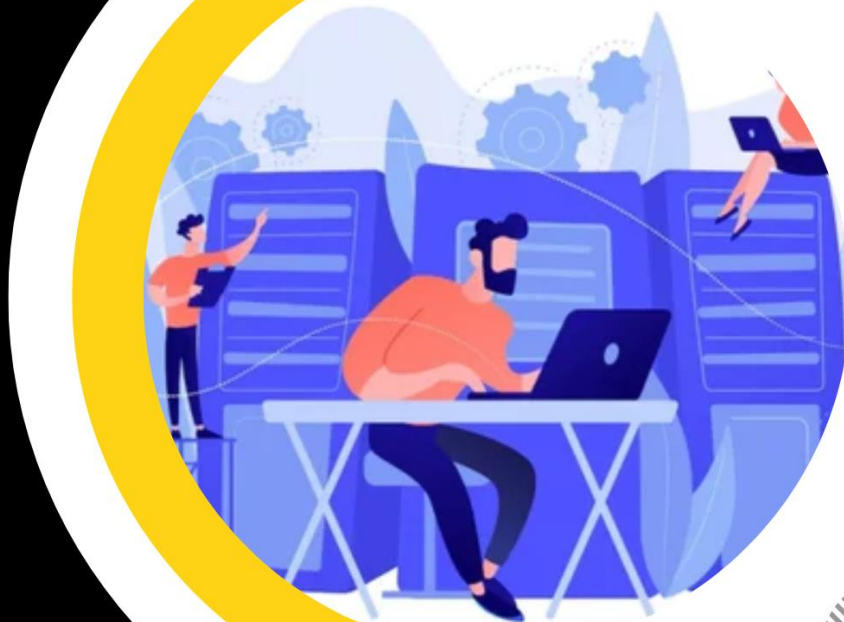


Data Base



Assignment 01

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Submitted to:

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Section = 02

Assignment No. = 01

Data = 10/27/2024

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E-Commerce Database System

1. Database Planning

Database Planning Process:

The database planning process is crucial for developing a reliable and efficient E-Commerce system. It consists of several stages:

- **Requirement Analysis:**
 - **Stakeholder Identification:** Identify key stakeholders, including customers, administrators, and product managers, to understand their data needs.
 - **Data Requirement Gathering:** Determine what types of data need to be collected and stored. This includes:
 - **Customer Information:** Names, email addresses, phone numbers, addresses.
 - **Product Details:** Product IDs, names, descriptions, prices, categories, stock levels.
 - **Order Information:** Order IDs, customer IDs, product IDs, quantities, order status, payment details.
 - **Transaction Records:** Payment types, transaction IDs, timestamps.
- **Schema Design:**
 - **Entity-Relationship Diagram (ERD):** Create an ERD to visualize the relationships between different entities (e.g., customers, products, orders). This helps in understanding how tables will relate to each other.
 - **Table Structures:** Define the tables based on the ERD. For example:
 - **Customers Table:** customer_id (PK), name, email, address, phone_number.
 - **Products Table:** product_id (PK), name, description, price, stock_level, category_id (FK).
 - **Orders Table:** order_id (PK), customer_id (FK), order_date, status, total_amount.
- **Normalization:**

- Apply normalization principles (1NF, 2NF, 3NF) to eliminate redundancy and ensure data integrity. For instance, if product categories are stored in a separate table, it prevents duplication of category names in the Products table.
- **Choosing a Database Management System (DBMS):**
 - Evaluate various DBMS options based on criteria like scalability, security, ease of use, and cost. Common choices include MySQL, PostgreSQL, and MongoDB.
- **Backup and Recovery Planning:**
 - Establish a robust backup strategy that includes regular backups of the database and a recovery plan for restoring data in case of failure.
- **Performance Planning:**
 - Identify potential performance bottlenecks and plan for indexing critical fields (like customer ID and product ID) to speed up query performance.

2. Mission Statement & Objectives

Mission Statement:

“To empower customers with a seamless and secure online shopping experience by effectively managing customer data, product inventories, and transactions, while leveraging data analytics for business growth.”

Objectives:

1. Customer Management:

- Implement user-friendly customer registration and login processes that allow easy access to account features while ensuring data security.

2. Order Processing:

- Streamline the order placement and tracking system to enable customers to easily place orders, view order status, and manage returns efficiently.

3. Inventory Control:

- Develop a robust inventory management system that tracks stock levels in real-time, categorizes products efficiently, and notifies managers of low stock levels.

4. Payment Security:

- Integrate a secure payment gateway (e.g., Stripe, PayPal) that adheres to PCI-DSS standards to ensure safe and secure transactions for customers.

5. Data Insights:

- Utilize data analysis tools to generate actionable insights on sales trends, customer behavior, and inventory turnover, enabling informed decision-making.

6. Trigger Functionality:

- Implement database triggers to automate processes, such as updating stock levels when an order is placed or sending alerts when inventory levels fall below a certain threshold.

3. System Definition

System Scope and Purpose:

The E-Commerce Database System is designed to support the operations of an online retail store by managing essential data and processes efficiently.

- **Scope:**

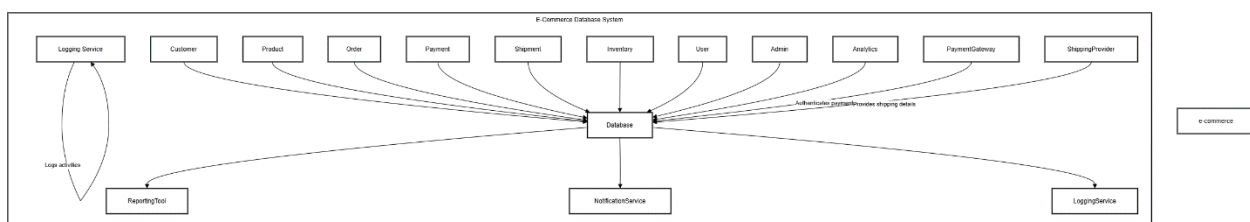
- The system encompasses various functionalities, including customer management, order management, inventory tracking, payment processing, and reporting.
- It involves integrating front-end applications (websites or mobile apps) with back-end databases to facilitate smooth transactions.

- **Purpose:**

- To provide a centralized database that maintains accurate and up-to-date information about customers, products, and orders.
- To enable customers to browse products, place orders, and make payments while ensuring data security and compliance with regulations.
- To empower administrators with tools for inventory management, order tracking, and data analytics, enhancing overall business performance.

4. System Boundary Diagram

The System Boundary Diagram provides a visual representation of the system's boundaries, indicating the internal components and external interactions. Below is a textual representation of what the diagram would encompass.



The diagram picture is available in the [zip](#) file also

5. User Views and Data Cross-reference

The following table outlines major user views and their corresponding data types, providing clarity on how users interact with the system and what data is involved:

User View	Data Types	Description
Customer	Customer ID, Name, Email, Address, Phone Number	Allows customers to register, log in, and manage personal information.
Product Manager	Product ID, Name, Description, Price, Stock Level, Category ID	Enables product managers to add, update, and remove products from inventory.
Order Fulfillment	Order ID, Customer ID, Order Status, Total Amount	Allows fulfillment staff to track order status and process shipments.
Data Analyst	Sales Data, Customer Trends, Inventory Reports	Provides insights into sales performance and customer behavior patterns for analysis.
Administrator	User Accounts, System Logs, Security Settings	Enables administrators to manage user accounts and monitor system performance.

6. Requirement Collection and Analysis

Gathering Requirements:

To gather and analyze project requirements effectively, a combination of fact-finding techniques was utilized:

- **Interviews:**
 - Conducted structured interviews with stakeholders, including:
 - **Customers:** To understand their expectations regarding usability, features, and security.
 - **Store Managers:** To identify operational challenges and desired functionalities.
- **Questionnaires:**
 - Designed and distributed questionnaires to a wider audience, collecting quantitative data regarding preferences for features such as payment methods, product categories, and desired functionalities.
- **Observation:**
 - Observed existing e-commerce platforms to pinpoint common issues and successful practices, focusing on user experience, navigation, and system functionality.

- **Document Analysis:**

- Reviewed documentation related to current business processes, including sales reports, inventory management records, and customer feedback, to identify gaps and opportunities for improvement.

Analysis of Requirements:

After gathering the data, it was categorized into two main groups:

- **Functional Requirements:**

- Define what the system should do, such as:
 - The ability for customers to register and log in.
 - The ability to place, update, and track orders.
 - Inventory tracking and management capabilities.

- **Non-Functional Requirements:**

- Outline system performance expectations, such as:
 - Security measures for handling sensitive data (e.g., encryption).
 - Performance benchmarks, like response time for customer queries.
 - Scalability requirements to accommodate future growth.

This thorough analysis ensured that the project would meet user needs and expectations, laying a solid foundation for the design and development phases of the E-Commerce Database System.

ERD of E-commerce Store

