Department of Computer Science and Engineering

BENGALURU, KARNATAKA, INDIA.

B. TECH. (CSE)

V SEMESTER

Aug. – Dec. 2023

UE21CS341A – SOFTWARE ENGINEERING

PROJECT REPORT

ON

Ecommerce Website with Sentiment Analysis

SUBMITTED BY

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Title: E-Commerce Website with Sentiment Analysis

Group No. 4

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Description:

We aspire to create a data-driven e-commerce solution that not only facilitates transactions but also delves into the realm of insights hidden within customer sentiments and preferences.

This Ecommerce Website is a modern, fully functional web application built using a combination of technologies, including React, HTML, CSS, JavaScript, and MongoDB. This project aims to emulate the core functionality and user experience of an e-commerce platform allowing users to browse, search, view, and purchase products online. It uses Sentiment Analysis program which uses Machine Learning and Natural Language Processing to analyze the sentiments of the customers. This project aims to create an engaging and data-driven e-commerce solution that provides valuable insights into customer sentiments and preferences.

Target Users:

Online Shoppers: These are the primary users of the e-commerce platform who browse and purchase products.
Product Vendors: Individuals or businesses that want to sell their products through the platform.
Platform Administrators: Responsible for managing and maintaining the e-commerce website, including product listings and user accounts.

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Key Features:

1. **User Authentication:**
   - Users can sign up and log in securely to access personalized features.
   - Authentication is implemented using Firebase or a custom authentication system.

2. **Product Catalog:**
   - The website displays a wide range of products categorized into various departments.
   - Users can search for products, filter by category, and view product details.

3. **Product Listings**:
   - Product listings feature high-quality images, detailed descriptions, prices, and customer reviews.
   - Users can add items to their shopping cart or wish list.

4. **Shopping Cart**:
   - Users can add products to their shopping cart and view a summary of selected items.
   - They can adjust quantities, remove items, and proceed to checkout.

5. **Checkout Process:**
   - A multi-step checkout process includes shipping information, payment methods, and order confirmation.
   - Users can enter shipping addresses, select payment options, and review their orders.

6. **Payment Integration:**
   - Integration with a payment gateway for secure and convenient transactions.
   - Users can make payments using credit/debit cards.

7. **Order History:**
   - Users can view their order history and track the status of their recent orders.
   - Order details include shipping information, payment receipts, and delivery status.

8. **User Reviews and Ratings:**
   - Registered users can leave reviews and ratings for products.
   - Reviews are displayed on product pages to help other customers make informed decisions.
   - These reviews are used for sentiment analysis to enhance user experience.

9. **Sentiment Analysis:**
   - Extracting Json file from the database and giving as input to the analyzer to analyze the sentiments of our customers using StreamLit and Python libraries.

10. **Admin Panel:**
   - An admin panel for managing products, categories, and user accounts.
   - Admins can add, edit, or delete products and categories.

11. **Responsive Design:**
   - The website is responsive, ensuring a seamless user experience on various devices.

12. **Database:**
   - MongoDB is used as the database to store product information, user data, and order details.

13. **Security:**
   - Security measures are implemented to protect user data, transactions, and authentication.

14. **Deployment:**
   - The application can be hosted on platforms like Heroku.

Project Work Distribution:

Kusum Manisha: Frontend Development, Sentiment Analysis Model Training

Maryam Khan: Frontend Development, Data extraction and preprocessing, Sentiment Analysis Model Training

Mohammed Hashim Maniyar: Backend Development, Sentiment Analysis Model Test, Fine Tuning

Manasvi Varma: Backend Development, Sentiment Analysis Model Deployment and Maintenance

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Software Requirements Specification

For

E-Commerce with Sentiment Analysis

Version 1.0 approved

Prepared by

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Revision History

Name	Date	Reason For Changes	Version

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Introduction

Purpose

This Software Requirements Specification (SRS) document outlines the software requirements for the development of the project "E-Commerce Website with Sentiment Analysis". This document serves as a guide for developers, project managers, testers, and stakeholders involved in the project.

Intended Audience

- **Developers**: To understand the technical requirements and design considerations.
- **Project Managers**: To oversee the project's progress and resource allocation.
- **Testers**: To create test cases and ensure compliance with requirements.
- **Marketing Staff**: To understand the features and capabilities of the product.
- **Users**: To gain insights into the product's functionality.
- **Documentation Writers**: To create user manuals and guides.

The SRS is organized as follows:
Section 3 covers External Interface Requirements
Section 4 includes Analysis Models
Section 5 details System Features
Section 6 outlines Non-Functional Requirements
Section 7 addresses Other Requirements
Appendices A, B, and C contain additional supporting information.

Product Scope

The "E-Commerce Website with Sentiment Analysis" is a comprehensive online platform designed to offer a seamless shopping experience with the added capability of sentiment analysis for product reviews. This platform allows users to register, browse products, make purchases, and benefit from sentiment analysis insights on product reviews.

References

<List any other documents or Web addresses to which this SRS refers. These may include user interface style guides, contracts, standards, system requirements specifications, use case documents, or a vision and scope document. Provide enough information so that the reader could access a copy of each reference, including title, author, version number, date, and source or location.>

Overall Description

Product Perspective

The "E-Commerce Website with Sentiment Analysis" is a standalone product, designed to provide end-to-end e-commerce functionality while integrating sentiment analysis capabilities for product reviews. It operates independently but may interact with external systems, such as payment gateways and sentiment analysis APIs.

Product Functions

The major functions of the product include:

- User Registration and Authentication
- Product Listing and Search
- Shopping Cart Management
- Checkout Process
- Sentiment Analysis of Product Reviews

Detailed descriptions of these functions are provided in Section 5 of this document.

User Classes and Characteristics

- **Customers:** These users represent the primary audience of the website. They vary in technical expertise and may have different levels of experience with online shopping. Characteristics include shopping preferences, browsing behaviour, and purchase history.

- **Administrators:** These users have technical expertise and are responsible for maintaining the website. They have privileged access to manage products, users, and the sentiment analysis system.

Certain requirements, such as user registration and shopping cart management, apply to all user classes. However, administrative tasks are specific to administrators.

Operating Environment

- **Hardware Platform**: The software will operate on standard web server infrastructure, which includes a web server and database server. The hardware requirements for these servers will be determined during the system architecture design phase.

- **Operating System and Versions**: The software will be compatible with commonly used operating systems such as Windows Server, Linux (e.g., Ubuntu), and cloud-based platforms (e.g., AWS, Azure).

- **Software Components**: The software will coexist with various software components, including web browsers (e.g., Google Chrome, Mozilla Firefox, Safari), web server software (e.g., Apache, Nginx), and database management systems (e.g., MongoDB, MySQL, PostgreSQL).

Design and Implementation Constraints

- **Hardware Limitations**: The software should be designed to work efficiently within the hardware limitations, including timing and memory requirements. Specific hardware requirements will be determined during the system design phase.
- **Interfaces to Other Applications**: The software may need to interface with third-party applications for payment processing and sentiment analysis. The integration must follow the APIs and protocols provided by these external systems.
- **Programming Languages and Technologies**: The development team is constrained to use specific programming languages and technologies, such as [Specify programming language], [Specify framework], and [Specify database system].
- **Security Considerations**: Stringent security measures must be implemented to protect user data, including secure communication (HTTPS), data encryption, and authentication mechanisms.
- **Corporate and Regulatory Policies**: The development must adhere to company policies regarding data privacy, security, and ethical data usage. Additionally, compliance with relevant regulations (e.g., GDPR, PCI DSS) is mandatory.

Assumptions and Dependencies

- Assumption 1: Assumption that the payment gateway and sentiment analysis APIs provide stable and reliable services.
- Assumption 2: Assumption that users have access to modern web browsers with JavaScript enabled.
- Assumption 3: Assumption that the hosting infrastructure will provide scalability and high availability.
- Dependency 1: Dependency on the availability and performance of the payment gateway API for secure payment processing.
- Dependency 2: Dependency on the sentiment analysis API for analyzing product reviews.
- Dependency 3: Dependency on external cloud hosting services for scalability and reliability.

External Interface Requirements

User Interfaces

The user interface will:

- Follow responsive web design principles to ensure compatibility with various devices and screen sizes.
- Adhere to GUI standards for consistent user experience.
- Include standard elements such as navigation menus, search bars, user registration forms, product listings, and shopping cart displays.
- Feature user-friendly error message displays and help functionalities.
- Be documented in a separate User Interface Specification document.

Software Interfaces

The software will interface with the following components:

- Database Management System: The software will interact with the database to retrieve and store user data, product information, and sentiment analysis results.
- Payment Gateway API: Integration with a payment gateway API for secure payment processing.
- Sentiment Analysis API: Integration with an external sentiment analysis API to analyze and provide sentiment insights for product reviews.
- Web Server: The software will be hosted on a web server that handles HTTP requests and responses.
- Operating System: Interactions with the underlying operating system for resource management.

Communications Interfaces

- HTTP/HTTPS: The software will use HTTP/HTTPS protocols for communication between clients and the web server.
- SSL Encryption: Secure Socket Layer (SSL) encryption will be employed to ensure secure data transmission.
- Email: The software will support email notifications and communication with users.
- RESTful API: RESTful APIs will be utilized for communication with external services, such as the sentiment analysis API.
- Message Formatting: JSON (JavaScript Object Notation) will be used for message formatting between components.
- Communication Standards: Standard communication standards such as FTP or HTTP will be employed as needed.

Analysis Models

The analysis models for the e-commerce website with sentiment analysis will include:
Use Case Diagrams: These diagrams will illustrate the interactions between various actors (users, administrators) and the system. They will help identify the primary use cases and system boundaries.
Entity-Relationship Diagrams (ERD): ERDs will depict the relationships between different entities within the system, such as users, products, orders, and reviews. These diagrams will aid in designing the database schema.

System Features

The major services provided by the e-commerce website with sentiment analysis are organized into system features. Below are some examples of these features:

System Feature 1

User Registration and Authentication

5.1.1 Description and Priority

This feature allows users to register on the platform and authenticate themselves.
It is of High priority as it is fundamental to user engagement and security.

5.1.2 Stimulus/Response Sequences

Stimulus: User clicks on the "Register" button.
Response: The system displays the registration form.
Stimulus: User submits registration details.
Response: The system verifies the information and creates a user account.

5.1.3 Functional Requirements

REQ-1: The system shall provide a user registration form with fields for username, email, password, and personal information.
REQ-2: The system shall validate user inputs and display appropriate error messages for invalid data.
REQ-3: The system shall securely store user credentials and personal information in the database.
REQ-4: The system shall provide user authentication functionality, including login and password recovery.

System Feature 2

Product Listing and Search

5.2.1 Description and Priority

This feature allows users to browse and search for products. It is of High priority as it is core to the shopping experience.

5.2.2 Stimulus/Response Sequences

Stimulus: User enters a search query.

Response: The system displays search results based on the query.

Stimulus: User clicks on a product.

Response: The system displays detailed product information.

5.2.3 Functional Requirements

REQ-5: The system shall provide a product listing page with search and filter options.

REQ-6: The system shall support keyword-based product searches.

REQ-7: The system shall display product details including images, descriptions, and prices.

REQ-8: The system shall provide sorting and filtering options for search results.

Other Non Functional Requirements

Performance Requirements

- Performance Requirement 1: The system shall respond to user interactions (e.g., product searches, page loads) within 2 seconds to ensure a responsive user experience.
- Performance Requirement 2: The system shall support concurrent user sessions, with a minimum of 500 simultaneous users, without significant degradation in performance.
- Performance Requirement 3: The database shall be optimized for efficient data retrieval, with query response times of less than 100 milliseconds for common queries.

Safety Requirements

- Safety Requirement 1: The system shall implement robust data validation and sanitization mechanisms to prevent security vulnerabilities such as SQL injection and cross-site scripting (XSS) attacks. This is to ensure the safety and security of user data.
- Safety Requirement 2: In case of unexpected system failures or errors, the system shall provide graceful error handling and fail-safe mechanisms to prevent data loss or corruption. This includes regular automated data backups and disaster recovery procedures.
- Safety Requirement 3: User-generated content, such as product reviews and comments, shall be monitored for inappropriate or harmful content. The system shall have content moderation features to prevent offensive, abusive, or harmful content from being published.
- Safety Requirement 4: Payment processing shall comply with industry-standard security practices, including Payment Card Industry Data Security Standard (PCI DSS) compliance. This is to ensure the safety of financial transactions and user payment information.
- Safety Requirement 5: The system shall enforce strict access control and authentication mechanisms to prevent unauthorized access to sensitive user data and administrative functionalities. This includes user session management and role-based access control.
- Safety Requirement 6: The system shall provide clear and accurate product information, including safety warnings and usage instructions, for products that may pose safety risks. This is to ensure that users are informed about potential hazards associated with certain products.
- Safety Requirement 7: In case of a security breach or data compromise, the system shall have a security incident response plan in place, including user notification procedures and legal compliance, to mitigate potential harm to users.

Security Requirements

- Security Requirement 1: The system shall implement strong encryption (e.g., AES-256) for the transmission and storage of sensitive user data, including login credentials and payment information.

- Security Requirement 2: User authentication shall follow industry best practices, including the use of multi-factor authentication (MFA) for user accounts that access sensitive information.

- Security Requirement 3: The system shall regularly undergo security assessments and penetration testing to identify and remediate vulnerabilities. Vulnerability assessments shall be conducted at least once every quarter.

- Security Requirement 4: Access to administrative functions and sensitive data shall be restricted to authorized personnel only. Role-based access control (RBAC) shall be enforced to ensure that users can only perform functions appropriate to their roles.

- Security Requirement 5: The system shall maintain comprehensive audit logs of user activities, including login attempts, data access, and configuration changes. Audit logs shall be securely stored and periodically reviewed for security incidents.

- Security Requirement 6: Compliance with relevant privacy regulations, such as the General Data Protection Regulation (GDPR), shall be ensured. This includes obtaining user consent for data processing and providing mechanisms for data deletion upon user request.

- Security Requirement 7: The system shall have a robust incident response plan in place to handle security breaches, including notification of affected users, authorities, and regulatory bodies, as required by law.

Software Quality Attributes

- Availability Requirement: The system shall maintain an availability rate of at least 99.9% to ensure uninterrupted service to users.

- Reliability Requirement: The system shall be designed to minimize unplanned downtime and system failures. The Mean Time Between Failures (MTBF) target shall be no less than 12 months.

- Usability Requirement: The user interface shall be intuitive and user-friendly, with an average user satisfaction rating of at least 4 out of 5 in user surveys.

- Maintainability Requirement: The software shall be designed with modular and maintainable code structures to facilitate future enhancements and updates.

Business Rules

- Business Rule 1: Only registered and authenticated users can place orders.

- Business Rule 2: Discounts and promotions shall be applied based on predefined business rules and user eligibility.

- Business Rule 3: Product reviews shall be visible to all users, but only registered users can submit reviews.

Other Requirements

- Database Requirements: The system shall use a relational database management system (e.g., MySQL or PostgreSQL) for data storage, with data backup procedures in place.
- Internationalization Requirements: The user interface shall support multiple languages and allow users to select their preferred language.
- Legal Requirements: The system shall comply with all relevant national and international laws and regulations governing e-commerce and data protection.

Appendix A: Glossary

SRS: Software Requirements Specification - A document that outlines the requirements for a software project.

E-Commerce: Electronic Commerce : The buying and selling of goods and services over the internet.

Sentiment Analysis: The process of determining the sentiment or emotional tone of a piece of text, often used to analyze customer reviews.

UI: User Interface - The graphical layout and elements that users interact with in a software application.

API: Application Programming Interface - A set of rules and protocols that allows different software applications to communicate with each other.

HTTP: Hypertext Transfer Protocol - The protocol used for transferring data over the World Wide Web.

HTTPS: Hypertext Transfer Protocol Secure - The secure version of HTTP that encrypts data transmitted between the web server and the client.

JSON: JavaScript Object Notation - A lightweight data interchange format often used for data serialization.

PCI DSS: Payment Card Industry Data Security Standard - A set of security standards designed to ensure that all companies that accept, process, store, or transmit credit card information maintain a secure environment.

GDPR: General Data Protection Regulation - A regulation in EU law on data protection and privacy for all individuals within the European Union and the European Economic Area.

MTBF: Mean Time Between Failures - A measure of the reliability of a system, indicating the average time between failures.

RBAC: Role-Based Access Control - A method of regulating access to computer or network resources based on the roles of individual users.

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SQL: Structured Query Language - A domain-specific language used in programming and managing relational databases.

GUI: Graphical User Interface - A type of user interface that allows users to interact with electronic devices through graphical elements.

ERD: Entity-Relationship Diagram - A diagram that illustrates the relationships between entities in a database.

API: Application Programming Interface - A set of rules and protocols that allows different software applications to communicate with each other.

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Project Plan Document

For

E-Commerce with Sentiment Analysis

Prepared by
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15-10-2023

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Project Plan Document

Lifecycle Model

We have chosen the **Incremental Model** as the primary lifecycle approach For the execution of our E-Commerce website project. Implementing an E-Commerce website is a complex project that involves various stages and continuous improvement to adapt to changing requirements and market conditions. The Incremental Model is a flexible and iterative software development process that allows for the gradual addition of features and functionalities in successive cycles or increments. This approach aligns well with the dynamic nature of e-commerce projects, enabling us to respond effectively to evolving requirements, market trends, and user feedback.

Incremental Lifecycle Model

1. Planning and Requirements Gathering:
-In the initial phase we gather high-level requirements and define project goals and objectives. We identify the core features and functionalities of the e-commerce website.

2. Architectural Design:
-Design the system architecture, considering scalability, security, and performance. Create a high-level design of the website.

3. Iterative Development and Testing:
- Divide the development process into smaller increments or iterations, typically 2-4 weeks in length.
- Develop a minimal viable product (MVP) during the first iteration. This may include basic product catalogue, user registration, and shopping cart features.
- Test and validate the features developed in each iteration.
- Make improvements based on feedback and emerging requirements.

4. User Feedback and Enhancements:
- Collect feedback from users, stakeholders, and market trends.
- Prioritize enhancements and new features based on feedback and evolving business needs.
- Implement changes in subsequent iterations.

5. Security and Performance Enhancements:
- Continuously monitor and enhance website security and performance.
- Address any vulnerabilities and optimize performance to ensure a seamless user experience.

6. Content and Data Management:
- Implement content management systems for easy updates and additions of product listings and information.

- Manage product data efficiently, possibly through integration with product information management (PIM) systems.

7. Payment and Checkout System Integration:
- Integrate secure payment gateways and optimize the checkout process.
- Ensure compliance with industry standards and regulations.

8. Scaling and Load Testing:
- As traffic and demand increase, scale the infrastructure to handle additional load.
- Conduct load testing to identify and rectify performance bottlenecks.

9. Continuous Monitoring and Maintenance:
- Implement continuous monitoring to detect issues in real-time.
- Regularly maintain and update the website to stay current with technology and security trends.

Incremental Lifecycle Model for E-commerce Website Development

Iteration 1

Planning and Initial Requirements Gathering:
Define project goals, objectives, and high-level requirements.
Identify the core features, such as user registration and authentication, product listing, and search.

Iteration 2

User Registration and Authentication:
Develop user registration functionality.
Implement authentication features.
Conduct testing and validation.

Iteration 3

Product Listing and Search:
Develop the product listing functionality, including product catalog and categories.
Implement the product search feature.
Integrate basic user authentication from the first iteration.
Test and validate the features.

Iteration 4

Shopping Cart Management:
Create the shopping cart functionality.
Allow users to add and manage items in the cart.
Integrate with the previous features.
Test and validate the shopping cart.

Iteration 5

Checkout Process:
Develop the checkout process, including order review and payment.
Integrate with the shopping cart, product listing, and user registration features.
Conduct testing and validation.

Iteration 6

Sentiment Analysis of Product Reviews:
Implement sentiment analysis for product reviews.
Integrate this functionality with the product listing.

Test and validate the sentiment analysis feature.

Iteration 7

Testing, Additional Features and Refinements:
Continue to add additional features based on evolving requirements.
Enhance existing functionalities.
Conduct regular testing, user feedback analysis, and improvements.

Once all the iterations are completed successfully, the model is deployed and is ready to be used in the market.

Justification for Using Incremental Model:

Adaptability to Changing Requirements: An e-commerce website's requirements can evolve rapidly due to changing market conditions, customer preferences, and technology advancements. The incremental model allows you to adapt to these changes effectively by developing and integrating features in iterations.

User-Centric Approach: Incremental development encourages frequent user involvement and feedback. This is essential for e-commerce, as user needs and expectations are critical. Features like user registration and authentication, shopping cart management, and sentiment analysis can be refined based on user feedback.

Early Delivery of Value: Incremental development enables the delivery of a minimum viable product (MVP) early in the project, allowing you to launch a functional website quickly and start generating revenue. In the e-commerce industry, time-to-market is often crucial.

Risk Mitigation: By breaking the project into smaller increments, risks can be identified and addressed earlier in the development process, reducing the chances of costly errors or changes in later stages.

Continuous Improvement: The incremental model promotes ongoing enhancements and refinements, ensuring that the e-commerce website stays competitive and up-to-date.
In conclusion, the incremental lifecycle model is a well-suited approach for developing an E-Commerce website due to its adaptability, risk mitigation, focus on user feedback, and ability to deliver a high-quality product in a dynamic and competitive market.

In conclusion, the incremental lifecycle model is a well-suited approach for an e-commerce website project due to its adaptability, customer focus, early value delivery, risk management, and support for continuous improvements. It aligns well with the dynamic nature of e-commerce and its evolving requirements.

Tools used throughout the lifecycle

planning tool, design tool, version control, development tool, bug tracking, testing tool.

In an Agile Scrum approach for e-commerce website development, we use a variety of tools to support different aspects of the project lifecycle. The tools used are:

For each phase of the incremental lifecycle model in the development of your e-commerce website, different tools and an operating environment will be utilized to ensure a smooth and efficient workflow. Here's a breakdown of the tools and the operating environment you might use throughout the project:

Planning Tool:
- Tool: Jira
- Use: To plan, organize, and track the progress of tasks and iterations.

Design Tool:
- Tool: ReactJS, NodeJS, Express, CSS, Java script
- Use: To create wireframes and webpages and design assets for the user interface and user experience (UI/UX) design.

Version Control Collaboration and Communication Tools:
- Tool: Git (e.g., GitHub, GitLab, Bitbucket).
- Use: To track changes to the source code, collaborate among developers, and manage version history.
- Slack: Slack is a team collaboration platform for real-time communication and file sharing.
- Microsoft Teams: communication and collaboration.

Development Tool:
- Tool: Integrated Development Environments (IDEs) like Visual Studio Code, PyCharm, Notepad++
- Use: To write, test, and debug code for the website's functionalities.

Testing Tool:
- Tool: Selenium, Postman
- Use: To automate testing processes, perform unit testing, integration testing, and system testing, and validate the functionality of the website.

Selenium: Selenium is an open-source testing framework for web applications. It's particularly useful for automated testing of the user interface and functionalities on your e-commerce website.

Postman: Postman is a tool for API testing, which is essential for e-commerce websites with backend APIs.

Operating Environment:

- Hardware Platform: Standard web server infrastructure, including web server and database server, with specific hardware requirements determined during system architecture design.
- Operating System and Versions: Compatibility with commonly used operating systems such as Windows Server, Linux (e.g., Ubuntu), and cloud-based platforms (e.g., AWS, Azure).
- Software Components: Compatibility with various software components, including web browsers (e.g., Google Chrome, Mozilla Firefox, Safari), web server software (e.g., Apache, Nginx), and database management systems (MongoDB).

These tools help ensure a well-structured, efficient, and secure development process while adhering to the defined constraints and operating environment requirements. We use the above mentioned tools to meet the requirements of our e-commerce website project.

Deliverables categorised as reuse/build components

Reuse Components:

1. User Authentication Module:
   - Categorization: Reuse Component
   - Justification: User authentication is a common feature across e-commerce websites. A well-developed authentication module can be reused for security purposes in future e-commerce projects.

2. Common Libraries and Frameworks:
   - Categorization: Reuse Component
   - Justification: Common libraries and frameworks, such as JavaScript libraries, CSS frameworks, or code components for user interface elements, can be reused to maintain consistency in design and functionality across e-commerce projects.

3. Shopping Cart Module:
   - Categorization: Reuse Component
   - Justification: Shopping cart functionality is a fundamental feature in e-commerce. A reusable shopping cart module can save development time and ensure consistency in cart management.

Build Components:

1. Product Listing and Search Module:
   - Categorization: Build Component
   - Justification: The product listing and search functionality may vary significantly based on the unique requirements of each e-commerce project. Therefore, it needs to be custom-built to accommodate specific product data and search criteria.

2. Custom Sentiment Analysis Module:
   - Categorization: Build Component
   - Justification: Sentiment analysis of product reviews is project-specific, and the models and algorithms may vary. Therefore, a custom sentiment analysis module needs to be built for each project.

3. Checkout Process:
   - Categorization: Build Component
   - Justification: The checkout process involves unique business rules, payment integrations, and shipping options. Thus, it should be custom-built to suit the specific needs of the current e-commerce website.

4. Product Catalogue Database Schema:
   - Categorization: Build Component

- Justification: The structure and organization of the product catalogue database may vary based on the project's unique product data and requirements, making it a project-specific build component.

5. Payment Gateway Integration:
- Categorization: Build Component
- Justification: Payment gateway integration is specific to the chosen payment service and involves custom API integrations and configurations tailored to the project's needs.

6. Bug Fixes and Issue Resolutions:
- Categorization: Build Component
- Justification: Bug fixes and issue resolutions are specific to the current project and address unique issues that arise during development and post-launch phases.

The categorization of deliverables is based on the project's unique requirements and the extent to which certain components can be generalized for reuse. It is essential to assess each deliverable's potential for reuse and evaluate the practicality of doing so within the context of an organization's practices and project constraints.

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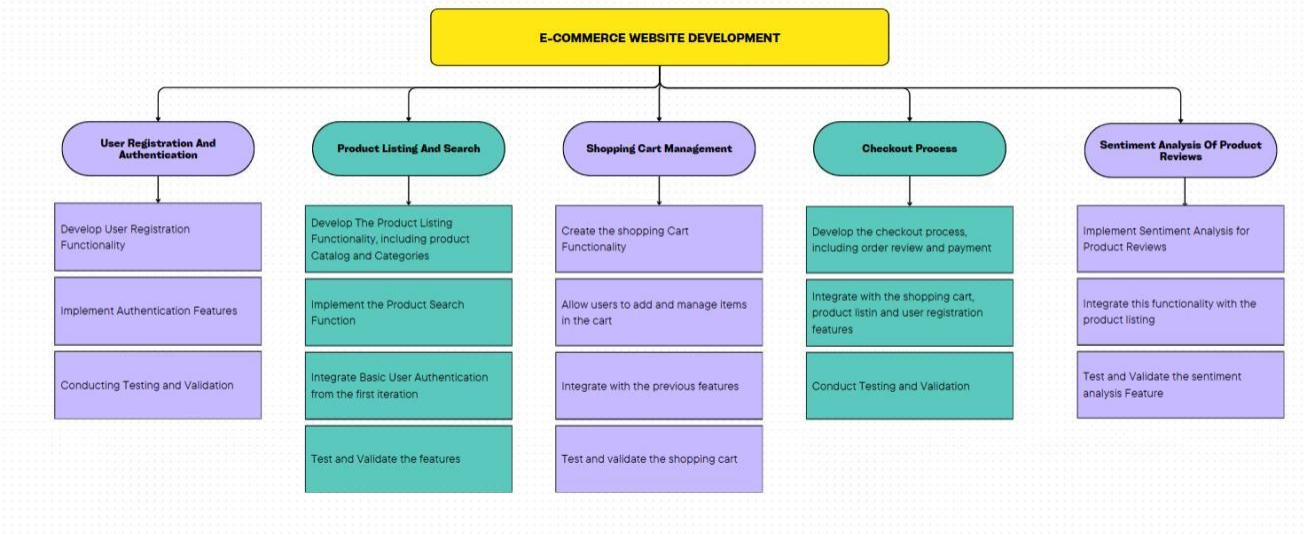

Estimate of effort required to accomplish each task in terms of person months.

Task 1: Planning And Initial Requirements
Participants: Entire Team
Time Allocated: 1 Month
Person Months: 4 x 1 = 4 Person Months

Task 2: User Registration And Authentication
Participants: Kusum, Maryam [2]
Time Allocated: 1 Months
Person Months: 2 x 1 = 2 Person Months

Task 3: Product Listing And Search
Participants: Hashim, Maryam [2]
Time Allocated: 1.15 Months
Person Months: 2 x 1.15 = 2.3 Person Months

Task 4: Shopping Cart Management
Participants: Kusum, Hashim [2]
Time Allocated: 1.611 Months
Person Months: 2 x 1.6 = 3.2 Person Months

Task 5: Checkout Process
Participants: Manasvi, Maryam, Hashim [3]
Time Allocated: 1 Months
Person-Months: 3 x 1 = 3 Person Months

Task 6: Sentiment Analysis Of Product Reviews
Participants: Manasvi [1]
Time Allocated: 1 Months
Person Months: 1 x 1 = 1 Person Months

Total Estimate Of Effort = 15.5 Person Months

Gantt Chart


STAGE
WEEK1
WEEK2
WEEK3
WEEK4
WEEK5
WEEK6
WEEK7
WEEK8
Planning and Initial Requirements Gathering
Define project goals, objectives, and high-level requirements.
Identify the core features, such as user registration and authentication, product listing, and search.
User Registration and Authentication
Develop user registration functionality.
Implement authentication features.
Conduct testing and validation.
Product Listing and Search
Develop the product listing functionality, including product catalog and categories.
Implement the product search feature.
Integrate basic user authentication from the first iteration.
Test and validate the features.
Shopping Cart Management
Create the shopping cart functionality.
Allow users to add and manage items in the cart.
Integrate with the previous features.
Test and validate the shopping cart.
Checkout Process
Develop the checkout process, including order review and payment.
Integrate with the shopping cart, product listing, and user registration features.
Conduct testing and validation.
Sentiment Analysis of Product Reviews
Implement sentiment analysis for product reviews.
Integrate this functionality with the product listing.
Test and validate the sentiment analysis feature
HASHIM
KUSUM
MARYAM
MANASVI
TEAM

PES UNIVERSITY
Department of Computer Science and Engineering

UE21CS341A: Software Engineering

Testing Document

for

Ecommerce Website with Sentiment Analysis

Prepared by

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Department of Computer Science and Engineering

19/11/2023

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Testing of various functional requirements:

1. New user registration

Test Case ID	Name of Module	Test Case Description	Pre conditions	Test Steps	Test Data	Expected Results	Actual Result	Test Result
UT-01	User Registration	Successful registration of a new user	User is on the registration page	1.User enters valid username and password 2.User clicks on the register button	Valid username and password (Unique username and password that meets certain criteria) Username: sami@2003 Password: Sami@123	The user is registered successfully, and they are redirected to the landing page where they can login.	The user is registered successfully, and they are redirected to the landing page where they can login.	Pass
UT-02	User Registration	User registration with existing username	User is on the registration page	1.User enters an already existing username with a valid password 2.User clicks on the register button	Existing username is used for registration Username: John Doe Password: JohnDoe@123	User registration should fail due to the existing username and an error message is displayed.	User registration fails due to the existing username and an error message is displayed.	Pass

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2. User login

Test Case ID	Name of Module	Test Case Description	Pre conditions	Test Steps	Test Data	Expected Results	Actual Result	Test Result
UT-01	User Login	Successful login of a user	User is registered	User navigates to login page. 1.User enters a registered username and password 2.User clicks on the login button	Valid username and password that is already registered Username: SamiMan Password: Sami@123	The user is successfully logged in	The user is successfully logged in	Pass
UT-02	User Login	Verify that a User cannot log in with an empty username	User is registered	1. Navigate to the login page. 2. Leave the Username field blank. 3. Enter a Valid password in the password field. 4. Click the Login button.	Empty username. Username: Password:123	Error message saying that the entered username cannot be empty	Error message saying that the username or password field cannot be empty	Pass
UT-03	User Login	Verify that a User cannot log in with an empty password	User is registered	1. Navigate to the login page. 2. Enter a valid username. 3. Leave the password field empty 4. Click the Login button.	Empty username. Username: bob Password:	Error message saying that the entered password cannot be empty	Error message saying that the username or password field cannot be empty	Pass

UT-04	User Login	Verify that a User cannot log in with an empty username and password	User is registered	1. Navigate to the login page. 2. Click the Login button.	Empty username. Username: Password:	Error message saying that the username and password field cannot be empty	Error message saying that the username or password field cannot be empty	Pass
UT-05	User login	Verify that a User cannot log in with a valid username and password that do not match.	User is registered	1. Navigate to the login page. 2. Enter a valid username in the username field. 3. Enter an incorrect password in the password field. 4. Click the Login button.	Valid username and incorrect password. Username;Sami Password:password	An error message is displayed indicating that the username and password do not match	An error message is displayed indicating that the username and password do not match	Pass

3. **Search Products**

Test Case ID	**Name of Module**	**Test Case Description**	**Pre conditions**	**Test Steps**	**Test Data**	**Expected Results**	**Actual Result**	**Test Result**
UT-01	Search Products	Successful search of a product	Product already exists	User navigates to search page and enters their requirements	Valid product name and that the product already exists	The product is found	The product is found	Pass

UT-02	Search Products	Verify that the search results are empty when the product doesn't exist	Product is not regisered	User navigates to search page and enters their requirements	Random string: adfadfflkj	Message showing product doesn't exist	Message showing product doesn't exist	Pass

4. Sentiment Analysis

Test Case ID	**Name of Module**	**Test Case Description**	**Pre conditions**	**Test Steps**	**Test Data**	**Expected Results**	**Actual Result**	**Test Result**
UT-01	Sentiment Analaysis	Should show the review to be positive/negative/neutral	User is registered so that he can post his review	User goes to product page and adds his comment	Valid product name and that the product already exists	The sentiment of the review what the user has uploaded is shown	The sentiment of the review what the user has uploaded is shown	Pass

Design Document

for

Ecommerce website using Sentiment Analysis

Version 1.0 approved

Prepared by

PES2UG21CS249- Kusum Manisha

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PES2UG21CS299 – Hashim Maniyar

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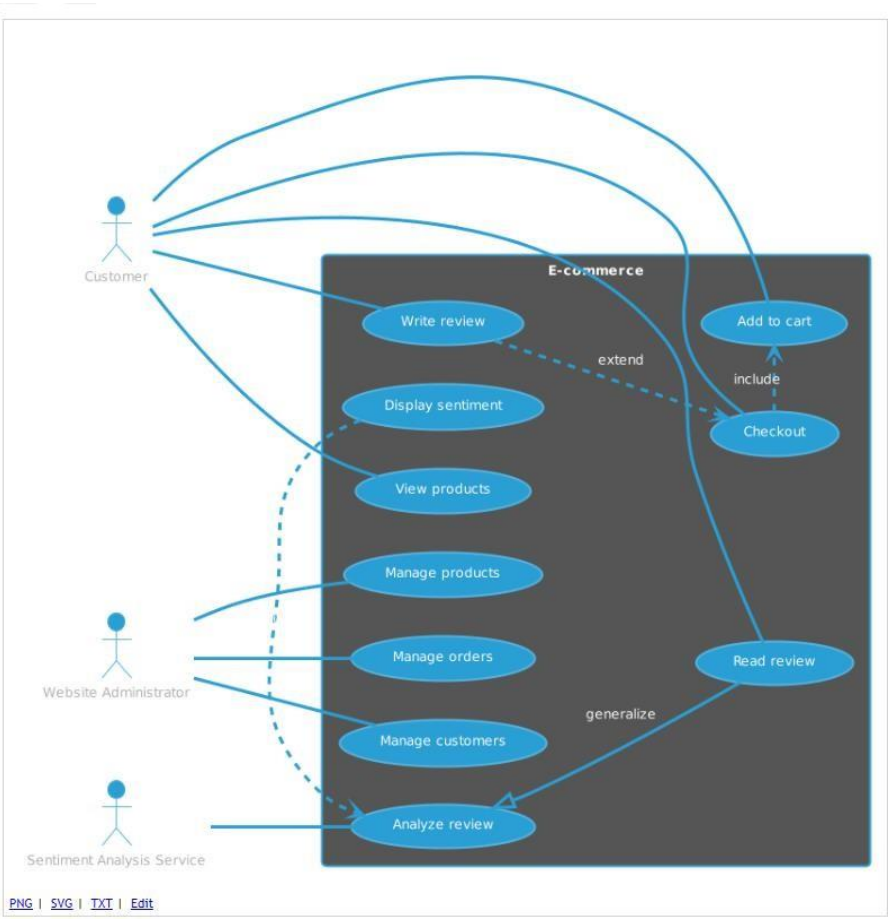
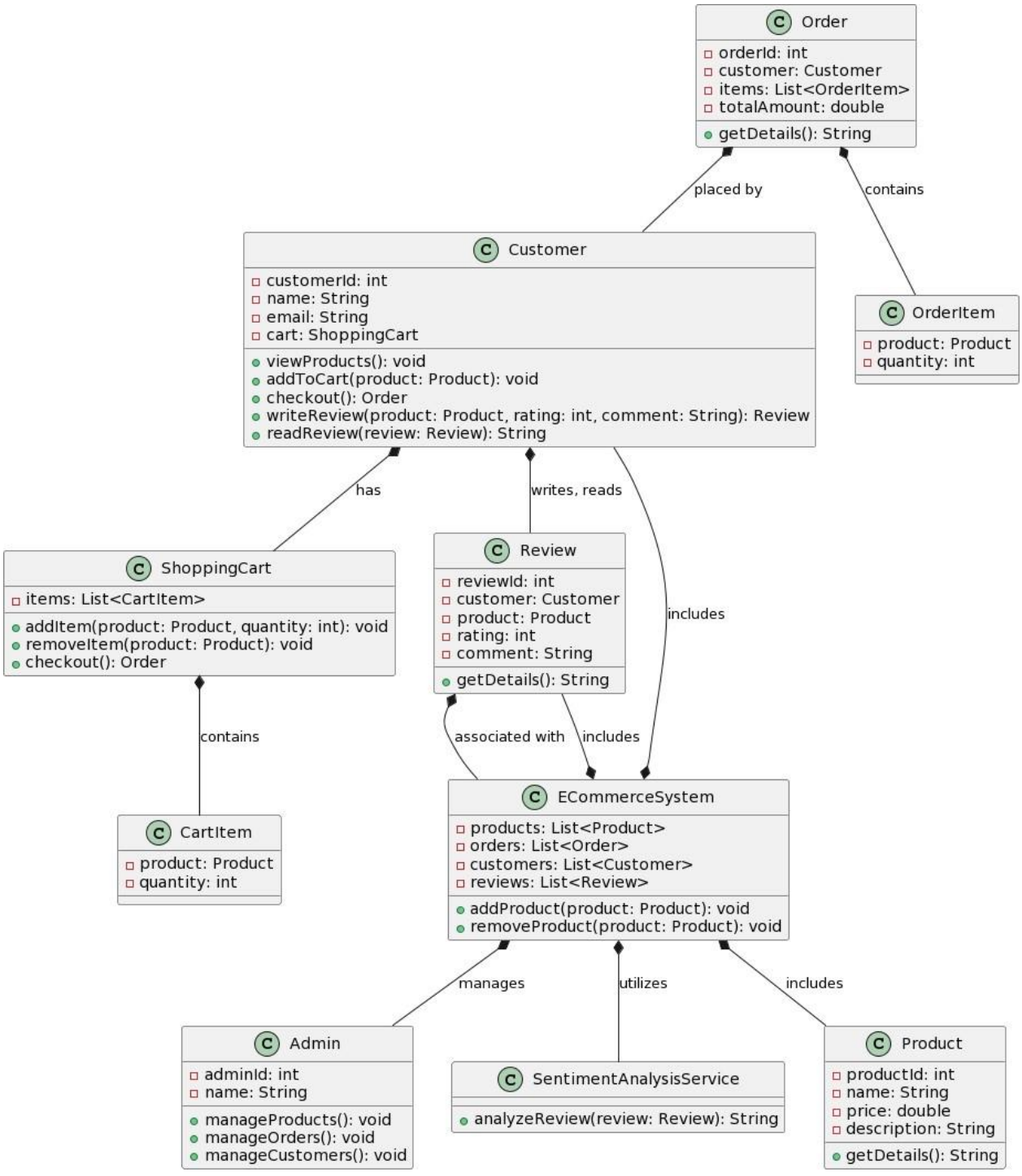
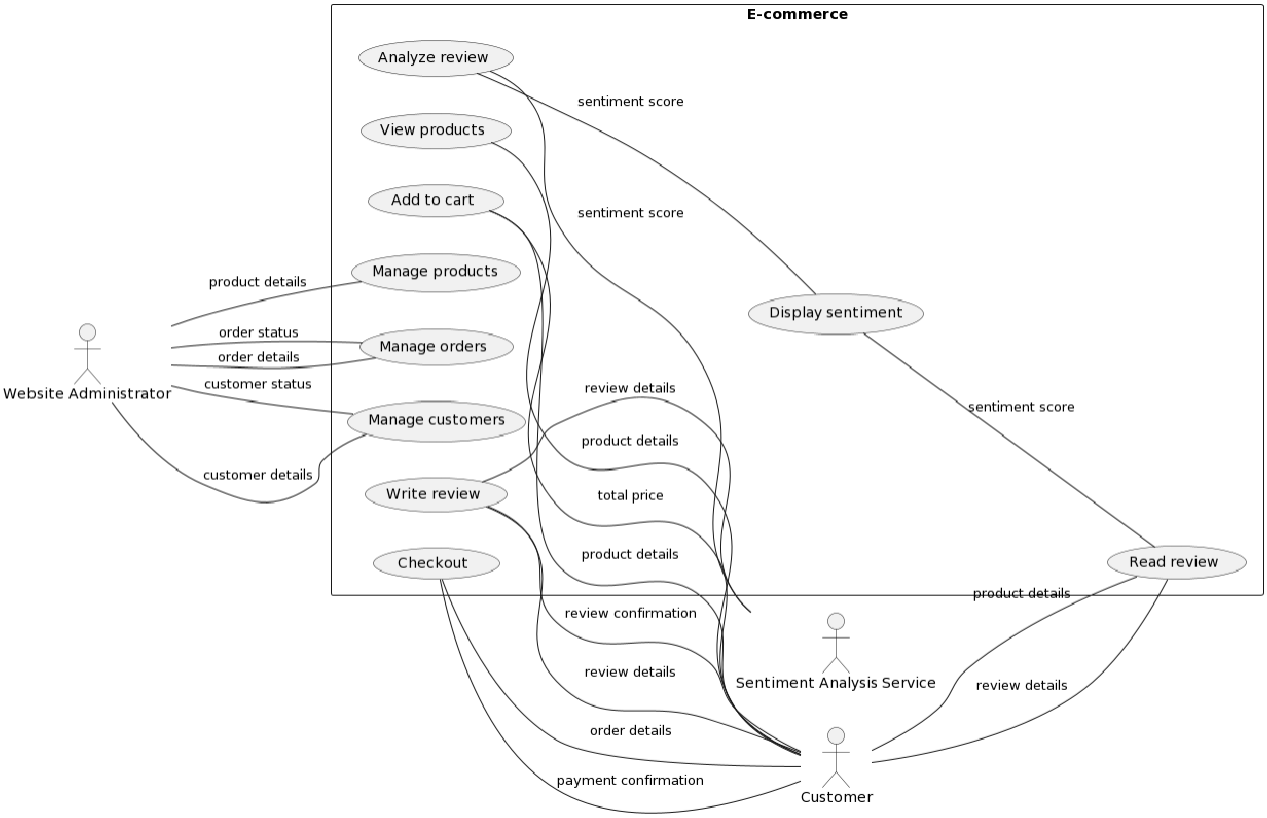
1 USE CASE DIAGRAM



2 CLASS DIAGRAM:



3 TOP LEVEL DATA FLOW DIAGRAM



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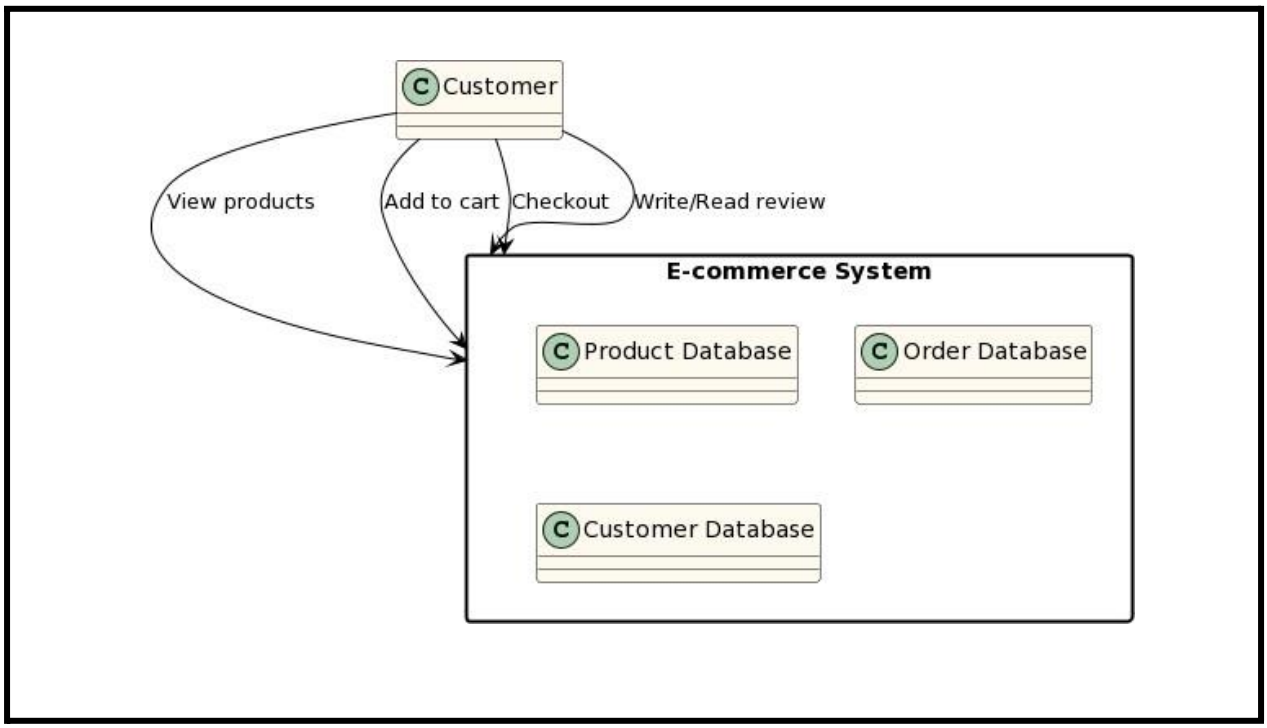
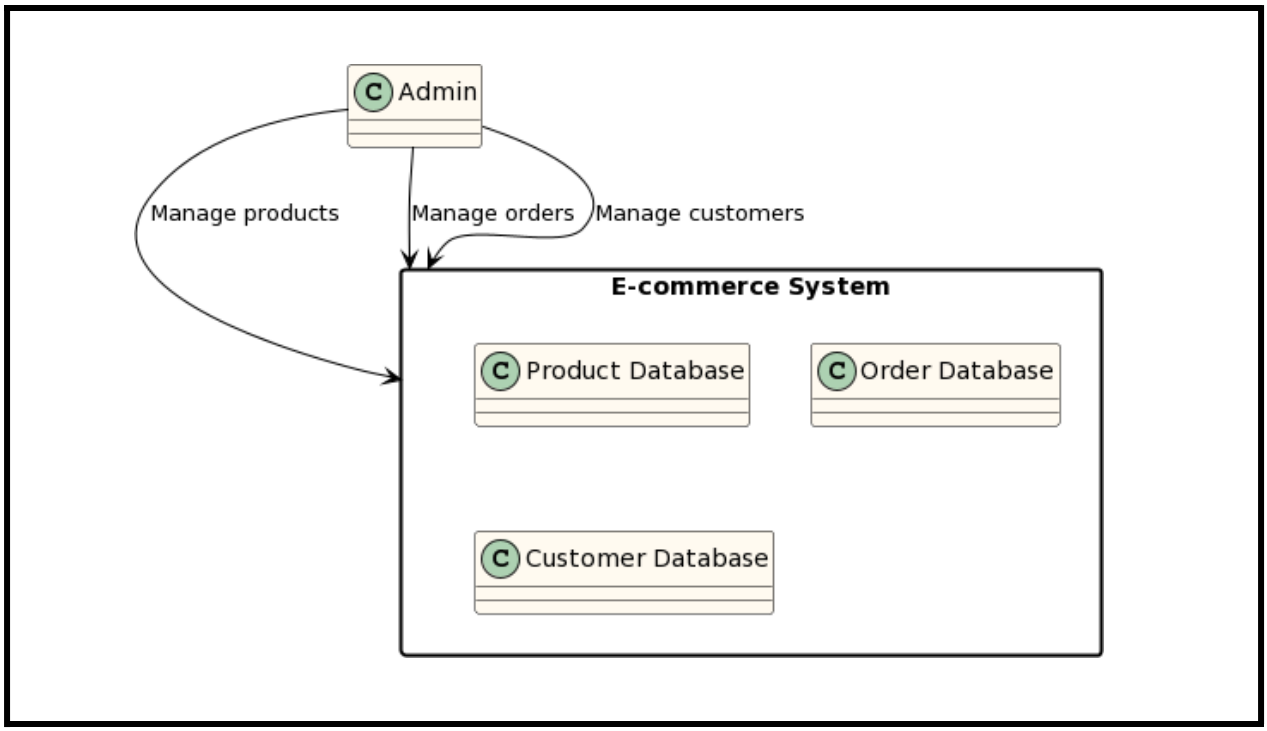
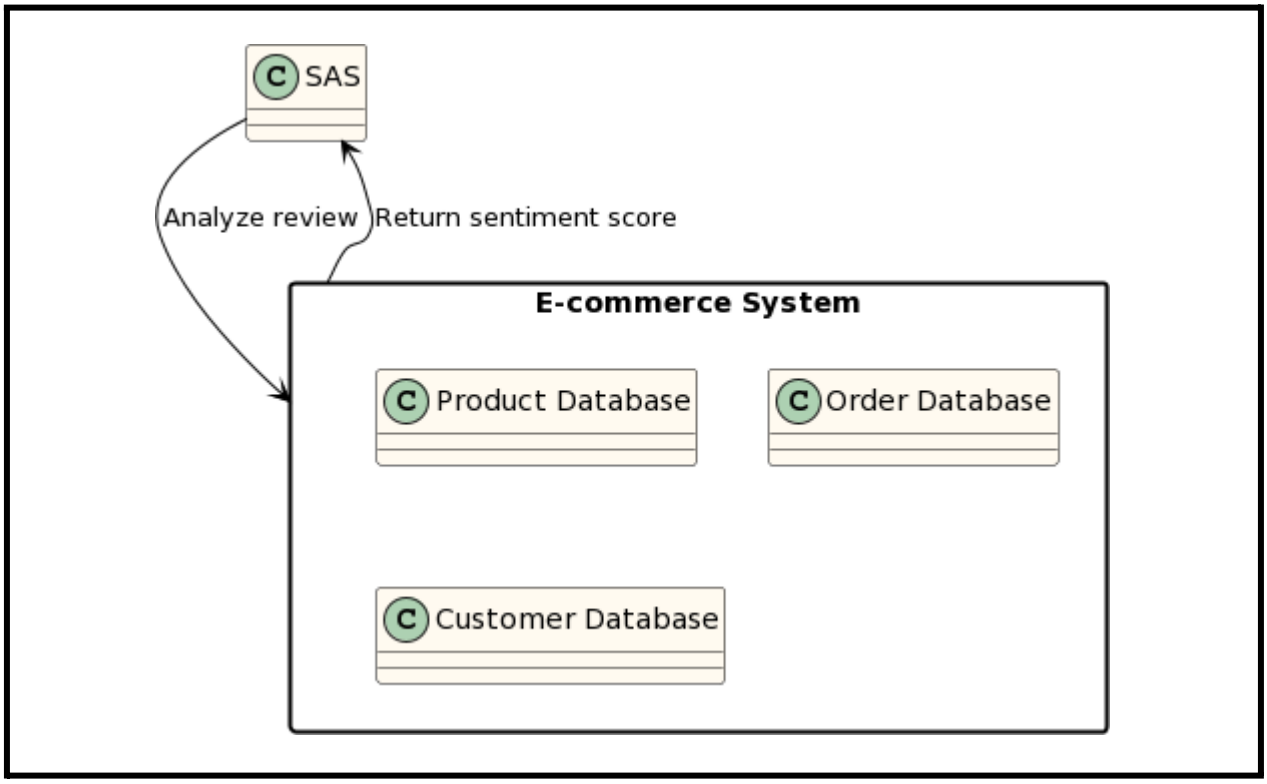
4 FIRST LEVEL DFD




Admin
Manage products
Manage orders
Manage customers
E-commerce System
Product Database
Order Database
Customer Database


SAS
Analyze review
Return sentiment score
E-commerce System
Product Database
Order Database
Customer Database

5 E-Commerce Website - Architectural Style Integration

Client-Server Architecture

Features of Client-Server Architecture:

Centralized Data Management:
User profiles, product details, and order information are centrally stored on the server.
Simplifies data management for consistent and secure access.
Enforces data integrity, backup, and security measures.

Security:
Manages sensitive information like product details, financial transactions, and customer data.
Centralized server implements authentication, authorization, encryption, and other security protocols.

Collaboration and Real-Time Features:
Facilitates real-time communication and collaboration.
Acts as a central hub for clients to exchange data, ensuring synchronization of messages and updates.

Consistency and Reliability:
Maintains a consistent user experience.
All users access the same server, ensuring consistency in product data and features.

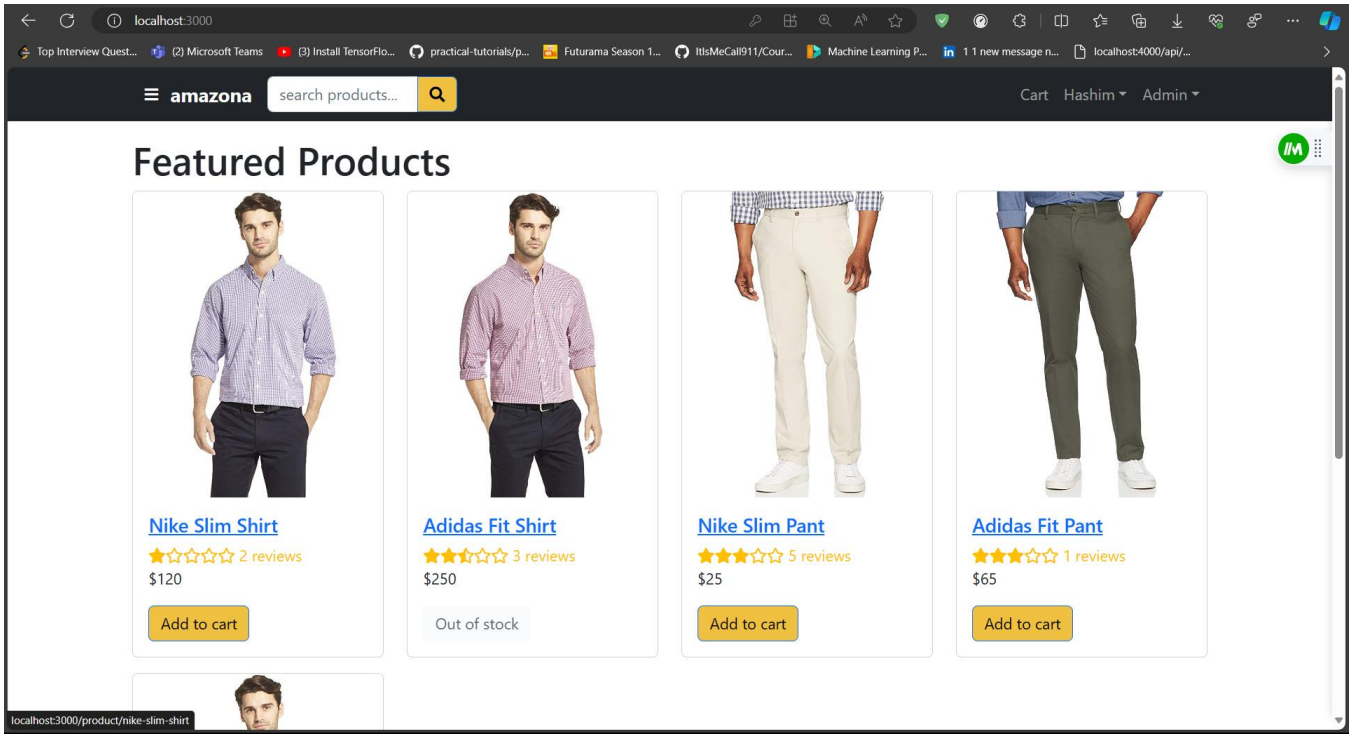
Maintenance and Updates:
Easier updates, bug fixes, and feature additions.
Modifications to the server can occur independently without affecting clients.
Ensures users have access to the latest version of the e-commerce platform, reducing the need for client updates.

Cross-Platform Compatibility:
Supports various devices and operating systems for user access.
Users experience consistency across platforms as the backend is accessed through the server.
Enhances accessibility and user experience.

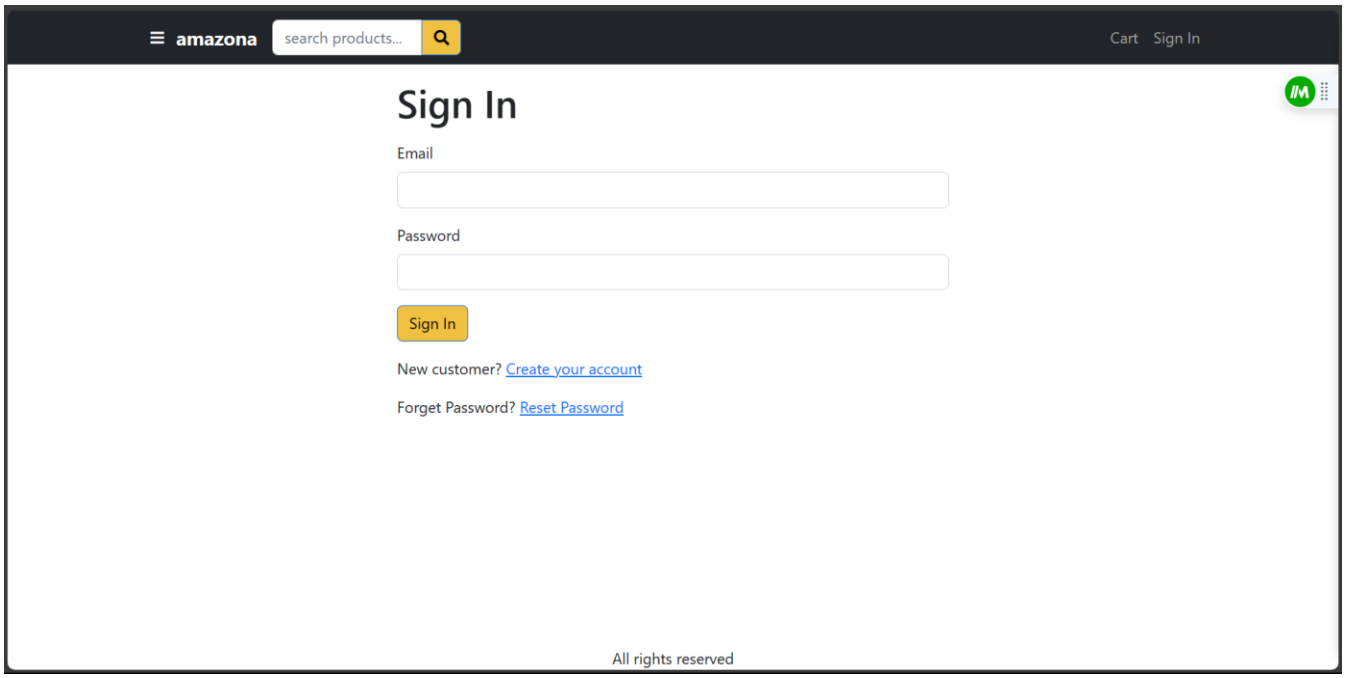
Data Backup and Recovery:
Centralized server allows routine backups of product data, orders, and customer information.
Simplifies data recovery in case of loss or system failures.

Screen Shots Of Output:

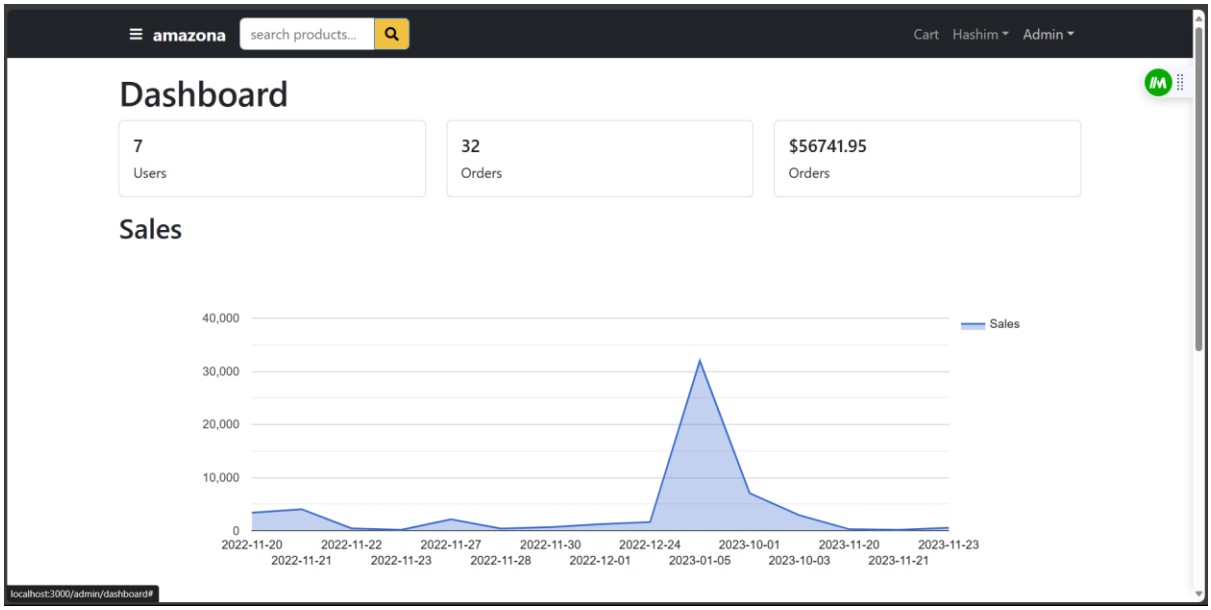
Home Page:



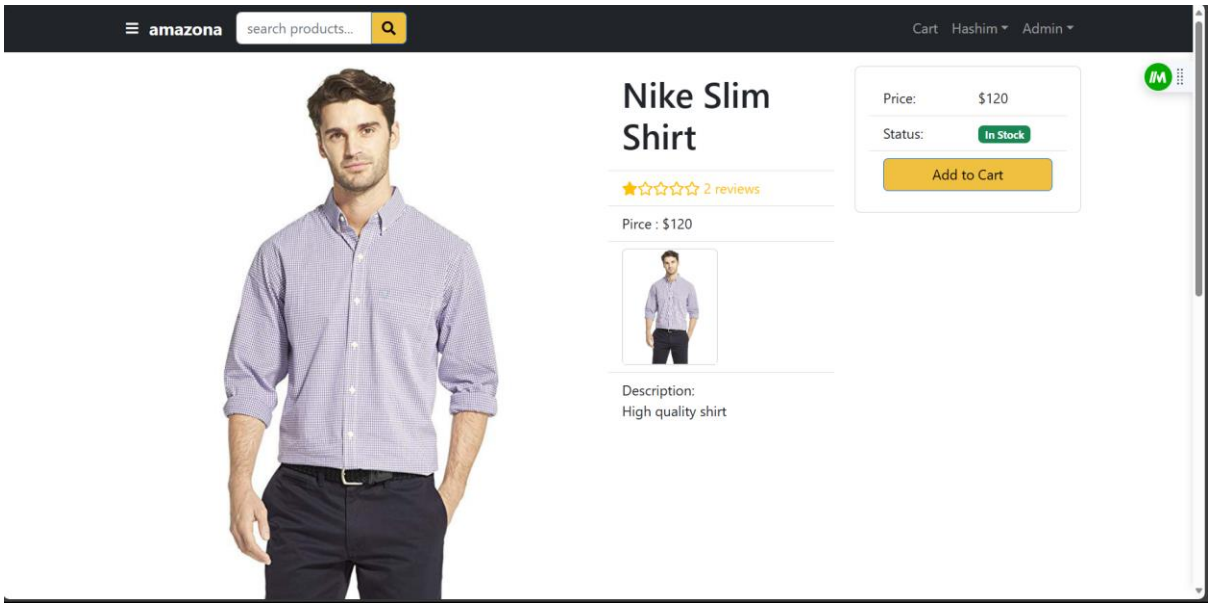
Sign In Page:



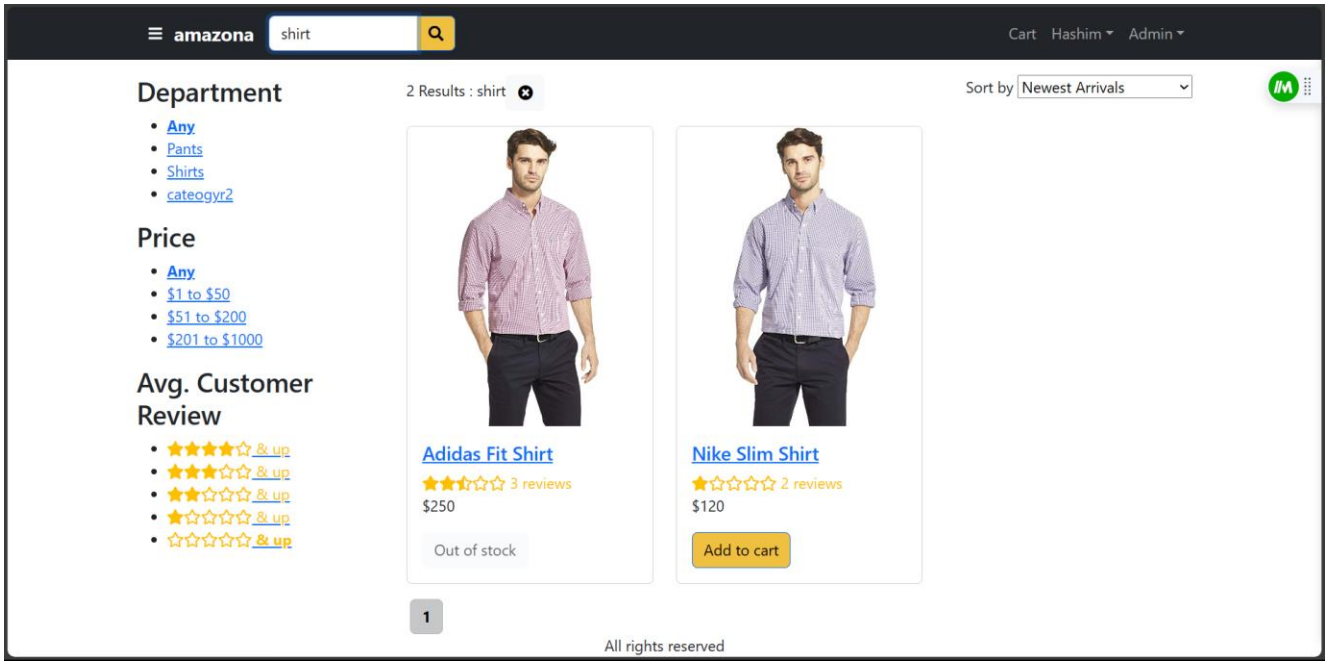
Admin Dashboard:



Product Screen:



Search Window:



Cart Screen: