

**A PROJECT REPORT ON
ONLINE RETAIL APPLICATION DATABASE PROJECT**

Submitted by

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Under the guidance of

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in partial fulfillment for the

completion of course

CSA0537-DATA BASE

MANAGEMENT

SYSTEM FOR DATA

MODEL



SIMATS ENGINEERING

THANDALAM

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BONAFIDE CERTIFICATE

Certified that this project report titled “ONLINE RETAIL APPLICATION DATABASE” is the bonafide work C.Mallikarjuna[192211499],M.Abdul

Ahammad[192211655]B.Vasanth[192211804] who carried out the project work under my supervision as a batch. Certified further, that to the best of my knowledge the work reported herein does not form any other project report .Date: Project Supervisor:

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ABSTRACT

This study aims to provide a comprehensive database schema that will make it easier for users to utilize an online retail application. Customers can register by providing their account number, bank name, and other necessary information. Each customer will have a unique customer ID, user ID, and password. Customers can purchase one or more goods in different quantities. Products can be divided into several classifications based on their price. Bills should be generated by the system based on the amount, price, and any applicable discounts of the item. The bill should contain information on the products that were purchased as well as the overall amount due. Customers can pay their bills with their bank accounts. The system ought to handle bank account information securely. The system ought to keep track of customer orders and details like the order date, delivery date, and order status. Product discounts ought to be controlled by the system and applied during the entire bill generation procedure. The system should only allow customers who have registered to access their accounts and complete transactions. The database should be designed to handle a large number of items, transactions, and clients effectively.

INTRODUCTION

The Online Retail Application Database Project aims to build an extensive database system for an online store. The project aims to provide a centralized platform for productive and successful operations by streamlining the administration of orders, inventory, customers, and items.

SQL (Structured Query Language) will be used in the project's design, development, and implementation of a relational database for data management. Ensuring data quality, security, and scalability, the database will be built to store and handle information about orders, inventory, and items. The creation of an intuitive web-based interface for database management and access is another component of the project. The interface will have features for creating reports and analytics, as well as adding, modifying, and removing entries.

GANTT CHART

Task	Start Date	End Date	Duration (days)
Project Planning and Setup	2024-02-06	2024-02-06	1
Database Design	2024-02-07	2024-02-08	2
Database Implementation	2024-02-09	2024-02-10	2
Customer Registration	2024-02-12	2024-02-13	2
Bank Account Management	2024-02-14	2024-02-15	2
Item Management	2024-02-16	2024-02-19	3
Order Management	2024-03-06	2024-03-06	1
Discount Management	2024-03-07	2024-03-07	1
Bill Generation	2024-03-08	2024-03-09	2
Supplier Management	2024-03-10	2024-03-10	1
Integration and Testing	2024-03-11	2024-03-11	1
Documentation and Training	2024-03-07	2024-03-07	1
Deployment	2024-03-08	2024-03-08	1
Maintenance and Support	2024-03-09	2024-03-09	1

METHODOLOGY

1. Requirement Analysis:

Obtain requirements from users, developers, and business owners, among other stakeholders.

Recognize the project's scope, which includes the kinds of goods to be sold, user roles, necessary functionalities, and anticipated traffic.

2. Conceptual Design:

Create an Entity-Relationship Diagram (ERD) to illustrate the database's conceptual model.

Determine the relationships between various entities, including orders, payments, products, and consumers.

3. Normalization:

To cut down on duplication and enhance data integrity, standardize the conceptual model.

When necessary, use normalization techniques like the Boyce-Codd Normal Form (BCNF) and the First, Second, and Third Normal Forms (1NF, 2NF, and 3NF).

4. Logical Design:

Convert the conceptual model to a logical schema or model.

Use the normalized entities as the basis for defining tables, attributes, primary keys, and foreign keys.

5. Data Model Refinement:

Adjust the data model in light of comments and more research.

Improve the scalability and performance of data structures and relationships.

6. Database Implementation:

Based on your needs, pick a suitable database management system (DBMS), such as PostgreSQL, MongoDB, or MySQL.

Using the logical design as a guide, create the actual database schema.

Define other database objects, such as constraints and indexes.

7. Data Population:

For testing purposes, add sample data to the database.

To enter data into tables, create scripts or use tools.

8. Testing and Optimization:

Conduct a range of tests, such as performance, integration, and unit tests.

When necessary, optimize queries, indexes, and database settings to remove bottlenecks.

9. Security and Access Control:

Put security procedures like authorization, authentication, and encryption into practice.

Establish access control guidelines to prevent unwanted access to private information.

10. Documentation:

For future reference and upkeep, document the data dictionary, database schema, and any other pertinent information.

LITERATURE REVIEW

(Cherkasova and Karlsson 2001; Schroeder et al. 2000)

A single instance at each layer is insufficient for the majority of online enterprises, even small- to medium-sized organizations, as each of these layers may encounter demands that exceed the capability of a single server or software resource. clustering multiple identically configured instances of hardware and software resources at each layer is the best practice recommended by vendors across all three layers of the typical online application architecture,

There are three important request distribution (RD) sites, as seen in Figure 2. To process HTTP requests, the web switch must first divide them among a cluster of web servers.[2]

(Liu et al., 2017, Díaz and associates (2017), Hwang(2009).

Consumer Internet shopping, a type of e-commerce retailing, has become more and more popular as online and hybrid shops provide alluring Internet-based services like discounts that are available only online and discounts for shipping Shoppers can locate things of interest by going to websites that aggregate products from multiple online sellers into a single page.

Noor Farizah Ibrahim , Xiaojun Wang(2019)

As such, the six common structures from the literature that this study integrates as its core themes are: transaction, website design, security and privacy, product performance, customer service, and delivery [48–50]. This review's primary goal is to interpret and validate the results of the topic modeling. These constructs were chosen because they were important and pertinent to this study, and because they were frequently discussed in the literature on internet shopping.

Jeffrey T. Prince(2007)

After that, a long list of themes and variables was compiled for additional study.

In the US, e-commerce has multiplied to constitute a sizable portion of sales. Within the personal computer (PC) sector, Dell and Gateway, two well-known direct-to-consumer PC suppliers, are fierce rivals in the PC business. By the end of 1998, the total revenues of the two companies had exceeded \$22 billion, with a significant portion of those purchases occurring online (InfoTech Trends, 2001). In general, there is still continuous worry about the degree of substitutability between things sold online and in stores.² This article investigates the timing and reasons behind the emergence of online and retail rivalry in the PC industry. Data on PC purchases at the home level is used to answer both of these queries. To determine the onset of online/retail PC

competition, I calculate the cross-price elasticity of online comparing those available in physical stores

Japutra et al. (2021) and Molinillo et al. (2020)

Thus, retail apps have the potential to be crucial in impacting the relationship between retailers and customers. But up until now, not much research has examined how CX affects the retailer. mobile application on customer loyalty (CL), or the devotion that a customer feels for a retailer.

Swapna Kodali (2007)

electronic commerce (e-commerce) facilitates communication over a network between the many parties engaged in a transaction and the administration of the data involved [2].

The study carried out by researchers at the Georgia Institute of Technology's Gvu (Graphics, Visualisation, and Usability) Centre shows how important e-commerce is becoming. The researchers state that "e-commerce is taking off both in terms of the number of users shopping as well as the total amount people are spending via Internet-based transactions" in their summary of the results from the eighth poll.

More than 75% of the 10,000 participants said they had purchased online. Convenience was the most often stated factor (65%) for using the Internet for personal buying.

Gururaj H L , Praveen K S , Ramesh (2017)

Attacking applications is the most modified method of attack in the modern day. They manage to divert attention with application assets like "flash crowd attacks" [1] [4]. By setting up the network and creating legal requests for the applications to override the victim, they might function as a legitimate application processor. Because this kind of attack uses legal resources to pretend to be legitimate network members, it is very difficult to stop. They occasionally target the network to reduce service applications.

The widespread use of the Internet for a wide range of purposes has made low-cost and low-power WSNs possible thanks to technology, due to this fundamental characteristic of networks.

Suci Inayah , Dana Indra Sensuse , Sofian Lusa Program (2023)

In addition, the growing trend of e-commerce in Indonesia has led to a shift in consumer behavior, with many offline store owners developing online shopping applications in response to the pandemic Covid-19's effects on their businesses. This is a calculated move to stay competitive and preserve their business in the face of societal changes in the shopping paradigm [3]. Entrepreneurs have also seized the opportunity to expand their market share and sales by leveraging technology, including websites and applications [4].

4. CODE:

```
CREATE TABLE Customer (  
    customer ID INT PRIMARY KEY,  
    first name VARCHAR(50) NOT NULL,  
    lastname VARCHAR(50) NOT NULL,  
    email VARCHAR(100) UNIQUE NOT NULL,  
    Shipping address VARCHAR(255),  
);
```

```
CREATE TABLE Product (  
    productid INT PRIMARY KEY,  
    name VARCHAR(100) NOT NULL,  
    Description TEXT,  
    Price DECIMAL(10,2) NOT NULL,  
    StockLevel INT NOT NULL,  
    CategoryID INT FOREIGN KEY REFERENCES Category(CategoryID),  
);
```

```
CREATE TABLE Order (  
    OrderID INT PRIMARY KEY AUTO_INCREMENT,  
    CustomerID INT NOT NULL,  
    OrderDate DATETIME NOT NULL,  
    TotalAmount DECIMAL(10,2) NOT NULL,  
    FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID),  
);
```

```
CREATE TABLE OrderItem (  
    OrderID INT NOT NULL,  
    ProductID INT NOT NULL,  
    Quantity INT NOT NULL,  
    UnitPrice DECIMAL(10,2) NOT NULL,  
    PRIMARY KEY (OrderID, ProductID),  
    FOREIGN KEY (OrderID) REFERENCES Order(OrderID),  
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID)  
);
```

```
CREATE TABLE Payment (  
    PaymentID INT PRIMARY KEY,  
    OrderID INT UNIQUE NOT NULL,  
    PaymentMethod VARCHAR(50) NOT NULL,
```

```
PaymentDate DATETIME NOT NULL,  
AmountPaid DECIMAL(10,2) NOT NULL,  
FOREIGN KEY (OrderID) REFERENCES Order(OrderID)  
);
```

```
CREATE TABLE Category (  
CategoryID INT PRIMARY KEY AUTO_INCREMENT,  
Name VARCHAR(50) NOT NULL,  
Description TEXT,  
);
```

```
CREATE TABLE Supplier (  
SupplierID INT PRIMARY KEY AUTO_INCREMENT,  
Name VARCHAR(100) NOT NULL,  
ContactInfo VARCHAR(255),  
);
```

```
CREATE TABLE SupplierProduct (  
SupplierID INT NOT NULL,  
ProductID INT NOT NULL,  
FOREIGN KEY (SupplierID) REFERENCES Supplier(SupplierID),  
FOREIGN KEY (ProductID) REFERENCES Product(ProductID),  
PRIMARY KEY (SupplierID, ProductID)  
);
```

IMPLEMENTATION:

CRUD Operations: Implement functions or methods to perform CRUD operations (Create, Read, Update, Delete) on the database entities. For example, functions to add a new customer, retrieve product details, update an order, etc.

Business Logic: Implement business logic to handle operations such as placing orders, calculating total order amounts, managing inventory, etc.

Execute the SQLCode:- Copy the provided SQL code for creating tables('customer', 'category', 'product', 'order', and 'payment') into your MySQL client.- Execute the SQL code to create the tables within your database. Ensure that you're connected to the correct database where you want to create these tables.

Data Population:

Insert sample data into your tables for testing purposes.

Develop scripts or procedures for importing real data if available.

Testing and Quality Assurance:

- Perform unit testing, integration testing, and system testing to ensure that the database functions correctly and meets the requirements.
- Conduct performance testing to identify and optimize any bottlenecks.
- Perform security testing to identify and address vulnerabilities.

customerID	firstName	lastName	email	ShippingAddress
1	John	Doe	john.doe@example.com	123 Main St, City, Country
2	Jane	Smith	jane.smith@example.com	456 Elm St, City, Country

CategoryID	Name	Description
1	Electronics	Electronic devices and accessories
2	Mobile Phones	Smartphones and related accessories

ProductID	Name	Description	Price	StockLevel	CategoryID
1	Laptop	High-performance laptop	999.99	50	1
2	Smartphone	Latest smartphone model	599.99	100	2

2 rows in set (0.00 sec)

OrderID	ProductID	Quantity	UnitPrice
1	1	1	999.99
2	2	2	599.99

MySQL SELECT: (ON Payments)

PaymentID	OrderID	PaymentMethod	PaymentDate	AmountPaid
1	1	Credit Card	2024-03-25 10:05:00	999.99
2	2	PayPal	2024-03-26 12:05:00	599.99

CONCLUSION

To effectively manage the operations of an e-commerce platform, we have designed a comprehensive online retail application database system for this project. The design and construction of tables as well as the development of efficient interfaces for these tables were all part of the implementation. To guarantee compliance with industry best practices and to integrate pertinent features and functionalities, thorough literature studies were carried out at various points during the project.

FUTURE ENHANCEMENT

improving the application's performance and scalability is essential for handling expansion and guaranteeing smooth user experiences, particularly during peak hours. To efficiently manage higher traffic loads, this may entail integrating caching methods, streamlining database architecture, and leveraging cloud-based solutions. It is also possible to offer a seamless online, mobile, social media, and in-store shopping experience by improving omni-channel capabilities. Enable services like click-and-collect, omnichannel returns, and synchronized product information, which entails smoothly integrating data and processes across several channels

Mobile App: Build a mobile application for the retail platform to expand the user base and provide a more convenient shopping experience.

- **Social Media Integration:** Allow users to share their purchases, wish lists, or reviews on social media platforms. Implement social login options to simplify account creation and login processes.
- **Multi-Language Support:** Add support for multiple languages to cater to a diverse user base.
- **Customer Loyalty Program:** Introduce a loyalty program with rewards points, discounts, or exclusive offers for repeat customers.
- **Enhanced Analytics:** Implement advanced analytics tools to track key metrics like customer lifetime value, conversion rates, and product performance. Use this data to make informed business decisions and optimize marketing strategies.

REFERENCES

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