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# Chapter 1

# 1.INTRODUCTION

Digital Bazaar is a B2C (Business 2 Customer) model-based E-Commerce platforms that provides services and goods related to electronics items to the costumer This system is a web-based system as it is developed using Eclipse IDE, the front end of the system is created using HTML, CSS, JS and JSP and Servlets are used to handle the backend server and the database is MYSQL. The system is used by the admin and customers who can perform the following operations after authentication and authorization

* Add/update/remove products (Admin)
* Manage stocks and orders (Admin)
* Manage Shipping (Admin)
* Provide emails to specific customer (Admin)
* Purchase products (Customer)
* Manage carts (Customer)
* Payment (Customer)
* Search products (Customer)

## Problem statement

After research on the existing system, we pointed out some drawback that were necessary to improve because in this modern generation the existing version were not much appealing to the users.

Some major drawbacks of the previous version of the system are as follows

* Poor customer support
* The speed of transactions(payment) is slow
* Complex to use and understand the nature of the system
* Highly vulnerable to outside threats and attacks

To correct these drawbacks our new system is introduced to reduce the complexity of the existing systems.

## 1.2 Goals and objectives

“Digital bazaar” is a software application used by business organizations to sell their products directly to their potential customers by providing payment gateways, cart managements and other functionalities Following are the major goals and objectives:

* To create robust, user friendly e commerce platform for seamless interaction between business organization and customer
* To enable admins to efficiently manage orders, stocks, products and customers
* Offer customer intuitive shopping experience with secure payment gateway
* Provide attractive Graphical User Interface
* Data integrity and scalability

## 1.3 Scope

This system is created mainly for business organizations who wants to sell their products directly to the customers through and e commerce. The scope of this system is broad and comprehensive, covering all aspects of managing student data and related administrative tasks within an educational institution. Some of the key areas that falls under its scope are as follows

* Order and stock management system
* Retail business
* Single vendor e-commerce platform

## 1.4 Motivation

There are several motivations for implementing this system. Some of the primary motivations include:

* To provide a seamless online shopping experience with easy product browsing, secure payment options, and quick order management.
* To simplify product, stock, and order management for admins, enabling better business operations.
* Leverage the booming e-commerce sector to create a scalable and robust solution for digital transactions.

## 1.5 Application

The Digital Bazaar is a versatile tool that can be applied in B2C model of business . Some of the applications include:

* Ecommerce platform
* Retail Business
* Order and Stock Management

In summary, The Digital Bazaar system is a versatile e-commerce platform designed for online shopping and business management that supports admin functionalities, customer experience and business solution.

## 1.6 Feasibility study

By gathering all the information available and by study we found that this proposed system is highly feasible

### 1.6.1 Technical Feasibility

The Digital Bazaar is technically feasible because:

* The required resources (hardware, software, and tools) for development and maintenance are readily available.
* Technologies like JSP, Servlets, HTML, CSS, JavaScript, and MySQL are well-supported and easy to implement.
* Existing infrastructure and expertise can be utilized effectively for development without additional requirements.

### 1.6.2 Operational Feasibility

### The system is operationally feasible due to:

### Its ability to perform core operations (product management, stock monitoring, secure transactions, and customer communication) efficiently.

### A simple and user-friendly interface that ensures easy navigation and usage for both admins and customers.

### Reliable backend logic that ensures smooth operation without unnecessary complexities.

### 1.6.3 Economic Feasibility

The development of DigitalBazaar is economically feasible because:

* Minimal investment is required as existing resources are utilized for development and maintenance.
* The organization incurs no significant additional expenses after development, making it cost-effective.
* By maximizing the usability of current resources and tools, the project delivers high value at a low cost.

# Chapter 2

# 2.Literature Review

The DigitalBazaar project is built upon the principles of e-commerce automation, drawing insights from various research papers, publications, and bibliographic resources. Automation plays a significant role in reducing manual efforts, enhancing efficiency, and ensuring accuracy in business processes. Studies highlight that automation not only eliminates human errors but also improves production flexibility, reduces delays, and ensures cost-effectiveness. In e-commerce, automation facilitates efficient stock management, order processing, and secure payment handling, aligning with the project's objectives of creating a seamless and robust online shopping platform.

The concept of Role-Based Access Control (RBAC), as used in many institutional systems, has been adopted in Digital Bazaar to distinguish between admin and customer roles. Admins are granted privileges to manage products, stocks, and orders, while customers can browse, search, and purchase products. This role segregation enhances security, prevents unauthorized access, and ensures smooth operations. Furthermore, research such as that by Yang Qingshan (2010) emphasizes the importance of secure and layered architectures in web-based systems. Digital Bazaar employs a similar three-tier architecture: a responsive front-end using HTML, CSS, and JavaScript; an application layer powered by JSP and Servlets for business logic; and a secure MySQL database layer for storing user, product, and order data.

The integration of secure payment gateways, a critical aspect of modern e-commerce platforms, has been addressed by implementing Stripe in Digital Bazaar. Literature highlights the importance of encrypted and reliable payment systems in building customer trust, and Stripe ensures secure transactions aligned with industry standards. Additionally, existing research emphasizes the significance of customer-centric design in e-commerce systems. DigitalBazaar incorporates these principles by providing an intuitive and responsive interface, easy navigation, and a simplified checkout process, ensuring a superior user experience.

Overall, the literature reviewed provides a strong foundation for the design and development of DigitalBazaar, ensuring it meets modern e-commerce standards, enhances operational efficiency, and delivers a secure and user-friendly platform.

## 2.1 Study on existing system

The concept of e-commerce platforms, including a user-friendly interface, has been widely explored and implemented using various technologies. Earlier e-commerce systems were often developed using basic frameworks and databases like MS Access. While these systems provided foundational functionality, they faced significant limitations, such as weak database schemas, inability to handle large-scale data, and lack of robust validation mechanisms for error and alert messages during transactions. These shortcomings made the systems vulnerable to frequent crashes, password attacks, and other security threats, leading to risks like data theft and breaches.

One major drawback of such systems was their inability to maintain the CIA (Confidentiality, Integrity, and Availability) security triad, which is critical for protecting sensitive customer and organizational data. Additionally, to update or modify any functionality, the entire system often had to be redeveloped following the software development life cycle from the beginning, making it inflexible and inefficient.

In contrast, Digital Bazaar addresses these challenges by using modern technologies like JSP, Servlets, and MySQL. With a secure database schema, robust validation mechanisms, and integration of Stripe for secure payments, it ensures data protection and scalability. The system is designed to handle large data volumes efficiently and provides error and alert messages to enhance user experience. By maintaining the CIA security triad and offering flexibility for future updates, Digital Bazaar overcomes the limitations of earlier systems, making it a reliable and secure e-commerce platform.

# Chapter 3

# 3.System analysis and design

## 3.1 Analysis on existing system

After analysis on existing system concluded earlier e-commerce systems were often developed using basic frameworks and databases like MS Access. While these systems provided foundational functionality, they faced significant limitations, such as weak database schemas, inability to handle large-scale data, and lack of robust validation mechanisms for error and alert messages during transactions

One major drawback of such systems was their inability to maintain the CIA (Confidentiality, Integrity, and Availability) security triad, which is critical for protecting sensitive customer and organizational data. Additionally, to update or modify any functionality, the entire system often had to be redeveloped following the software development life cycle from the beginning, making it inflexible and inefficient

## 3.2 Problems of existing system

Some the of main problems of the existing systems are as follows:

* User Management and Roles
* Scalability issues
* Lack of error and Validation messages
* No implementation of CIA security triad
* Performance issues

## 3.3 Proposed System

The proposed system is a full stack web application that provide admins and customer with full featured dashboard, order management, stock management payment gateway and other functionalities.

Our proposed system has several advantages

* User friendly interface
* Fast access to database
* Less error
* Search facility
* Look and Feel Environment
* OTP email verifications

## 3.4 Requirement Analysis

### 3.4.1 Functional Requirement

Functional requirements capture the intended behavior of the system. This behavior may be expressed as services, tasks or functions the system is required to perform. Therefore, the proposed system is able to:

* Enable admins to add, update, and remove products, manage stock levels, and handle orders Generate reports accurately and timely.
* Provide customers with a seamless experience to search, browse, and purchase product.
* Manage and store product details, customer information, and order history securely.
* Send notification emails to customers regarding orders, offers, or updates.

### 3.4.2 Non-Functional Requirement

Non-functional requirements are requirements which specify criteria that can be used to judge the operation of a system, rather than specific behaviors. This is contrasted with functional requirements that specify specific behavior or functions. Systems must exhibit software quality attributes, such as accuracy, performance, cost, security and modifiability plus usability, i.e., easy to use for the intended users. NFRs help to achieve the functional requirement of a system. Thus, the proposed system does the following:

* High-level securitymeasures, including user authentication and protection against SQL injection.
* Multi factor authentication (MFA)
* The system prevents unauthorized access to the system with user authentication via login on system.
* High-level securitymeasures, including user authentication and protection against SQL injection

### 3.4.3 Hardware requirements

* System processor : Intel Pentium 4 or higher
* RAM : 2 GB or higher
* Disk storage : 80 GB or higher
* Virtual memory (VRAM) : 512 MB or higher

### 3.4.4 Software requirements

* Operating System : Windows (XP,Vista,7,8,10,11),Linux-Distro
* Database :My SQL
* Web browser :Chrome,Firefox,Tor,Opera..etc
* Server :Apache tomcat version 8.0 or higher

### 3.4.5 Time Scheduling (Gantt Chart)

The following Gantt chart shows the time scheduling for the system planning

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| S.N | Phase | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 | Week 7 |
| 1 | Interception |  |  |  |  |  |  |  |
| 2 | System study |  |  |  |  |  |  |  |
| 3 | System analysis and designing |  |  |  |  |  |  |  |
| 4 | Coding |  |  |  |  |  |  |  |
| 5 | Testing |  |  |  |  |  |  |  |
| 6 | Documentation |  |  |  |  |  |  |  |

Table 3.4.5 : Gantt Chart

## 3.5 System Design

System design is a process through which requirements are translated into representation of software. Initially the representation depicts a holistic view of software.

Subsequent refinement leads to a design representation that is very close to source code. Design is a place where quality fostered in software development. Design provides us with representation of software that can be assessed for quality; this is the only way that can accurately translate the customer requirements into finished software product or system.We look the design process from three distinct perspectives:

* Conceptual design
* Logical design
* Physical design

**Conceptual Design**

It is the process of acquiring and evaluating, documenting And then validating what the user envisions to be the business relation. It identifies the user and business requirements of the application and leads to a business solution as seen by the user achieve this conceptual design is driven by developing usage scenarios. These scenarios are a direct representation of the user’s view of the solution to a specific business problem. A conceptual view places the emphasize on solving a business problem and deriving a solution that corresponds to the needs and requirements of the users .It is based on deriving the behavior of the solution with a primary emphasizes on the user. Beginning with a emphasis on the activities of the business rather than aspects of software development, underscores the fact that systems exists to serve the business. A strong focus on the user in the beginning of the project will help in maintaining a proper perspective throughput the development life cycle .The conceptual design results in the first description of what the system does to solve the business problem articulated in the vision/scope document

**Physical Design**

The purpose of Physical Design is to translate the logical design into a solution that can be implemented effectively, according to performance, administration and development process requirements. This physical view should correctly implement the desired system behavior while meeting the constraints imposed by the technology. In Physical Design, the perspective shifts from an abstraction of system behavior to an implementation of the behavior. Whereas the logical design is largely technology independent, physical design is necessarily tied to chosen set of technologies, these being the hardware and software on which the application will run. The aim of physical design is to specify how to build portioned applications from software components. The interaction of these components through defined interfaces results in the desired behavior of the system as a whole. The rules for communicating between components are defined by interaction standards: what a component does and how it communicates are major considerations in physical design . Some steps are :

1.Design the physical media

* Specify input/output media.
* Design the database..
* Design physical information flow through the system.

2.Plan the system implementation

* Prepare a schedule target date.
* Determine training procedures.

**Logical Design**

Logical Design derives business objects and their related services directly from these usage scenarios. The logical view of the solution provides a basis for evaluating different physical options. It also formalizes the solution for the project team. The idea of the application is that the system first emerges in logical design. Its boundaries and business objects and it contains the system definition. Logical design specifies the interfaces between the system and external entities, such as users and other systems. Within a system there may be a number of sub-systems, and these boundaries are also specified. Logical System Design consists of the following steps:

* Input/output specifications
* File specification
* Processing specification

## 3.5.1 Use Case Diagram

A use case diagram shows the interaction between the system and its environment. The components of a use case diagram are:

* Actors: Represent external entities of the system i.e. People who interact with the
* system that is being modeled. For example, customers and system administrator will
* be the actors of the proposed system.
* Use Cases: Use cases are functional parts of the system. Examples are recording and
* submitting measurements.
* Associations: Associations are shown between actors and use cases, by drawing a
* solid line between them. This only represents that and actor uses the use case.

**Digital Bazaar**

Admin

Fig 3.5.1 Use Case Diagram for Admin

**Digital Bazaar**

**Consumer**

Fig 3.5.2 Use Case Diagram for Customer

## 3.5.2 DFD Diagram

Data flow diagrams (DFDs) were used to illustrate the flow of information in a system. They are hardware independent and do not reflect decision points. They demonstrate the information and how it flows between specific processes in a system. They provide one kind of documentation for reports. These diagrams help to show how data moves and changes through the system in a graphical top-down fashion. They also help to give graphical representation of the system’s components, processes and the interfaces between them. When it came to conveying how data flows through systems (and how that data was transformed in the process), DFDs were the method of choice over technical descriptions for three principal:

* DFDs are easier to understand by technical and non-technical audiences.
* They provide a high-level system overview, complete with boundaries and connections tother systems
* They provide a detailed representation of the system components.

Main Dashboard

Login validation

Admin

Login credentials

Product add/remove/update

Manage stocks

Manage shipping , orders

Fig 3.5.2 : level 0 DFD diagram for admin

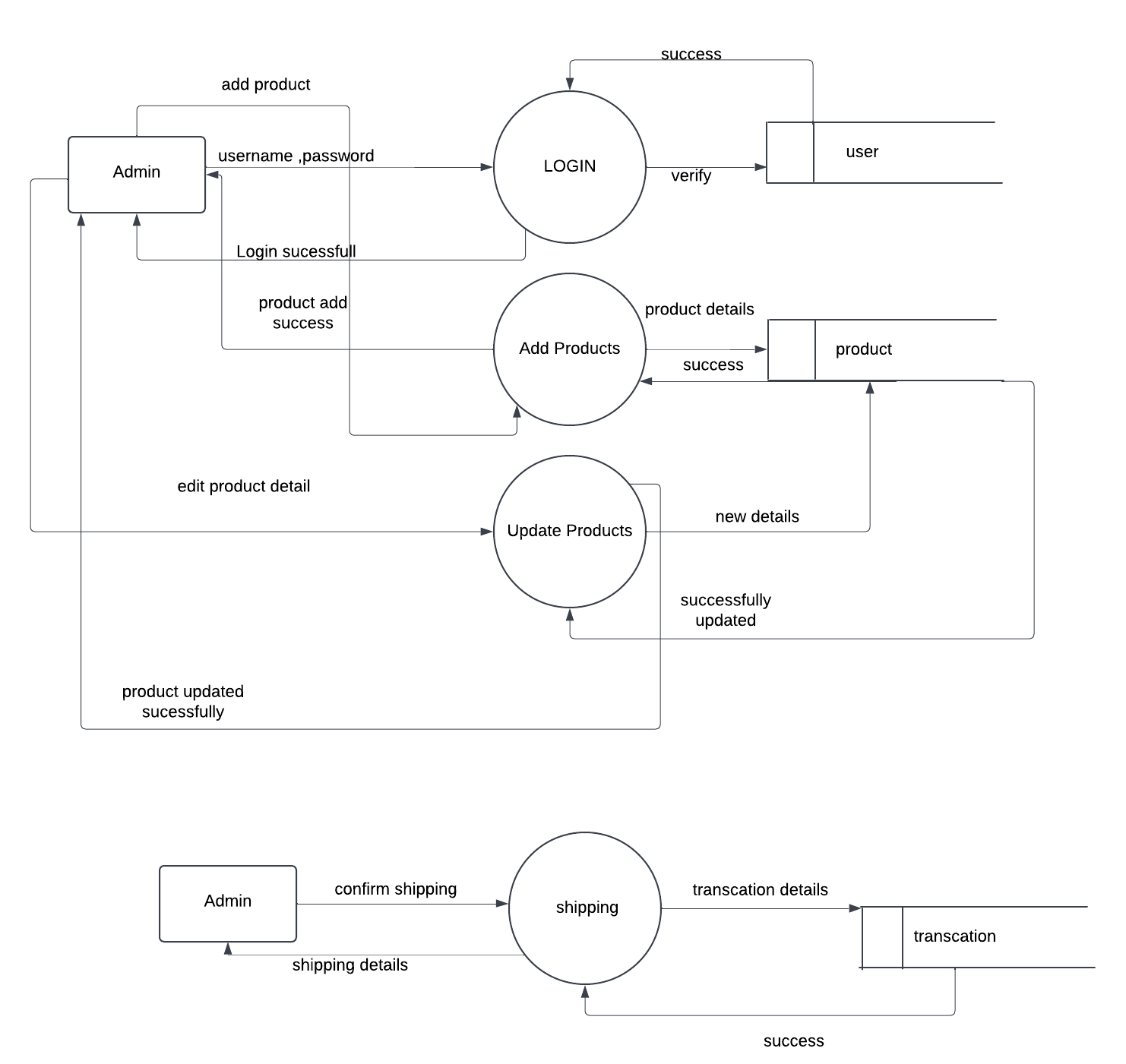
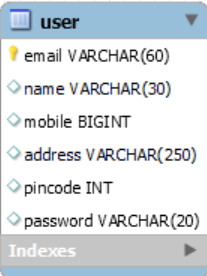


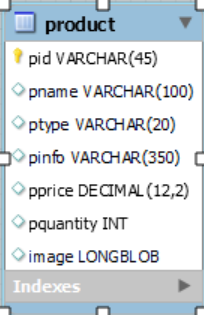
Fig 3.5.2 : Level 1 DFD

## 3.5.3 Database Schema

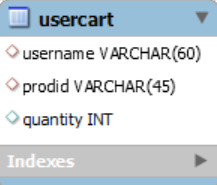
Database schema for user



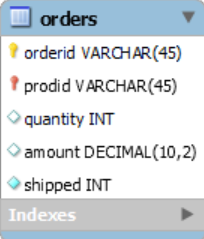
Database schema for Product



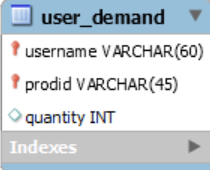
Database schema for usercart



Database schema for orders



Database Schema for user\_demand



Database Schema for transactions

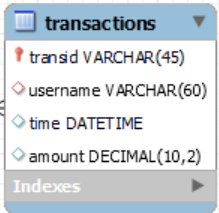


Fig 3.5.3 : Database Schema

## 3.5.4 ER Diagram

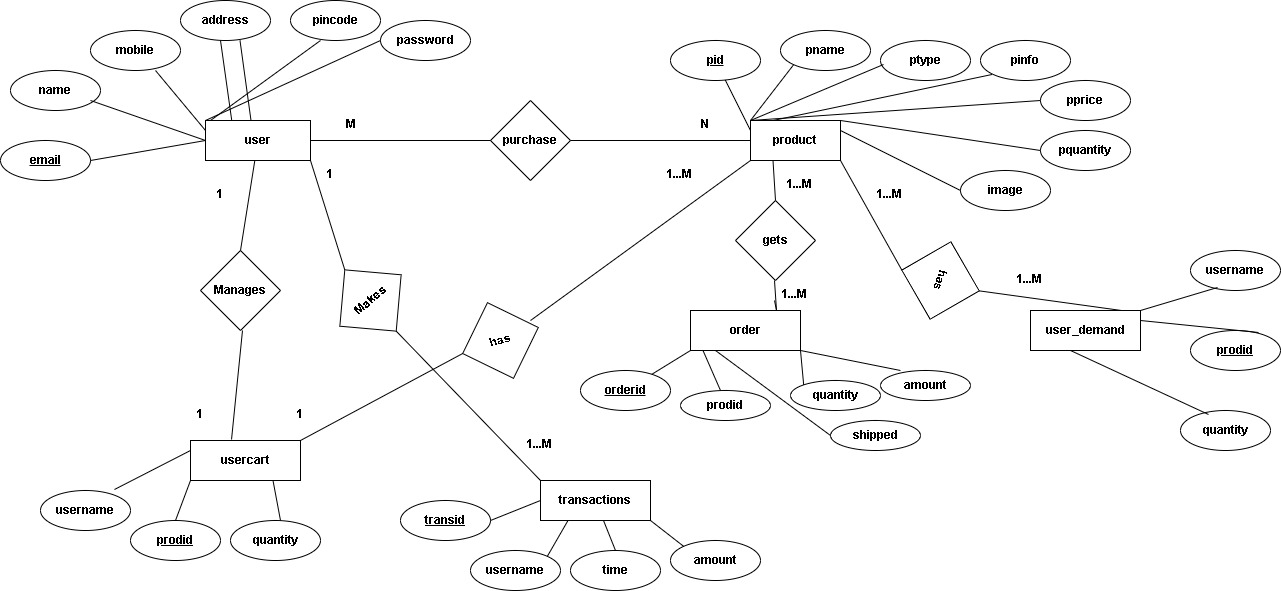


Fig 3.5.4 : ER-Diagram

# Chapter 4

# 4.Implementation and Discussion

## 4.1 Project Implementation

System implementation is performed once system design was done. During system implementation, step-by-step development and installation would be performed. Due to this project is applied prototype methodology, system implementation would be performed by prototype implementation and final implementation. Implementation is the stage in the project where the theoretical design is turned into a working system. The implementation phase constructs, installs and operates the new system. The most crucial stage in achieving anew successful system is that it will work efficiently and effectively. There are several activities involved while implementing a new project.

There are several activities involved while implementing a new project. They are

* End user training
* End user Education
* Training on the application software
* System Design
* Post implementation Review

## 4.2 Project Modules

Our system Deals with two main modules. They are

* Admin module
* Customer module

### 4.2.1 Admin modules

* The admin has to login before accessing to the system
* After logging into the system , admin can manage products ,stocks ,orders
* When customer purchase items , admin can ship the product

### 4.2.2 Customer module

* Customer can register new user before logging into the system
* Customer can reset password through OTP email verification
* Customer can manage carts to purchase items.
* Customers can make online-payment via STRIPE

# Chapter 5

# 5. System testing

Once system implementation is done, system testing will be performed to testing on system performance. System testing is an important process in system development project. It will Perform after the development process.

Testing criteria is based on the users and the requirements to verify the system meets its requirements or not. System reliability is very important for a system to the end users and testing process able to verify the reliability of the system.

## 5.1 Unit Testing

Test case 1: Login module testing

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| NO | Test objectives | Test steps | Input | Output | Expected result | Remarks |
| 1 | To verify the wrong credentials | 1)Input wrong credentials | Username: abcd@  Password:1234 | Wrong username and password | Login Failure | Passed |
| 2 | To verify correct credentials | 1)Input correct credentials | Username:admin@gmail.com  Password:admin | Redirect to register page | Login success | Passed |
| 3 | To verify role based authorization | 1)Admin try to login as customer and vice versa | User type = Customer  Username:admin@gmail.com  Password:admin | Admin cannot login as customer | Login failure | Passed |

Table 5.1(i): Login module testing

Test case 2 : To test the OTP verification

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Test objectives | Test steps | Expected result | Result |
| 1 | To test the OTP is sent to email address provided | Forget password  1)Email provided | Email sent to specified address if exists | Pass |
| 2 | To verify the OTP | 1)Incorrect OTP input  2)correct OTP | Invalid OTP  Valid OTP | Pass |
| 3 | Reset password | 1)Enter new password | Password changes in database | Pass |

Table 5.2(ii) : OTP verification testing table

Test case 3 : To test the operations performed by admin.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Test objectives | Test steps | Expected result | Result |
| 1 | To test the success of add , remove , delete update products | 1)Add new data  2)Save  3)Delete  4)Update | New data added  Data saved  Data deleted  Updated | Pass |
| 2 | To test the stock quantity | 1)stock amount defined | If customer purchase items stock should be reduced | Pass |
| 3 | To search the items by category | 1)Search available items  2)Search random unavailable items | Items displayed  Error message | Pass  Pass |

Table 5.2(iii) : Admin functionality testing

Test case 3 :Payment module testing

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| No | Test objectives | Test steps | Expected result | Result |
| 1 | To test the STRIPE payment integration | 1)Enter correct card details | Payment success | Pass |
| 2 | To test the stock quantity | 2)Enter incorrect card details | Payment failure | Pass |

Table 5.3(iv) : Payment module testing

# Chapter 6

# 6.Conclusion

The creation of the system was not easy task because there were many error with the platform from which the system was created. Many systems had to be written numerous ways before a final working solution was found .By ignoring all the error and complexity that arise while developing the system , by utilizing all the resource we successfully created this system. Our project is only a humble venture to satisfy the needs in an Institution. Several user friendly coding have also adopted. This package shall prove to be a powerful package in satisfying all the requirements of the organization.

The DigitalBazar project successfully achieves its objective of creating a robust B2C e-commerce platform that caters to the needs of both administrators and customers. Built using JSP, Servlets, MySQL, and Maven, the application integrates core functionalities required for seamless e-commerce operations.

For administrators, the platform provides comprehensive tools to manage products, update inventory, track stocks, handle shipping, store transaction details, and communicate with customers through email services. These features streamline backend operations, ensuring efficiency and control over business processes.

For customers, the platform offers an intuitive and user-friendly interface for activities such as login, signup, password recovery, product browsing, cart management, payment processing, and order tracking. By incorporating features like email notifications and secure payment mechanisms, the project enhances user engagement and trust in the system.

The system not only demonstrates the efficient use of Java technologies but also highlights the importance of integrating web technologies with database management for scalable and reliable performance. Overall, the Digital Bazar project serves as a practical and functional solution for a digital marketplace, offering a solid foundation for future advancements such as incorporating advanced analytics, AI-driven recommendations, and additional payment gateways. It showcases the potential of modern e-commerce platforms to transform business operations and provide a seamless shopping experience.

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# Appendix

1. Index page

A screenshot of a computer

Description automatically generated

1. Login page

A screenshot of a login form

Description automatically generated

1. Customer Registration

A screen shot of a registration form

Description automatically generated

1. Product update form

A screenshot of a product update form

Description automatically generated

1. Stock Management

A screenshot of a computer

Description automatically generated

1. Shipping Details

A screenshot of a computer

Description automatically generated

1. Unshipped orders

A screenshot of a computer

Description automatically generated

1. Remove product by id

A screenshot of a deletion form

Description automatically generated

1. Customer index page

A screenshot of a computer

Description automatically generated

1. Cart management

A screenshot of a computer

Description automatically generated

1. Order details

A screenshot of a order

Description automatically generated

1. User Profile

A screenshot of a phone

Description automatically generated

1. Payment via Stripe

A screenshot of a credit card payment

Description automatically generated