"DIGITAL PAYMENTS BOOK"

A

Project Report

submitted

in partial fulfillment

for the award of the Degree of

Bachelor of Technology

in Department of Information Technology

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Assistant Professor, IT

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Swami Keshvanand Institute of Technology, M & G, Jaipur
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Session 2022-2023

Swami Keshvanand Institute of Technology, Management & Gramothan, Jaipur

Department of Information Technology

CERTIFICATE

This is to certify that **Ms. Arpita Dubey**, a student of B.Tech (Information Technology), 8th semester has submitted her Project Report entitled **"Digital Payments Book"** under my guidance.

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Assistant Professor, IT

Signature.....

Coordinator

Mrs. Sanju Choudhary

Associate Professor, IT

Signature.....

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Management & Gramothan, Jaipur

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This is to certify that **Mr. Aryan Sharma**, a student of B.Tech (Information Technology), 8th semester has submitted his Project Report entitled **"Digital Payments Book"** under my guidance.

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DECLARATION

We hereby declare that the report of the project entitled "Digital Payments Book" is a record of an original work done by us at Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur under the mentorship of Mrs. Shalini Singhal (Dept. of Information Technology) and coordination of Mrs. Sanju Choudhary (Dept.of Information Technology). This project report has been submitted as the proof of original work for the partial fulfillment of the requirement for the award of the degree of Bachelor of Technology (B.Tech) in the Department of Information Technology.It has not been submitted anywhere else, under any other program to the best of our knowledge and belief.

Team Members **Signature**

(Arpita Dubey, 19ESKIT017)

(Aryan Sharma, 19ESKIT018)

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(Gaurav Jangid, 19ESKIT026)

Acknowledgement

A project of such a vast coverage cannot be realized without help from numerous sources and people in the organization.We take this opportunity to express our gratitude to all those who have been helping us in making this project successful.

We are highly indebted to our faculty mentor Mrs. Shalini Singhal. She has been a guide, motivator source of inspiration for us to carry out the necessary proceedings for the project to be completed successfully. We also thank our project coordinator Mrs. Sanju Choudhary for her co-operation, encouragement, valuable suggestions and critical remarks that galvanized our efforts in the right direction.

We would also like to convey our sincere thanks to Prof. Dr.Anil Choudhary, HOD, Department of Information Technology, for facilitating, motivating and supporting us during each phase of development of the project. Also, we pay our sincere gratitude to all the Faculty Members of Swami Keshvanand Institute of Technology, Management and Gramothan, Jaipur and all our Colleagues for their co-operation and support.

Last but not least we would like to thank all those who have directly or indirectly helped and cooperated in accomplishing this project.

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(Gaurav Jangid, 19ESKIT026)

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Chapter 1
Introduction

1.1 Problem Statement and Objective

Payment book application is designed to maintain customers, payments and their purchases. A retailer will be an admin of the application and each customer of the retailer's shop will be the user. Customers can create their account in the payment book app by reading and agree to the terms and conditions of the shop. Once a user created their account they can login to their account by using their own credentials, users will be able to see their purchase history, pending payments and also if the user is having any doubt or complaints they can contact the retailer by using contact us service. Admin will maintain data about purchases made by the customers can see payment details and pending payment of the customers. Admin will send alerts to the customers if there is any due for payment or payment is pending for a long time.

1.2 Literature Survey /Market Survey/Investigation and Analysis

Kevin Foster, Scott Schuh, and Hanbing Zhang (2010) they examined the consumer payment methods with respect to cash holdings and withdrawals which was decreasing since 2010.There was an increase in card payment system with respect to 2009 in the year 2010, which resulted in less usage of paper currency. Since 2010 there was an increase in usage of debit and credit card compare to cash transaction which slowly took a decline giving rise to prepaid payments.

1.3 Introduction to Project

Payment book application is designed to maintain customers, payments and their purchases. A retailer will be an admin of the application and each customer of the

retailer's shop will be the user. Customers can create their account in the payment book app by reading and agree to the terms and conditions of the shop. Once a user created their account they can login to their account by using their own credentials, users will be able to see their purchase history, pending payments and also if the user is having any doubt or complaints they can contact the retailer by using contact us service. Admin will maintain data about purchases made by the customers can see payment details and pending payment of the customers. Admin will send alerts to the customers if there is any due for payment or payment is pending for a long time.

1.4 Proposed Logic / Algorithm / Business Plan / Solution / Device

We try to develop the system which can be used by the people of all agr group. Try to develop the user interface assimple as possible. Developd all the modules which are mentioned in the problem statement.

1.5 Scope of the Project

The project Digital Payment Book Application has been developed in such a manner, that the future requirements of the user are met. The project is flexible to adapt the changes efficiently without affecting the present system. We are also planning to implement more features on the app. This is the future scope of our project. The proposed Digital Payments Book will take care of the each customer of the retailer's shop at any point of time. The pending payments, purchase history will update the current customer details automatically so that admin will get the update current customer details

Chapter 2
Software Requirement Specification

2.1 Overall Description

The implementation of Digital Payments Book starts with entering and updating master records like customer details, payment information. Any further transaction like pending payments, purchase history will automatically update the current customer details.

2.1.1 Product Perspective

2.1.1.1 User Interfaces

For the efficient working of the User Interface, i.e. the Front End of the system, the OS must be having at least Internet Explorer 8 installed. To login to the website.

2.1.1.2 Hardware Interfaces

For the hardware requirements, the SRS specifies the logical characteristics of each interface b/w the software product and the hardware components. It specifies the hardware requirements like memory restriction, cache size, processor, RAM etc. those are required for software to run.

1. **Minimum Hardware Requirements**
    - Hard Disk: 20GB and Above
    - RAM: 512MB and Above
    - Processor: Pentium III and Above
2. **Referred Hardware Requirements**
    - HDD 80 GB

- RAM: 512 MB
- Cache: 1 MB L1
- Cache 512 KB L2

2.1.1.3 Software Interfaces

1. **For Hosting** - Any Windows Operations System with DOS Support and Virtual Studio for development. Primarily Windows 8 having Dream Weaver Installed with a working LAN connection to mandatory.
2. **For Using** - Any type of operating system with a Least Internet Explorer Installed and having minimum of 521 kbps working LAN compulsorily.
3. **Web Server** - Operating System (Windows)
4. **Data Base Server** - MongoDB, Operating System (Windows)
5. **Referred Software Requirements** -
    - Front End: ReactJS
    - Back End: NodeJS, MongoDB

2.1.1.4 Operations

This software will work on all operating systems with a web browser with active internet connection.

2.1.1.5 Project Functions

1. **Administrator (Retailer) -**
    - Admin should be able to maintain data about customers purchases.
    - Can send alerts to the customers if there is any due for payment or payment is pending for a long time.
    - Increase the period for payment.

- Can get the information (status report) of any customer who has pending payment.
- Add and edit customer details and arrange customers by amount of pending payment.
- Can see payment details and pending payment of the customers.
- Can send lateness warnings to people who have exceeded deadline date.
- Can record customer details who have paid all pending payments.

2. **Users (Customer) -**

   - Customers can create their account in the payment book app by reading and agree to the terms and conditions of the shop.
   - Customers are given a provision to check their account's information.
   - Once a user created their account they can login to their account by using their own credentials.
   - Users will be able to see their purchase history, pending payments.
   - If the user is having any doubt or complaints they can contact the retailer by using contact us service.

2.1.1.6 User Characteristics

We have 2 levels of users :

1. **User module:** In the user module, user will create and login to their accounts.

   - Agree to terms and conditions
   - See purchase history
   - See pending payment
   - Contact

2. **Administration module:** The following are the sub module in the administration module :

- Register user
- Maintain data
- Send alerts

2.1.1.7 Constraints

1. GUI is only in English.
2. Login and password is used for the identification of users.
3. Limited to HTTP/HTTPS or locally during development.
4. This system is working for a single server.

2.1.1.8 Assumption and Dependencies

The success of this system depends on

1. Existence of an Internet service.
2. Admins (retailers) and Users (customers) must be comfortable with computers and have enough ability to work with the product.
3. Website interface must be friendly and easy-to-use.

Chapter 3
System Design Specification

3.1 System Architecture

This document presents the architecture as a series of views; use case view, logical view, process view and deployment view. There is no separate implementation view described in this document. These are views on an underlying Unified Modeling Language (UML) model developed using Rational Rose.

3.2 High Level Design Diagrams

3.2.1 Use Case Diagram

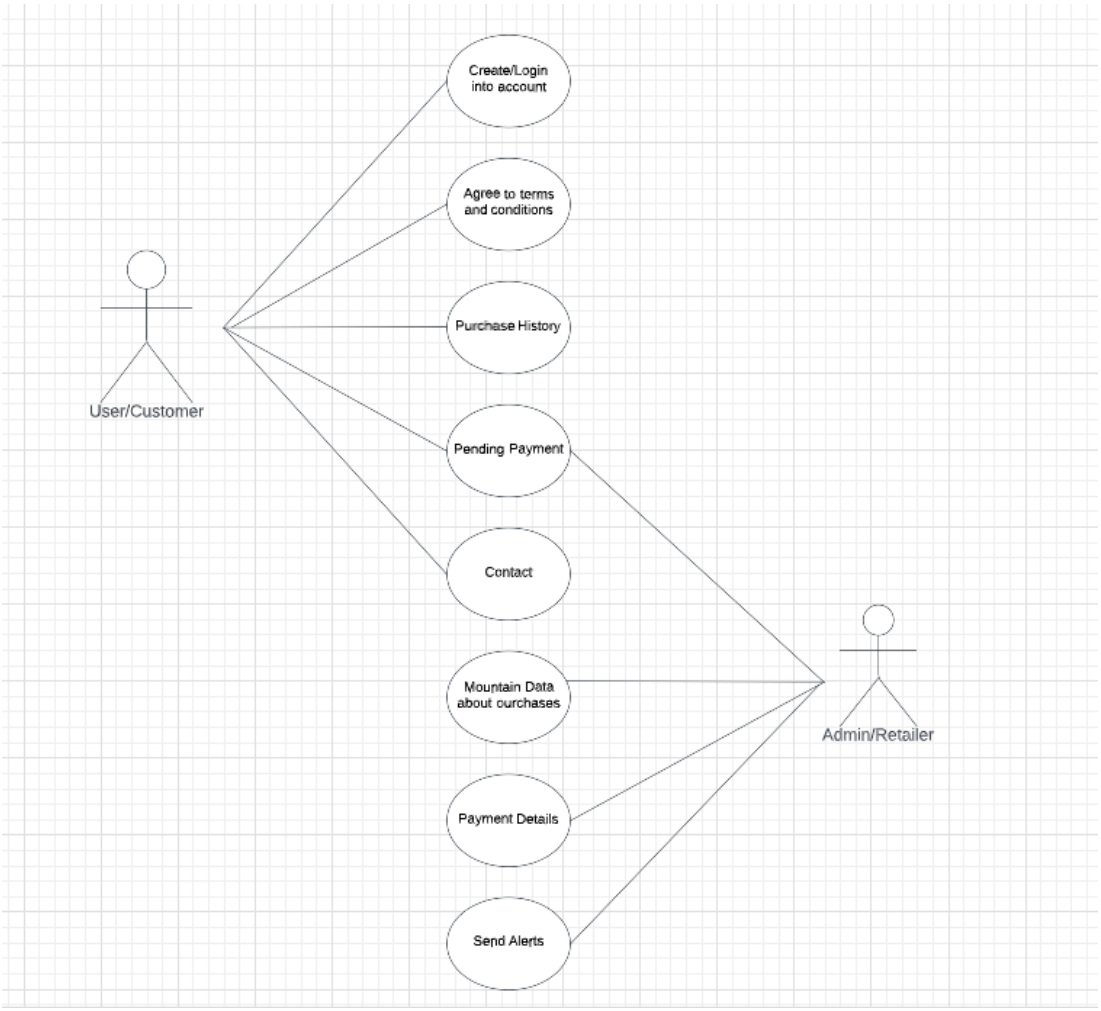


Figure 3.1: UseCase - Digital Payments Book

3.2.2 ER Diagram

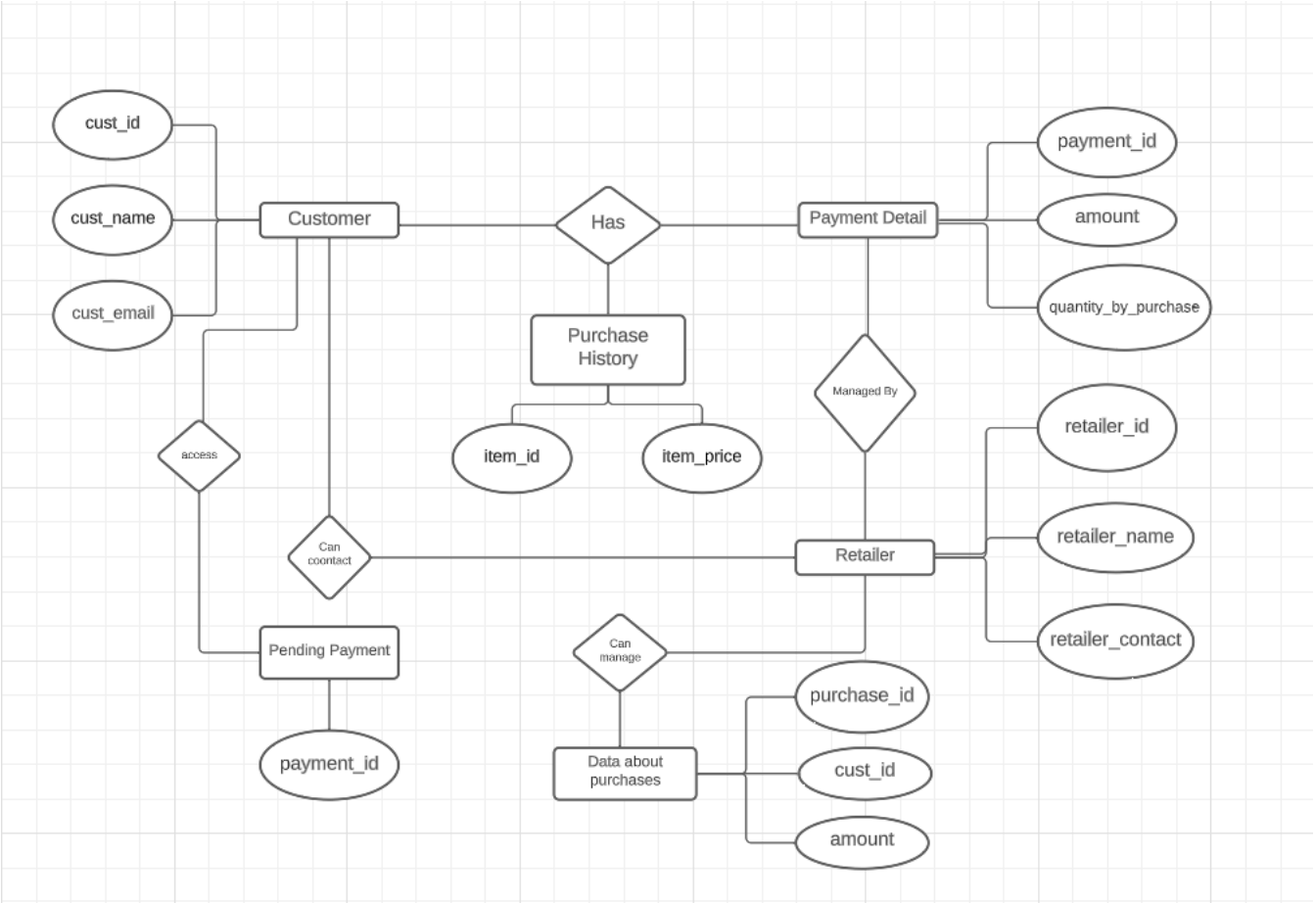


Figure 3.2: ER Diagram - Digital Payments Book

3.2.3 Activity Diagram

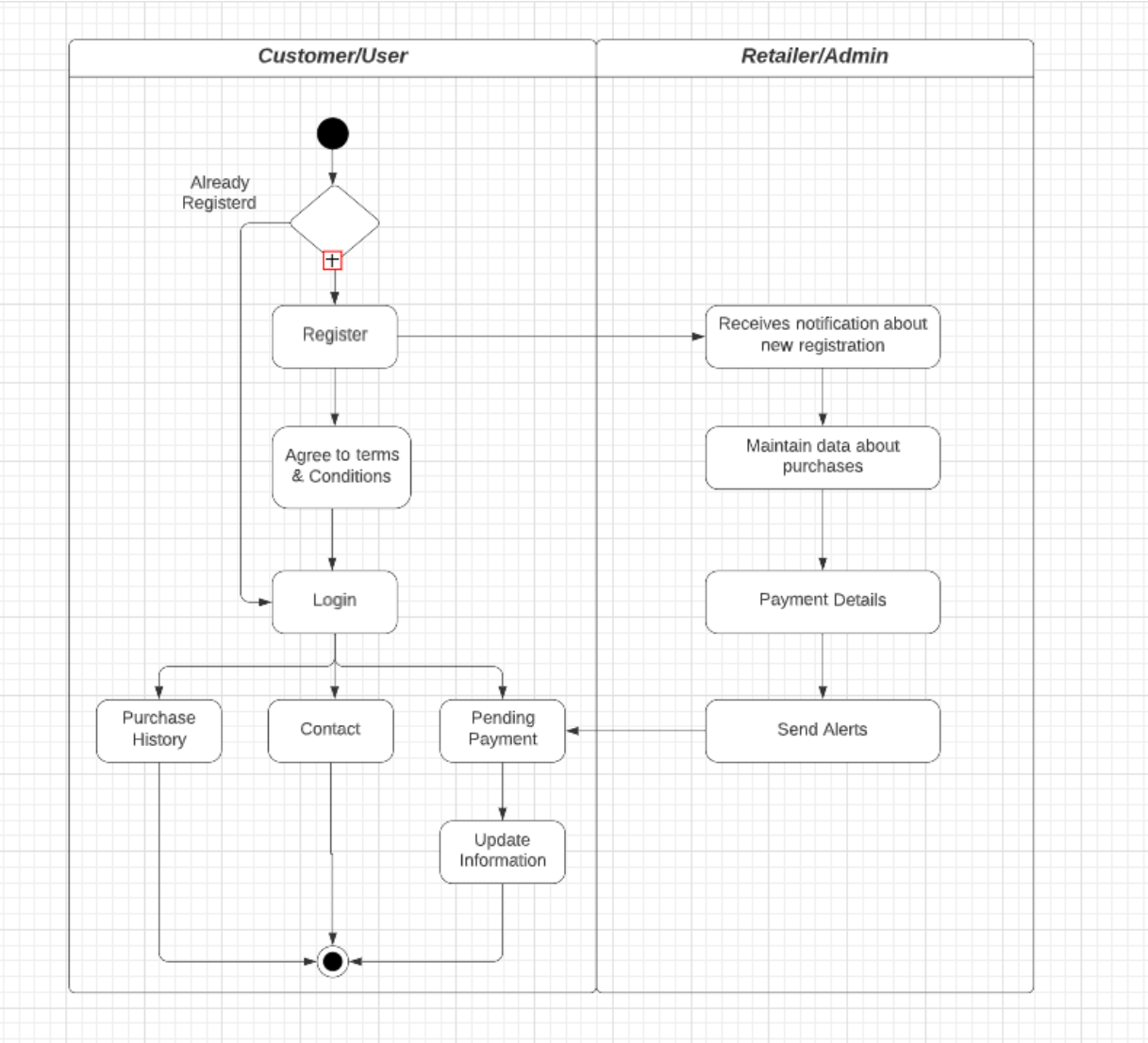


Figure 3.3: Activity Diagram - Digital Payments Book

3.2.4 Sequence Diagram

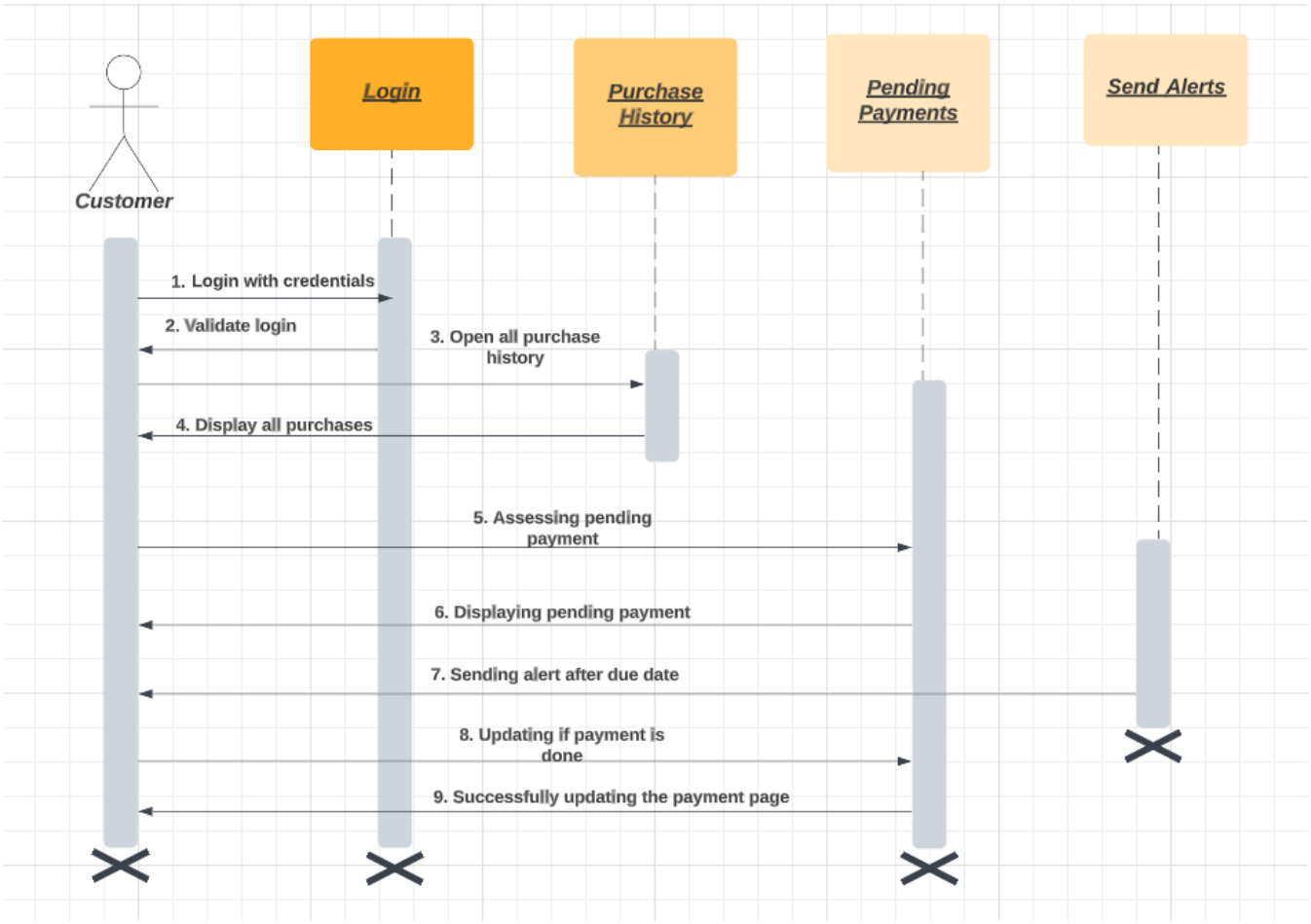


Figure 3.4: Sequence Diagram - Digital Payments Book

3.2.5 Class Diagram

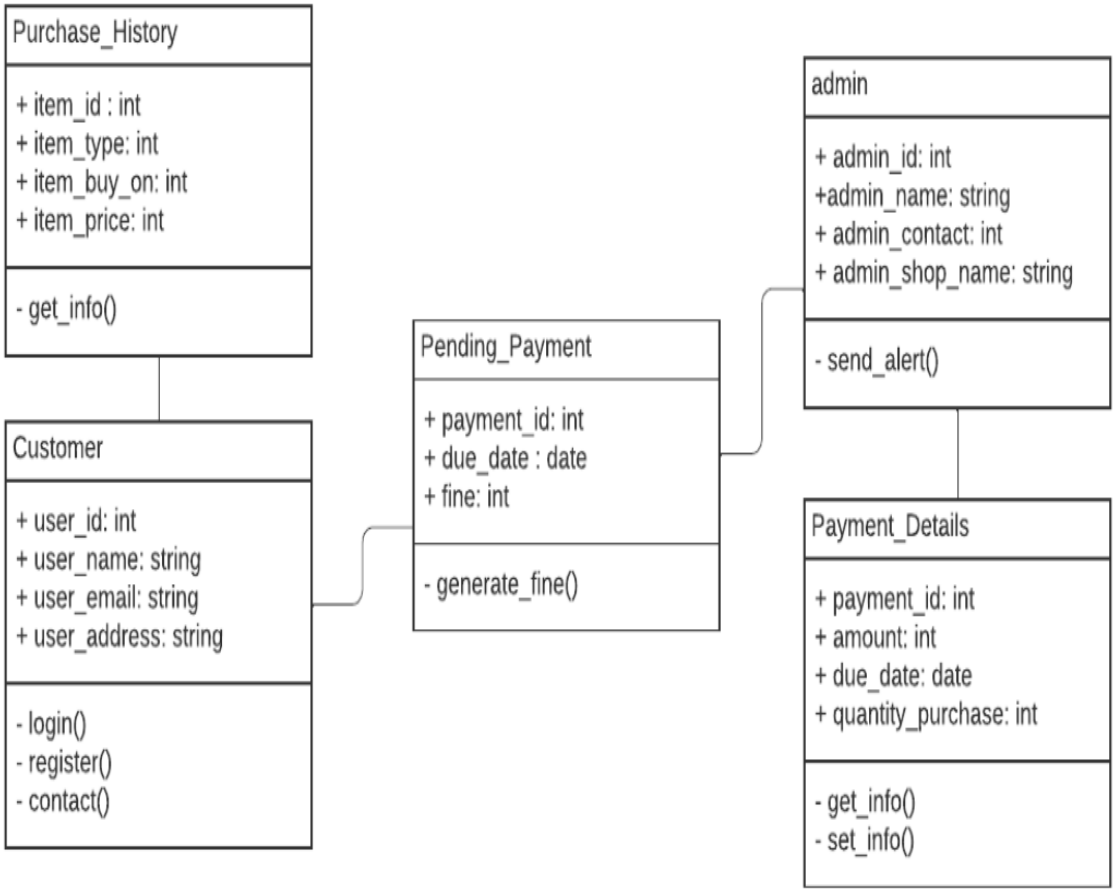


Figure 3.5: Class Diagram - Digital Payments Book

3.2.6 Deployment Diagram

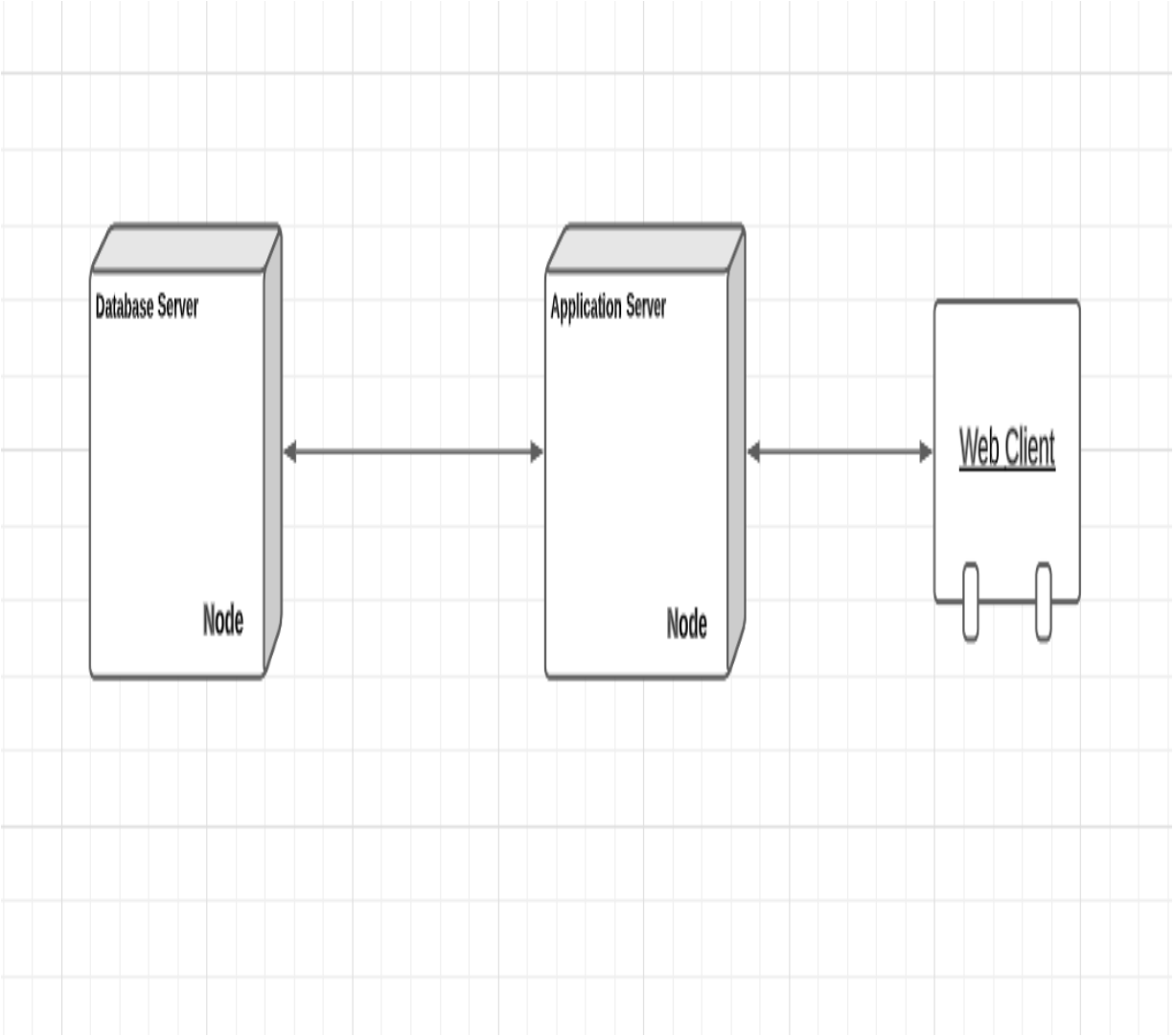


Figure 3.6: Deployment Diagram - Digital Payments Book

3.2.7 Component Diagram

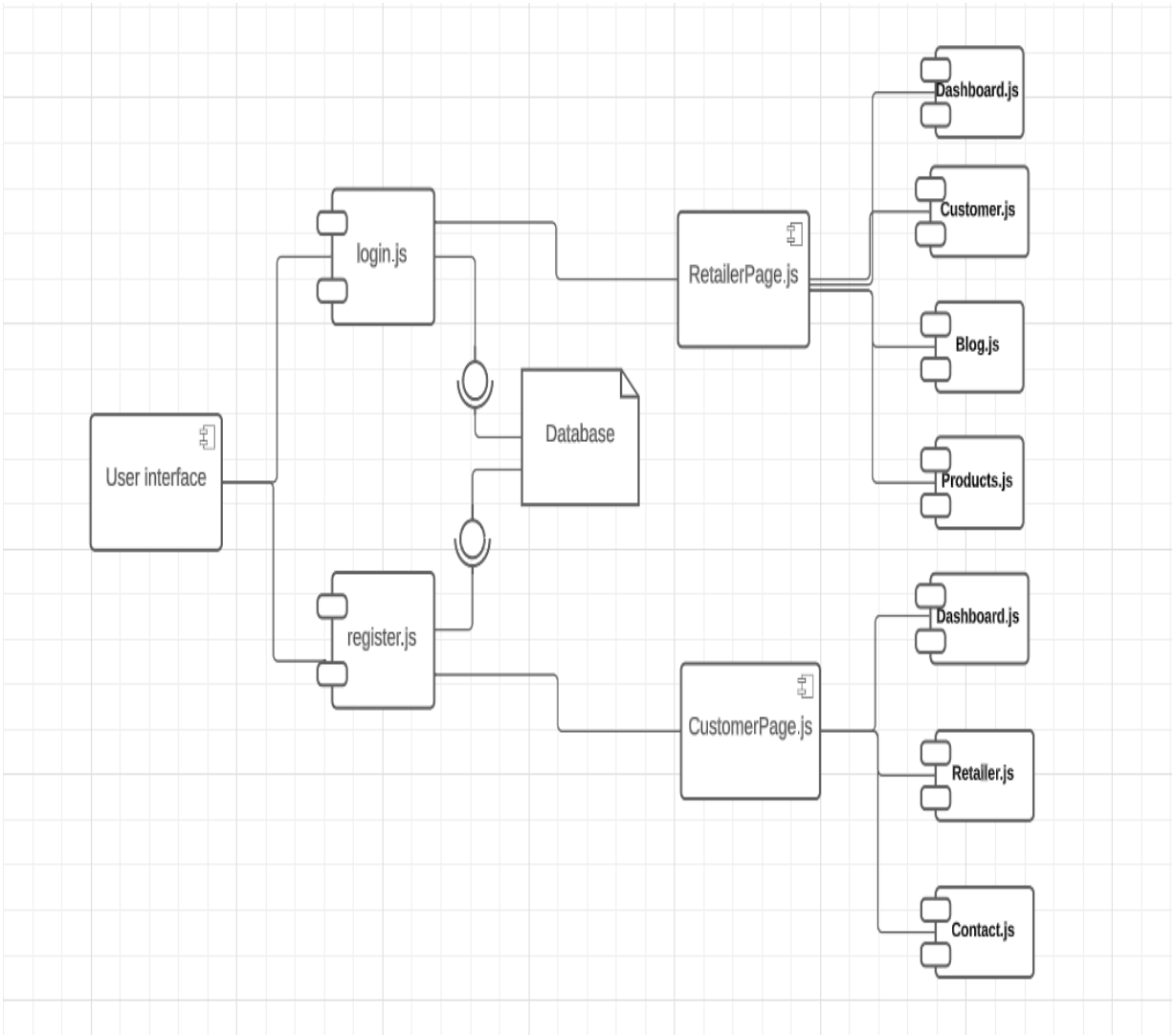


Figure 3.7: Component Diagram - Digital Payments Book

Chapter 4

Methodology and Team

4.1 Introduction to Waterfall Framework

The Waterfall Model was first Process Model to be introduced. It is also referred to as a linear-sequential life cycle model. It is very simple to understand and use. In a waterfall model, each phase must be completed before the next phase can begin and there is no overlapping in the phases. The waterfall Model illustrates the software development process in a linear sequential flow; hence it is also referred to as a linear-sequential life cycle model. This means that any phase in the development process begins only if the previous phase is complete. In waterfall model phases do not overlap. In "The Waterfall" approach, the whole process of software development is divided into separate phases. In Waterfall model, typically, the outcome of one phase acts as an input for the next phase sequentially. Following is a diagrammatic representation of different phases of waterfall model.

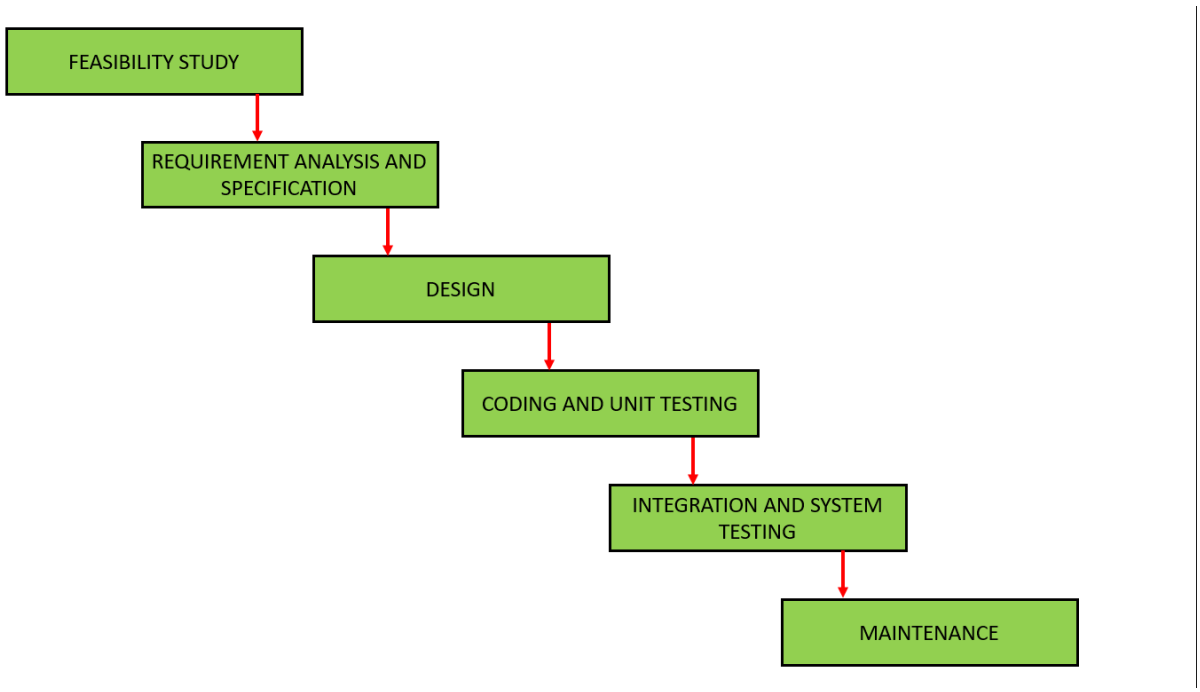


Figure 4.1: WaterFall model

The sequential phases in Waterfall model are-

1. **Requirement Gathering and analysis:** All possible requirements of the system to be developed are captured in this phase and documented in a requirement specification doc.

2. **System Design:** The requirement specifications from first phase are studied in this phase and system design is prepared. System Design helps in specifying hardware and system requirements and also helps in defining overall system architecture.

3. **Implementation:** With inputs from system design, the system is first developed in small programs called units, which are integrated in the next phase. Each unit is developed and tested for its functionality which is referred to as Unit Testing.

4. **Integration and Testing:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.

5. **Deployment of system:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.

6. **Maintenance:** All the units developed in the implementation phase are integrated into a system after testing of each unit. Post integration the entire system is tested for any faults and failures.

All these phases are cascaded to each other in which progress is seen as flowing steadily downwards (like a waterfall) through the phases. The next phase is started only after the defined set of goals are achieved for previous phase and it is signed off, so the name ”Waterfall Model”. In this model phases do not overlap.

Waterfall Model Pros & Cons

Advantage The advantage of waterfall development is that it allows for departmen-

talization and control. A schedule can be set with deadlines for each stage of development and a product can proceed through the development process model phases one by one. Development moves from concept, through design, implementation, testing, installation, troubleshooting, and ends up at operation and maintenance. Each phase of development proceeds in strict order.

Disadvantage The disadvantage of waterfall development is that it does not allow for much reflection or revision. Once an application is in the testing stage, it is very difficult to go back and change something that was not well-documented or thought upon in the concept stage.

4.2 Team Members, Roles & Responsibilities

1. **Arpita Dubey -** Developed the back-end of the system. The back-end is developed in Nodejs. Handle all the API calls as well.
2. **Aryan Sharma -** Developed the front-end components of the system. Created the front-end for the Admin.
3. **Atishay Harsola -** Responsible for developing the front-end components for the customer. Also fix the bugs in the UI.
4. **Gaurav Jangid -** He maintained all the data for the system. Created the database and also help in connecting database to the back-end as well as front-end.

Chapter 5
Centering System Testing

The designed system has been testing through following test parameters.

5.1 Functionality Testing

In testing the functionality of the web sites the following features were tested:

1. Links
   (a) Internal Links: All internal links of the website were checked by clicking each link individually and providing the appropriate input to reach the other links within.
   (b) External Links: Till now no external links are provided on our website but for future enhancement we will provide the links to the candidate's actual profile available online and link up with the elections updates online etc.
   (c) Broken Links : Broken links are those links which so not divert the page to specific page or any page at all. By testing the links on our website, there was no link found on clicking which we did not find any page.
2. Forms
   (a) Error message for wrong input : Error messages have been displayed as and when we enter the wrong details (eg. Dates), and when we do not enter any details in the mandatory fields. For example: when we enter wrong password we get error message for acknowledging us that we have entered it wrong and when we do not enter the username and/or password we get the messages displaying the respective errors.
   (b) Optional and Mandatory fields : All the mandatory fields have been marked with a red asterisk (*) and apart from that there is a display of error messages when we do not enter the mandatory fields. For example: As the first

name is a compulsory field in all our forms so when we do not enter that in our form and submit the form we get an error message asking for us to enter details in that particular field.

3. Database Testing is done on the database connectivity.

5.2 Performance Testing

Metric	Value	Descriptions
Average Page Load Time	< 4 sec	
Max Page Load Time	< 60 sec	
Minimum Throughput	per scenario	
Max Number of Registered Users	30k	
Max Concurrent Connection	2000	
Max Records in the DB	300k	e.g. 10000 invoices, 3mln customers, etc...
Max DB Size	11GB	

Figure 5.1: Performace Requirements -

Scenario (Thread Group)	Expected Normal Throughput in peaks [scenarios/min] (100%, Load Test)	Number of concurrent threads (100%)	Throughout in JMeter plan [scenarios/min] for Load Test (100%)	Number of concurrent threads (200%)	Throughout in JMeter plan [scenarios/min] for Stress Test (200%)
Anonymous Views a front page	120	10	140	20	180
Anonymous Browse Course catalogue and an outline	60	10	50	20	65
Training Coordinator Edits a node	2	1	4	2	8

Figure 5.2: Performace Testing -

Chapter 6

Test Execution Summary

Execution Test Summary Report is an overall view of Testing Process from start to end. Test Plan comes at the starting of project while Test Summary Report comes at the end of the testing process. This report is given to the client for his understanding purpose. The Test Summary Report contents are :

1. Test Case ID generated
2. Total number of resources consumed
3. Passed Test Cases
4. Failed Test Cases
5. Status of Test Cases

S.No	Test Case Id	Test Case Description	Test Case Status	No. of Resources Consumed
1	6	87837	787	
2	7	78	5415	
3	545	778	7507	
4	545	18744	7560	
5	88	788	6344	

Table 6.1: Table to test captions and labels

Chapter 7

Project Screen Shots

1. **Register -**

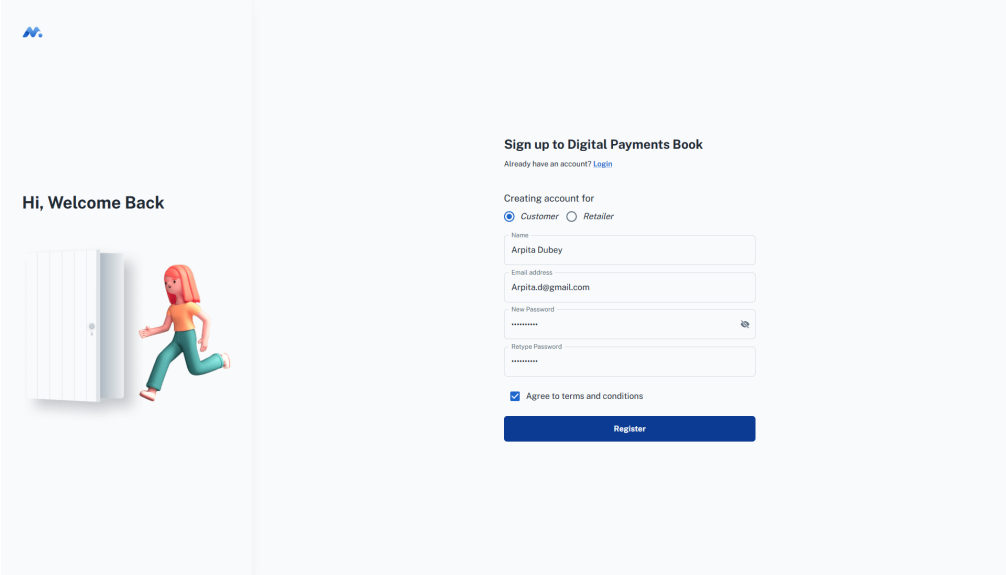


Figure 7.1: Register Page - Digital Payments Book

2. **Login -**

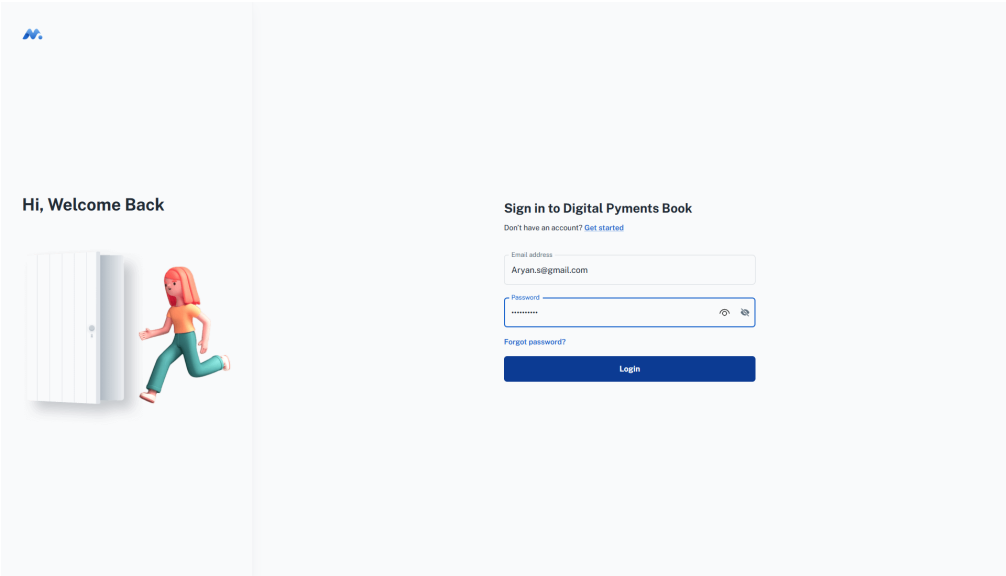
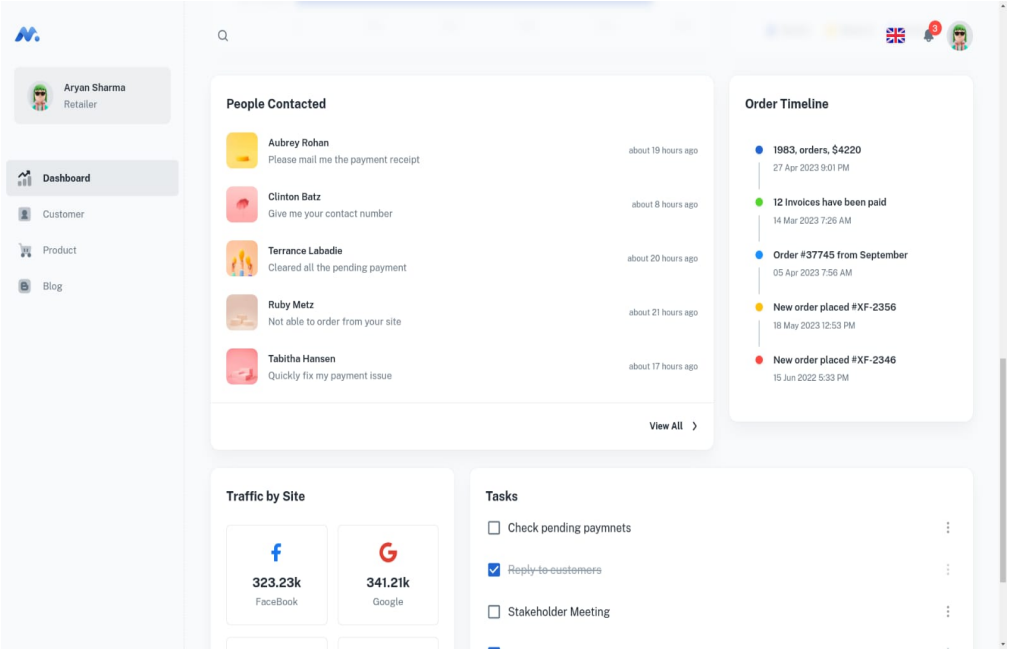
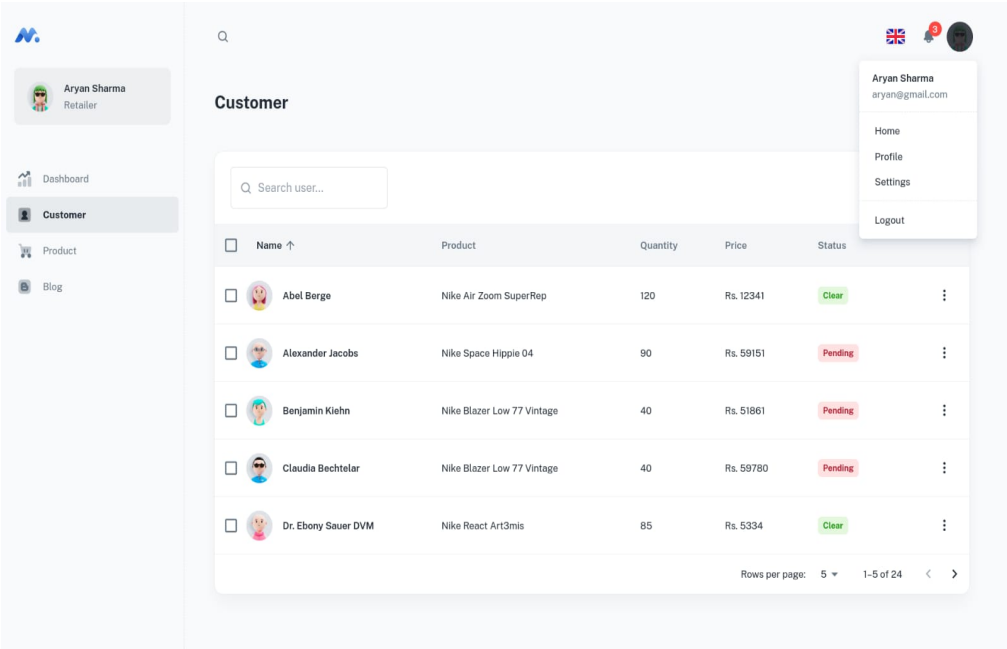


Figure 7.2: Login Page - Digital Payments Book

3. **Retailer Page -**





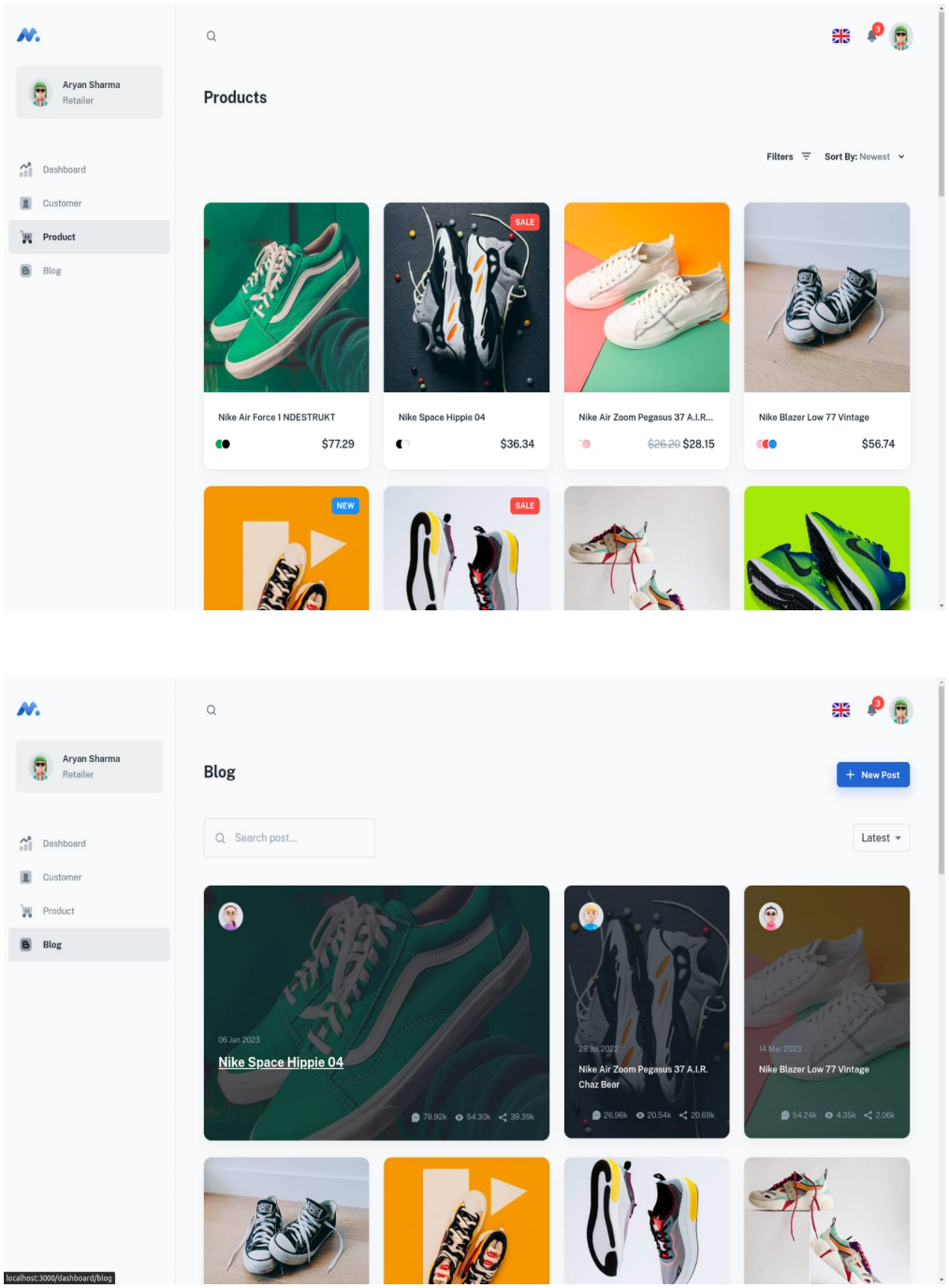


Figure 7.3: Retailer Page - Digital Payments Book

4. **Customer Page -**

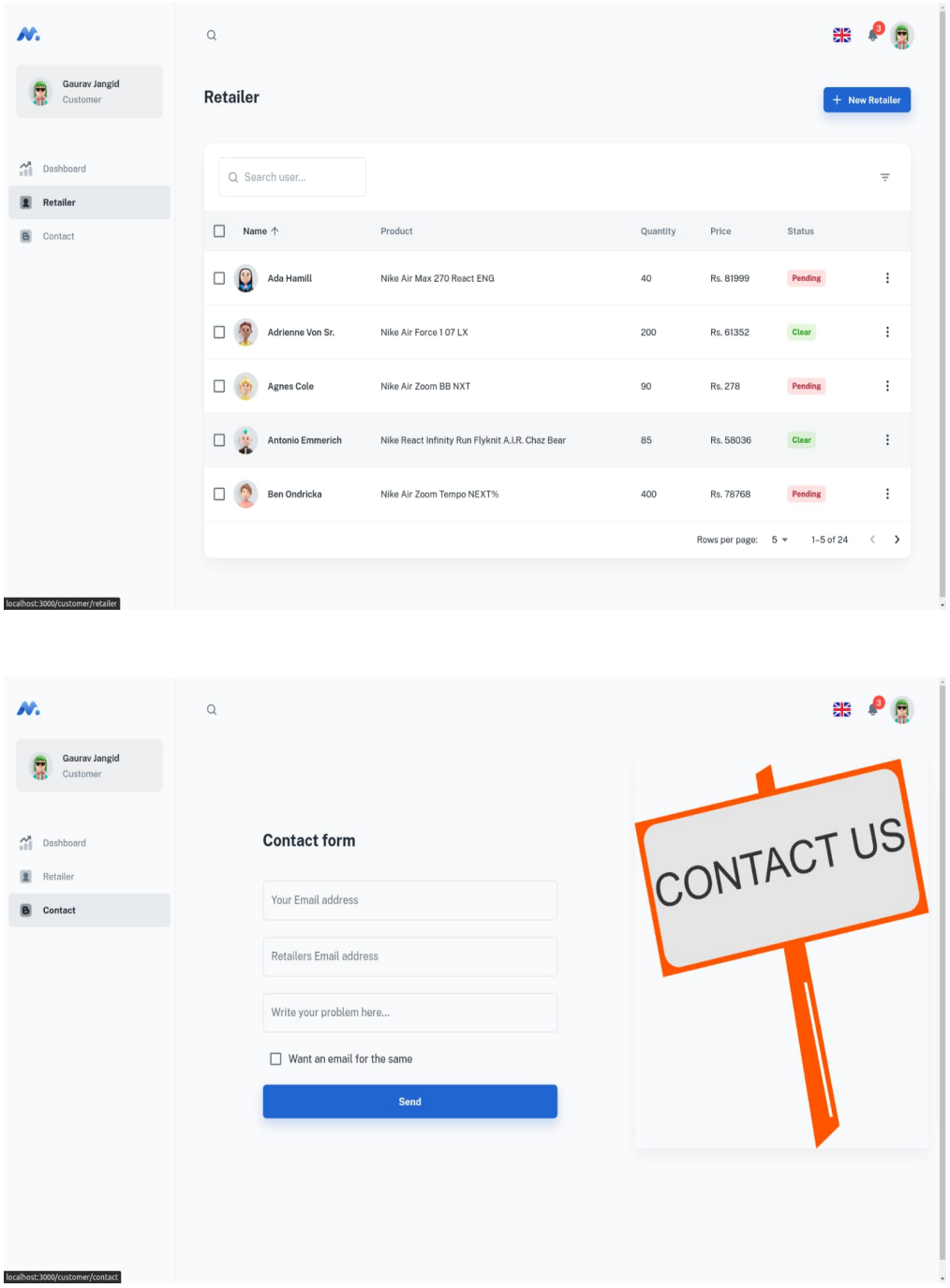


Figure 7.4: Customer Page - Digital Payments Book

5. **Database -**

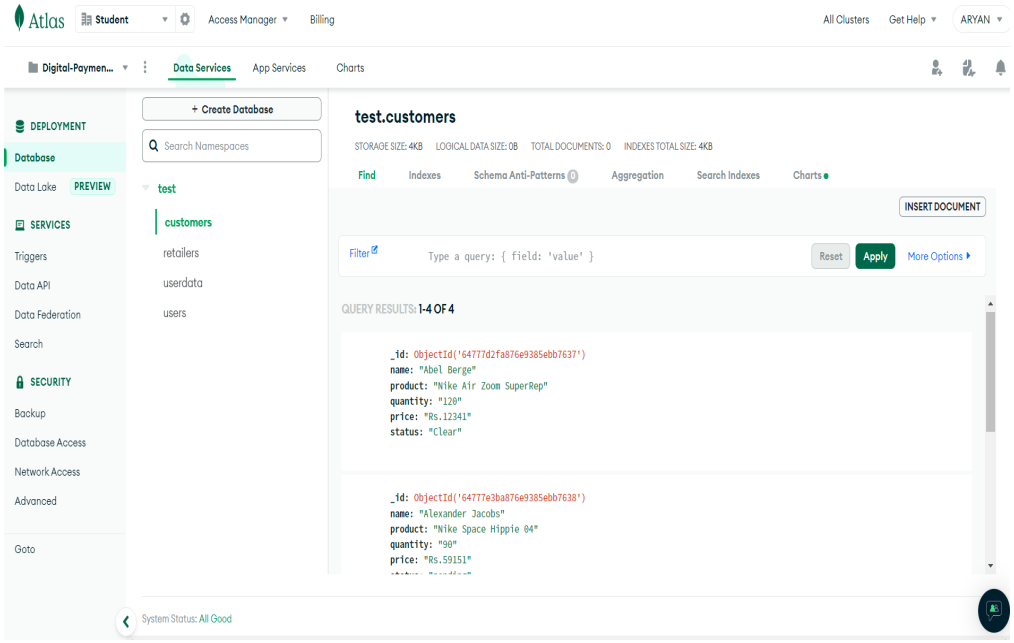


Figure 7.5: Database for Customers

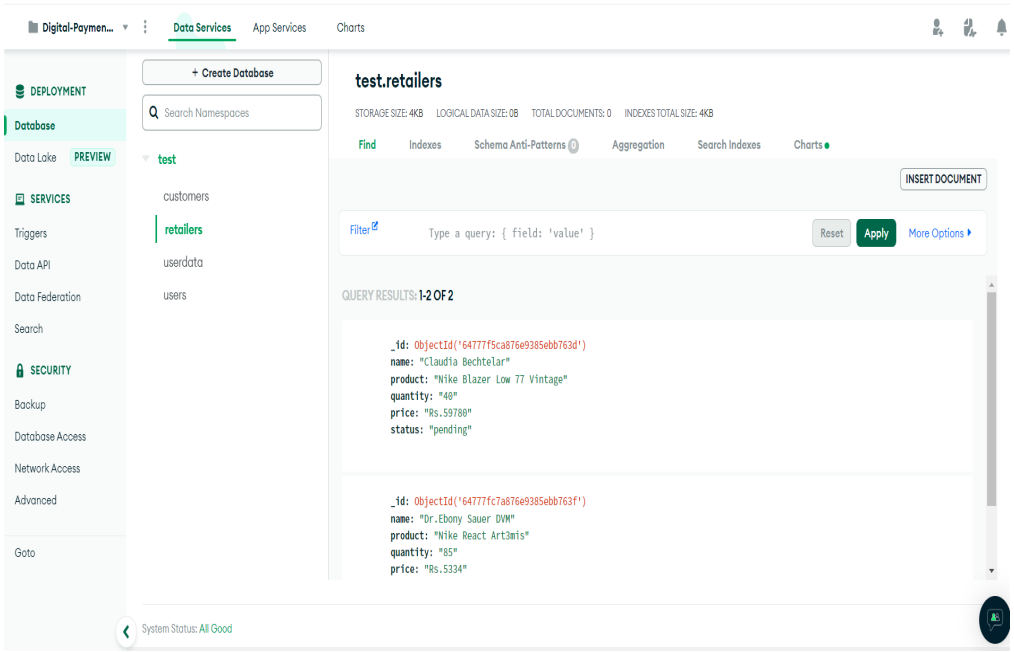


Figure 7.6: Database for Retailers

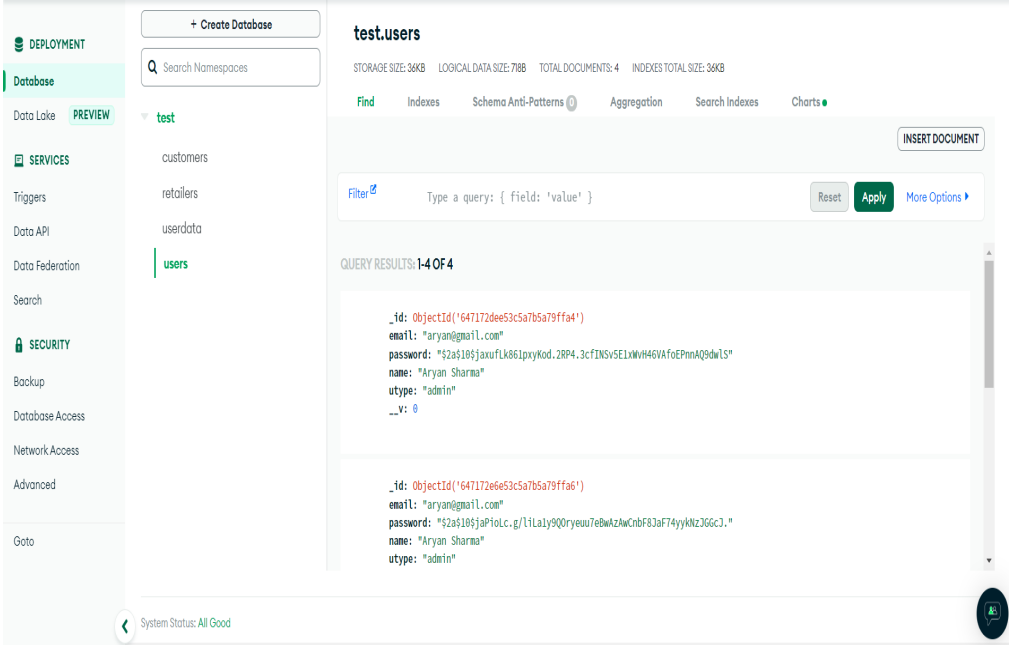


Figure 7.7: Database for Login/Signup

Chapter 8
Project Summary and Conclusions

8.1 Conclusion

The project Digital Payment Book Application has been developed in such a manner, that the future requirements of the user are met. The project is flexible to adapt the changes efficiently without affecting the present system. We are also planning to implement more features on the app. This is the future scope of our project. The proposed Digital Payments Book will take care of the each customer of the retailer's shop at any point of time. The pending payments, purchase history will update the current customer details automatically so that admin will get the update current customer details

8.2 Project Summary

The proposed project aims to develop a comprehensive payment management system for retailers that allows them to maintain records of customer payments and send alerts for pending payments. The system will provide a seamless and efficient way for customers to clear their outstanding dues, enhancing transparency and convenience for both parties involved.

The payment management system will be designed to integrate with the retailer's existing infrastructure, such as point-of-sale systems or e-commerce platforms, to capture payment information accurately and securely. It will store and organize payment records, including transaction details, due dates, and payment statuses, in a centralized database.

One key feature of the system will be the ability to send automated alerts to customers regarding their pending payments. These alerts can be delivered through various channels such as email, SMS, or mobile app notifications, based on the cus-

tomer's preferred communication method. The alerts will include essential information such as the outstanding amount, due date, and payment options, providing customers with convenient reminders and clear instructions on how to settle their payments.

Chapter 9
Future Scope

The future scope of the system for retailers with customer alerts is promising, as it can be further enhanced and expanded to meet evolving needs and market trends. Here are some potential areas of future development and expansion:

- Integration with Additional Payment Methods: The system can be enhanced to integrate with emerging payment methods, such as digital wallets, cryptocurrency payments, or contactless payments through technologies like Near Field Communication (NFC). This would provide customers with more options and flexibility when it comes to clearing their pending payments.

- Personalized Customer Engagement: The system can incorporate personalized customer engagement features, leveraging customer data and analytics. This could include targeted promotional offers, loyalty programs, and tailored communication based on individual payment behavior and preferences. Such personalization can enhance customer satisfaction and foster stronger relationships with the retailer.

- Mobile Payment Integration: With the increasing use of mobile devices for payments, the system can explore integrating mobile payment solutions such as QR code scanning, mobile-based wallets, or payment apps. This would enable customers to initiate payments directly from their mobile devices, enhancing convenience and providing a seamless payment experience.

Overall, the future scope of the payment management system lies in its ability to adapt to evolving customer preferences, emerging technologies, and market dynamics. By continuously innovating and expanding its functionalities, the system can stay relevant, provide added value to retailers and customers, and contribute to the ongoing digital transformation in the retail industry.

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