Database Management and Database Design

Retail Online Commerce Solution

Database Specification: Purpose, Business Problems Addressed

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Updates:

As feedback from the Professor, no further changes are needed. Final ERD is made.

Database Purpose:

This project aims to develop an e-commerce database design that will allow for online business platforms to manage order information, customer information, payments, shipping, commodities, and other relevant information efficiently.

Problems Addressed:

- This project provides business solutions to local vendors and consumers by providing an online commerce platform.
- Perform critical analysis about demand-supply statistics based on the data to effectively enhance and improve the platform for achieving a successful business model.
- It addresses the problem of minimizing human-human interactions while making substantial online services accessible to people during pandemic situations.

Business Rules:

- Before placing an order, the customer must first register or sign up.
- A customer may have various addresses and credit card information.
- Customers can add goods or products to their shopping basket.
- A unique product id should be assigned to each commodity in the commodity master entity.
- The commodity's details should be supplied in the commodity details entity.
- Stock quantity and seller id should be kept in the stock master entity.
- At least one product must be ordered when placing an order.
- Once the order is confirmed, an invoice will be generated.
- Once payment is successful or defined, the order will be placed.
- There may be different shipment details for each order.

Design Requirements:

- Connecting the attributes of each entity to show the relationship between the entities. This connection line should point directly to the properties used to construct the relationship in each entity.
- Specifying primary key fields as PK in each entity and Foreign Key as FK.
- Crow's Foot Notation will be used to ER diagram
- Identify which side of the entity has 'one' relationship by placing a one next to the entity where the connection line starts.
- Identify which entity has 'many' relationship by placing a Crow's Feet Symbol and connecting it to another entity on other table.

Design Decisions:

S No.	Entity Name	Entity Purpose	Relation with other entities
1.	Customer_Master_Table	This entity pertains to obtain the customer's personal information, such as name, gender, etc. This entity will also contain the customer's information that they used to login or sign up. It also assists us in determining the type of customer.	This is the database's principal entity. This entity will have a one-to-many relationship with customer_address_table and customer_bank/card_table. The primary key will be customer id in this case. It also has a zero-to-many relationship with the order master entity.
2.	Customer_Address_Table	The database will store the customer's address to obtain further shipment information. This entity will also provide further information about the address, such as whether it is a home, workplace, or other type of location. The database will also send the customer an invoice for the user registration using the customer's email address.	This entity is linked to the Customer master table entity, which has address id and customer id as primary keys. Customer id will operate as a foreign key, assisting in the establishment and identification of a relationship between Customer_Master_Table and Customer id.
3.	Customer_Bank/Card_Table	The transactions will take place over the internet and will be paid for utilizing an online payment method. This is where the entity comes in handy in our database. It specifies the type of card that can be used to make a payment by the customer. Except the CVV number, the database will consider the card's details.	This entity is linked to the Customer_Master_table entity, which has the card number and customer_id as primary keys. Customer_ID will be used as a foreign key to construct a link between Customer Master table and Customer_ID.

4.	Master_Commodity_Table	Customers want to know the specifics of how a product will be delivered. This entity provides important information to customers, such as the availability of Cash on Delivery. The product's branding, the maximum quantity that can be delivered to a consumer.	The Master Commodity table, as its name suggests, will store product information with product id as the primary key. With commodity details table, Master Commodity table will have a one-to-one entity relationship, and with stock master, it will have a one-to-many relationship.
5.	Stock_Master_table	One of the most important aspects of any Online Commerce platform is knowing when a product is available. The Stock Master table entity contains information on the seller, including the seller's name and total stock, as well as the stock that is available for delivery.	The primary keys for the Stock Master table entity will be Seller ID and product id, with a one-to-one relationship with the Master Commodity table.
6.	Commodity_details_table	The main task of the project, which is to purchase a product, is entirely reliant on the product specs, which are described in the commodity details table. There is a clear need for customers to understand the product's performance and quality assurance, which may be expressed by looking at many product level details contained in this entity.	This entity contains all of the requirements needed to describe the product, there is a primary key called product id that acts as a unique identifier for the product, connecting commodity details table to Master Commodity table via a one-to-one connection.
7.	Cart_Master_Table	A shopping cart is usually the most convenient way for a customer to collect the products they want to buy. This entity will serve as a preview, displaying the quantity, cart total, status, and creation date of the cart.	Different products may be added to the cart by each customer. Customer Master table and Master Commodity table will have a one-to-one relationship with the Cart master table entity.
8.	Order_Master_Table	The goal of this Entity is to understand the functionality of online based Purchases that are produced and maintained in this entity. It is critical to keep track of such key information to analyze the sorts of commodities purchased by clients, which will allow the demand-supply model to be more efficiently created, resulting in a successful online business model.	All other E-Commerce entities, such as Customer, Commodity, Payment, and Shipment, are tied to this entity. While purchasing a commodity online, basic customer information such as name, delivery address, and phone number will serve as the foundation, leading us to the commodity details table to obtain information about the goods purchased. The order will be placed using a successful payment method

			that includes payment entities, and the order's status will be tracked using shipping entities. The relationship between order master table and other entities can be expressed as a zero-many relationship.
9.	Order_Details	This entity is generally used to handle and store precise information about a specific order, such as product information, price split-up details, invoice status, cancellation, and return-related information, and supporting notes.	The order details entity is linked to its parent table, order master table, which has several relational dependencies on other entities. As a result, this entity is also dependent on the Order master table linked entities.
10.	Order_Shipment_Master	This entity mostly deals with delivery-related information, such as delivery partner information, delivery date information, and customer address information. This information is essential for analyzing and tracking delivery-related difficulties and questions.	This is one of the order master entity's connected tables, and it's largely linked to customer address table and order master table.
11.	Invoice_Master_Table	The invoice master entity's purpose is to keep you organized and alert about the overall amount owed by customers.	The Invoice Master Entity is directly related to Order Master table entity through one and only one relationship.
12.	Invoice_Details	The precise information on the invoice aids in remaining organized and informing about which goods are being sold and what taxes are being charged by the seller.	Invoice Details is linked to Invoice Master table via one-to-one relationships.
13.	Payment_Master	The payment master, which functions similarly to a cash register, is in charge of processing and preserving electronic payments. It assists ecommerce sites in processing, validating, and authorizing credit card and other kinds of payment.	Payment Information comes from Invoice_master_table through one-to-one relationship.
14.	Shipment_Details	The shipping detail entity is created to maintain track of order distribution, charges, and the results of distribution partners.	The shipping details entity is linked to Order_shipment_master through one-to-one relationship.

Customer_Master_Table
- 🔑 Cus_ID INT
- ◇ Cus_Fnam VARCHAR(45)
- ◇ Cus_Lname VARCHAR(45)
- ◇ DOB DATE
- ◇ Sex VARCHAR(1)
- ◇ Email VARCHAR(45)
- ◇ Phone VARCHAR(45)
- ◇ username VARCHAR(45)
- ◇ Password VARCHAR(45)
- ◇ cus_membership VARCHAR(45)
- ◇ cus_type VARCHAR(45)
- ◇ cus_check_flag TINYINT
- ◇ cus_remarks VARCHAR(45)
- ◇ Create_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Customer_Address_Table
- 🔑 Address_ID INT
- 🔴 Cus_ID INT
- ◇ Address_Type VARCHAR(45)
- ◇ Flat VARCHAR(45)
- ◇ ST_Name VARCHAR(45)
- ◇ City VARCHAR(45)
- ◇ pincode INT
- ◇ contact_email VARCHAR(45)
- ◇ Default_Flag TINYINT
- ◇ Create_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Master_Commodity_Table
- 🔑 Product_ID INT
- ◇ Product_type VARCHAR(45)
- ◇ brand VARCHAR(45)
- ◇ Purhcase_Limit VARCHAR(45)
- ◇ replacement_flag TINYINT
- ◇ COD_flag TINYINT
- ◇ Create_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Stock_Master_Table
- 🔑 Seller_ID INT
- 🔴 Product_ID INT
- ◇ Seller_Name VARCHAR(45)
- ◇ Total_Stock INT
- ◇ Available_Stock INT

Indexes

Order_Master_Table
- 🔑 Order_ID INT
- 🔴 Cus_ID INT
- ◇ Shipmnet_Check_Flag TINYINT
- ◇ Payment_Mode VARCHAR(45)
- ◇ Transaction_ID INT
- ◇ Order_Date DATE
- ◇ Order_Status VARCHAR(45)
- ◇ Return/Replace_Check_Flag TINYINT
- ◇ Cancle_Check_Flag TINYINT
- ◇ Remarks VARCHAR(45)
- ◇ Create_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Commodity_Details_Table
- 🔴 Product_ID INT
- ◇ Product_Title VARCHAR(45)
- ◇ Product_Description VARCHAR(45)
- ◇ Product_Specification VARCHAR(45)
- ◇ Product_Unit_Price DOUBLE
- ◇ Product_Rating INT
- ◇ Manufacture_Date DATETIME
- ◇ Warranty_Years INT
- ◇ Expiry_Date DATETIME
- ◇ Create_Time DATETIME
- ◇ Updated_Time DATETIME

Indexes

Customer_Bank/Card_Table
- 🔑 Card_Number INT
- 🔴 Cus_ID INT
- ◇ Card_Base VARCHAR(45)
- ◇ Valid_From INT
- ◇ Valid_To INT
- ◇ Name_On_Card VARCHAR(45)
- ◇ Card_Type VARCHAR(45)
- ◇ Default_Flag TINYINT
- ◇ Created_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Cart_Master_Table
- 🔑 Cus_ID INT
- 🔴 Product_ID INT
- ◇ Cart_Quantity INT
- ◇ Cart_Status VARCHAR(45)
- ◇ Order_Flag TINYINT
- ◇ Create_Date DATETIME
- ◇ Updated_Date DATETIME

Indexes

Invoice_Master_Table
- 🔑 Invoice_ID INT
- 🔴 Order_ID INT
- ◇ Invoice_Date DATETIME
- ◇ Invoice_Amount DOUBLE
- ◇ Invoice_Status VARCHAR(45)

Indexes

Invoice_Details
- 🔑 Invoice_Detail_ID INT
- 🔴 Invoice_ID INT
- ◇ Seller_ID INT
- ◇ Invoice_Item VARCHAR(45)
- ◇ Item_Amount DOUBLE
- ◇ Tax_Amount DOUBLE
- ◇ Tax_ID INT
- ◇ Create_Date DATETIME
- ◇ Updated_date DATETIME

Indexes

Order_Details
- 🔑 Order_ID INT
- 🔑 Product_ID INT
- ◇ Order_Type VARCHAR(45)
- ◇ Seller_ID INT
- ◇ Price_Per_Unit DOUBLE
- ◇ Quantity INT
- ◇ Tax_Amount DOUBLE
- ◇ Shipment_Charges DOUBLE
- ◇ Discount DOUBLE
- ◇ Coupun_Value DOUBLE
- ◇ Total_Price DOUBLE
- ◇ Invoice_Status VARCHAR(45)
- ◇ Return_Charges DOUBLE
- ◇ Cancellation_Charge DOUBLE
- ◇ Cancel_Reason_Type VARCHAR(45)
- ◇ Cancel_Reason_Other VARCHAR(45)
- ◇ Remarks VARCHAR(45)
- ◇ Create_Date DATETIME
- ◇ Processing_Date DATETIME

Indexes

Payment_Master
- 🔑 Payment_ID INT
- 🔴 Invoice_ID INT
- ◇ Transaction_ID VARCHAR(45)
- ◇ Payment_Date DATETIME
- ◇ Payment_Amount DOUBLE
- ◇ Payment_Category_Name VARCHAR(45)
- ◇ Payment_Status VARCHAR(45)

Indexes

Order_Shipment_Master
- 🔑 Order_ID INT
- ◇ Customer_ID INT
- ◇ Address_ID VARCHAR(45)
- ◇ Expected_Delivery_Date DATETIME
- ◇ Actual_Delivery_Date DATETIME
- ◇ Delivery_Partner VARCHAR(45)
- ◇ Delivery_Status VARCHAR(45)

Indexes

Shipment_Details
- 🔑 Shipment_ID INT
- 🔴 Order_ID INT
- ◇ Shipment_Method VARCHAR(45)
- ◇ Shipment_Charge DOUBLE
- ◇ Shipment_Status VARCHAR(45)
- ◇ Shipment_Delivery_Date DATETIME
- ◇ Address_ID VARCHAR(45)
- ◇ Shipment_Due_Date DATETIME
- ◇ Shipped_Date DATETIME
- ◇ Remarks VARCHAR(45)

Indexes