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Bookshop Automation

System Requirement & Specification

(Project No – P10)

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Abstract

- The project report consists of 2 phases. In the first phase, the problem assigned to us has been mentioned. Second phase provides the solution for the same problem along with an insight into the development process involved.

- Introduction part gives the information regarding Bookshop Automation System. It also gives brief introduction about the project under the topic **PROBLEM DEFINITION** .It gives a short introduction about Bookshop and its operations.

- The next part is the **REQUIRMENT ANALYSIS** which is mainly concerned with study of various requirements such as user, System, Hardware/Software & Performance. It also includes feasibility study of system.

- The next part is on **SYSTEM DESIGN**, which include interface design, detailed design .It also includes function flow, DFD, and ER diagram & database design.

- Last part is regarding **CONCLUSION** about above mention problem.

Table of Content

Introduction:

The Bookshop Automation System is to automate all operations in a bookshop. Generally it includes the Order Processing, Stock Management and Accounts Management.

Before automating a bookshop we have to understand the concept of automation. In automation of any operation we make a system which do work automatically as the respective events occurs, for which it is meant.

There are the some common examples of the automation like that auto pilot system in the aircraft, automatic home systems (electric system, water system, fire alarm system, doors system etc). These are best examples of the automation systems.

Here we are try to develop such type system which is provide the automation on the any type of the bookshop. That means a shop which has the type system which provides the facility to the customers of the shop to purchase the books from the shop without any complexity.

For example any customer want to purchase any book from the shop than first of all customer just choose the stream of the book than he/she can see the more then one type of books there and than he/she can choose the specific book from there. And then purchase it by paying price on bookshop cash counter and receives its invoice.

Approach to Problem Solving:

IN BRIEF LIFE CYCLE:

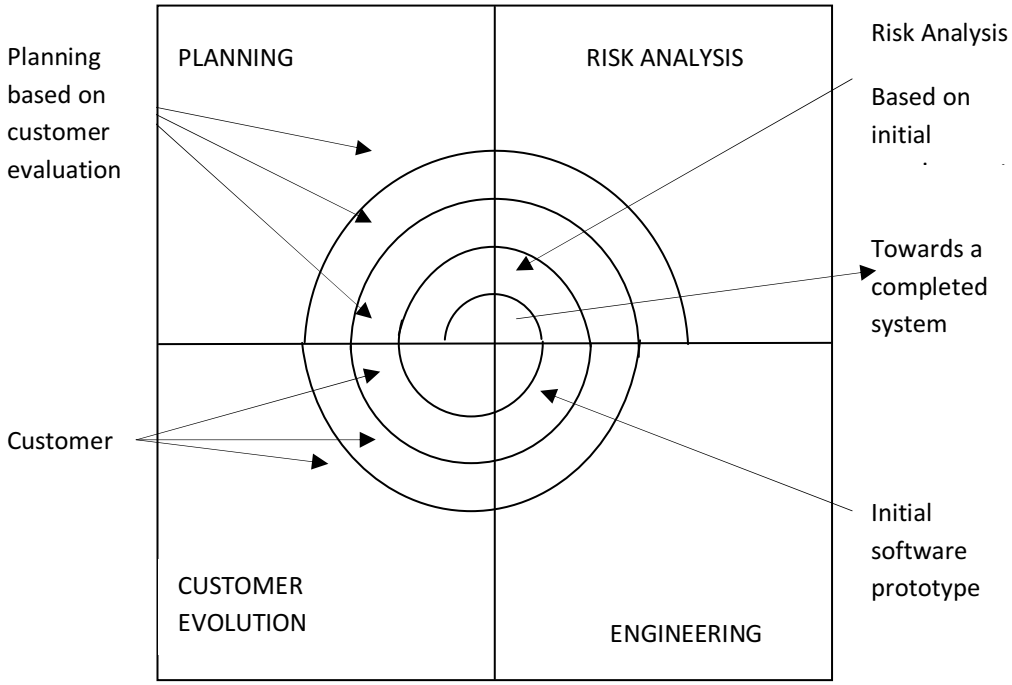
S.No.	Stage	Key Question	Results
1	**Need Recognition** • Preliminary survey/initial investigation	• What is the problem or opportunity?	• Statement of scope and objectives.
2	**Feasibility Study** • Evaluation of existing system • Cost estimates	• What are the user's demonstrable needs?	• Statement of new scope and objectives.
3	**Analysis** • Detailed evaluation of present system • Data Collection	• What are the facts?	• Logical Model of the System.
4	**Design** • Design Specifications • Programmed Construction • Testing	• • Specifically, how must the problem is solved? • How ready are programs for acceptance test?	• Alternative design • Hardware specifications • Test plans • Security, audit, operating procedures.
5	**Implementation** • User training • System Conversion	• What is an actual operation? • Are user manuals ready?	• Training • Programme. • User-Friendly documentation
6	**Post Implementation** • Evaluation • Maintenance • Enhancements	• Is the key system running? • Should the system be modified?	• User Requirements met. • User standards met. • Satisfied user.

SPIRAL MODEL

The Spiral Model is one that couples the iterative nature of prototyping with controlled and systematic aspect of linear sequential or waterfall model. It provides the potential for rapid development of incremental versions of the system. Here it is used for successful development of Sales and Product Management System.

Spiral Model consists of four phases:

- Planning
- Risk Analysis
- Engineering
- Customer Evolution



Software Development Process moves throughout these four phase until the Software is not implemented .In the last phase (Customer Evaluation), End User evaluates the product, and gives the comments according to requirement. On basis Software either goes forward in the phases or for implementation process.

Problem Definition:

Almost every activity in the world today is controlled by computer driven software programs. His trend was first accommodated by engineering applications in the past. However, as the life style became more and more complex, every area of human interactions was invaded by various software systems, such as real time, business, simulation, embedded, web based, personal and more recently, artificial intelligence software etc.

According to the above facts, managing and maintaining a book shop could also be controlled by efficient software. This project focuses attention on designing efficient and reliable software which controls the transactions of a bookshop.

In real world, it tends to associate with automated systems as they provide many benefits than doing the same thing in manually. As above mentioned, here we have introduced a system which can be used to maintain a bookshop.

When we are concerning the manual process of a bookshop, the major problem is the waste of time. A customer has to waste his/her valuable time when he needs to buy a book as all the events such as searching, purchasing are done by members of the staff .In briefly, the manual process is very slow. But automation will reduce the time taken in the whole process.

In a bookshop we should deal with a large store. Then person (storekeeper) has to maintain it with documents which are recorded by him. Therefore, there may be defective reports. Also company has to appointed more persons to complete the maintenance of the stationery. Then the company has to have an additional cost.

As we familiar with this type of system at instance we will be able to have the results that we want. Communication with suppliers, customers and other related organizations will be more successful as the system is so fast.

When the bookshop issues an item to a customer, all the stages of the transaction procedure will be facilitated by the system & it will be more accurate.

Existing system description:

At present, the Wholesale and Retail outlets are working under manual management. All records related to Products, Sales, Suppliers, Orders, Payment are stored in registers. To manage the whole data, the person maintaining records has to take great pain. Various registers has to be maintained for each separate process.

Existing system, used for the Management of sales of electronic products, is completely dependent on human actions and responses (Manual Management), which couldn't be free from errors. In each process whether it is Product Management, Maintaining Customer Records, Payment Management, Report Generation, user has to pay attention to a greater extent while performing the tasks.

During the manual management, the tasks, which are to be performed by its users, are:

- Maintenance of Customers Records (including the new and the existing customers).
- New Products launched in the market.
- Maintenance of Customers Payment Record (including installment details).
- Issue Orders for more Stock.
- Maintenance of Suppliers and Staff Records.
- Searching and answer the query asked by other users.
- Present monthly, quarterly or annual Reports.

All these operations will lead to continuous modifications in the database (Here Registers).

- In case of Customer records, all information related to customers and the product which the customer has purchased is to be stored in the Customers register. If the changes in the customer profile (like Phone no. , Address) occur, registers must be updated.
- In case of new product launched, all the entries like product name and brand must be same in the register (except Model number).
- For the maintenance of the payment records, the customer register has to be checked to know the details of the product purchased by customer. Monthly payment of installment needs record in the register to be updated.
- During issuing order of more stock, the product register is required to check to availability of stock in hand.
- To generate the reports based on the management requirement, will require extensive searching of records.

- In case of Supplier and Staff Record Management, the registers need to be updated time to time as information (like Phone No., Address) changes frequently.

Business Processes of Existing System:

During the system study the following types of business processes were identified:

- Business processes related to Store Sales
- Business processes related to Inventory Management

Store Sales:

- Customer book searching
- Book reservation
  Book purchase – Generating invoice, Billing the customer and Entering sales order.

Inventory Management:

- Searching inventory - searches based on title, code, author and category.
- Buying books from supplier and adding them to inventory (also entering the new books details in the database).
- Removing books which are not fast moving or which are damaged and sending them back to supplier

Other Processes (related to manager)

- Viewing sales records
- Generating sales summaries
- Understanding the sales trends

Problems and constraints:

Manual Management of any task is Time consuming having lots of errors, which will lead to corrupt records in registers. In case of Existing Management System, authorized person has to face a lot of problems. Few of them are as follows:

- Change of profile's information of any Customer, Staff and Supplier requires overwriting in existing records every time.
- In order to delete the record of a particular customer, the person maintaining records will have to search the record of that particular person in every related register.
- For Issuing Order, first the Product register reference is to be made, which is time consuming process.
- Manual calculation of installment and payment is required, which is error prone.
- Reports are generated manually.
- Searching is quite hectic task for a person.
- No way to check the different queries which may arise at various stages of processing.
- If any reference is to be made to any particular register and it is not available, then no further work can be done.

While modifying a record, the person will have to first search the record and then make changes of that particular record in every related register.

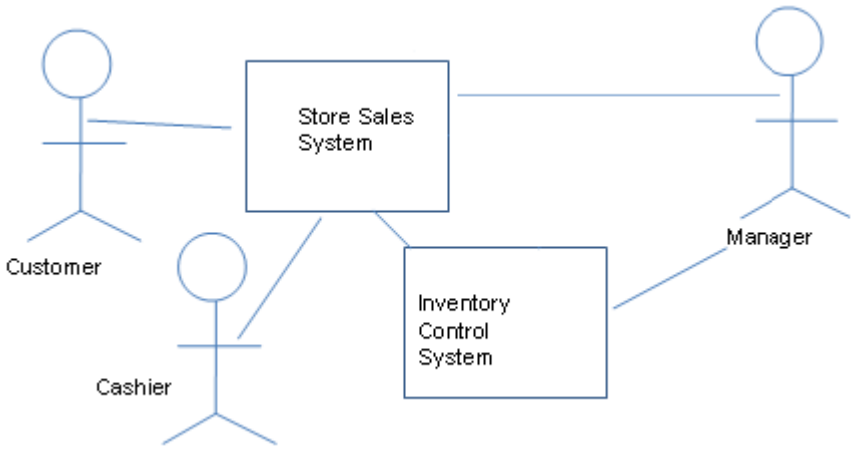


Figure - Existing System

Feasibility Study:

Feasibility study is the measure of how beneficial or practical the development of an information system will be to an organization. The Feasibility analysis is a cross life cycle activity and should be continuously performed throughout the system life cycle.
Feasibility tests;

Operational feasibility:

By automating the book shop both the customers and employees will feel better than when it was manual. Users will get a very quick service by reducing the manual recordings. Also employees will feel comfortable by reduction of their work. Recording errors will be reduced. Easy to handle a large database. Losing of records will be avoided.
Considering all these factors we can conclude that all the users and end users will be satisfied by the system.

Technical feasibility:

For the design and development of the system, several software products have been accommodated.
· Database design – MySql, or any free DBMS.
· Interface design – .NET Framework.
· Coding – C# or any other supported Language.
This software's have the enough efficiency in producing the system. Therefore the project is technically feasible.

Schedule feasibility:

The duration of time required for the project has been planned appropriately and it is the same as the duration of time expected by the customer. Therefore the product can be delivered to the customer within the expected time duration, satisfying the customer. Hence the project is feasible in scheduling.

Economic feasibility:

According to the resources available and the project scheduling process it is estimated that the expenses allocated for the software to be developed, by the customer is sufficient enough. Hence the economical factor has been considered feasible.

Requirement Specification:

From discussion with various bookshop owners various requirements are arrived at:

Book shop automation system (BAS):

- BAS should help the customers query whether a book in a stock the user can query the availability of a book either by using the book title or by using the name of author.
- If the book is not currently sold by the bookshop, then the customer is asked to enter the full detail of the book for procurement of the book by the bookshop.
- The customer can also provide his e-mail address and mobile, so that he can be intimated automatically by the software as and when the book copy received.
- If a book in stock, the exact number of copies available and the rack number in which the book is located should be displayed.
- If a book not in the stock, the query for the book is used to increment a request field for the book.
- The manager can periodically view the request field of the book arrive at a rough estimate regarding the current demand for different books.
- BAS should maintain the price of various books.
- As soon as customer selects his book for purchase, the sale clerk would enter the ISBN number of the books. BAS should update the stock and generate the sales receipt for the book.
- BAS should allow employees to update inventory whenever new supply arrives. Also upon request by the owner of book shop.
- BAS should generate sales statistics (viz, book name, publisher, ISBN number, number of copies sold and the sales revenue) for any period.
- The sales statistics will help the owner to know the exact business done over any period of time and also determine the inventory level required for various books.
- The inventory level required for a book is equal to the number of copies of the book sold over a period of one week multiplied by the average number of weeks it takes to procure the book from its publisher.
- Everyday the bookshop owner would give a command for BAS to print the book which have fallen below the threshold and the number of copies to be procured along with the full address of the publisher.

Interface Requirements:

User Interfaces

The system users are:-

- The book shop management as the system administrators.
- Book shop cashiers as the normal users.

System administrators

The administrator logs on to the system by inserting administrator user name and password. Administrator can do any transaction as well as editing all details inside the database such as adding, editing and deleting a new user or adding, editing and deleting items.

System users

System users are the ones who at the cashier and do transactions with customers. The users have to enter the user name and password and click on 'Login' button. If user makes any mistake the system will ask for the correct username and password until he enters the correct one.

When the user wants to do any transaction user has to click on the menu icon on the main menu. Then the transaction window will open. User has to enter the Book No and press enter. Then user has to select the transaction type and the quantity. Then click on the update button. Then the system will automatically update the database according to the transaction type. Hardware Interfaces

The Book Shop System is having the following hardware:

- Book shop main computer
- Other pc's

Software Interfaces

- System will interact with the system database to record all transaction data.

Performance Requirements:

- The response time for menu changes will be not more than 3 seconds.
- The time for search for a book will not more than 3 seconds.
- The time to print the stock valuation will not be more than 3 seconds.
- The time taken to update the database or get information from the database will not be more than 2 seconds.
- The time taken to prompt message boxes will not more than 2 seconds.

Design Constraints:

- The system is based on menu driven interfaces. Menu selection will be done by using the mouse and the key board keys.
- Confirmation messages on taken actions, input acceptance and error conditions will be displayed after each input.
- Error messages will be displayed at the time of detection of input errors and the system errors.

Attributes:

Qualities of the product

Reliability - The system is thoroughly tested at the time of delivery so that computational errors are minimized.

Maintainability - To make ease of maintain the system to the Book shop administrators the user manual and the system manual is provided at the delivery. Each module is designed independently so that at any change of a request can be modified easily.

Security - Only the administrators have the authority to edit details in Users and Items tables. No one can enter the system without a username and a password. Normal system users cannot access the Administrators login. All deleting actions are notified by a message box asking to confirm deletion.

Challenges:

- It was a difficult task to convince the staff members and the management about the new technologies that are going to use in the proposed system and it was difficult to win over them.

- It was difficult to get the confirmation and the approval for the cost estimation for the proposed system form the top management.

- It was a time consuming task to make the staff members convince about the proposed system and make the cashiers at the counter sure about that they will not lose their jobs because of the system.

- It was time consuming to collect the relevant information form the users due to the busy environment in the company.

- There was resistance from the cashiers for the system due to the fear of losing their jobs and had to face this challenge also during that period.

Problems are solved by system:

Here our main goal is that we are just solving the problem of selling of book in the particular very big book shop which have large amount of books within it. Since there are many people would be in the shop to provide the good service to the customers of the book shop. But it is not possible to provide the good service to the customers because it is not possible by the manually. There are the some problems which may be solving by our application. Which are as follows:-

- **Fast service: -** In the sense of fast service by this we can give the fast service (entertain, selling, purchasing, money deposits etc.) to the customers of the shop.

- **Reduces the workload: -** in the sense of workload reduction that means all the tasks are done by the automated system/machine which give the rest to the shop owner.

- **Good management: -** in the sense of good management our system provide the good management in the book keeping and provide the good scheduling in the all the operations of the book shop.

- **Provide the satisfaction to the customers: -** In the sense of satisfaction of the customer, because customer is doing its all operations with the system on his requirements and he is completely satisfied because our system is fulfils its all requirements.

- **Able to do all type of money transactions: -** we are developing the type system which is able to do all type of money transactions (debit & credit cards and internet banking etc.)

- **Remove the complexity in the operations: -** our system is providing the real life features to providing the service since the user of the system in not feel the complexity in its operations.

- **Provide the long term relationship with the customers: -** our system is providing the long term relationship with the customers which are more important for the good future benefits of the shop.

- **Provide the flexibility in the purchasing in the books: -** it provides the very easy way to purchase the book from the book shop.

- **Networking:-**It covers the maximum space through its network for its service at any time and any where.

Characteristics of the entities are used to solve the problem:

Here we are use the big one entity which is our computer system. Which is use to run our project in the network environment. So we are use all the characteristics of the computer system to solve the problem all the problems which are occurs in book shops operations. There are the some characteristics which are as follows:-

- **Fast accessibility: -** by any computer system we can got the fast access for our operations. Which are take the more time in the manually form.

- **Multitasking: -** by this character we can perform the more than on task at single time.

- **Storage space and Management: -** by this character we have the large space to have all the records which are completely safe and sound in compare to the manually management.

- **Portability: -** by this we can remove the problem of state of the customer that means customer can access all the operations from any place on its facility.

- **Mobility: -** by this we can remove the problem of specific place and time. Which is always needed in manually system? Because our project is able to survive in the network environment.

- **User Friendly Environment: –** Graphical user interface is used for easy handling of the system. A user can use the system efficiently without meeting any difficulty.

- **User Satisfaction: -** Under consideration according user requirement and expectation, the system is developed.

- **Security: -** System is secure in itself by checking the illegal access of invalid users. System is also capable to input some security checks at certain points

- **Quick Response: -** As the processing time of any task is minimized therefore the user gets the quick response of his/her queries even though there is a huge amount of data.

- **Robust Error Handling: -** The errors and undesirable situation, generated through the user intervention, are handled successfully to ensure that the system operates without halting by providing the appropriate error messages to the user.

- **Accuracy: -** All the processes provided by the system are accurate thus increase the reliability.

General Characteristics:

Introduction:

This section introduces the software and includes the characteristics and the constraints effecting the product and requirements.

Product Perspective:

Product Function:

The Book Shop System will perform following functions:

- User Identification
- Select service
- Record purchases
- Record sales
- Search for existing books
- Calculate budget
- Prepare stock evaluation
- Display stock details

User Characteristics:

- The users (Book shop officers) should have a basic computer literacy to work with a computer.
- The users of this software should be well trained and should given the relevant user documentation, reference materials and instructions.
- The user should be able to follow simple instructions given by the system.

General Constraints:

The following are the general design constraints

- Data encoding scheme: ASCII character.
- Total available memory for programming, logic, tables etc as specified in this document should not be exceeded.

Assumptions and Dependencies:

- The bookshop's database is accessible in real time
- The bookshop's database will be modified to identify accounts.

System Design:

Procedural design:

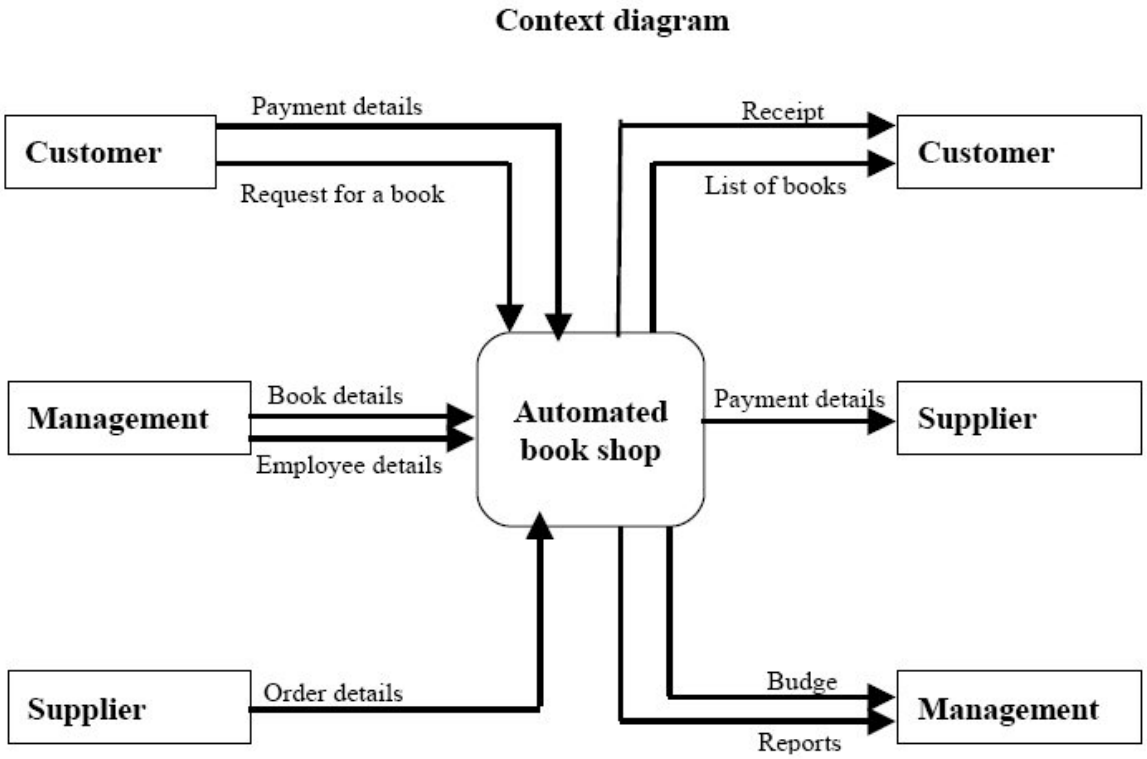


Figure – Context Diagram of System

Detail Data Flow Diagram (DFD):

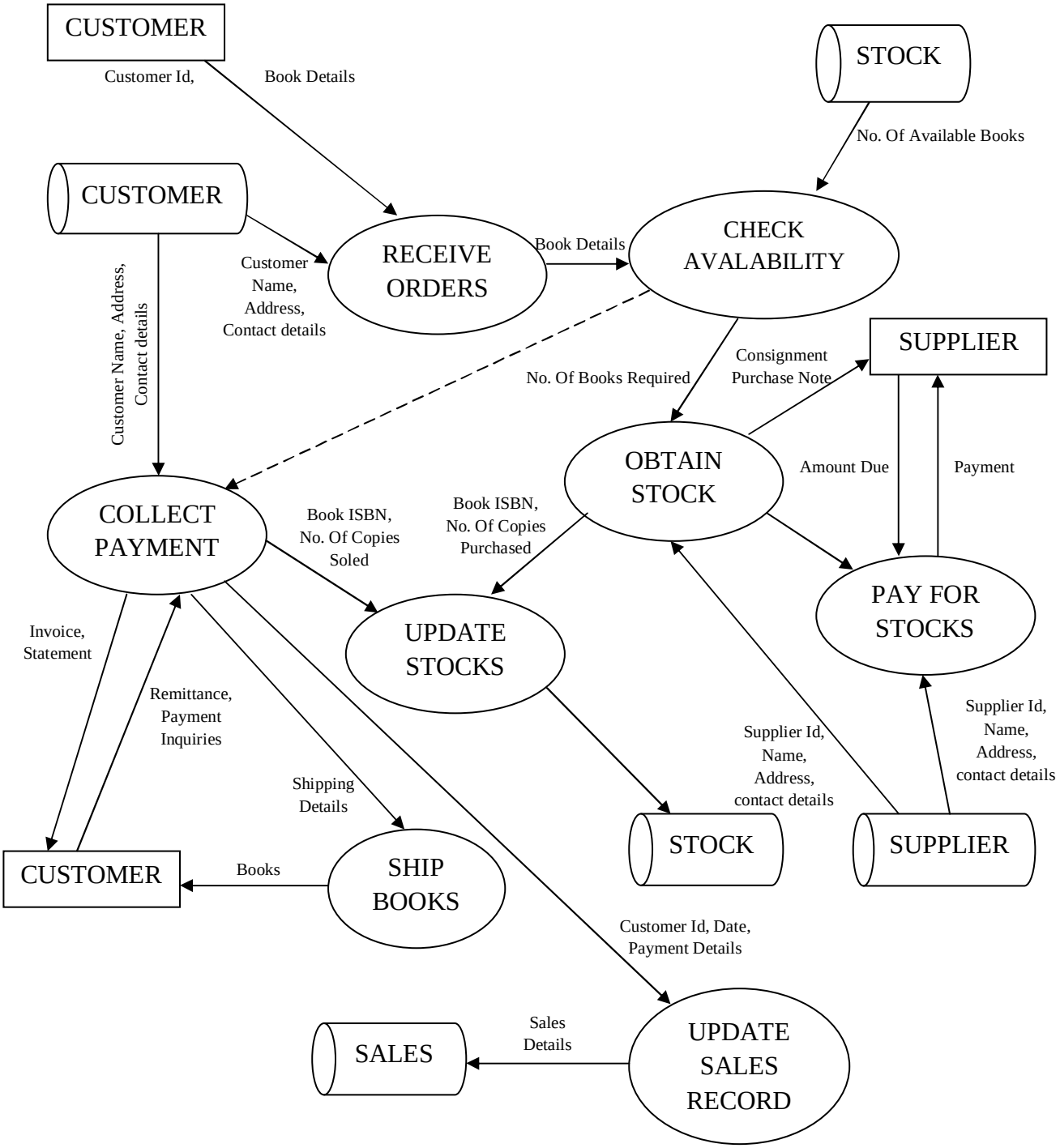


Figure – Detail DFD for Selling and Purchasing of Books

Use Case Diagram for Entire System:

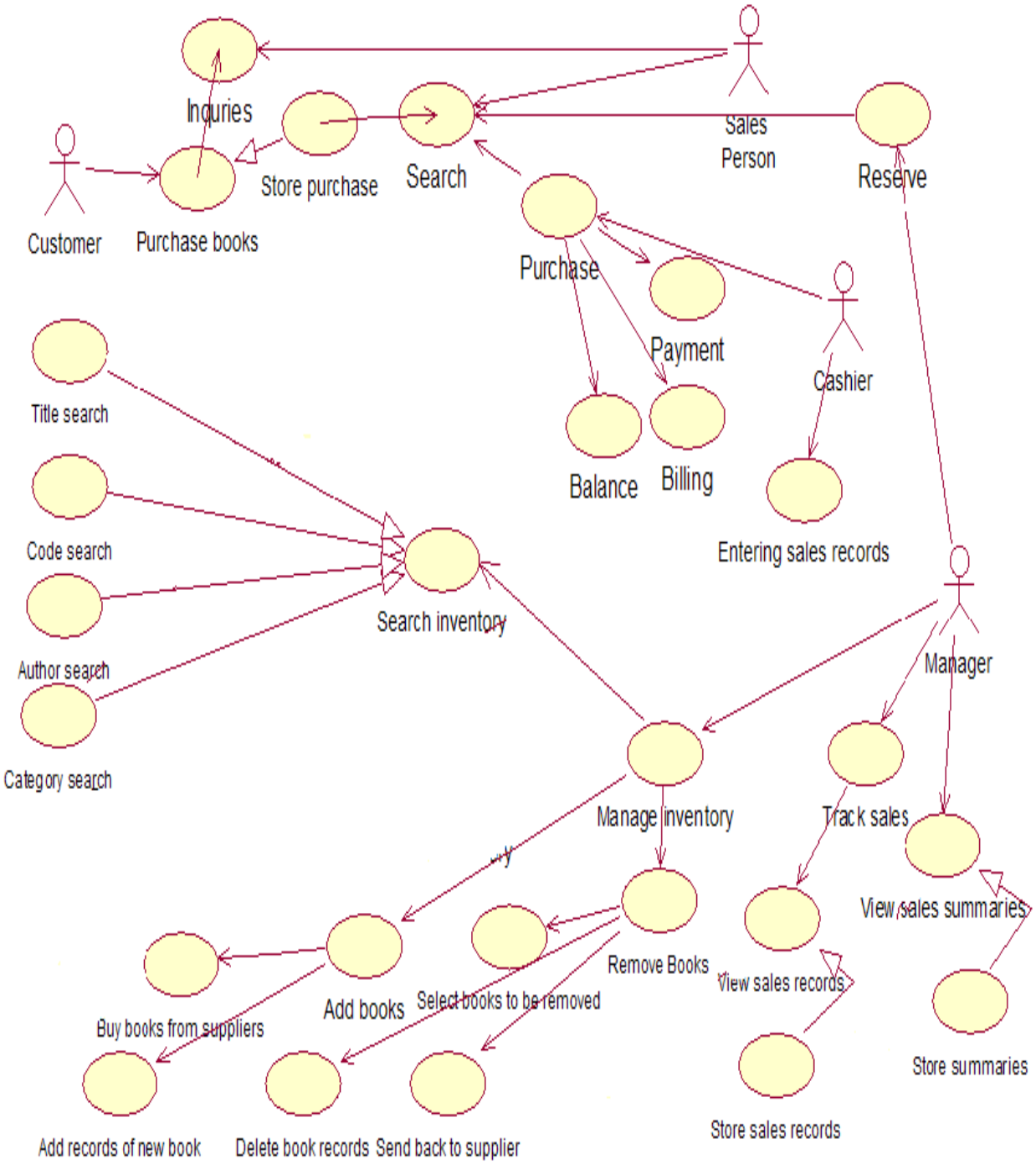


Figure – Use Case Diagram for Entire System

Use Case Diagram for Computerized Parts of the System:

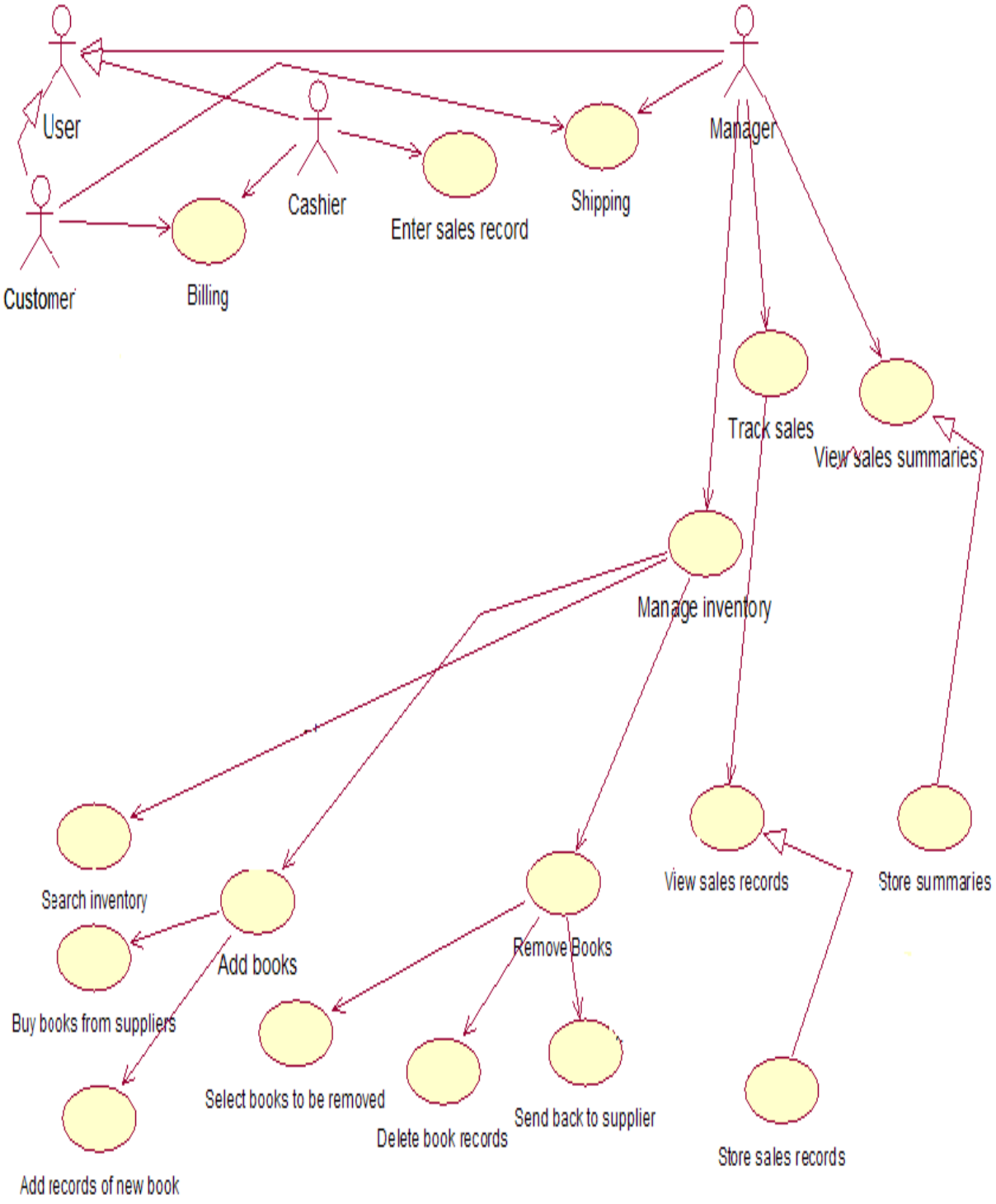


Figure - Use Case Diagram for Computerized Parts of the System

Class Diagram for Entire System:

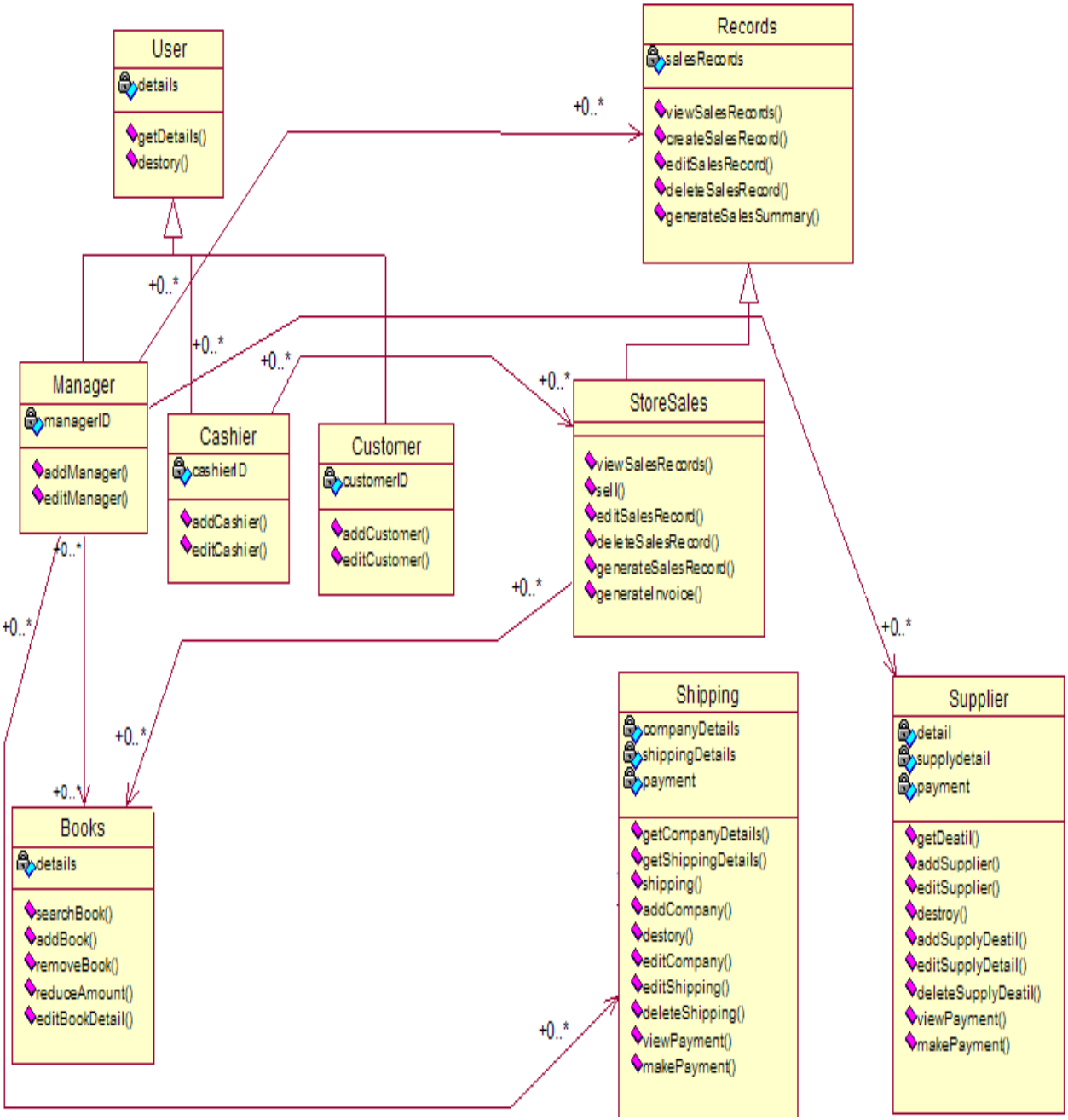


Figure - Class Diagram for Entire System

Searching Books and Reservation – Sequence Diagram:

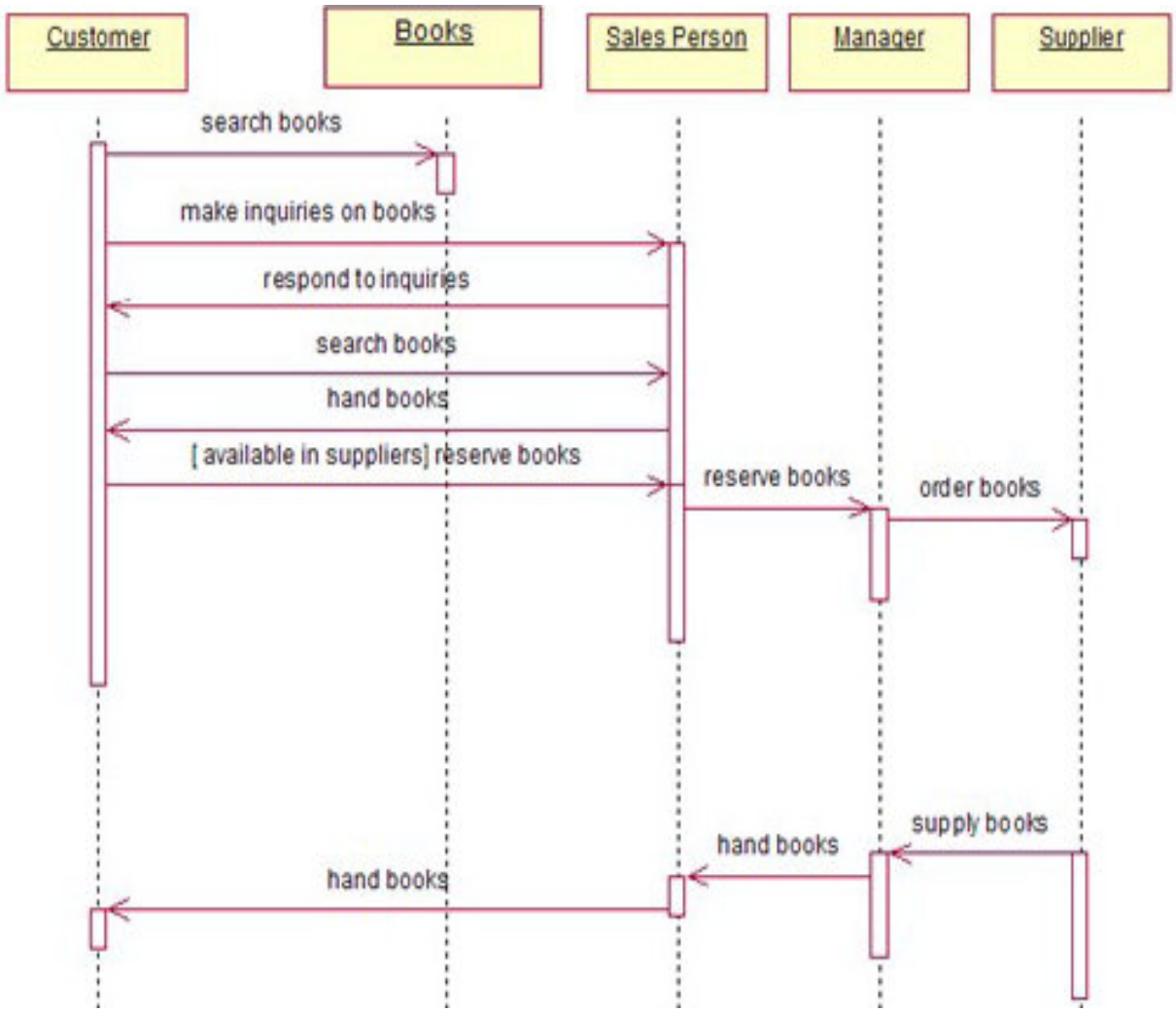


Figure - Searching Books and Reservation – Sequence Diagram

Searching Books and Reservation – Activity Diagram:

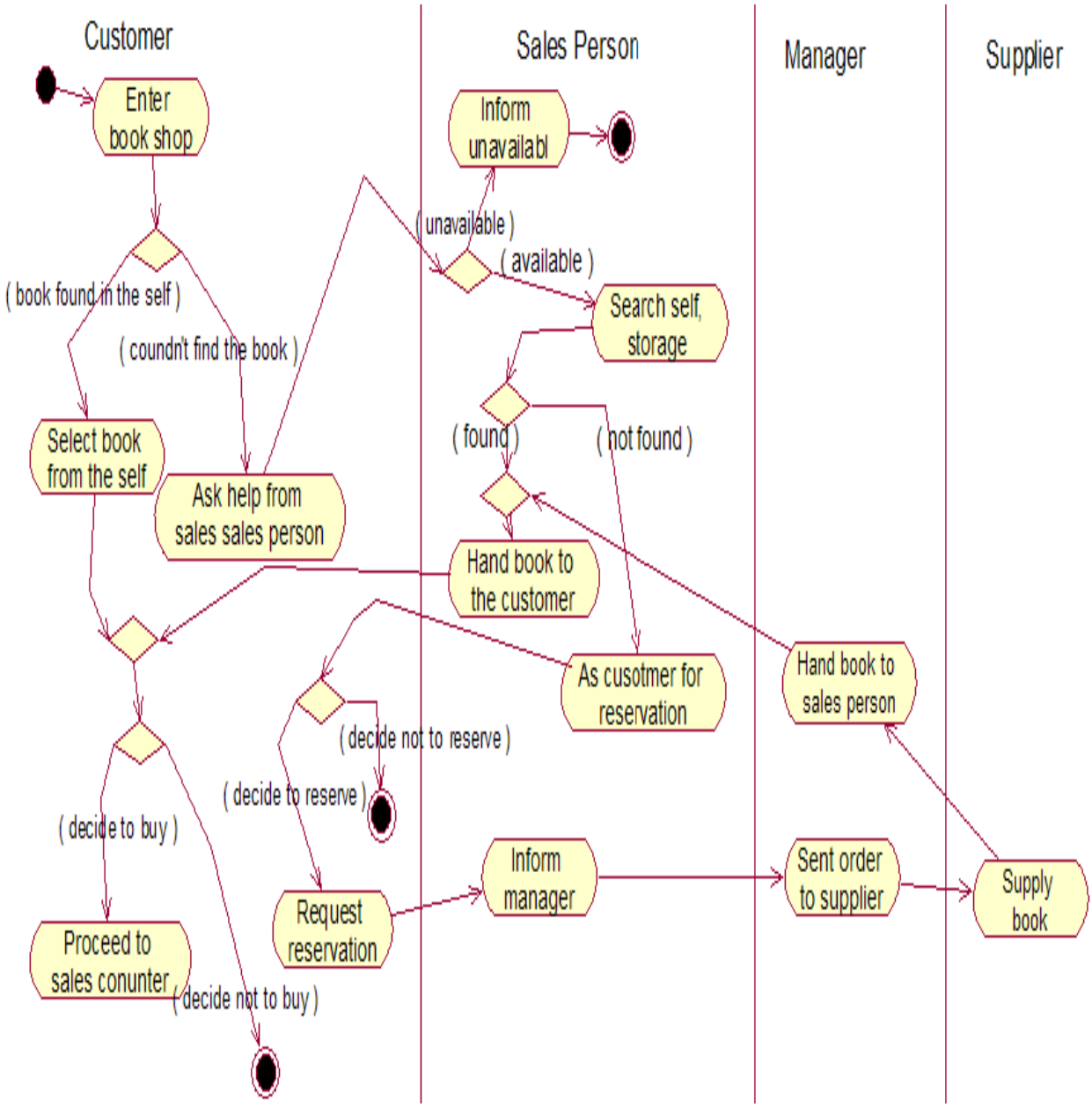
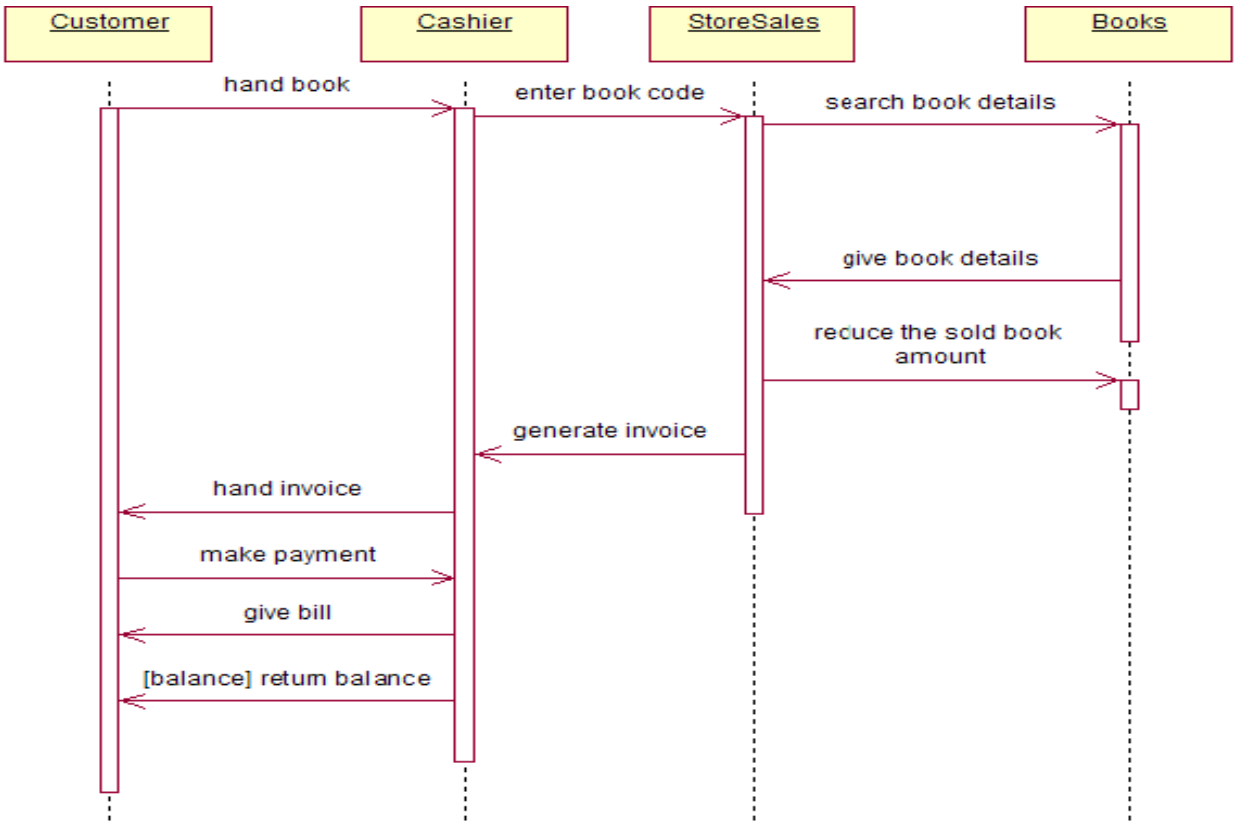
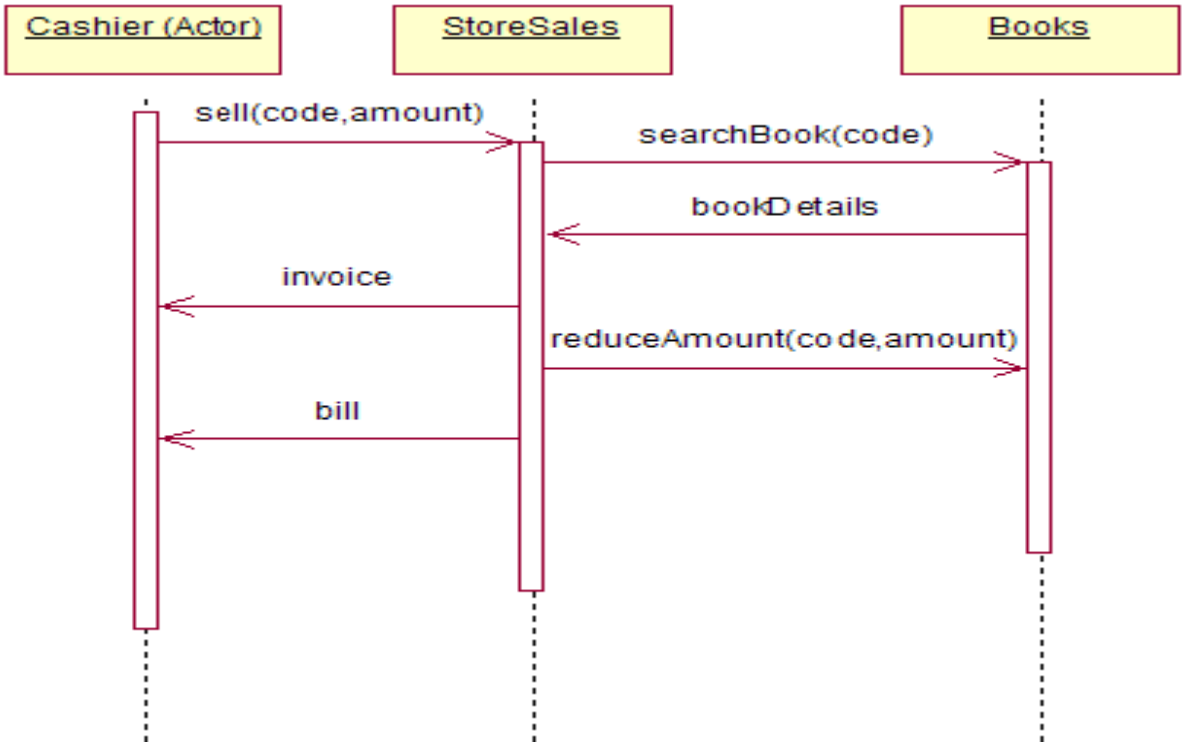


Figure - Searching Books and Reservation – Activity Diagram

Store Sales Sequence Diagram:



Store Sales – Computerized Part - Sequence Diagram:



Store Sales – Activity Diagram:

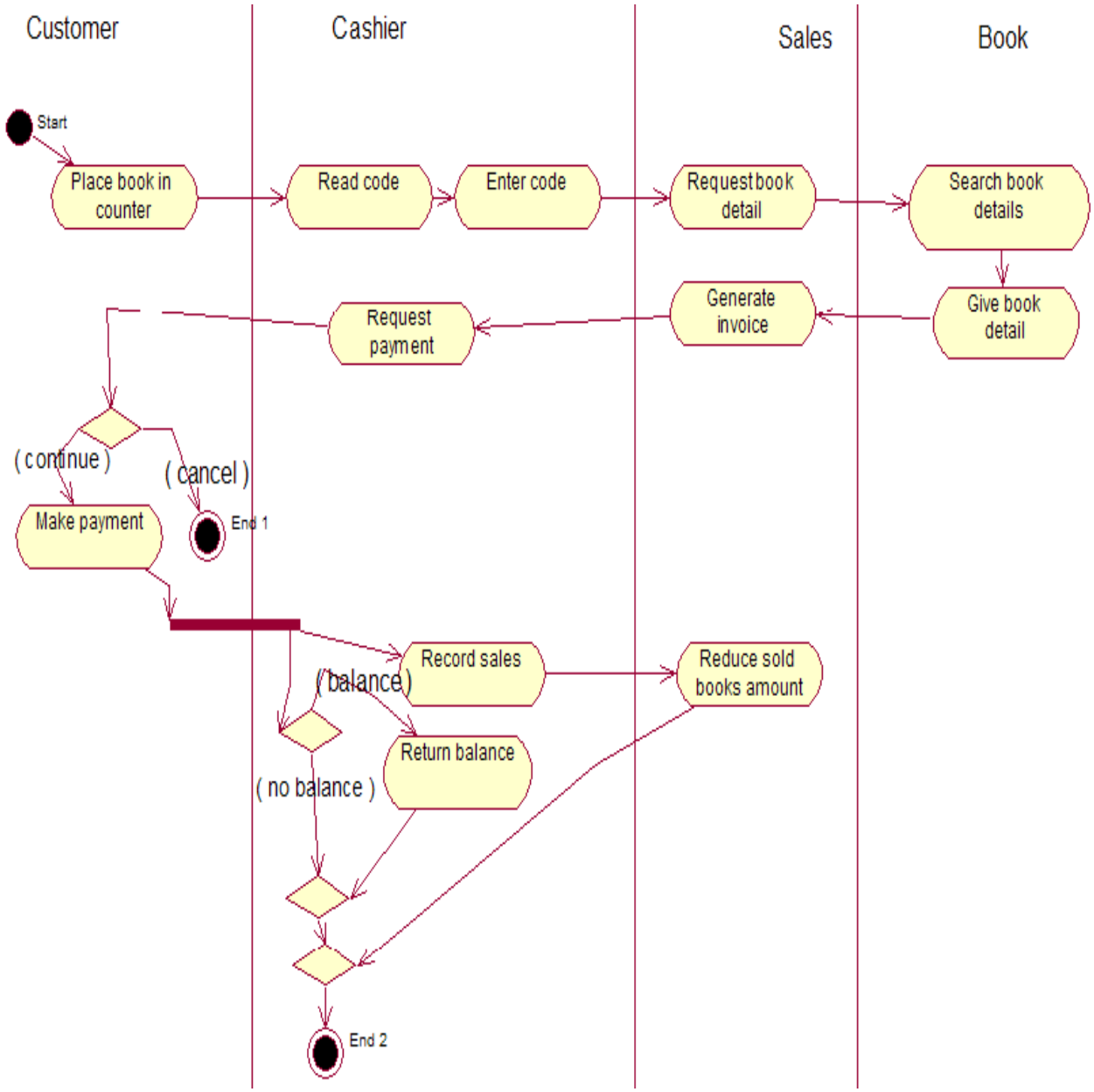
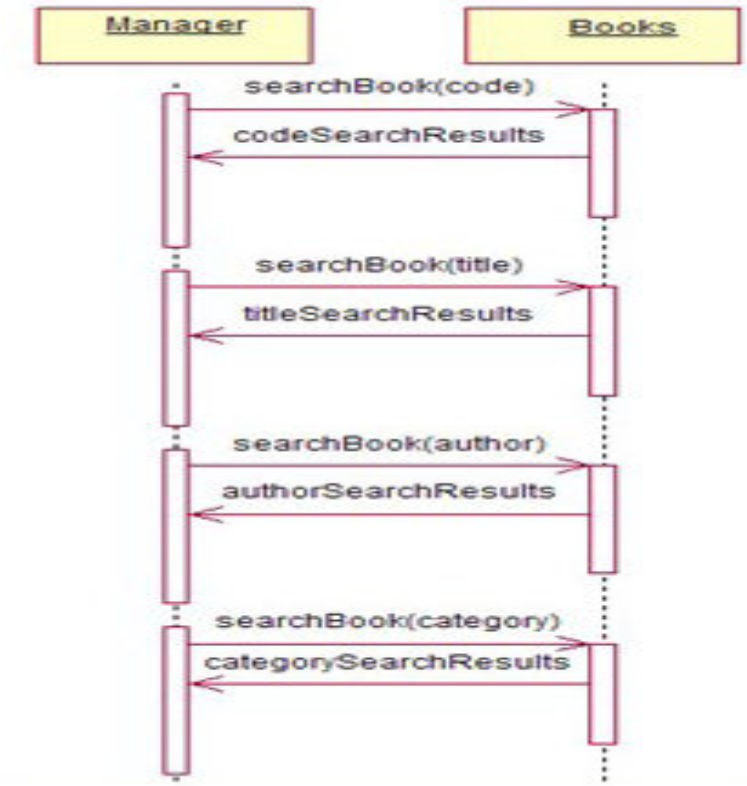


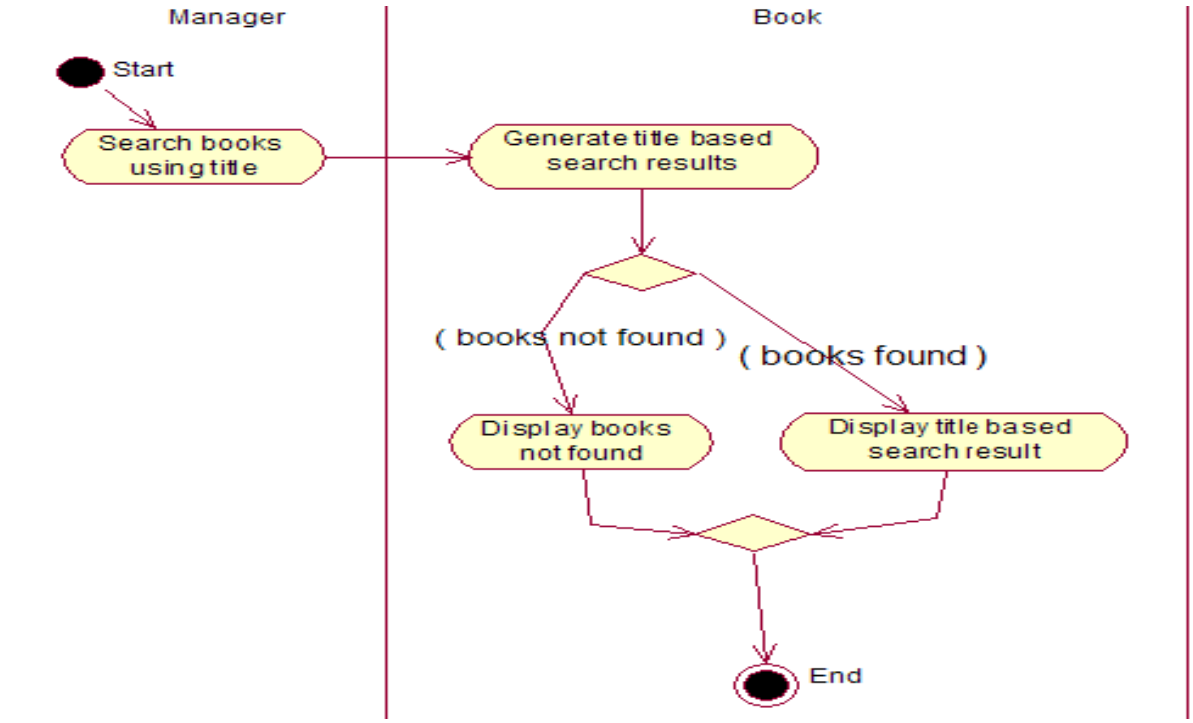
Figure - Store Sales – Activity Diagram

Inventory Management - Search Books:

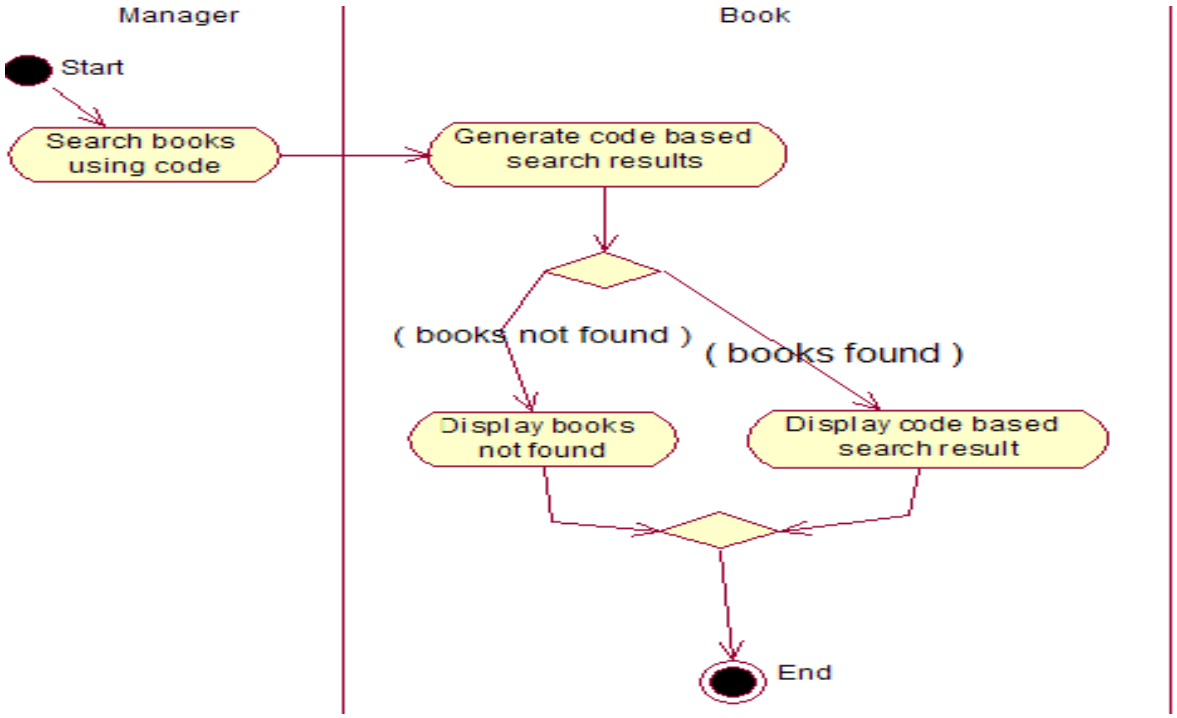


Inventory Management - Search Books – Activity Diagram:

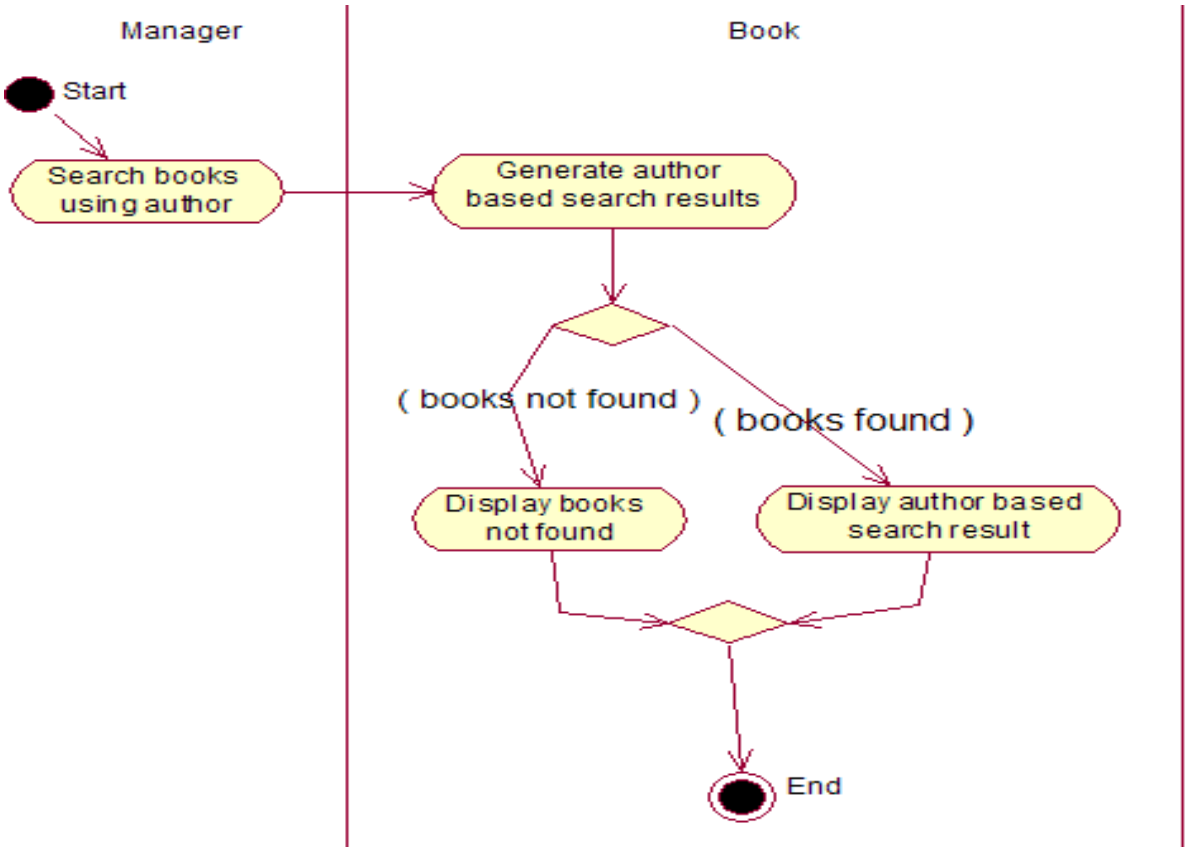
Tile based search:



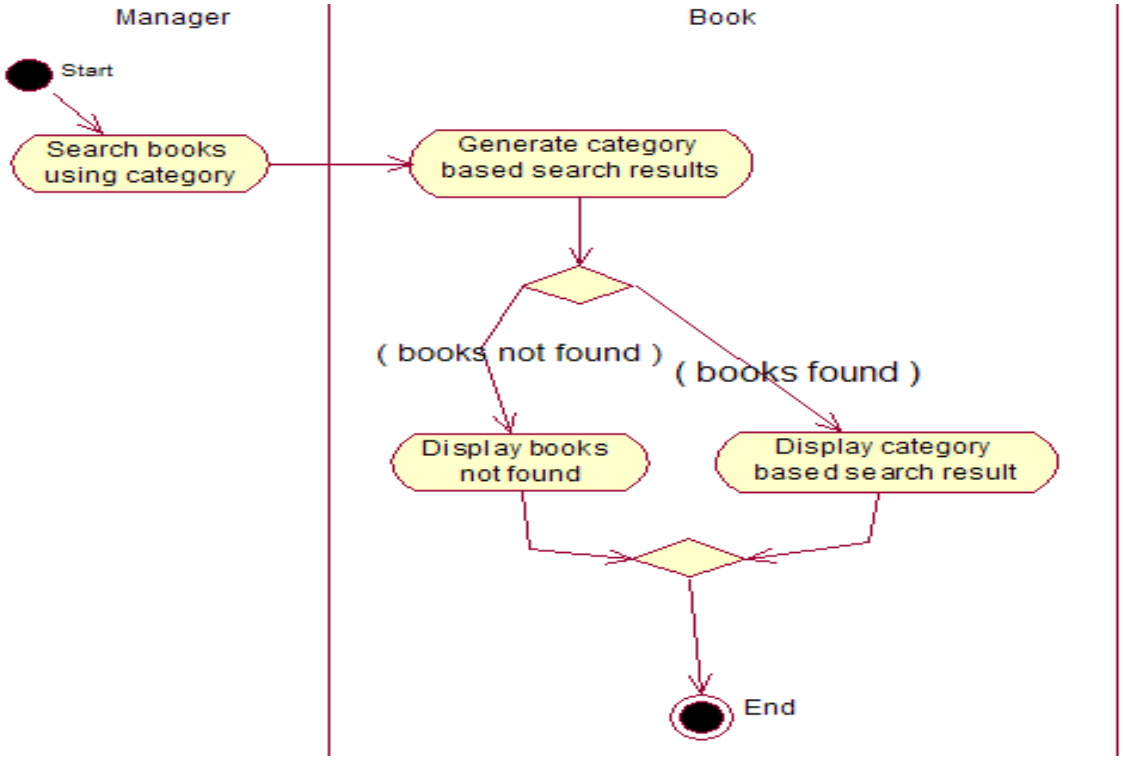
Code based search:



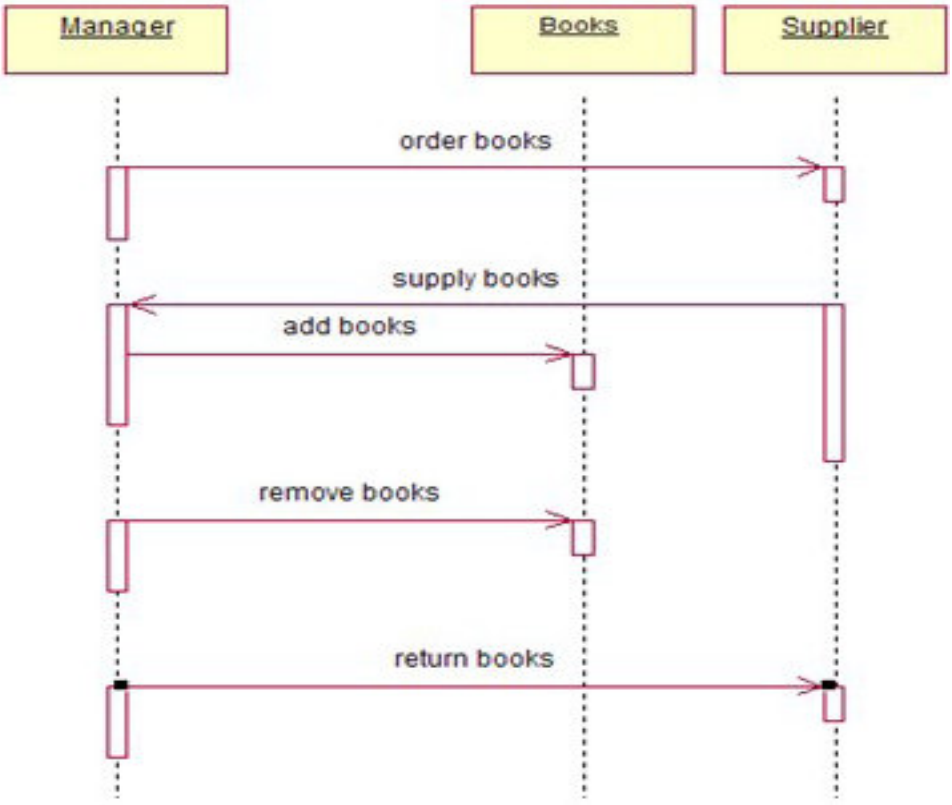
Author based search:



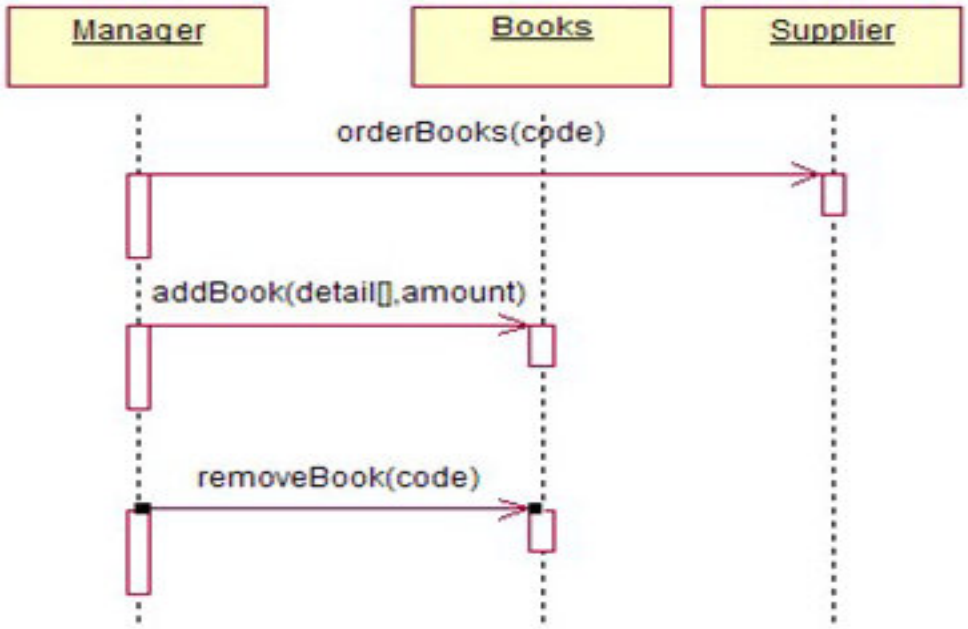
Category based search:



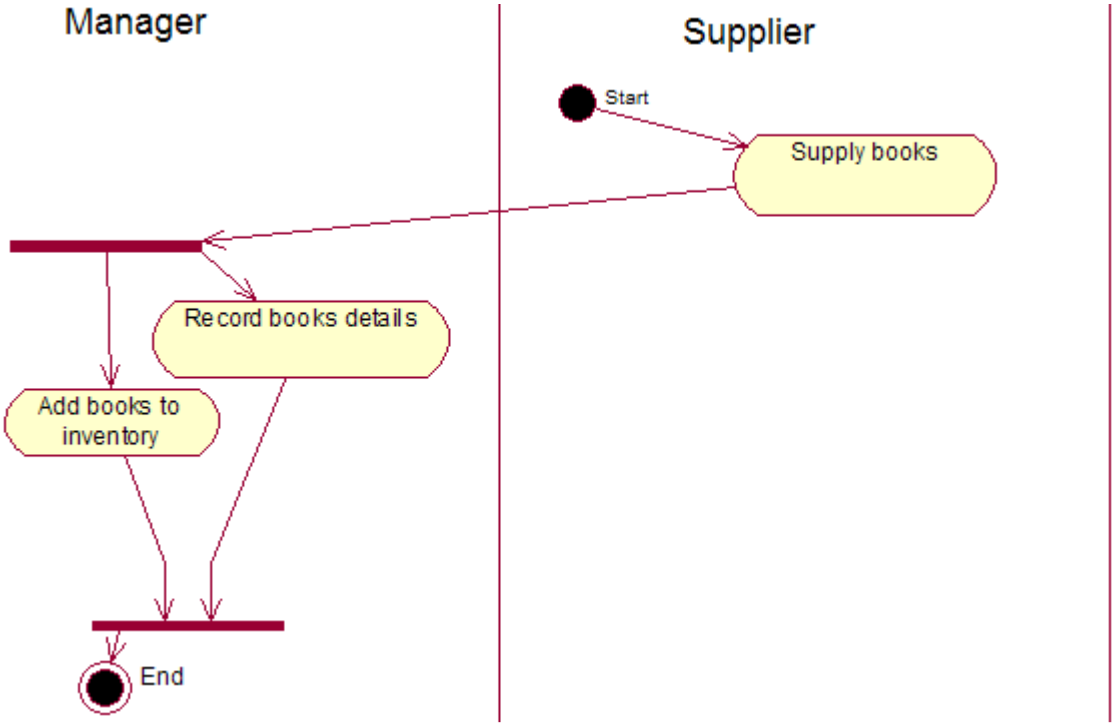
Inventory Management - Add and Remove Books - Sequence Diagram:



Inventory Management - Computerized Part-Add and Remove Books -Sequence Diagram:



Adding Books to Inventory:



Removing Books from Inventory:

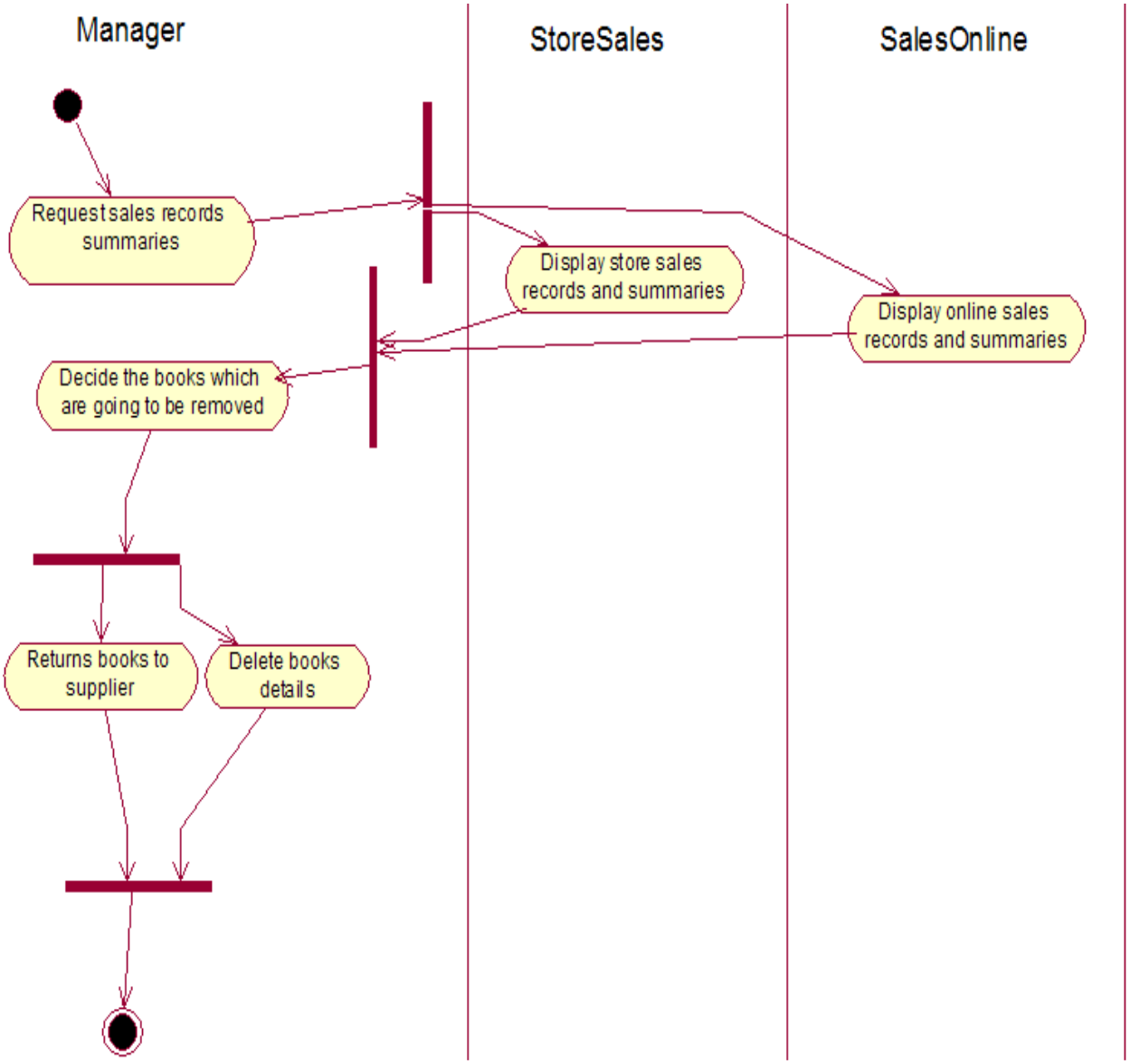


Figure - Removing Books from Inventory

Inventory Management - Viewing Sales Records and Sales Summary – Sequence Diagram

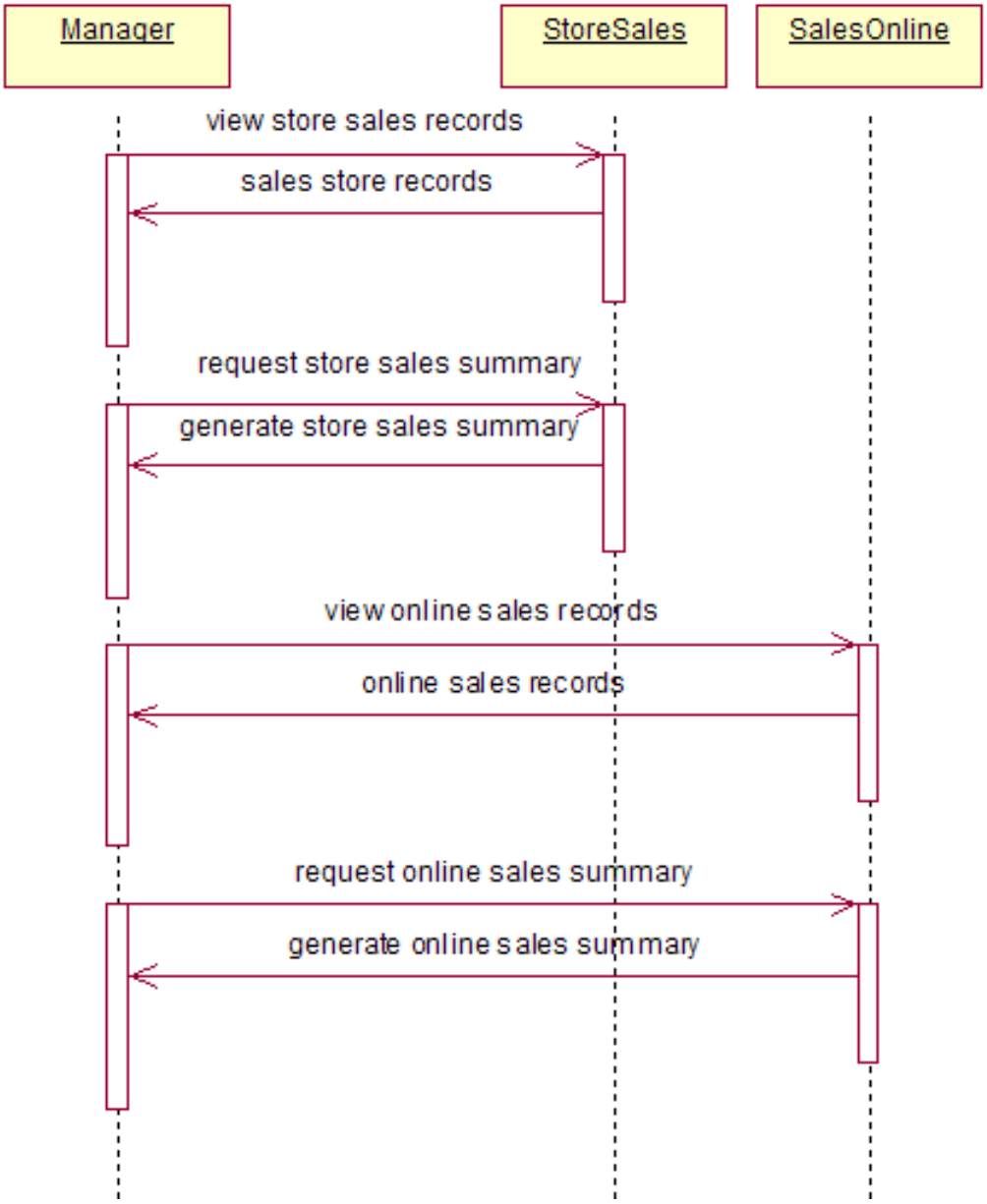


Figure - Inventory Management - Viewing Sales Records and Sales Summary – Sequence Diagram

Inventory Management - Computerized Part - Viewing Sales Records and Sales Summary - Sequence Diagram:

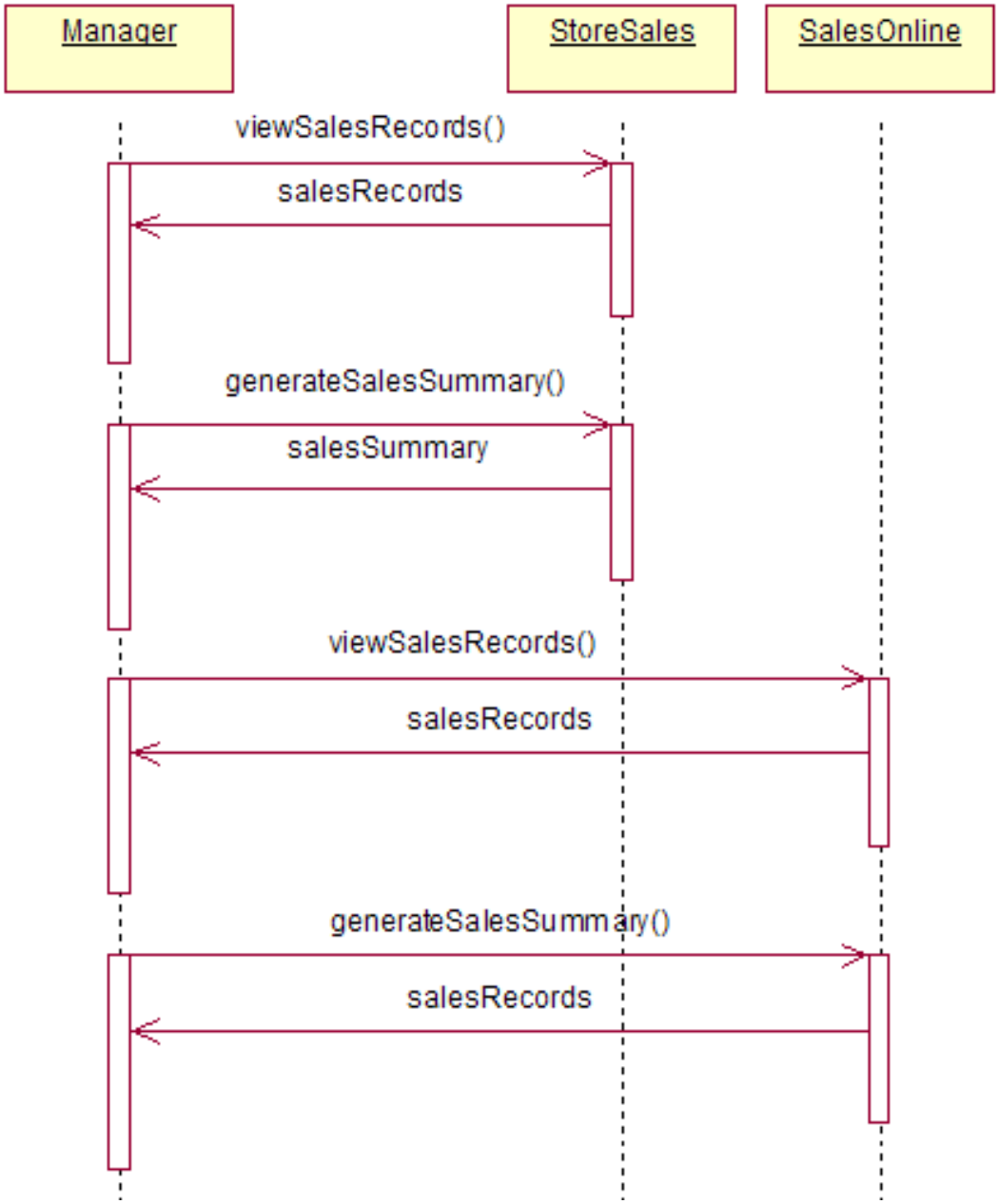


Figure - Inventory Management - Computerized Part - Viewing Sales Records and Sales Summary - Sequence Diagram

Database design: The database contains following tables

Books Table:

Field Name	Data Type	Description
Book_ISBN	Varchar	Primary Key(Book Id or Code)
Book_Name	Varchar	
Author	Varchar	
Price	Varchar	
Edition	Varchar	
Publisher	Varchar	
Category	Varchar	
No_Of_Copies	Number	
E.O.Q	Number	
Store_Location	Varchar	

User Table:

Field Name	Data Type	Description
User_Id	Varchar	Primary Key
Login_Id	Varchar	
Password	Varchar	
Role	Varchar	
Address	Varchar	
Contact_No.	Varchar	
Email_Id	Varchar	

Customer Table:

Field Name	Data Type	Description
Customer_Id	Varchar	Primary Key
Cutomer_Name	Varchar	
Address	Varchar	
Contact_No	Varchar	
Email_Id	Varchar	
Type		

Supplier Table:

Field Name	Data Type	Description
Supplier_Id	Varchar	Primary Key
Supplier_Name	Varchar	
Address	Varchar	
Contact_No.	Varchar	
Email_Id	Varchar	
Publication	Varchar	

Sales Table:

Field Name	Data Type	Description
Sale_Id	Varchar	Primary Key
Customer_Id	Varchar	Foreign Key to Customer Table
Invoice_No	Varchar	
Date	DateTime	
Amount_to_Pay	Number	
Amount_Paid	Number	
Balance	Number	

Sales-Record Table:

Field Name	Data Type	Description
Sale_Id	Varchar	Foreign Key to Sales Table
Book_ISBN	Varchar	Foreign Key to Book Table
No_of_Copies	Number	
Price	Number	
Discount	Number	
Amount_to_ Pay	Number	

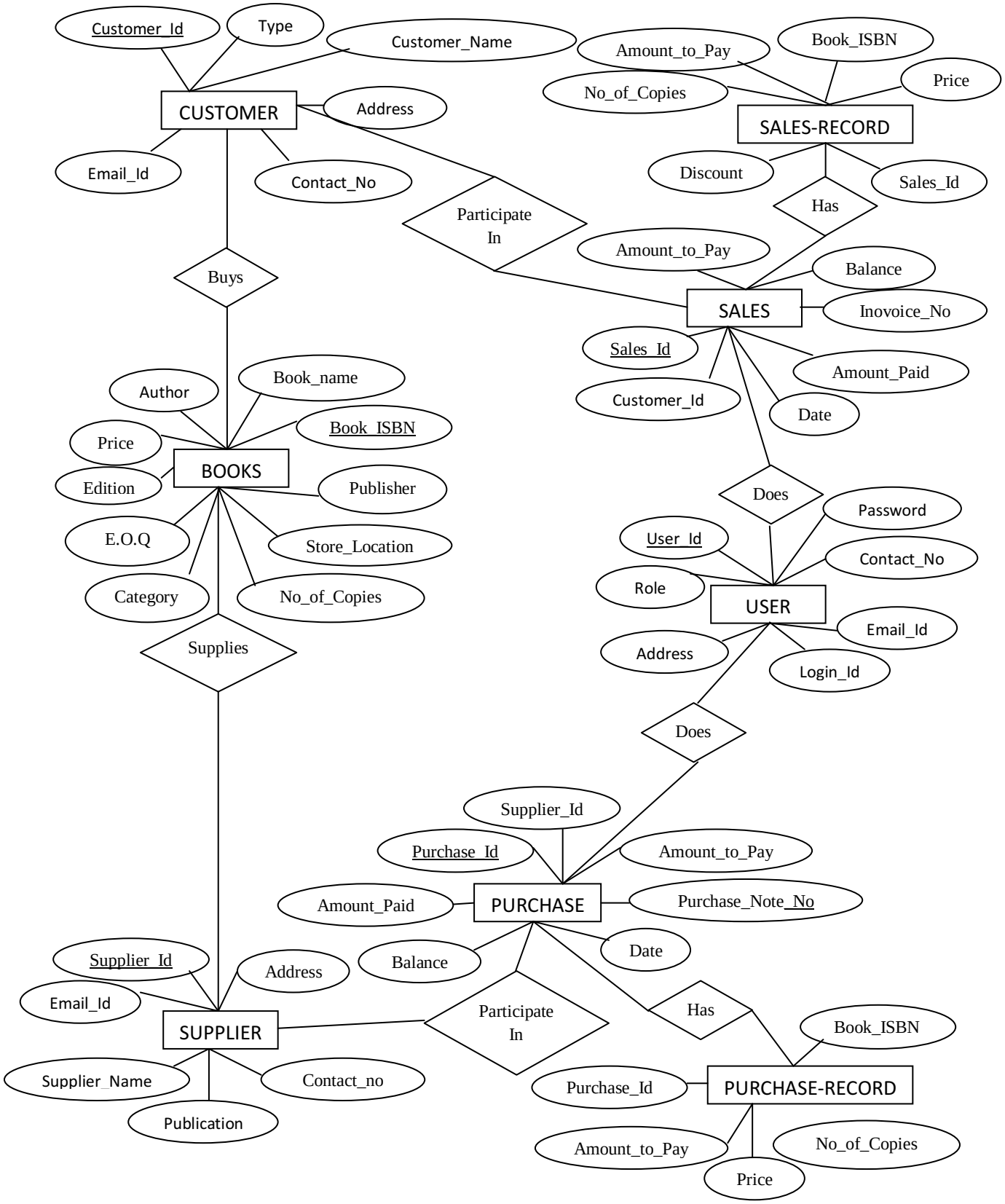
Purchase Table:

Field Name	Data Type	Description
Purchase_Id	Varchar	Primary Key
Supplier_Id	Varchar	Foreign Key to Supplier Table
Purchase_Note_No.	Varchar	
Date	DateTime	
Amount_to_Pay	Number	
Amount_Paid	Number	
Balance	Number	

Purchase-Record Table:

Field Name	Data Type	Description
Purchase_Id	Varchar	Foreign Key to Sales Table
Book_ISBN	Varchar	Foreign Key to Book Table
No_of_copies	Number	
Price	Number	
Amount_to_ Pay	Number	

Entity – Relationship Diagram:



Conclusion:

This Bookshop Automation System is an attempt to overcome the present inefficient and time consuming process of locating, reserving and purchasing quality reading materials available in the store. Currently, clients have to go through a time consuming process to perform aforementioned tasks which cause waste of labor and firms resources. Through our automated book store solution, we provide an easy way of searching, reserving and purchasing of books.

User data are validated and checked for authenticity with the data stored in the system database. All the newly coined processes will address time consuming, ineffective and inefficient areas of the existing system which has being wasting a lot of firms resources such as, labor, electricity, equipment, products and services, while discouraging customers to make purchases and repelling clients from the book store.

Proposed system will support both clients and the store in many areas. It's worth analyzing and identifying the benefits as it would directly influence the productivity of the store.

Customer satisfaction plays the most vital role in any form of product and service rendering store as the existence of any firm solely depends on its customer-base. Therefore, every system should facilitate the customer satisfaction up to a certain extent which is feasible from the company perspective.

The aforementioned facts ensure customer satisfaction to a greater extent benefiting the store in:

- Retaining current customers
- Tempting current customers to attract their friends to the store
- Attracting new customers
- Enhancing the customer faith on the firm due to secure transaction techniques while temping customers to make more online purchases
- Identifying profitable customers
- Identifying different categories of customers
- Making necessary alterations and plans to address broader range of customers
- Identifying key areas of the inventory which need to be maintained at a healthy stock limit
- Analyzing trends to make more effective management decisions and
- development of new strategies to increase profit

These particulars will make sure the broadening the customer base of the store which will have good impact on the sales and revenue of the store.

Employee satisfaction also plays an influential role in healthy revenue levels of a firm. Due to the proposed system, employees will have to handle minimum amount of workload than that of the existing system which will help the employees to provide optimal service to the firm while maintaining healthy physical and mental levels.

Proposed system will reduce transaction and agency cost of the store up to a certain extent since the transactions are automated and need of minimal labor to handle work as the their work has been governed by the system.

Even though these advantages prevail, due to lack of IT literacy and fluency of clients and lack of distribution of internet facility will have a negative impact and it will take some time to cover up the capital investment made on implementing the new system. Since the technical facilities are expanding in great heaps, proposed system will facilitate enhancing productivity immensely.

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