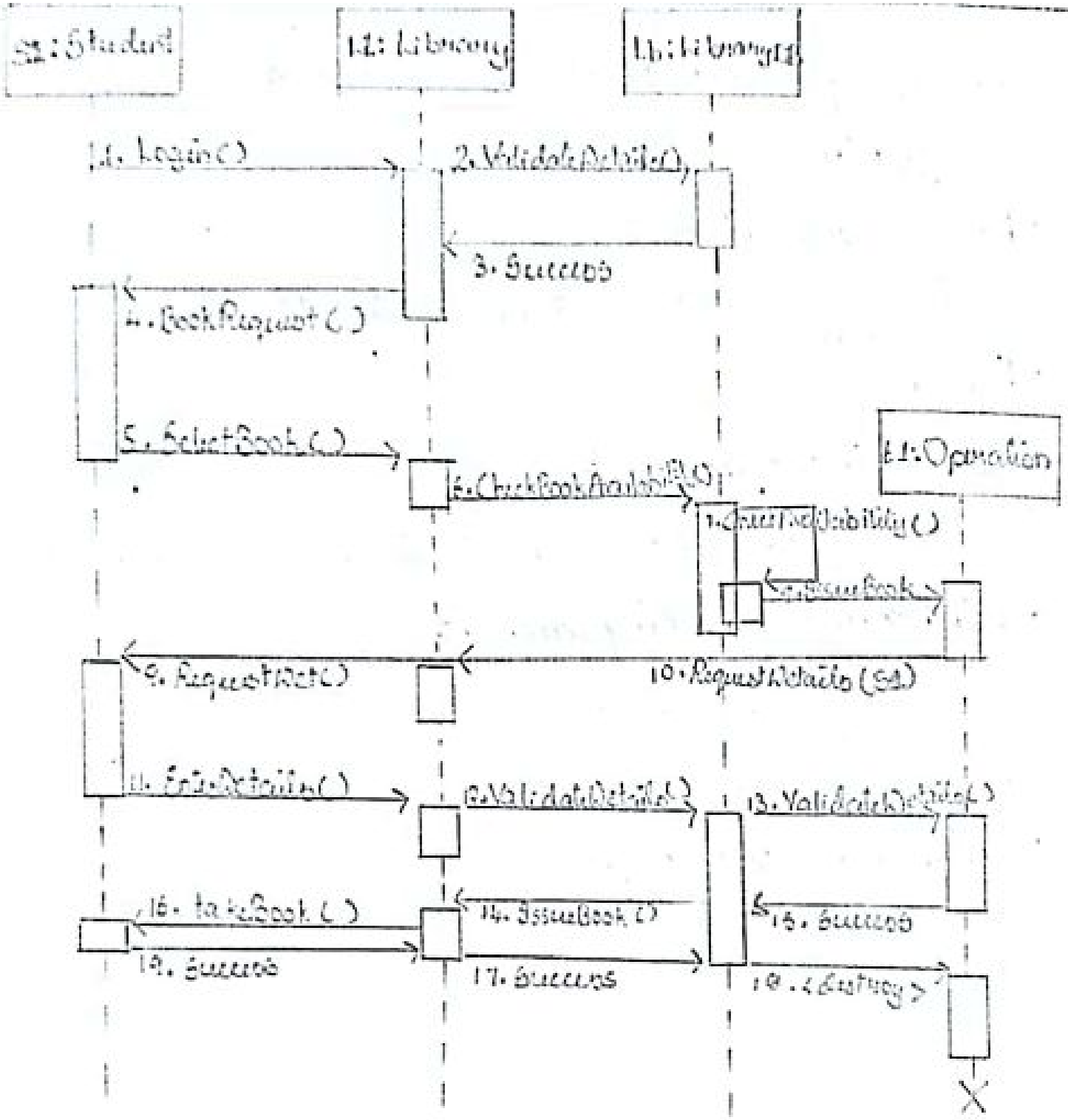
- Pin ok
- Transaction Successfull

Message from Account object to Checking Account object

- Withdraw chucking account

Message from Checking Account object to Account object

- Withdraw successful



Case Study 2 : Design sequence diagram for Library Management System

Explanation:

Messages from Student object to Library object

- Login
- SelectBook
- EnterDetails
- Success

Message from Library object to Student object

- BookRequest
- RequestDet
- TakeBook

Messages from Libray object to LibraryDB object

- ValidateDetails
- CheckBookAvailability
- ValidateDetails
- Sucess

Messages from LibraryDB to Library object

- Success

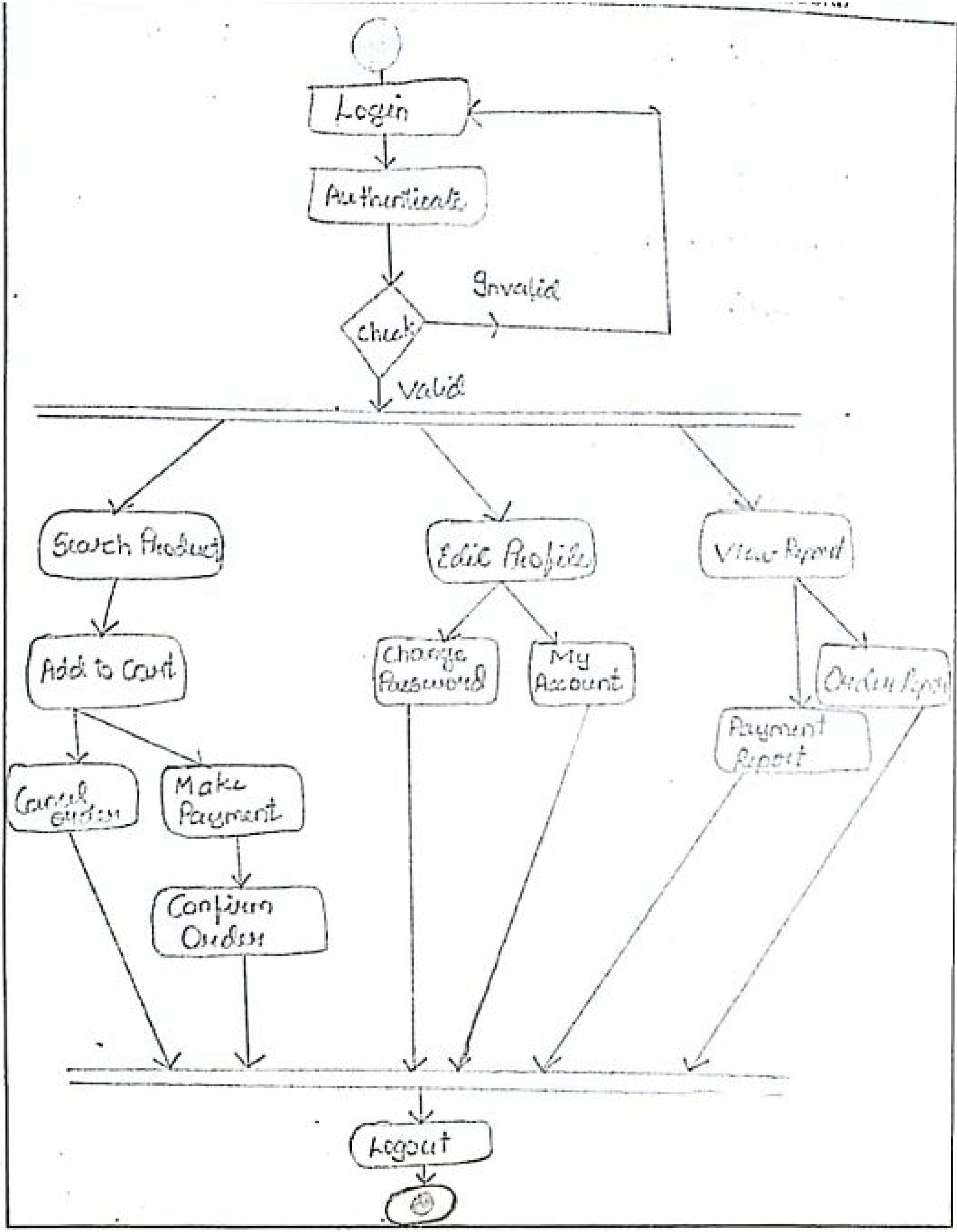
- IssueBook

Messages from libraryDB object to Operation object

- IssueBook
- ValidateDetails
- <destroy>

Messages from Operation object to libraryDB object

- ValidateDetails
- Success



ACTIVITY DIAGRAMS

Case Study 1: Design activity diagram for Online Shopping

Explanation: User Side

List of Activities:

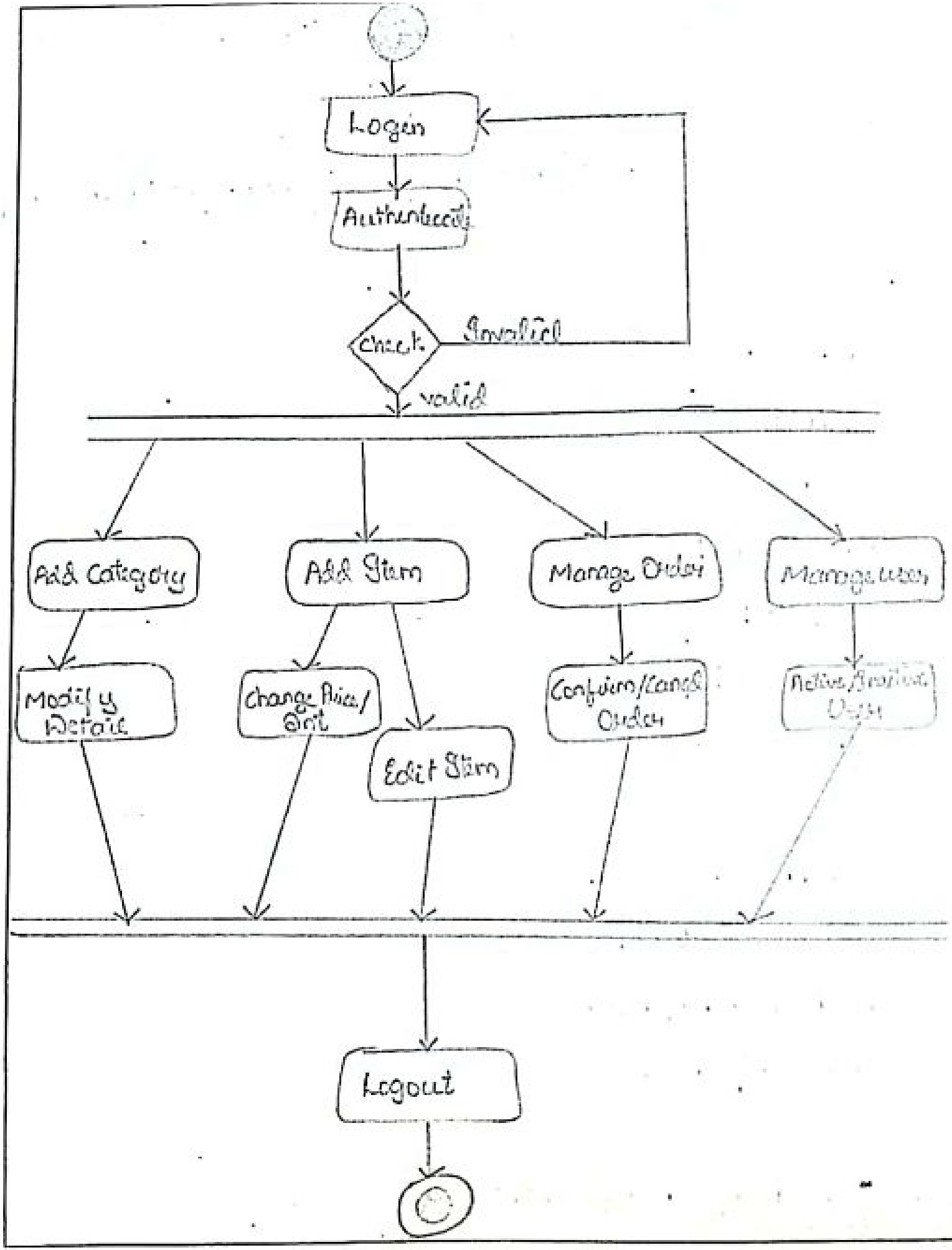
1. Login
2. Authenticate
3. Check
4. Search Product
5. Edit Profile
6. View Report
7. Logout

Sub-Activities of Search Product

1. Add to Cart
2. Cancel Order
3. Make Payment
4. Confirm Order

Sub-Activities of Edit Profile

1. Change Password.



2. My Account

Sub-Activities of View Report

1. Payment Report
2. Order Report

Admin Side :

List of Activities

1. Login
2. Authenticate
3. Check
4. Add Category
5. Add Item
6. Manage Order
7. Manage User
8. Logout

Sub-Activities of Add Category

1. Modify Detail

Sub-Activities of Add Item

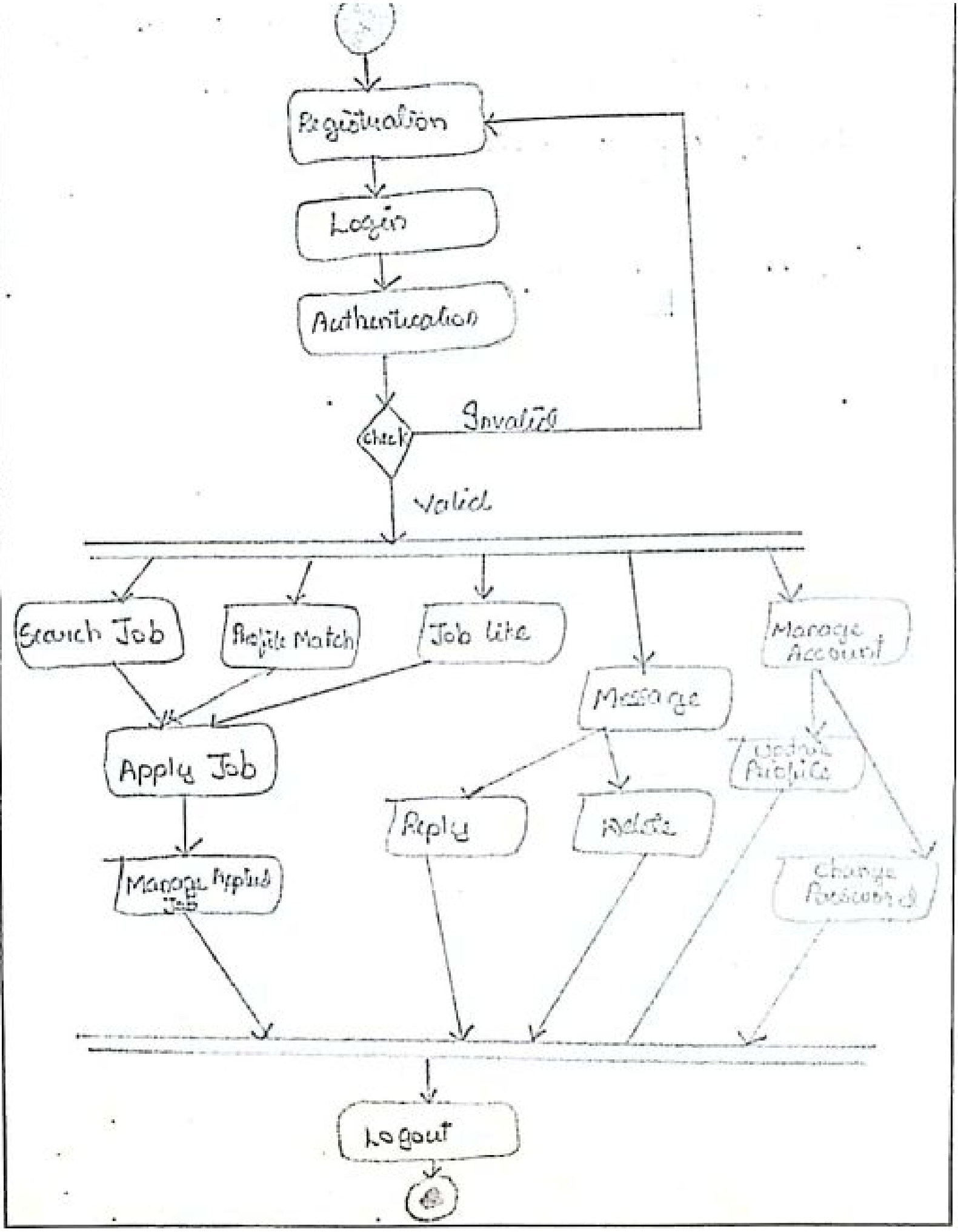
1. Change Price / Qnt
2. Edit Item

Sub - Notifico of Manage. Order

1. Confirm / Cancel Order.

Sub - Notifico of Manage. User

1. Active / Inactive User.



Case Study 2: Design Activity Diagram for Job Portal System

Explanation: Student Side

List of Activities:

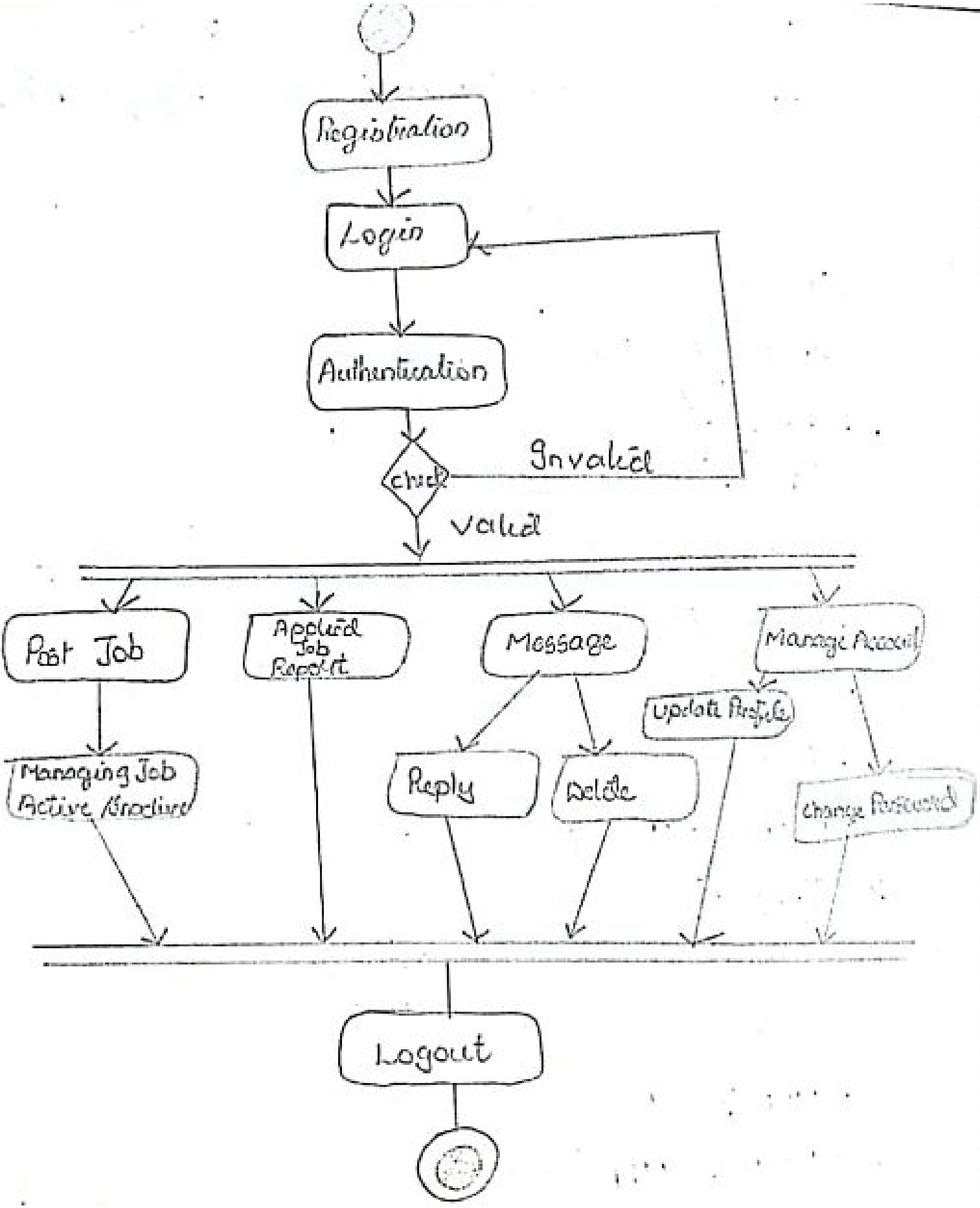
1. Registration
2. Authentication
3. Login
4. Check
5. Search Job
6. Profile Match
7. Job Like
8. Message
9. Manage Account
10. Logout.

Sub-Activities of Search Job, Profile Match and Job Like

1. Apply Job
2. Manage Applied Job

Sub-Activities of Message

1. Reply



2. Delete

Sub-Activities of Manage Account:

1. Update Profile
2. Change Password

Company Side

List of Activities

1. Registration
2. Login
3. Authentication
4. Check
5. Post Job
6. Applied Job Report
7. Message
8. Manage Account
9. Logout

Sub-Activities of Post Job

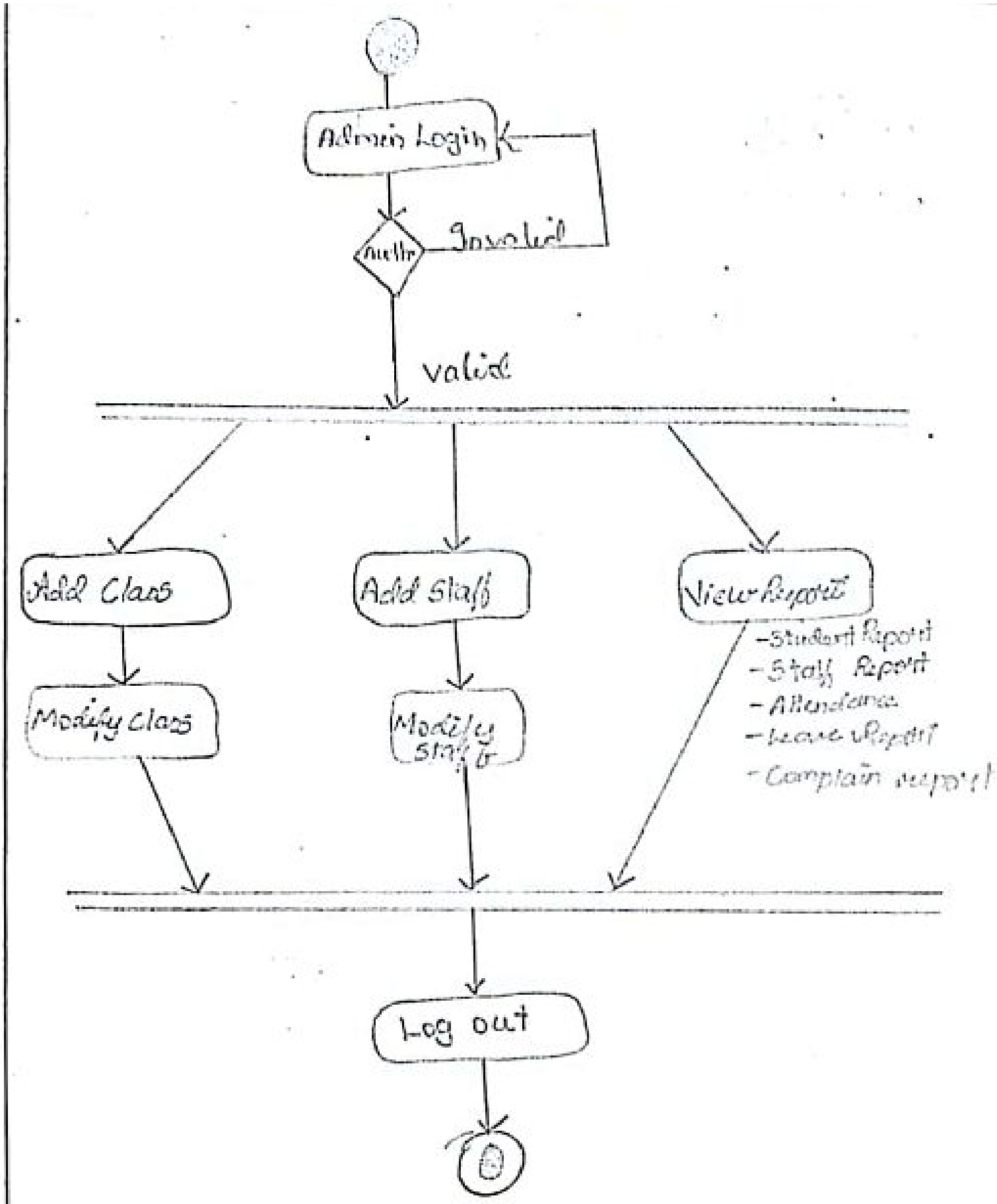
1. Manage Job Active/Inactive

Sub- Activities of Message:

1. Reply
2. Delete

Sub- Activities of Manage Account:

1. Update Profile
2. Change Password



Case Study 3: Design activity diagram for Student Attendance Management System

Explanation: Admin Side

List of Activities

1. Admin Login
2. Authentication
3. Add Class
4. Add Staff
5. View Report
6. Logout

Sub-Activities of Add Class

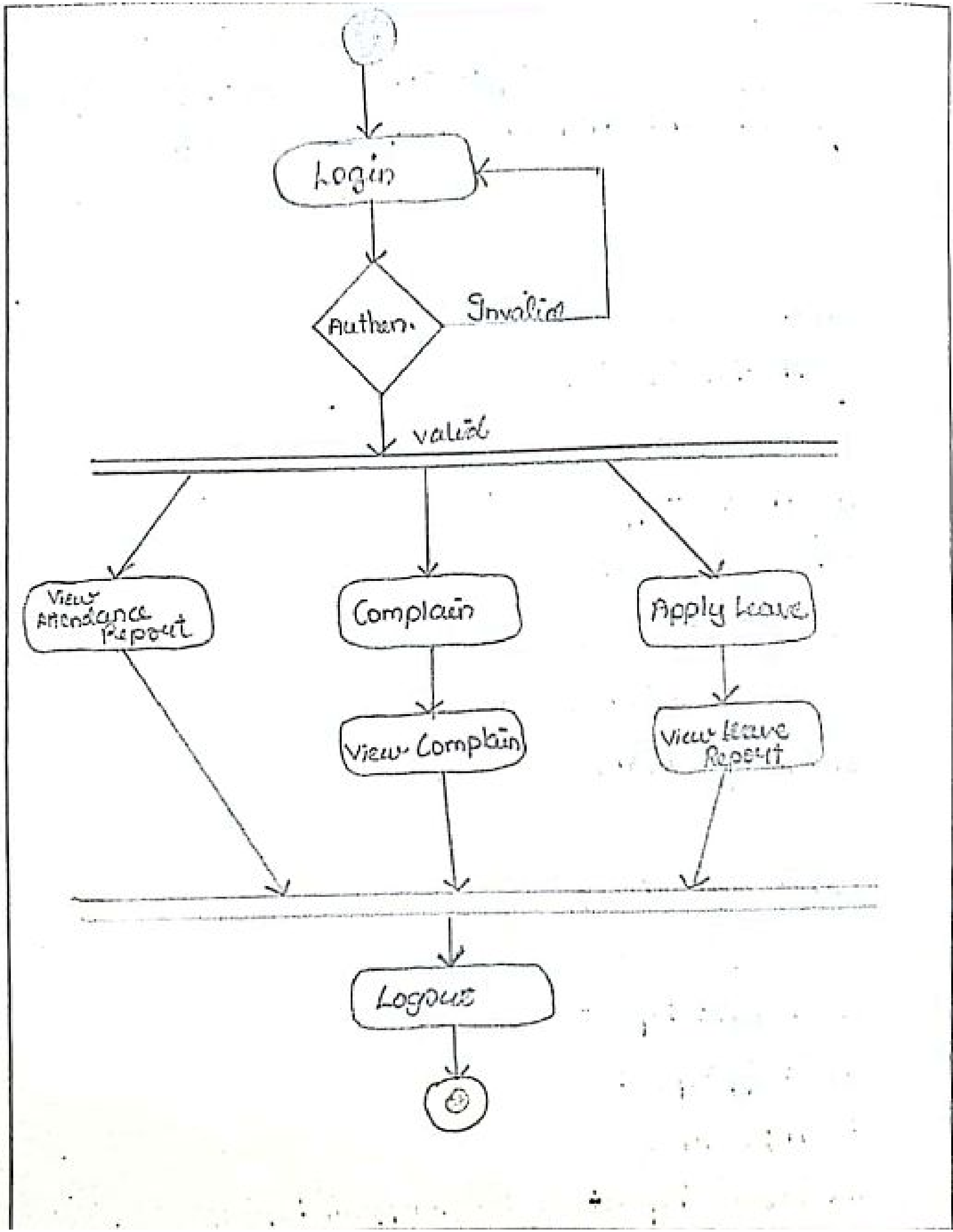
1. Modify Class

Sub-Activities of Add Staff

1. Modify staff

Sub-Activities of View Report

1. Student Report
2. Staff Report
3. Attendance
4. Leave Report
5. Complain Report



Student Side :

List of Activities

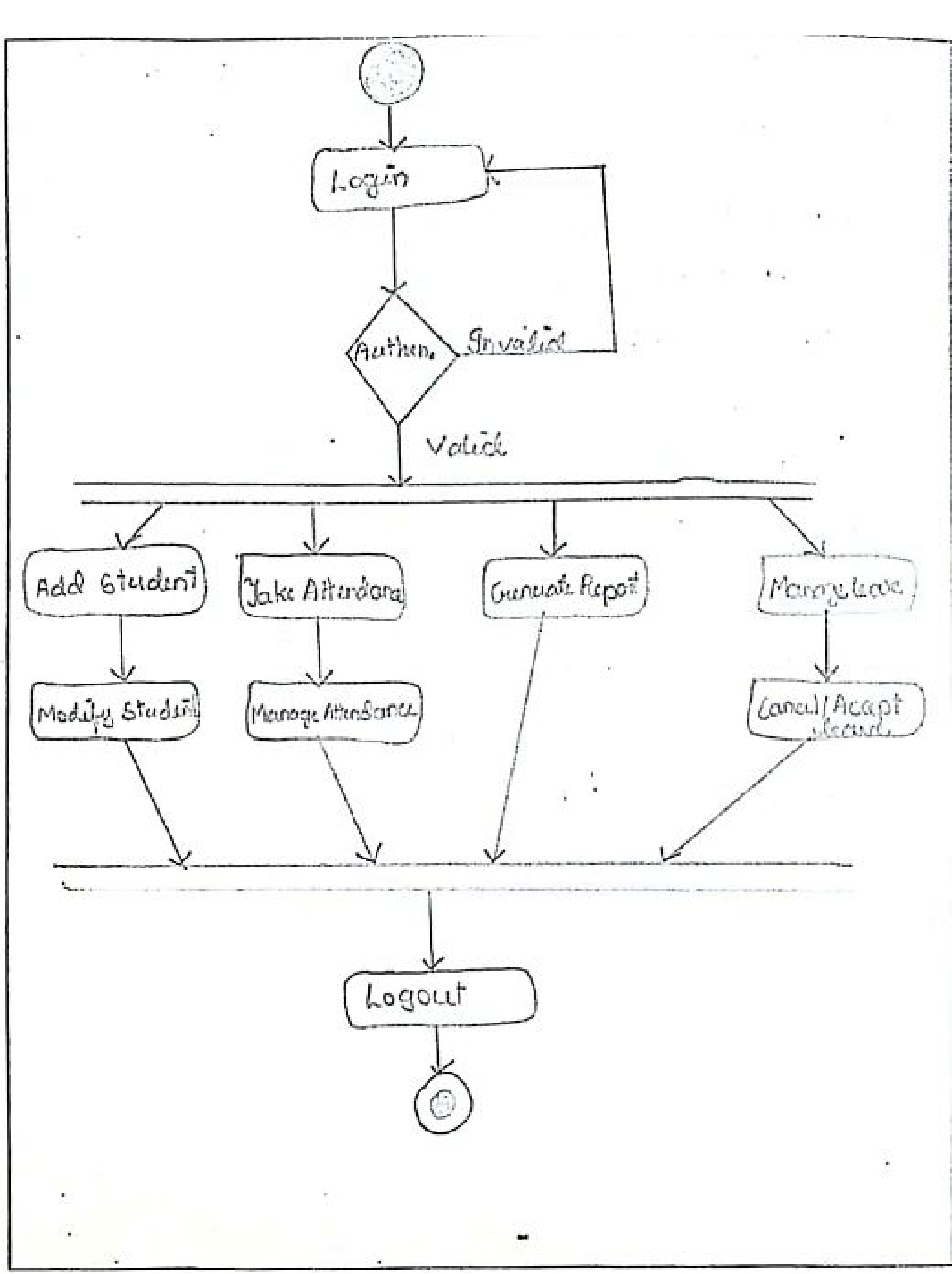
1. Login
2. Authentication
3. View Attendance Report
4. Complain
5. Apply leave
6. Logout

Sub - Activities of Complain :

1. View Complaint

Sub- Activities of Apply leave

1. View leave Report.



Staff Side:

List of Activities:

1. Login
2. Authentication
3. Add Student
4. Take Attendance
5. Generate Report
6. Manage leave
7. Logout

Sub-Activities of Add Student

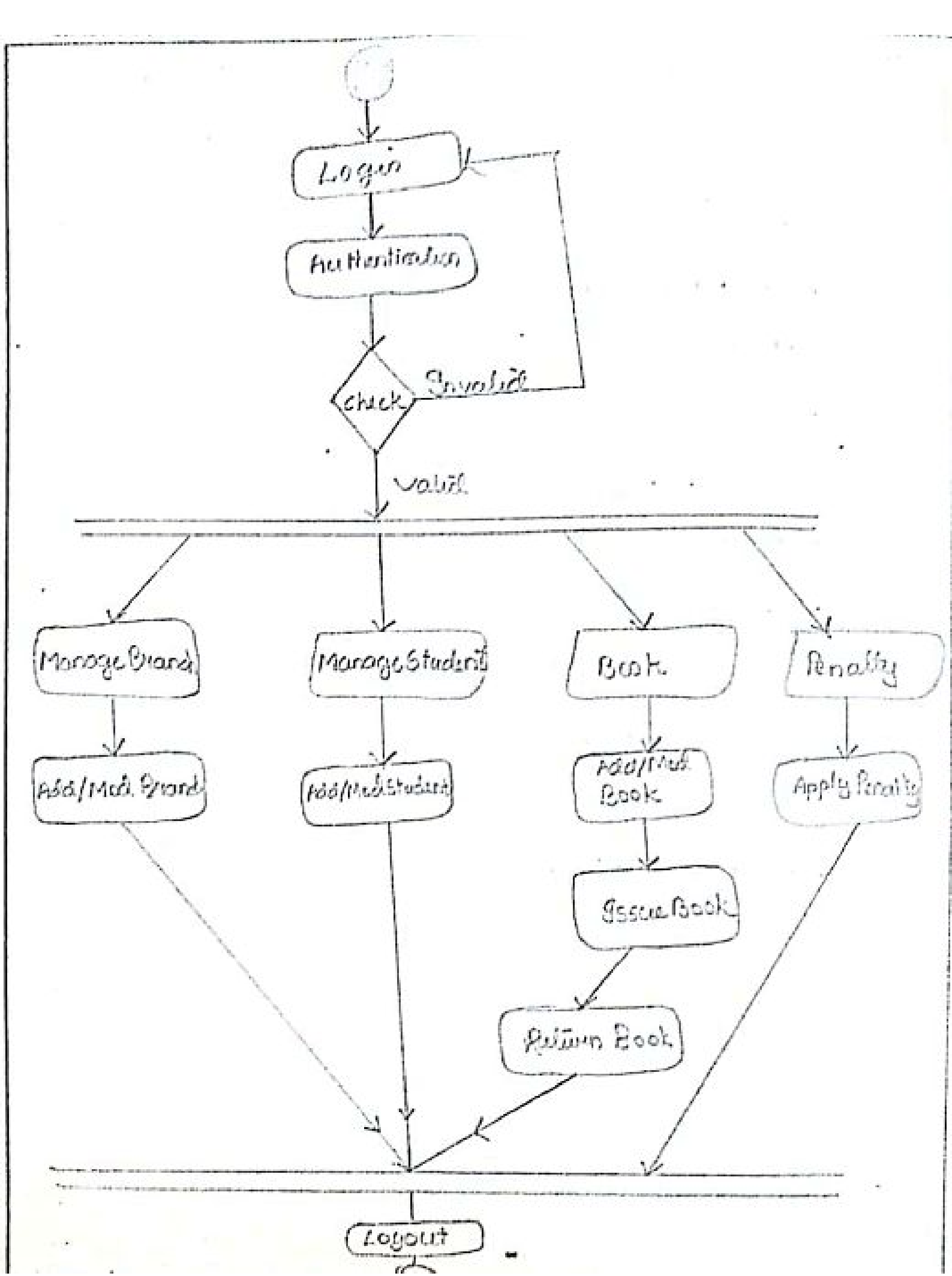
1. Modify Student

Sub-Activities of Take Attendance

1. Manage Attendance

Sub-Activities of Manage leave

1. Cancel / Accept leave



Case Study 4: Design Activity Diagram for Library Management System

Explanation:

List of Activities

1. Login
2. Authenticate
3. Check
4. Manage Branch
5. Manage Student
6. Book
7. Penalty
8. Logout

Sub-Activities of Manage Branch

1. Add/Mod Branch

Sub-Activities of Manage Student

1. Add/Mod Student

Sub-Activities of Book

1. Add/Mod Book
2. Issue Book

3. Return Book

Sub- Activities of Penalty.

1. Apply Penalty