PUSL2019 Information Management Retrieval

SUPER SMART POS SYSTEM - REPORT 2024/25

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TABLE OF CONTENT

1. INTRODUCTION

Supermarkets are complex systems that manage various operational aspects, from inventory control to customer engagement. With rising customer expectations and an increasingly competitive retail landscape, it has become essential to adopt advanced technological solutions. This project focuses on developing a customized Point of Sale (POS) system tailored to the needs of a supermarket.

The proposed system is not just a cash register replacement but an all-encompassing solution designed to handle sales, stock management, discounts, and reporting. By automating key processes and providing real-time insights, the system aims to improve operational efficiency, reduce errors, and empower management to make informed decisions for business growth.

1.1 OVERVIEW OF THE SUPER MARKET'S POS SYSTEM REQUIREMENTS.

The supermarket imagines a smart and reliable **POS system** (EDB, 2024) that brings together several essential features to meet its unique needs and streamline operations.

I. CUSTOMER MANAGEMENT

The POS system will store and manage customer information, enabling personalized interactions. Key functionalities include,

- Recording details such as names, contact numbers, and purchase histories.
- Supporting loyalty programs where customers can earn and redeem points.
- Enabling targeted promotions based on purchase trends, such as offering discounts to high-spending customers.

II. STOCK MANAGEMENT

Inventory control is a critical aspect of retail operations. The system will,

- Maintain real-time inventory levels to avoid stockouts or overstocking.
- Provide notifications for low-stock or expiring items to prevent wastage.
- Allow categorization of products by attributes like brand, category, and expiry date for efficient tracking.

III. DISCOUNT AND PROMOTIONS MANAGEMENT

To attract and retain customers, discounts and promotions must be managed seamlessly by,

- Automatically apply discounts based on predefined rules, such as percentage discounts or "Buy 1 Get 1 Free" offers.
- Allow staff to update discount policies quickly during promotional events.
- Ensure discounts are accurately reflected in the final billing.

IV. SALES MANAGEMENT.

Sales processing is at the heart of the POS system. Its features will include,

- Recording each transaction with details like item, quantity, price, and timestamp.
- Supporting multiple payment (Wikipedia, 2024) methods, including cash, cards, and mobile payments.
- Ensuring receipts are generated and printed quickly to reduce checkout delays.

V. REPORTING AND ANALYTICS

Management needs actionable data to make decisions. The reporting module will:

- Generate daily, weekly, and monthly reports summarizing sales, revenue, and inventory usage.

- Highlight trends such as best-selling items or peak shopping times.
- Present data visually through charts and graphs for better understanding.

1.2 IDENTIFIED BUSINESS NEEDS AND CHALLENGES.

BUSINESS NEEDS

- **Automation**: Automating tasks like inventory updates, sales recording, and discount application will reduce the manual workload and errors.
- **Real-Time Data Access**: Managers and staff require instant updates on inventory and sales to make timely decisions.
- **Customer Engagement**: Personalized interactions through loyalty programs and promotions will improve customer satisfaction and retention.
- **Data-Driven Decisions**: Reports on sales trends and stock levels are essential for effective planning and forecasting.

CHALLENGES

- **Scalability**: The system must be flexible to accommodate future expansions, such as new branches or online sales.
- **Security**: Protecting sensitive customer and business data from unauthorized access is critical.
- **User Adoption**: Designing a user-friendly interface will be necessary to ensure that staff can use the system efficiently with minimal training.
- **Data Accuracy**: Maintaining accurate and consistent data across all modules of the system is a major technical challenge.

1.3 OBJECTIVES OF THE DATABASE AND APPLICATION DEVELOPMENT.

PRIMARY OBJECTIVES

1. **Streamline Operations**: Automate repetitive tasks to save time and reduce human errors.
2. **Ensure Data Integrity**: Use database constraints and validation rules to maintain data consistency.
3. **Empower Management**: Provide detailed reports and analytics to assist in decision-making.
4. **Enhance User Experience**: Create a simple and intuitive interface for all system users.

SECONDARY OBJECTIVES

- Allow easy updates to discount and stock information.
- Provide secure access to sensitive data with role-based permissions.
- Offer scalability to support future business growth.

1.4 ASSUMPTIONS AND CONSTRAINTS.

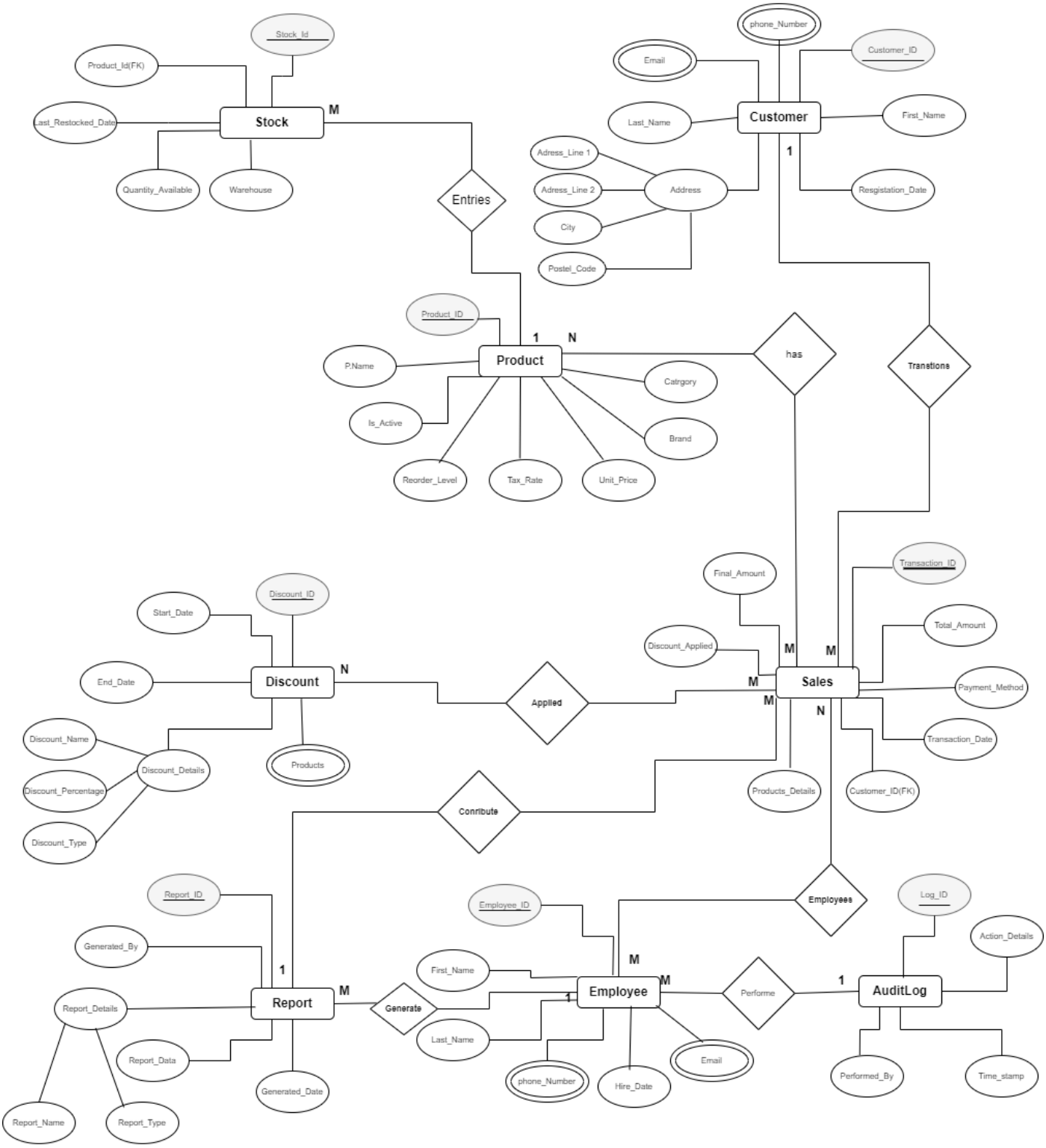
ADDITIONAL ASSUMPTIONS

- The supermarket primarily operates offline, and this system will be deployed locally with optional cloud backup.
- Staff using the system have basic knowledge of computers and will receive training for the application.
- Discount rules and stock categories will be predefined by the management during the setup phase.
- The supermarket's internet connectivity is reliable for any optional online integrations in the future.

CONSTRAINTS ON DATA HANDLING AND SOFTWARE FEATURES

- **Data Accuracy**: Data validation (CFI, 2024) will be enforced through primary keys, foreign keys, and constraints. For instance, a sales transaction cannot occur without a corresponding product in stock.
- **Performance**: The system must handle peak transaction loads efficiently, especially during busy hours.
- **Security**: Sensitive information, such as customer details and payment records, must be encrypted and accessible only to authorized users.
- **Compliance**: The system must adhere to relevant data protection laws and industry standards.

2. ER/EER DIAGRAM.



2.1 ASSUMPTIONS FOR THE ER/EER DIAGRAM (MICROSOFT, 2024)

CUSTOMER:

- Each customer has a unique CustomerID.
- Customers can register in the system, and their details such as name, email, and phone numbers are stored.
- A customer can make multiple transactions (1:M relationship with Sales).

PRODUCT:

- Each product has a unique ProductID.
- Products belong to specific categories.
- ReorderLevel indicates the minimum quantity of a product before it needs restocking.
- **Product - Stock:** Each product can have different stock levels across various warehouses. (1:M)

STOCK:

- Each Stock is uniquely identified by a Stock_ID.
- Stock shows us the last Restocked date.
- Stocks are stored in a WareHouse.

DISCOUNT:

- Discounts are applied to Sales, creating an M:N relationship between products and Sales.
- Each discount is uniquely identified by a DiscountID and includes details like Discount Details, start date, and end date.
- Discounts can apply to multiple Sales.

SALES:

- Each sales transaction is uniquely identified by a TransactionID.
- Sales include details of the customer making the purchase, the Discount method, and the Employees.
- Discounts applied during sales are linked to the transaction.

EMPLOYEE:

- Employees are uniquely identified by EmployeeID.
- Each employee have Employee Id, contact information, First and Last Name.
- Employees perform actions logged in the AuditLog.

AUDIT LOGGING:

- Actions performed by employees (e.g., adding, modifying, or deleting data) are recorded in the AuditLog with details of the action and a time.

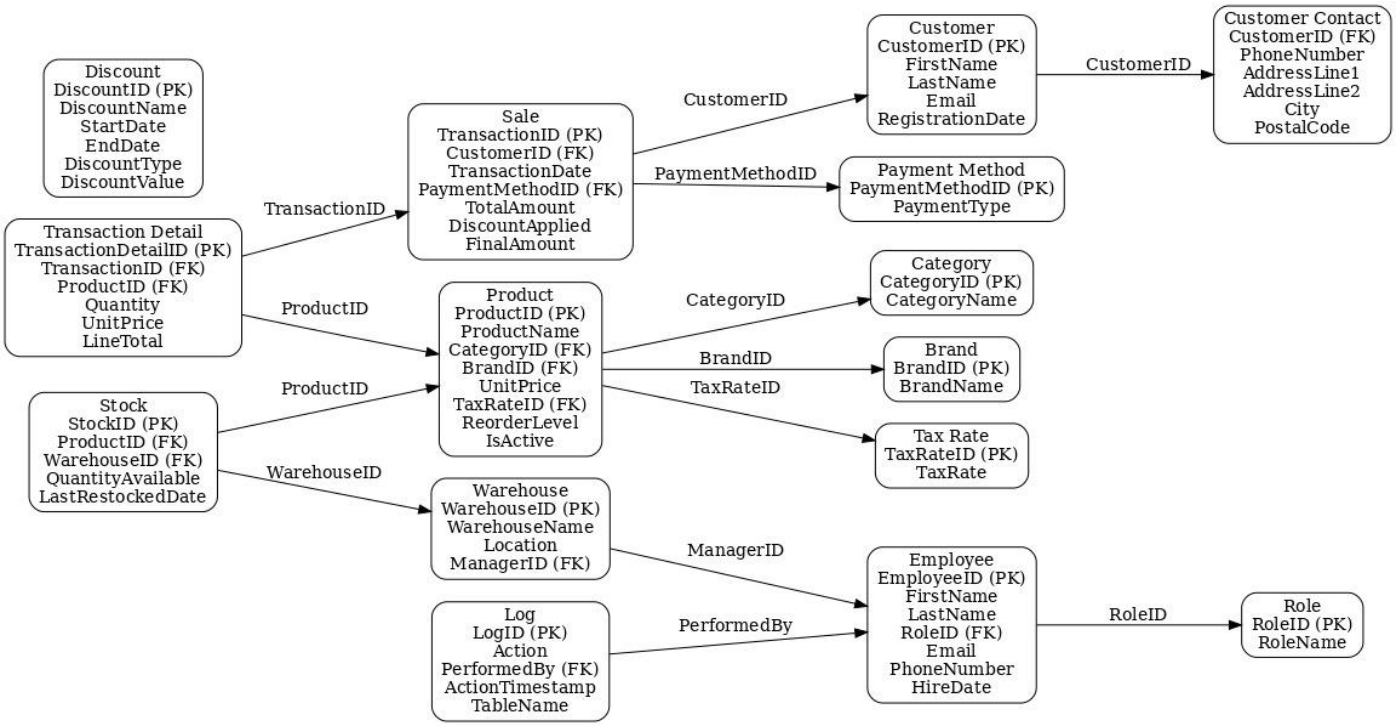
REPORT GENERATION:

- Reports are uniquely identified by a ReportID and include details such as the report type, generation date, and generated by (an employee).
- Reports are generated daily or monthly to help the owner make informed decisions.
- Sales and other operational data contribute to report generation (1:M relationship between Reports and Sales).

RELATIONSHIPS AND CARDINALITY:

- A customer can have multiple transactions (1:M between Customer and Sales).
- A Sales can belong to multiple discounts, and discounts can apply to multiple Sales (N:N between Sales and Discount).
- Employees can generate multiple reports and perform multiple actions logged in the audit (1:N relationships)

3. RELATIONAL MAPPING



4. NORMALIZATION

4.1 FIRST NORMAL FORM – 1NF

In **1NF** (Wikipedia, 2024), all data must be atomic (no multi-valued attributes), and there must be a unique identifier for each row.

I. CUSTOMER MANAGEMENT

CustomerID	FirstName	LastName	Email	PhoneNumber	AddressLine1	AddressLine2	City	PostalCode	RegistrationDate
C123	John	Doe	john@email.com	1234567890	Line1	Line2	New York	10001	2024-01-01
C124	Jane	Smith	jane@email.com	0987654321	Line3	Line4	Chicago	60606	2024-02-01

II. PRODUCT MANAGEMENT

ProductID	ProductName	Category	Brand	UnitPrice	TaxRate	ReorderLevel	IsActive
P101	TV	Electronics	Sony	1000.00	10%	5	Yes
P102	Sofa	Furniture	Ikea	500.00	5%	2	Yes

III. STOCK MANAGEMENT

StockID	ProductID	Warehouse	QuantityAvailable	LastRestockedDate
S001	P101	Warehouse1	10	2024-01-10
S002	P102	Warehouse2	5	2024-01-15

IV. DISCOUNT MANAGEMENT

DiscountID	DiscountName	StartDate	EndDate	DiscountDetails
D001	Summer Sale	2024-06-01	2024-06-30	15%, Percentage

V. SALES MANAGEMENT

TransactionID	CustomerID	TransactionDate	PaymentMethod	TotalAmount	DiscountApplied	FinalAmount	ProductDetails
T001	C123	2024-01-05	Credit Card	2000.00	15%	1700.00	P101: 2 units, $1000/unit

VI. EMPLOYEE MANAGEMENT

EmployeeID	FirstName	LastName	Role	ContactInfo	HireDate
E001	Alice	Brown	Manager	alice@company.com, 1234567	2020-01-01

4.2 SECOND NORMAL FORM – 2NF

To achieve **2NF**, all partial dependencies (fields depending only on part of a composite key) are removed. This step involves creating separate tables for attributes that do not directly depend on the primary key.

I. CUSTOMER MANAGEMENT

CustomerID	FirstName	LastName	Email	RegistrationDate
C123	John	Doe	john@email.com	2024-01-01

CustomerID	PhoneNumber	AddressLine1	AddressLine2	City	PostalCode
C123	1234567890	Line1	Line2	New York	10001

II. PRODUCT MANAGEMENT

ProductID	ProductName	UnitPrice	ReorderLevel	IsActive
P101	TV	1000.00	5	Yes

ProductID	Category
P101	Electronics

ProductID	Brand
P101	Sony

ProductID	TaxRate
P101	10%

III. STOCK MANAGEMENT

StockID	ProductID	Warehouse	QuantityAvailable	LastRestockedDate
S001	P101	Warehouse1	10	2024-01-10

IV. DISCOUNT MANAGEMENT

DiscountID	DiscountName	StartDate	EndDate
D001	Summer Sale	2024-06-01	2024-06-30

DiscountID	DiscountType	DiscountValue
D001	Percentage	15%

V. SALES MANAGEMENT

TransactionID	CustomerID	TransactionDate	PaymentMethod	TotalAmount	DiscountApplied	FinalAmount
T001	C123	2024-01-05	Credit Card	2000.00	15%	1700.00

TransactionID	ProductID	Quantity	UnitPrice	LineTotal
T001	P101	2	1000.00	2000.00

VI. EMPLOYEE MANAGEMENT

EmployeeID	FirstName	LastName	RoleID	HireDate
E001	Alice	Brown	R001	2020-01-01

RoleID	RoleName
R001	Manager

EmployeeID	ContactInfo
E001	alice@company.com, 1234567

4.3 THIRD NORMAL FORM – 3NF

To achieve **3NF**, all transitive dependencies (attributes depending on non-primary key attributes) are removed. The following tables demonstrate the fully normalized structure:

I. CUSTOMER MANAGEMENT

CustomerID	FirstName	LastName	Email	RegistrationDate
C123	John	Doe	john@email.com	2024-01-01

CustomerID	PhoneNumber	AddressLine1	AddressLine2	City	PostalCode
C123	1234567890	Line1	Line2	New York	10001

II. PRODUCT MANAGEMENT

ProductID	ProductName	CategoryID	BrandID	UnitPrice	TaxRateID	ReorderLevel	IsActive
P101	TV	CAT01	BR01	1000.00	TAX01	5	Yes

CategoryID	CategoryName
CAT01	Electronics

BrandID	BrandName
BR01	Sony

TaxRateID	TaxRate
TAX01	10%

III. STOCK MANAGEMENT

StockID	ProductID	WarehouseID	QuantityAvailable	LastRestockedDate
S001	P101	WH01	10	2024-01-10

WarehouseID	WarehouseName	Location	ManagerID
WH01	Warehouse1	New York City	E001

IV. DISCOUNT MANAGEMENT

DiscountID	DiscountName	StartDate	EndDate	DiscountType	DiscountValue
D001	Summer Sale	2024-06-01	2024-06-30	Percentage	15%

V. SALES MANAGEMENT

TransactionID	CustomerID	TransactionDate	PaymentMethodID	TotalAmount	DiscountApplied	FinalAmount
T001	C123	2024-01-05	PM01	2000.00	15%	1700.00

TransactionDetailID	TransactionID	ProductID	Quantity	UnitPrice	LineTotal
TD001	T001	P101	2	1000.00	2000.00

PaymentMethodID	PaymentType
PM01	Credit Card

VI. EMPLOYEE MANAGEMENT

EmployeeID	FirstName	LastName	RoleID	Email	PhoneNumber	HireDate
E001	Alice	Brown	R001	alice@company.com	1234567890	2020-01-01

RoleID	RoleName
R001	Manager

LogID	Action	PerformedBy	ActionTimestamp	TableName
LOG001	Update Stock	E001	2024-01-10 10:30:00	Stock

VII. REPORT GENERATION

ReportID	ReportName	GeneratedBy	GeneratedDate	ReportType	ReportData
REP001	Daily Sales Report	E001	2024-01-11	Sales	JSON Data

4.4 PROCESS OF NORMALIZATION

Normalization (Geeks for Geeks, 2024) is a systematic approach to organizing data in a database to reduce redundancy and improve data integrity. This document explains normalization through **1NF**, **2NF**, and **3NF**, using examples to demonstrate how redundant data is removed at each stage.

4.4.1 1NF (FIRST NORMAL FORM)

DEFINITION

1NF ensures that:

- All columns in a table contain atomic (indivisible) values.
- Each record is unique, and there are no duplicate rows.
- There are no repeating groups or arrays within the table.

EXAMPLE: DATA IN UNNORMALIZED FORM (0NF)

Consider a CustomerOrders table that stores customer orders.

CustomerID	CustomerName	Orders
C001	John Doe	TV: 2 units, $1000/unit; Sofa: 1 unit, $500
C002	Jane Smith	TV: 1 unit, $1000/unit

TRANSITION TO 1NF

To achieve 1NF:

- Split multi-valued attributes (e.g., Orders) into atomic values.
- Create a separate row for each unique order.

CustomerID	CustomerName	ProductName	Quantity	UnitPrice
C001	John Doe	TV	2	1000
C001	John Doe	Sofa	1	500
C002	Jane Smith	TV	1	1000

4.4.2 2NF (SECOND NORMAL FORM)

DEFINITION

2NF eliminates partial dependencies, where non-primary key attributes depend only on part of a composite primary key. To achieve 2NF:

- Move attributes that are dependent on only part of the primary key to a separate table.
- Ensure all attributes depend on the entire primary key.

EXAMPLE: DATA IN 1NF

Continuing with the CustomerOrders table:

CustomerID	CustomerName	ProductName	Quantity	UnitPrice
C001	John Doe	TV	2	1000
C001	John Doe	Sofa	1	500
C002	Jane Smith	TV	1	1000

IDENTIFYING PARTIAL DEPENDENCIES

- CustomerName depends only on CustomerID.
- UnitPrice depends only on ProductName.

TRANSITION TO 2NF

Split the table into two separate tables:

Customer Table

CustomerID	CustomerName
C001	John Doe
C002	Jane Smith

Product Table

ProductName	UnitPrice
TV	1000
Sofa	500

CustomerOrders Table

CustomerID	ProductName	Quantity
C001	TV	2
C001	Sofa	1
C002	TV	1

By eliminating partial dependencies, redundancy is reduced. For example, the price of a product is stored only once in the Product table, rather than being repeated for every order.

4.4.3 3NF (THIRD NORMAL FORM

DEFINITION

3NF eliminates transitive dependencies, where a non-primary key attribute depends on another non-primary key attribute. To achieve 3NF:

- Move attributes that do not directly depend on the primary key to a separate table.

EXAMPLE: DATA IN 2NF

Consider the Customer table:

CustomerID	CustomerName	City	PostalCode
C001	John Doe	New York	10001
C002	Jane Smith	Chicago	60606

IDENTIFYING TRANSITIVE DEPENDENCIES

- City depends on PostalCode.
- CustomerID is the primary key.

TRANSITION TO 3NF

Split the table into two separate tables:

Customer Table

CustomerID	CustomerName	PostalCode
C001	John Doe	10001
C002	Jane Smith	60606

Location Table

PostalCode	City
10001	New York
60606	Chicago

By removing transitive dependencies, redundancy is further reduced. For instance, the city corresponding to a postal code is stored only once in the Location table.

4.4.4 SUMMARY OF NORMALIZATION STEPS

Normalization Form	Key Action	Result
1NF	Remove multi-valued attributes	Atomic values and unique rows
2NF	Eliminate partial dependencies	Attributes depend on the entire primary key
3NF	Eliminate transitive dependencies	Attributes depend only on the primary key

By applying normalization, we ensure the database is efficient, consistent, and free of unnecessary redundancy. This improves data integrity and minimizes the risk of anomalies during data manipulation.

5. DATA DICTIONARY

5.1 CUSTOMER MANAGEMENT

Table Name	Field Name	Data Type	Length	Constraints	Description
Customer	CustomerID	INT	-	Primary Key, Not Null, Auto Increment	Primary Key
	FirstName	VARCHAR	100	Not Null	Customer's first name
	LastName	VARCHAR	100	Not Null	Customer's last name
	Email	VARCHAR	255	Not Null, Unique	Customer's email address
	PhoneNumber	VARCHAR	11	Not Null	Customer's phone number
	AddressLine1	VARCHAR	255	Not Null	Primary address line
	AddressLine2	VARCHAR	255	Null	Secondary address line
	City	VARCHAR	100	Not Null	City of residence
	PostalCode	VARCHAR	20	Not Null	Postal code
	RegistrationDate	DATE	-	Not Null	Date of registration

5.2 PRODUCT AND STOCK MANAGEMENT

Table Name	Field Name	Data Type	Length	Constraints	Description
Product	ProductID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	ProductName	VARCHAR	255	Not Null	Name of the product
	CategoryID	INT		Foreign Key, Not Null	Foreign Key to Category
	BrandID	INT		Foreign Key, Not Null	Foreign Key to Brand
	UnitPrice	DECIMAL	10,2	Not Null	Price per unit
	TaxRateID	INT		Foreign Key, Not Null	Foreign Key to TaxRate
	ReorderLevel	INT		Not Null	Stock level to trigger reorder
	IsActive	BOOLEAN		Not Null	Indicates if the product is active

Table Name	Field Name	Data Type	Length	Constraints	Description
Category	CategoryID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	CategoryName	VARCHAR	255	Not Null	Name of the category

Table Name	Field Name	Data Type	Length	Constraints	Description
Brand	BrandID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	BrandName	VARCHAR	255	Not Null	Name of the brand

Table Name	Field Name	Data Type	Length	Constraints	Description
TaxRate	TaxRateID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	TaxRate	DECIMAL	5,2	Not Null	Tax percentage applied

Table Name	Field Name	Data Type	Length	Constraints	Description
Stock	StockID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	ProductID	INT	5,2	Foreign Key, Not Null	Foreign Key to Product
	WarehouseID	INT		Foreign Key, Not Null	Foreign Key to Warehouse
	QuantityAvailable	INT		Not Null	Quantity available in stock
	LastRestockedDate	DATE		Not Null	Date when stock was last restocked

Table Name	Field Name	Data Type	Length	Constraints	Description
Warehouse	WarehouseID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	WarehouseName	VARCHAR	255	Not Null	Name of the warehouse
	Location	VARCHAR	255	Not Null	Location of the warehouse
	ManagerID	INT		Foreign Key, Not Null	Foreign Key to Employee

5.3 DISCOUNT MANAGEMENT

Table Name	Field Name	Data Type	Length	Constraints	Description
Discount	DiscountID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	DiscountName	VARCHAR	5,2	Not Null	Name of the discount
	StartDate	DATE		Not Null	Start date of the discount
	EndDate	DATE		Not Null	End date of the discount
	DiscountPercentage	DECIMAL	5,2	Not Null	Percentage of discount
	DiscountType	VARCHAR	50	Not Null	Type of discount (e.g., Percentage, Flat)

Table Name	Field Name	Data Type	Length	Constraints	Description
ProductDiscount	ProductDiscountID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	ProductID	INT		Foreign Key, Not Null	Foreign Key to Product
	DiscountID	INT		Foreign Key, Not Null	Foreign Key to Discount

5.4 SALES MANAGEMENT

Table Name	Field Name	Data Type	Length	Constraints	Description
SalesTransaction	TransactionID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	CustomerID	INT		Foreign Key (Nullable for Guest Customers)	Foreign Key to Customer, Nullable for Guest Customers
	TransactionDate	DATE		Not Null	Date of transaction
	PaymentMethodID	INT		Foreign Key, Not Null	Foreign Key to PaymentMethod
	TotalAmount	DECIMAL	10,2	Not Null	Total amount before discounts
	DiscountApplied	DECIMAL	5,2	Not Null	Discount applied to the transaction
	FinalAmount	DECIMAL	10,2	Not Null	Final amount after discounts

Table Name	Field Name	Data Type	Length	Constraints	Description
SalesTransactionDetail	TransactionDetailID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	TransactionID	INT		Foreign Key, Not Null	Foreign Key to SalesTransaction
	ProductID	INT		Foreign Key, Not Null	Foreign Key to Product
	Quantity	INT		Not Null	Quantity of product sold
	UnitPrice	DECIMAL	10,2	Not Null	Price per unit
	LineTotal	DECIMAL	10,2	Not Null	Total price for the line item
Table Name	**Field Name**	**Data Type**	**Length**	**Constraints**	**Description**
PaymentMethod	PaymentMethodID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	PaymentType	VARCHAR	50	Not Null	Type of payment (e.g., Cash, Credit Card, Mobile Payment)

5.5 EMPLOYEE MANAGEMENT

Table Name	Field Name	Data Type	Length	Constraints	Description
Employee	EmployeeID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	FirstName	VARCHAR	100	Not Null	First name of the employee
	LastName	VARCHAR	100	Not Null	Last name of the employee
	RoleID	INT		Foreign Key, Not Null	Foreign Key to Role
	Email	VARCHAR	255	Not Null	Employee's email address
	PhoneNumber	VARCHAR	11	Not Null	Employee's phone number
	HireDate	DATE		Not Null	Date of hire

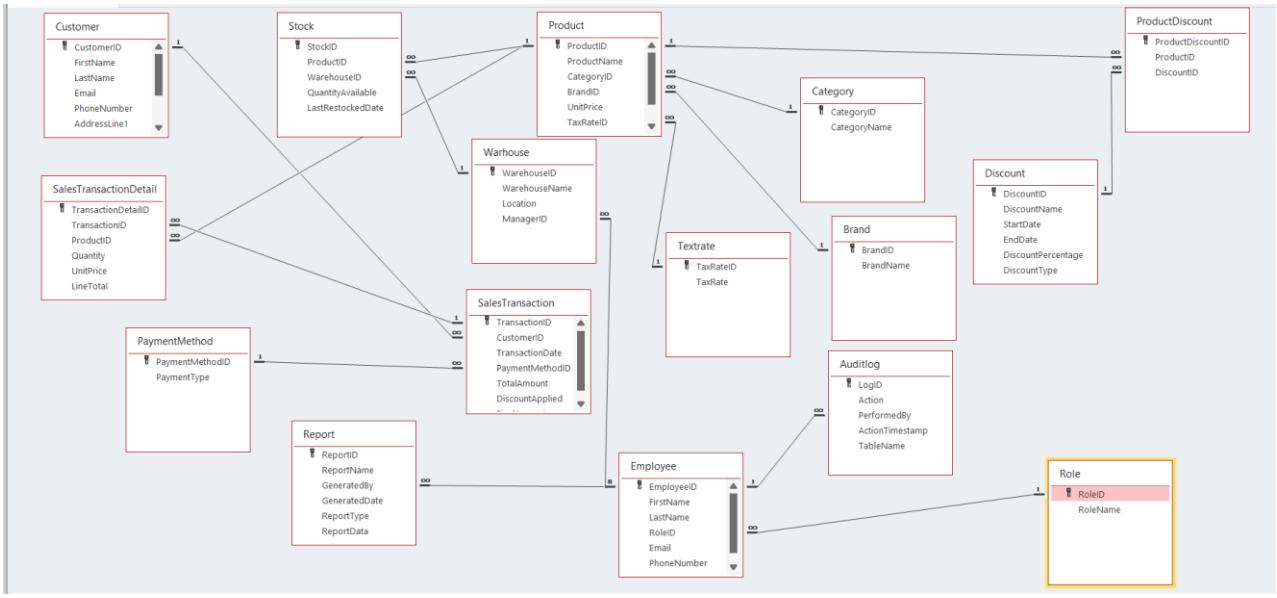
Table Name	Field Name	Data Type	Length	Constraints	Description
Role	RoleID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	RoleName	VARCHAR	100	Not Null	Name of the role (e.g., Admin, Cashier, Manager)

Table Name	Field Name	Data Type	Length	Constraints	Description
AuditLog	LogID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	Action	TEXT		Not Null	Description of the action
	PerformedBy	INT		Foreign Key to Employee, Not Null	Foreign Key to Employee
	ActionTimestamp	TIMESTAMP		Not Null	Timestamp of the action
	TableName	VARCHAR	100	Not Null	Name of the table affected

5.6 REPORT GENERATION

Table Name	Field Name	Data Type	Length	Constraints	Description
Report	ReportID	INT		Primary Key, Not Null, Auto Increment	Primary Key
	ReportName	VARCHAR	255	Not Null	Name of the report
	GeneratedBy	INT		Foreign Key to Employee	Foreign Key to Employee
	GeneratedDate	DATE		Not Null	Date the report was generated
	ReportType	VARCHAR	50	Not Null	Type of report (e.g., Daily, Monthly, Sales Summary)
	ReportData	BLOB/JSON		Not Null	Data in the report (Blob or JSON)

RELATIONSHIP DIAGRAM



6. DATABASE DESIGN

6.1 CUSTOMMER MANAGEMENT

6.1.1. "CUSTOMER" TABLE

SQLQuery1.sql - DI...ILSHAN\dilsh (76))*

```
SELECT *
FROM Customer;
```

100 %

Results | Messages

	CustomerID	FirstName	LastName	Email	PhoneNumber	AddressLine1	AddressLine2	City	PostalCode	RegistrationDate
1	1	Kumar	Perera	kumar.perera@example.com	0771234567	123 Temple Road	Apartment 4B	Colombo	00100	2023-01-15
2	2	Nuwan	Fernando	nuwan.fernando@example.com	0719876543	45 Beach Drive	NULL	Galle	80000	2023-02-10
3	3	Amali	Wijesinghe	amali.wijesinghe@example.com	0723456789	78 Lake View	Suite 3	Kandy	20000	2023-03-05
4	4	Saman	Silva	saman.silva@example.com	0751234560	89 High Street	NULL	Matara	81000	2023-04-12
5	5	Lakshmi	De Silva	lakshmi.desilva@example.com	0762345671	15 Palm Grove	Near Park	Negombo	11500	2023-05-18
6	6	Ruwan	Jayasinghe	ruwan.jayasinghe@example.com	0783456782	52 Hill Crest	Flat 6A	Nuwara Eliya	22200	2023-06-07
7	7	Chathura	Karunaratne	chathura.k@example.com	0709876544	102 Green Lane	NULL	Jaffna	40000	2023-07-02
8	8	Dilini	Gunasekara	dilini.g@example.com	0775671234	56 River Side	Opposite School	Batticaloa	30000	2023-08-19
9	9	Thilini	Ratnayake	thilini.ratnayake@example.com	0743456789	28 Mountain Pass	NULL	Badulla	90000	2023-09-03
10	10	Prasanna	Abeywickrama	prasanna.abeywickrama@example.com	0712349876	16 Lotus Street	Near Temple	Kurunegala	60000	2023-10-01
11	11	Harsha	Senanayake	harsha.senanayake@example.com	0721234568	9 Orchid Path	NULL	Ratnapura	70000	2023-10-15
12	12	Shanika	Dias	shanika.d@example.com	0784567890	67 Cinnamon Drive	NULL	Trincomalee	31000	2023-11-20
13	13	Anjana	Bandara	anjana.bandara@example.com	0702345679	34 Jasmine Avenue	Apartment 5C	Anuradhapura	50000	2023-12-01
14	14	Kavindu	Ekanayake	kavindu.ekanayake@example.com	0753456781	77 Sunset Boulevard	Flat 2B	Polonnaruwa	51000	2023-12-05
15	15	Nadeeka	Rajapakse	nadeeka.r@example.com	0715678901	101 Palm Court	Opposite Market	Hambantota	82000	2023-12-08
16	16	Sunil	Herath	sunil.herath@example.com	0767890123	12 Garden Path	NULL	Kalutara	12000	2023-12-12
17	17	Malith	Gamage	malith.gamage@example.com	0778901234	24 Cliff Road	Suite 101	Ampara	32000	2023-12-15
18	18	Rashmi	Liyanage	rashmi.liyanage@example.com	0759012345	88 Oak Lane	NULL	Puttalam	61000	2023-12-20
19	19	Janaka	Dissanayake	janaka.d@example.com	0701237890	40 Main Street	Building A	Vavuniya	43000	2023-12-25
20	20	Ishara	Peiris	ishara.peiris@example.com	0713456782	17 Cherry Blossom	NULL	Kilinochchi	44000	2023-12-30

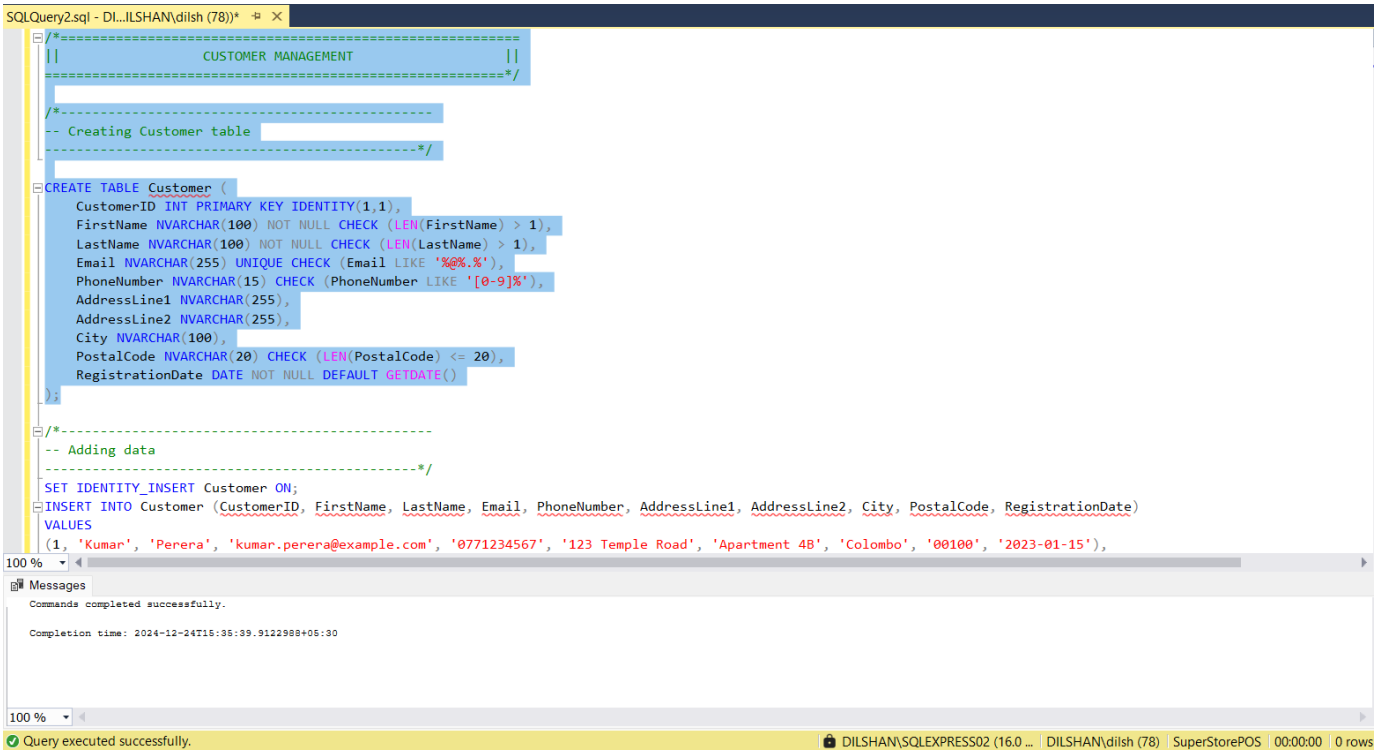
PURPOSE

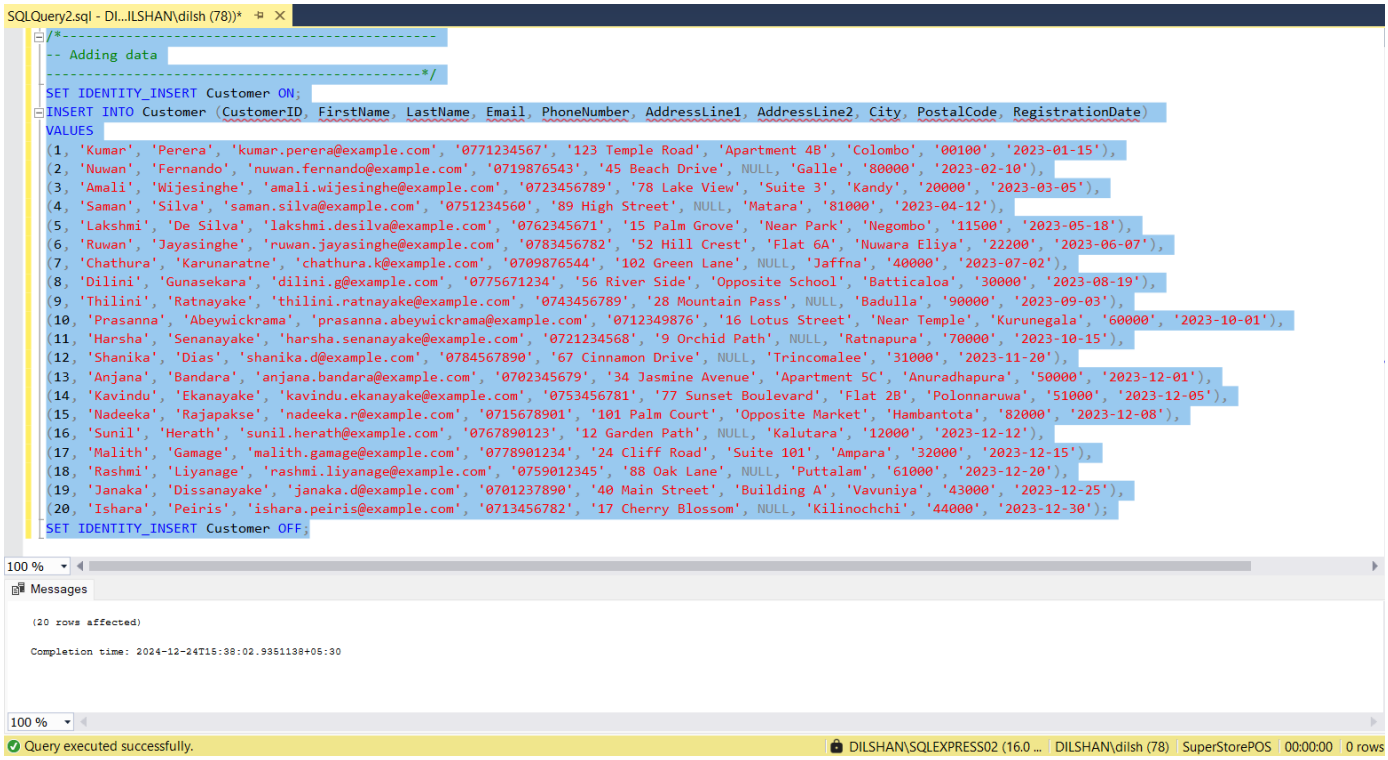
Manages customer information like personal details, contact information, and registration date. Essential for identifying and contacting customers (IBM, 2024).

DATA VALIDATION

- **Primary Key Constraint:** (CustomerID) Ensures unique identification of each customer.
- **NOT NULL Constraints:** Prevent missing essential details like (FirstName) and (LastName).
- **CHECK Constraints:**
  - Validates (FirstName) and (LastName) length.
  - Ensures (Email) follows a valid format and is unique.
  - Validates (PhoneNumber) starts with digits.
  - Limits (PostalCode) length.

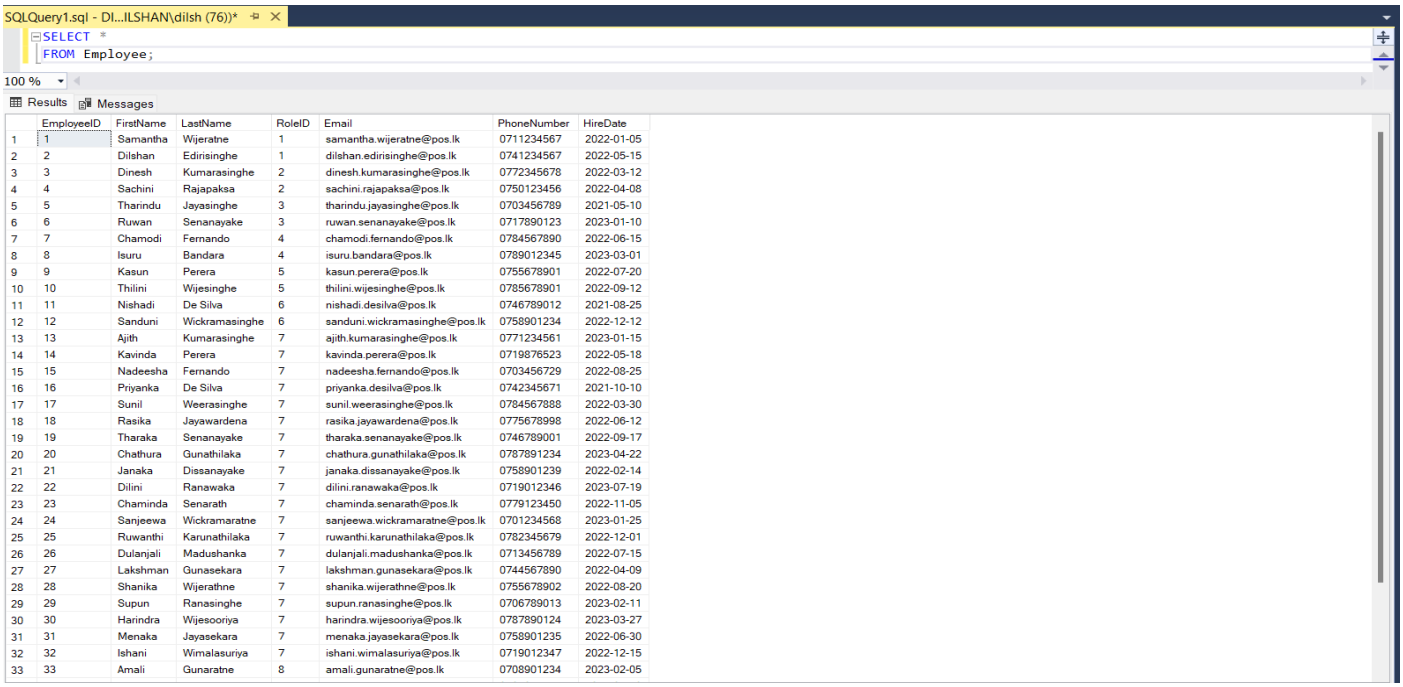
CODE & OUTPUT RESULTS.





6.2 EMPLOYEE MANAGEMENT

6.2.1 "EMPLOYEE" TABLE



```
SELECT *
FROM Employee;
```

100 %

Results | Messages

	EmployeeID	FirstName	LastName	RoleID	Email	PhoneNumber	HireDate
1	1	Samantha	Wijeratne	1	samantha.wijeratne@pos.lk	0711234567	2022-01-05
2	2	Dilshan	Edirisinghe	1	dilshan.edirisinghe@pos.lk	0741234567	2022-05-15
3	3	Dinesh	Kumarasinghe	2	dinesh.kumarasinghe@pos.lk	0772345678	2022-03-12
4	4	Sachini	Rajapaksa	2	sachini.rajapaksa@pos.lk	0750123456	2022-04-08
5	5	Tharindu	Jayasinghe	3	tharindu.jayasinghe@pos.lk	0703456789	2021-05-10
6	6	Ruwan	Senanayake	3	ruwan.senanayake@pos.lk	0717890123	2023-01-10
7	7	Chamodi	Fernando	4	chamodi.fernando@pos.lk	0784567890	2022-06-15
8	8	Isuru	Bandara	4	isuru.bandara@pos.lk	0789012345	2023-03-01
9	9	Kasun	Perera	5	kasun.perera@pos.lk	0755678901	2022-07-20
10	10	Thilini	Wijesinghe	5	thilini.wijesinghe@pos.lk	0785678901	2022-09-12
11	11	Nishadi	De Silva	6	nishadi.desilva@pos.lk	0746789012	2021-08-25
12	12	Sanduni	Wickramasinghe	6	sanduni.wickramasinghe@pos.lk	0758901234	2022-12-12
13	13	Ajith	Kumarasinghe	7	ajith.kumarasinghe@pos.lk	0771234561	2023-01-15
14	14	Kavinda	Perera	7	kavinda.perera@pos.lk	0719876523	2022-05-18
15	15	Nadeesha	Fernando	7	nadeesha.fernando@pos.lk	0703456729	2022-08-25
16	16	Priyanka	De Silva	7	priyanka.desilva@pos.lk	0742345671	2021-10-10
17	17	Sunil	Weerasinghe	7	sunil.weerasinghe@pos.lk	0784567888	2022-03-30
18	18	Rasika	Jayawardena	7	rasika.jayawardena@pos.lk	0775678998	2022-06-12
19	19	Tharaka	Senanayake	7	tharaka.senanayake@pos.lk	0746789001	2022-09-17
20	20	Chathura	Gunathilaka	7	chathura.gunathilaka@pos.lk	0787891234	2023-04-22
21	21	Janaka	Dissanayake	7	janaka.dissanayake@pos.lk	0758901239	2022-02-14
22	22	Dilini	Ranawaka	7	dilini.ranawaka@pos.lk	0719012346	2023-07-19
23	23	Chaminda	Senarath	7	chaminda.senarath@pos.lk	0779123450	2022-11-05
24	24	Sanjeewa	Wickramaratne	7	sanjeewa.wickramaratne@pos.lk	0701234568	2023-01-25
25	25	Ruwanthi	Karunathilaka	7	ruwanthi.karunathilaka@pos.lk	0782345679	2022-12-01
26	26	Dulanjali	Madushanka	7	dulanjali.madushanka@pos.lk	0713456789	2022-07-15
27	27	Lakshman	Gunasekara	7	lakshman.gunasekara@pos.lk	0744567890	2022-04-09
28	28	Shanika	Wijerathne	7	shanika.wijerathne@pos.lk	0755678902	2022-08-20
29	29	Supun	Ranasinghe	7	supun.ranasinghe@pos.lk	0706789013	2023-02-11
30	30	Harindra	Wijesooriya	7	harindra.wijesooriya@pos.lk	0787890124	2023-03-27
31	31	Menaka	Jayasekara	7	menaka.jayasekara@pos.lk	0758901235	2022-06-30
32	32	Ishani	Wimalasuriya	7	ishani.wimalasuriya@pos.lk	0719012347	2022-12-15
33	33	Amali	Gunaratne	8	amali.gunaratne@pos.lk	0708901234	2023-02-05

PORPOSE

Maintains employee information (Resorce for Employee, 2024), linking employees to roles. Tracks hire dates and contact details for the organization.

DATA VALIDATION

- **Primary Key Constraint:** (EmployeeID) Uniquely identifies employees.
- **Foreign Key Constraint:** (RoleID) Links employees to roles.
- **NOT NULL Constraints:** Prevent missing essential details like (FirstName), (LastName), (Email) and (HireDate)
- **CHECK Constraints:**
  - Validates (FirstName), (LastName), and (Email) format.
  - Ensures (HireDate) is not in the future.

CODE & OUTPUT RESULTS

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Creating Employee table
-----------------------------------------------*/

CREATE TABLE Employee (
    EmployeeID INT PRIMARY KEY IDENTITY(1,1),
    FirstName NVARCHAR(100) NOT NULL CHECK (LEN(FirstName) > 1),
    LastName NVARCHAR(100) NOT NULL CHECK (LEN(LastName) > 1),
    RoleID INT NOT NULL,
    Email NVARCHAR(255) UNIQUE NOT NULL CHECK (Email LIKE '%@%.%'),
    PhoneNumber NVARCHAR(15) CHECK (PhoneNumber LIKE '[0-9]%'),
    HireDate DATE NOT NULL CHECK (HireDate <= GETDATE()),
    FOREIGN KEY (RoleID) REFERENCES Role(RoleID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Employee ON;
INSERT INTO Employee (EmployeeID, FirstName, LastName, RoleID, Email, PhoneNumber, HireDate)
VALUES
-- Admins
(1, 'Samantha', 'Wijeratne', 1, 'samantha.wijeratne@pos.lk', '0711234567', '2022-01-05'),
(2, 'Dilshan', 'Edirisinghe', 1, 'dilshan.edirisinghe@pos.lk', '0741234567', '2022-05-15'),
-- Cashiers
(3, 'Dinesh', 'Kumarasinghe', 2, 'dinesh.kumarasinghe@pos.lk', '0772345678', '2022-03-12'),
(4, 'Sachini', 'Rajapaksa', 2, 'sachini.rajapaksa@pos.lk', '0750123456', '2022-04-08'),
-- Managers
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T15:41:51.3813482+05:30
```

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Employee ON;
INSERT INTO Employee (EmployeeID, FirstName, LastName, RoleID, Email, PhoneNumber, HireDate)
VALUES
-- Admins
(1, 'Samantha', 'Wijeratne', 1, 'samantha.wijeratne@pos.lk', '0711234567', '2022-01-05'),
(2, 'Dilshan', 'Edirisinghe', 1, 'dilshan.edirisinghe@pos.lk', '0741234567', '2022-05-15'),
-- Cashiers
(3, 'Dinesh', 'Kumarasinghe', 2, 'dinesh.kumarasinghe@pos.lk', '0772345678', '2022-03-12'),
(4, 'Sachini', 'Rajapaksa', 2, 'sachini.rajapaksa@pos.lk', '0750123456', '2022-04-08'),
-- Managers
(5, 'Tharindu', 'Jayasinghe', 3, 'tharindu.jayasinghe@pos.lk', '0703456789', '2021-05-10'),
(6, 'Ruwan', 'Senanayake', 3, 'ruwan.senanayake@pos.lk', '0717890123', '2023-01-10'),
-- Inventory Supervisors
(7, 'Chamodi', 'Fernando', 4, 'chamodi.fernando@pos.lk', '0784567890', '2022-06-15'),
(8, 'Isuru', 'Bandara', 4, 'isuru.bandara@pos.lk', '0789012345', '2023-03-01'),
-- Sales Representatives
(9, 'Kasun', 'Perera', 5, 'kasun.perera@pos.lk', '0755678901', '2022-07-20'),
(10, 'Thilini', 'Wijesinghe', 5, 'thilini.wijesinghe@pos.lk', '0785678901', '2022-09-12'),
-- Accountants
(11, 'Nishadi', 'De Silva', 6, 'nishadi.desilva@pos.lk', '0746789012', '2021-08-25'),
(12, 'Sanduni', 'Wickramasinghe', 6, 'sanduni.wickramasinghe@pos.lk', '0758901234', '2022-12-12'),
-- Warehouse Managers
(13, 'Ajith', 'Kumarasinghe', 7, 'ajith.kumarasinghe@pos.lk', '0771234561', '2023-01-15'),
(14, 'Kavinda', 'Perera', 7, 'kavinda.perera@pos.lk', '0719876523', '2022-05-18'),
```

100 %

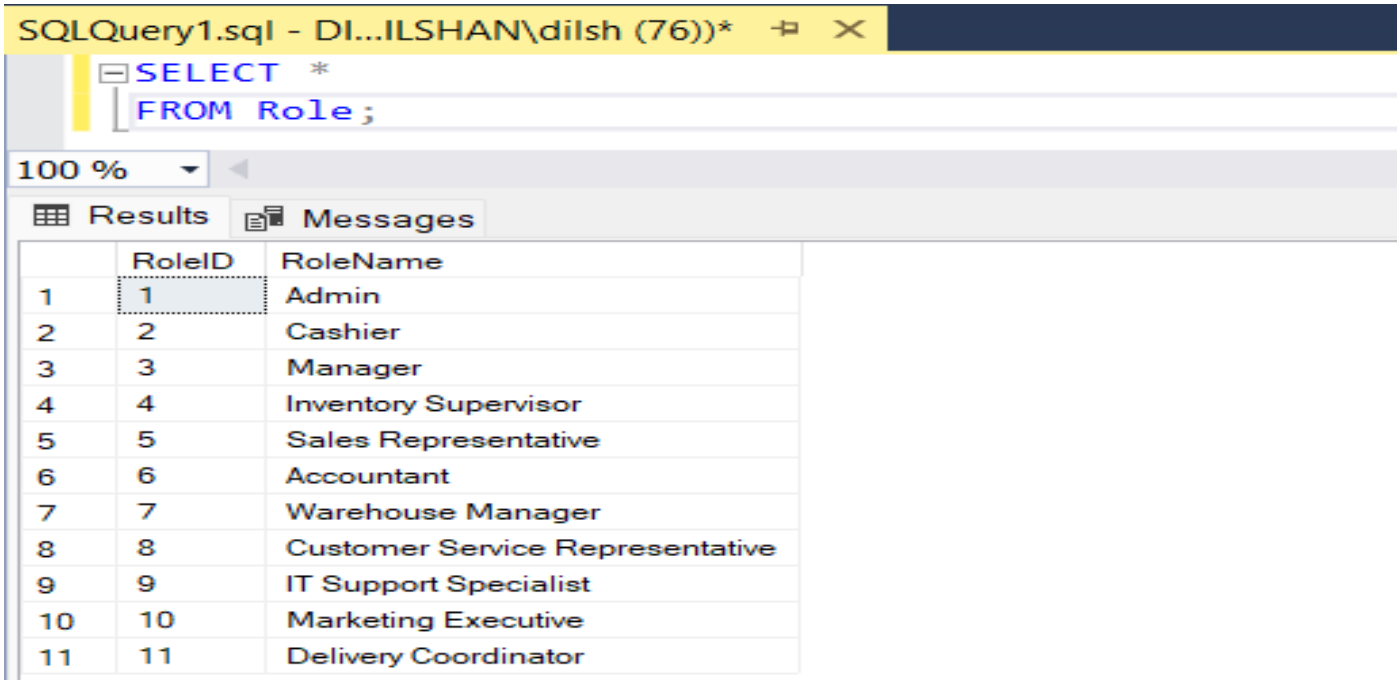
Messages

```
(39 rows affected)

Completion time: 2024-12-24T15:42:38.8233522+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.2.2 “ROLE” TABLE



	RoleID	RoleName
1	1	Admin
2	2	Cashier
3	3	Manager
4	4	Inventory Supervisor
5	5	Sales Representative
6	6	Accountant
7	7	Warehouse Manager
8	8	Customer Service Representative
9	9	IT Support Specialist
10	10	Marketing Executive
11	11	Delivery Coordinator

PORPOSE

Defines roles (e.g. Admin, Manager) for employees, helping assign and manage responsibilities.

DATA VALIDATION

- **Primary Key Constraint:** (RoleID) Ensures unique role identification.
- **NOT NULL Constraints:** Ensure (RoleName) is not empty.

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*============================================================
||                    EMPLOYEE MANAGEMENT                   ||
============================================================*/

/*-----------------------------------------------
-- Creating Role table
-----------------------------------------------*/

CREATE TABLE Role (
    RoleID INT PRIMARY KEY IDENTITY(1,1),
    RoleName NVARCHAR(100) NOT NULL CHECK (LEN(RoleName) > 0)
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Role ON;
INSERT INTO Role (RoleID, RoleName)
VALUES
(1, 'Admin'),
(2, 'Cashier'),
(3, 'Manager'),
(4, 'Inventory Supervisor'),
(5, 'Sales Representative'),
(6, 'Accountant'),
(7, 'Warehouse Manager'),
(8, 'Customer Service Representative'),
(9, 'IT Support Specialist'),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T15:39:50.8728873+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Role ON;
INSERT INTO Role (RoleID, RoleName)
VALUES
(1, 'Admin'),
(2, 'Cashier'),
(3, 'Manager'),
(4, 'Inventory Supervisor'),
(5, 'Sales Representative'),
(6, 'Accountant'),
(7, 'Warehouse Manager'),
(8, 'Customer Service Representative'),
(9, 'IT Support Specialist'),
(10, 'Marketing Executive'),
(11, 'Delivery Coordinator');
SET IDENTITY_INSERT Role OFF;
```

100 %

Messages

```
(11 rows affected)

Completion time: 2024-12-24T15:40:21.4413969+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.2.3 “AUDITLOG” TABLE

SQLQuery1.sql - DI...ILSHAN\dilsh (76))*

```
SELECT *
FROM AuditLog;
```

100 %

Results Messages

	LogID	Action	PerformedBy	ActionTimestamp	TableName
1	1	Added new employee: Amali Gunaratne	1	2023-02-05 09:15:30.000	Employee
2	2	Updated product price for Ceylon Tea 500g	2	2023-06-12 10:22:15.000	Product
3	3	Deleted inactive customer record	1	2023-08-01 14:45:05.000	Customer
4	4	Processed sales transaction #10123	3	2023-05-25 13:34:50.000	SalesTransaction
5	5	Applied discount on sales transaction #10256	4	2023-06-18 15:25:10.000	SalesTransactionDetail
6	6	Updated payment method for transaction #10321	4	2023-07-02 16:40:00.000	PaymentMethod
7	7	Approved bulk order request for Lanka Spices Ltd.	5	2023-09-10 11:10:45.000	Stock
8	8	Assigned new warehouse manager to Warehouse #3	6	2023-10-20 10:00:15.000	Warehouse
9	9	Updated stock reorder level for Rice 10kg	5	2023-11-11 09:45:30.000	Product
10	10	Stock restocked for Product #205 (Milk Powder)	7	2023-08-23 14:15:55.000	Stock
11	11	Updated supplier details for Product #109 (Coconut ...	8	2023-09-30 12:10:25.000	Product
12	12	Performed monthly stock audit for Warehouse #1	7	2023-12-01 11:00:00.000	AuditLog
13	13	Generated sales report for July 2023	9	2023-07-31 17:45:30.000	Report
14	14	Generated promotional sales summary	10	2023-09-12 18:00:00.000	Report
15	15	Submitted customer feedback report	9	2023-10-18 15:20:15.000	Report
16	16	Processed supplier invoice #20435	11	2023-09-05 10:05:40.000	AuditLog
17	17	Generated tax report for Q2 2023	12	2023-07-01 12:45:55.000	Report
18	18	Corrected payment record for Invoice #20987	11	2023-08-20 14:30:25.000	PaymentMethod
19	19	Added new stock location: Warehouse #4	13	2023-04-01 10:20:00.000	Warehouse
20	20	Updated manager details for Warehouse #2	14	2023-05-18 15:15:35.000	Warehouse
21	21	Approved stock transfer to Warehouse #3	15	2023-06-22 09:50:30.000	Stock
22	22	Resolved customer complaint for Order #23145	33	2023-07-25 11:30:15.000	Customer
23	23	Updated customer phone number for account #12345	34	2023-08-10 14:05:50.000	Customer
24	24	Performed system backup for Q3 2023	35	2023-10-15 20:00:00.000	AuditLog
25	25	Restored customer database from backup	35	2023-11-20 22:10:05.000	Customer

PURPOSE

Logs administrative actions performed by employees, ensuring traceability and accountability.

DATA VALIDATION

- **Primary Key Constraint:** (LogID) Unique identifier for log entries.
- **Foreign Key Constraint:** (PerformedBy) Links actions to employees, allowing NULL for unspecified actions.
- **NOT NULL Constraints:** Ensure (Action) and (ActionTimestamp) are not empty.

CODE & OUTPUT RESULTS

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Creating AuditLog table
-----------------------------------------------*/

CREATE TABLE AuditLog (
    LogID INT PRIMARY KEY IDENTITY(1,1),
    Action NVARCHAR(255) NOT NULL,
    PerformedBy INT NULL, -- Allow NULL values for SET NULL action
    ActionTimestamp DATETIME NOT NULL,
    TableName NVARCHAR(100),
    FOREIGN KEY (PerformedBy) REFERENCES Employee(EmployeeID) ON DELETE SET NULL
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT AuditLog ON;
INSERT INTO AuditLog (LogID, Action, PerformedBy, ActionTimestamp, TableName)
VALUES
-- Admin Actions
(1, 'Added new employee: Amali Gunaratne', 1, '2023-02-05 09:15:30', 'Employee'),
(2, 'Updated product price for Ceylon Tea 500g', 2, '2023-06-12 10:22:15', 'Product'),
(3, 'Deleted inactive customer record', 1, '2023-08-01 14:45:05', 'Customer'),
-- Cashier Actions
(4, 'Processed sales transaction #10123', 3, '2023-05-25 13:34:50', 'SalesTransaction'),
(5, 'Applied discount on sales transaction #10256', 4, '2023-06-18 15:25:10', 'SalesTransactionDetail'),
(6, 'Updated payment method for transaction #10321', 4, '2023-07-02 16:40:00', 'PaymentMethod'),
-- Manager Actions
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T15:44:36.9028420+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

SQLQuery2.sql - DILSHAN\SQLEXPRESS02.SuperStorePOS (DILSHAN\dilsh (78))*

```sql
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT AuditLog ON;
INSERT INTO AuditLog (LogID, Action, PerformedBy, ActionTimestamp, TableName)
VALUES
-- Admin Actions
(1, 'Added new employee: Amali Gunaratne', 1, '2023-02-05 09:15:30', 'Employee'),
(2, 'Updated product price for Ceylon Tea 500g', 2, '2023-06-12 10:22:15', 'Product'),
(3, 'Deleted inactive customer record', 1, '2023-08-01 14:45:05', 'Customer'),
-- Cashier Actions
(4, 'Processed sales transaction #10123', 3, '2023-05-25 13:34:50', 'SalesTransaction'),
(5, 'Applied discount on sales transaction #10256', 4, '2023-06-18 15:25:10', 'SalesTransactionDetail'),
(6, 'Updated payment method for transaction #10321', 4, '2023-07-02 16:40:00', 'PaymentMethod'),
-- Manager Actions
(7, 'Approved bulk order request for Lanka Spices Ltd.', 5, '2023-09-10 11:10:45', 'Stock'),
(8, 'Assigned new warehouse manager to Warehouse #3', 6, '2023-10-20 10:00:15', 'Warehouse'),
(9, 'Updated stock reorder level for Rice 10kg', 5, '2023-11-11 09:45:30', 'Product'),
-- Inventory Supervisor Actions
(10, 'Stock restocked for Product #205 (Milk Powder)', 7, '2023-08-23 14:15:55', 'Stock'),
(11, 'Updated supplier details for Product #109 (Coconut Oil)', 8, '2023-09-30 12:10:25', 'Product'),
(12, 'Performed monthly stock audit for Warehouse #1', 7, '2023-12-01 11:00:00', 'AuditLog'),
-- Sales Representative Actions
(13, 'Generated sales report for July 2023', 9, '2023-07-31 17:45:30', 'Report'),
(14, 'Generated promotional sales summary', 10, '2023-09-12 18:00:00', 'Report'),
(15, 'Submitted customer feedback report', 9, '2023-10-18 15:20:15', 'Report'),
-- Accountants Actions
```

100 %

Messages

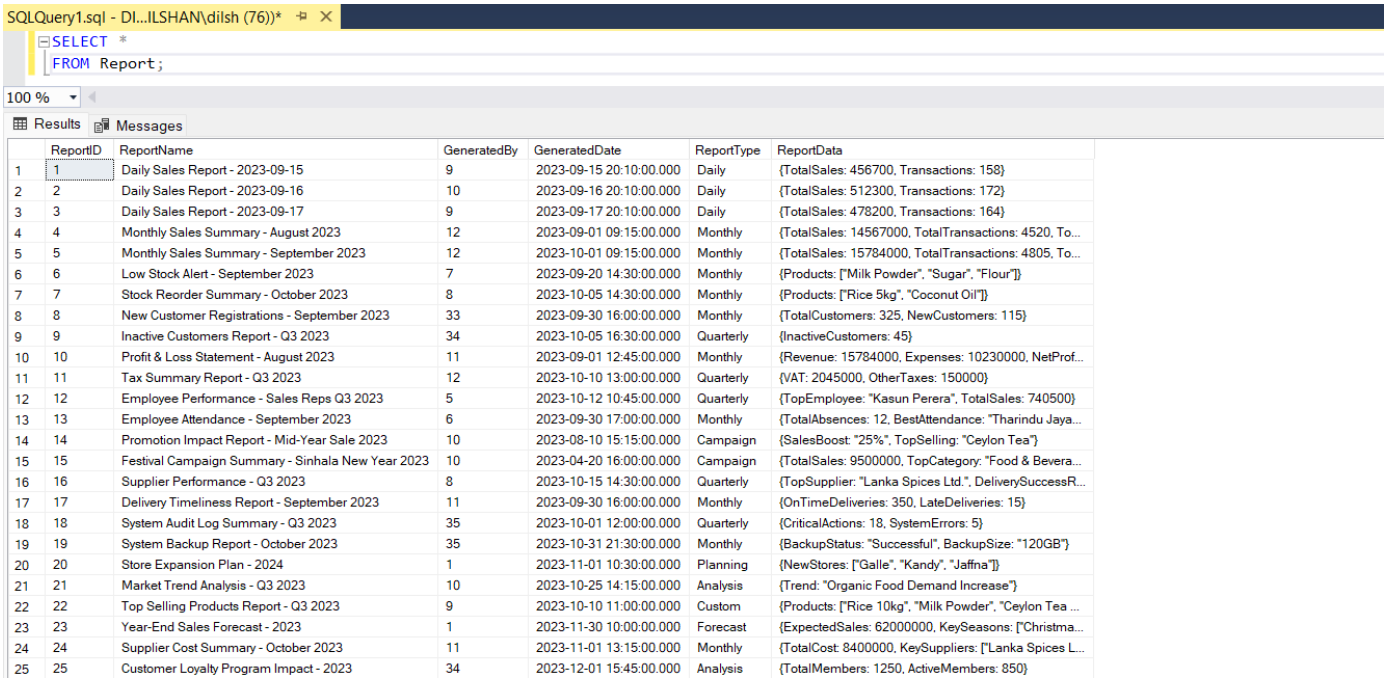
```
(25 rows affected)

Completion time: 2024-12-24T15:45:20.4291797+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.3 REPORT GENERATION

6.3.1. REPORT" TABLE



```
SELECT *
FROM Report;
```

100 %

Results | Messages

	ReportID	ReportName	GeneratedBy	GeneratedDate	ReportType	ReportData
1	1	Daily Sales Report - 2023-09-15	9	2023-09-15 20:10:00.000	Daily	{TotalSales: 456700, Transactions: 158}
2	2	Daily Sales Report - 2023-09-16	10	2023-09-16 20:10:00.000	Daily	{TotalSales: 512300, Transactions: 172}
3	3	Daily Sales Report - 2023-09-17	9	2023-09-17 20:10:00.000	Daily	{TotalSales: 478200, Transactions: 164}
4	4	Monthly Sales Summary - August 2023	12	2023-09-01 09:15:00.000	Monthly	{TotalSales: 14567000, TotalTransactions: 4520, To...
5	5	Monthly Sales Summary - September 2023	12	2023-10-01 09:15:00.000	Monthly	{TotalSales: 15784000, TotalTransactions: 4805, To...
6	6	Low Stock Alert - September 2023	7	2023-09-20 14:30:00.000	Monthly	{Products: ["Milk Powder", "Sugar", "Flour"]}
7	7	Stock Reorder Summary - October 2023	8	2023-10-05 14:30:00.000	Monthly	{Products: ["Rice 5kg", "Coconut Oil"]}
8	8	New Customer Registrations - September 2023	33	2023-09-30 16:00:00.000	Monthly	{TotalCustomers: 325, NewCustomers: 115}
9	9	Inactive Customers Report - Q3 2023	34	2023-10-05 16:30:00.000	Quarterly	{InactiveCustomers: 45}
10	10	Profit & Loss Statement - August 2023	11	2023-09-01 12:45:00.000	Monthly	{Revenue: 15784000, Expenses: 10230000, NetProf...
11	11	Tax Summary Report - Q3 2023	12	2023-10-10 13:00:00.000	Quarterly	{VAT: 2045000, OtherTaxes: 150000}
12	12	Employee Performance - Sales Reps Q3 2023	5	2023-10-12 10:45:00.000	Quarterly	{TopEmployee: "Kasun Perera", TotalSales: 740500}
13	13	Employee Attendance - September 2023	6	2023-09-30 17:00:00.000	Monthly	{TotalAbsences: 12, BestAttendance: "Tharindu Jaya...
14	14	Promotion Impact Report - Mid-Year Sale 2023	10	2023-08-10 15:15:00.000	Campaign	{SalesBoost: "25%", TopSelling: "Ceylon Tea"}
15	15	Festival Campaign Summary - Sinhala New Year 2023	10	2023-04-20 16:00:00.000	Campaign	{TotalSales: 9500000, TopCategory: "Food & Bevera...
16	16	Supplier Performance - Q3 2023	8	2023-10-15 14:30:00.000	Quarterly	{TopSupplier: "Lanka Spices Ltd.", DeliverySuccessR...
17	17	Delivery Timeliness Report - September 2023	11	2023-09-30 16:00:00.000	Monthly	{OnTimeDeliveries: 350, LateDeliveries: 15}
18	18	System Audit Log Summary - Q3 2023	35	2023-10-01 12:00:00.000	Quarterly	{CriticalActions: 18, SystemErrors: 5}
19	19	System Backup Report - October 2023	35	2023-10-31 21:30:00.000	Monthly	{BackupStatus: "Successful", BackupSize: "120GB"}
20	20	Store Expansion Plan - 2024	1	2023-11-01 10:30:00.000	Planning	{NewStores: ["Galle", "Kandy", "Jaffna"]}
21	21	Market Trend Analysis - Q3 2023	10	2023-10-25 14:15:00.000	Analysis	{Trend: "Organic Food Demand Increase"}
22	22	Top Selling Products Report - Q3 2023	9	2023-10-10 11:00:00.000	Custom	{Products: ["Rice 10kg", "Milk Powder", "Ceylon Tea ...
23	23	Year-End Sales Forecast - 2023	1	2023-11-30 10:00:00.000	Forecast	{ExpectedSales: 62000000, KeySeasons: ["Christma...
24	24	Supplier Cost Summary - October 2023	11	2023-11-01 13:15:00.000	Monthly	{TotalCost: 8400000, KeySuppliers: ["Lanka Spices L...
25	25	Customer Loyalty Program Impact - 2023	34	2023-12-01 15:45:00.000	Analysis	{TotalMembers: 1250, ActiveMembers: 850}

PURPOSE

Stores generated reports, linking them to the responsible employee. Useful for record-keeping and analysis.

DATA VALIDATION

- **Primary Key Constraint:** (ReportID) Uniquely identifies reports.
- **Foreign Key Constraint:** (GeneratedBy) Links reports to generating employees.
- **NOT NULL Constraints:** Prevent missing essential details (GeneratedDate) and (ReportType).
- **CHECK Constraints:**
  - Ensures (ReportName) has at least 1 character

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*============================================================
||                    REPORT GENERATION                     ||
============================================================*/

/*-------------------------------------------------
-- Creating Report table
-------------------------------------------------*/

CREATE TABLE Report (
    ReportID INT PRIMARY KEY IDENTITY(1,1),
    ReportName NVARCHAR(255) NOT NULL CHECK (LEN(ReportName) > 0),
    GeneratedBy INT NOT NULL,
    GeneratedDate DATETIME NOT NULL DEFAULT GETDATE(),
    ReportType NVARCHAR(100) NOT NULL,
    ReportData NVARCHAR(MAX),
    FOREIGN KEY (GeneratedBy) REFERENCES Employee(EmployeeID) ON DELETE CASCADE
);

/*-------------------------------------------------
-- Adding data
-------------------------------------------------*/
SET IDENTITY_INSERT Report ON;
INSERT INTO Report (ReportID, ReportName, GeneratedBy, GeneratedDate, ReportType, ReportData)
VALUES
-- Daily Sales Reports
(1, 'Daily Sales Report - 2023-09-15', 9, '2023-09-15 20:10:00', 'Daily', '{TotalSales: 456700, Transactions: 158}'),
(2, 'Daily Sales Report - 2023-09-16', 10, '2023-09-16 20:10:00', 'Daily', '{TotalSales: 512300, Transactions: 172}'),
(3, 'Daily Sales Report - 2023-09-17', 9, '2023-09-17 20:10:00', 'Daily', '{TotalSales: 478200, Transactions: 164}'),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T15:50:02.7807704+05:30
```

100 %

Query executed successfully. | DILSHAN\SQLEXPRESS02 (16.0 ... | DILSHAN\dilsh (78) | SuperStorePOS | 00:00:00 | 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-------------------------------------------------
-- Adding data
-------------------------------------------------*/
SET IDENTITY_INSERT Report ON;
INSERT INTO Report (ReportID, ReportName, GeneratedBy, GeneratedDate, ReportType, ReportData)
VALUES
-- Daily Sales Reports
(1, 'Daily Sales Report - 2023-09-15', 9, '2023-09-15 20:10:00', 'Daily', '{TotalSales: 456700, Transactions: 158}'),
(2, 'Daily Sales Report - 2023-09-16', 10, '2023-09-16 20:10:00', 'Daily', '{TotalSales: 512300, Transactions: 172}'),
(3, 'Daily Sales Report - 2023-09-17', 9, '2023-09-17 20:10:00', 'Daily', '{TotalSales: 478200, Transactions: 164}'),
-- Monthly Sales Summary
(4, 'Monthly Sales Summary - August 2023', 12, '2023-09-01 09:15:00', 'Monthly', '{TotalSales: 14567000, TotalTransactions: 4520, TopProduct: "Ceylon Tea 500g"}'),
(5, 'Monthly Sales Summary - September 2023', 12, '2023-10-01 09:15:00', 'Monthly', '{TotalSales: 15784000, TotalTransactions: 4805, TopProduct: "Rice 10kg"}'),
-- Stock and Inventory Reports
(6, 'Low Stock Alert - September 2023', 7, '2023-09-20 14:30:00', 'Monthly', '{Products: ["Milk Powder", "Sugar", "Flour"]}'),
(7, 'Stock Reorder Summary - October 2023', 8, '2023-10-05 14:30:00', 'Monthly', '{Products: ["Rice 5kg", "Coconut Oil"]}'),
-- Customer Reports
(8, 'New Customer Registrations - September 2023', 33, '2023-09-30 16:00:00', 'Monthly', '{TotalCustomers: 325, NewCustomers: 115}'),
(9, 'Inactive Customers Report - Q3 2023', 34, '2023-10-05 16:30:00', 'Quarterly', '{InactiveCustomers: 45}'),
-- Financial Reports
(10, 'Profit & Loss Statement - August 2023', 11, '2023-09-01 12:45:00', 'Monthly', '{Revenue: 15784000, Expenses: 10230000, NetProfit: 5554000}'),
(11, 'Tax Summary Report - Q3 2023', 12, '2023-10-10 13:00:00', 'Quarterly', '{VAT: 2045000, OtherTaxes: 150000}'),
-- Employee Performance Reports
(12, 'Employee Performance - Sales Reps Q3 2023', 5, '2023-10-12 10:45:00', 'Quarterly', '{TopEmployee: "Kasun Perera", TotalSales: 740500}'),
(13, 'Employee Attendance - September 2023', 6, '2023-09-30 17:00:00', 'Monthly', '{TotalAbsences: 12, BestAttendance: "Tharindu Jayasinghe"}'),
-- Promotional Campaigns and Marketing
(14, 'Promotion Impact Report - Mid-Year Sale 2023', 10, '2023-08-10 15:15:00', 'Campaign', '{SalesBoost: "25%", TopSelling: "Ceylon Tea"}'),
(15, 'Festival Campaign Summary - Sinhala New Year 2023', 10, '2023-04-20 16:00:00', 'Campaign', '{TotalSales: 9500000, TopCategory: "Food & Beverages"}'),
```

100 %

Messages

```
(25 rows affected)

Completion time: 2024-12-24T15:50:47.0624608+05:30
```

100 %

Query executed successfully. | DILSHAN\SQLEXPRESS02 (16.0 ... | DILSHAN\dilsh (78) | SuperStorePOS | 00:00:00 | 0 rows

6.4 PRODUCT AND STOCK MANAGEMENT

6.4.1. "PRODUCT" TABLE

SQLQuery1.sql - DI...ILSHAN\dilsh (76))*

```
SELECT *
FROM Product;
```

100 %

Results | Messages

	ProductID	ProductName	CategoryID	BrandID	UnitPrice	TaxRateID	ReorderLevel	IsActive
1	1	Anchor Full Cream Milk Powder	1	7	1000.00	3	50	1
2	2	Kotmale Fresh Milk 1L	1	19	240.00	1	30	1
3	3	Highland Butter 200g	1	37	950.00	3	20	1
4	4	Dilmah Premium Tea 200g	2	2	750.00	2	40	1
5	5	Mlesna Black Tea 100g	2	4	600.00	2	25	1
6	6	Gold Leaf Tea 400g	2	26	850.00	3	50	1
7	7	Prima Wheat Flour 1kg	3	3	180.00	1	100	1
8	8	Ruhunu Red Rice 5kg	3	34	1500.00	2	50	1
9	9	CIC Basmati Rice 1kg	3	11	1100.00	2	30	1
10	10	Munchee Marie Biscuits 400g	4	16	240.00	2	70	1
11	11	Ritzbury Chocolate Fingers 200g	4	17	380.00	3	40	1
12	12	Maliban Lemon Puff 300g	4	5	300.00	2	60	1
13	13	Elephant House Chicken Sausages 1kg	5	14	1500.00	3	20	1
14	14	Keells Chicken Drumsticks 1kg	5	6	1200.00	3	25	1
15	15	Kotmale Ice Cream Vanilla 1L	5	19	800.00	3	15	1
16	16	MD Mango Chutney 250g	6	27	500.00	2	40	1
17	17	Kist Tomato Sauce 750ml	6	8	450.00	2	50	1
18	18	Maggi Coconut Milk Powder 300g	6	28	600.00	2	35	1
19	19	Sunlight Detergent Powder 2kg	7	9	1500.00	3	20	1
20	20	Harpic Toilet Cleaner 500ml	7	12	550.00	2	25	1
21	21	Dettol Antibacterial Soap 100g	7	18	150.00	2	60	1
22	22	Coca-Cola Bottle 1.5L	8	15	300.00	2	100	1
23	23	Elephant House Cream Soda Can 330ml	8	14	120.00	2	150	1
24	24	Nestlé Milo 400g	8	35	800.00	3	30	1
25	25	LUX Body Wash 250ml	9	10	450.00	2	20	1
26	26	Pears Baby Lotion 200ml	9	25	550.00	2	15	1
27	27	Hemas Velvet Soap 100g	9	24	100.00	1	50	1

PURPOSE

Manages product information, including category, brand, pricing, and tax rates. Ensures active product status.

DATA VALIDATION

- **Primary Key Constraint:** (ProductID) Ensures unique identification of products.
- **Foreign Key Constraints:** (CategoryID), (BrandID), (TaxRateID) Link products table to Category, Brand, and TaxRate tables.
- **NOT NULL Constraints:** Prevent missing essential details like (ProductName), (UnitPrice), (ReorderLevel) and (IsActive) status.
- **CHECK Constraints:**
  - Ensure (ProductName) is valid.
  - Validate (UnitPrice) and (ReorderLevel) are non-negative.

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Creating Product table
-----------------------------------------------*/

CREATE TABLE Product (
    ProductID INT PRIMARY KEY IDENTITY(1,1),
    ProductName NVARCHAR(150) NOT NULL CHECK (LEN(ProductName) > 0),
    CategoryID INT NOT NULL,
    BrandID INT NOT NULL,
    UnitPrice DECIMAL(10, 2) NOT NULL CHECK (UnitPrice >= 0),
    TaxRateID INT NOT NULL,
    ReorderLevel INT NOT NULL CHECK (ReorderLevel >= 0),
    IsActive BIT NOT NULL DEFAULT 1,
    FOREIGN KEY (CategoryID) REFERENCES Category(CategoryID) ON DELETE CASCADE,
    FOREIGN KEY (BrandID) REFERENCES Brand(BrandID) ON DELETE CASCADE,
    FOREIGN KEY (TaxRateID) REFERENCES TaxRate(TaxRateID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Product ON;
INSERT INTO Product (ProductID, ProductName, CategoryID, BrandID, UnitPrice, TaxRateID, ReorderLevel, IsActive)
VALUES
-- Dairy Products
(1, 'Anchor Full Cream Milk Powder', 1, 7, 1000.00, 3, 50, 1),
(2, 'Kotmale Fresh Milk 1L', 1, 19, 240.00, 1, 30, 1),
(3, 'Highland Butter 200g', 1, 37, 950.00, 3, 20, 1),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T18:38:16.0969228+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Product ON;
INSERT INTO Product (ProductID, ProductName, CategoryID, BrandID, UnitPrice, TaxRateID, ReorderLevel, IsActive)
VALUES
-- Dairy Products
(1, 'Anchor Full Cream Milk Powder', 1, 7, 1000.00, 3, 50, 1),
(2, 'Kotmale Fresh Milk 1L', 1, 19, 240.00, 1, 30, 1),
(3, 'Highland Butter 200g', 1, 37, 950.00, 3, 20, 1),
-- Tea
(4, 'Dilmah Premium Tea 200g', 2, 2, 750.00, 2, 40, 1),
(5, 'Mlesna Black Tea 100g', 2, 4, 600.00, 2, 25, 1),
(6, 'Gold Leaf Tea 400g', 2, 26, 850.00, 3, 50, 1),
-- Staples
(7, 'Prima Wheat Flour 1kg', 3, 3, 180.00, 1, 100, 1),
(8, 'Ruhunu Red Rice 5kg', 3, 34, 1500.00, 2, 50, 1),
(9, 'CIC Basmati Rice 1kg', 3, 11, 1100.00, 2, 30, 1),
-- Snacks
(10, 'Munchee Marie Biscuits 400g', 4, 16, 240.00, 2, 70, 1),
(11, 'Ritzbury Chocolate Fingers 200g', 4, 17, 380.00, 3, 40, 1),
(12, 'Maliban Lemon Puff 300g', 4, 5, 300.00, 2, 60, 1),
-- Frozen Food
(13, 'Elephant House Chicken Sausages 1kg', 5, 14, 1500.00, 3, 20, 1),
(14, 'Keells Chicken Drumsticks 1kg', 5, 6, 1200.00, 3, 25, 1),
(15, 'Kotmale Ice Cream Vanilla 1L', 5, 19, 800.00, 3, 15, 1),
-- Condiments
(16, 'MD Mango Chutney 250g', 6, 27, 500.00, 2, 40, 1),
```

100 %

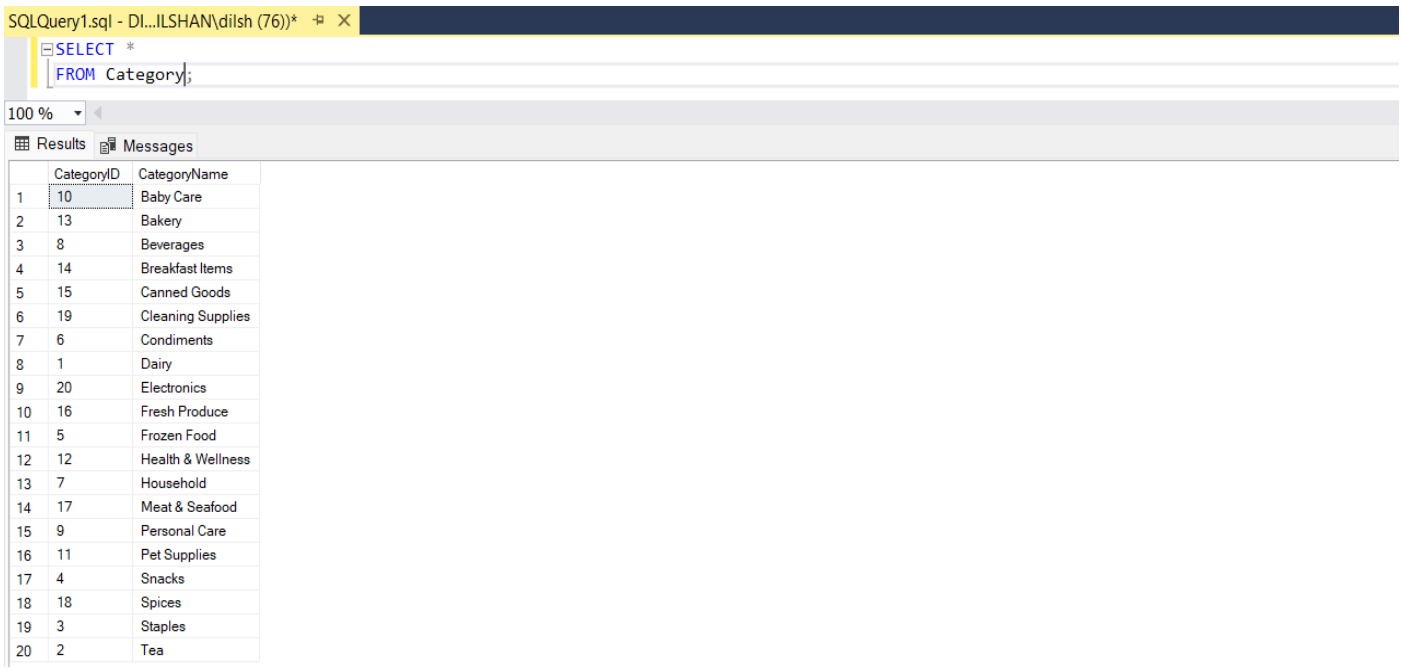
Messages

```
(27 rows affected)

Completion time: 2024-12-24T18:38:54.7548839+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.4.2. “CATEGORY” TABLE



	CategoryID	CategoryName
1	10	Baby Care
2	13	Bakery
3	8	Beverages
4	14	Breakfast Items
5	15	Canned Goods
6	19	Cleaning Supplies
7	6	Condiments
8	1	Dairy
9	20	Electronics
10	16	Fresh Produce
11	5	Frozen Food
12	12	Health & Wellness
13	7	Household
14	17	Meat & Seafood
15	9	Personal Care
16	11	Pet Supplies
17	4	Snacks
18	18	Spices
19	3	Staples
20	2	Tea

PURPOSE

Categorizes products for better organization and retrieval.

DATA VALIDATION

- **Primary Key Constraint:** (CategoryID) Ensures unique category identification.
- **NOT NULL Constraints:** Ensure (CategoryName) is not empty.
- **CHECK Constraints:**
  - Ensures (CategoryName) is unique and valid.

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*============================================================
||                PRODUCT AND STOCK MANAGEMENT              ||
============================================================*/

/*-----------------------------------------------
-- Creating Category table
-----------------------------------------------*/

CREATE TABLE Category (
    CategoryID INT PRIMARY KEY IDENTITY(1,1),
    CategoryName NVARCHAR(100) NOT NULL UNIQUE CHECK (LEN(CategoryName) > 0)
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Category ON;
INSERT INTO Category (CategoryID, CategoryName)
VALUES
(1, 'Dairy'),
(2, 'Tea'),
(3, 'Staples'),
(4, 'Snacks'),
(5, 'Frozen Food'),
(6, 'Condiments'),
(7, 'Household'),
(8, 'Beverages'),
(9, 'Personal Care'),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T18:33:01.9709273+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Category ON;
INSERT INTO Category (CategoryID, CategoryName)
VALUES
(1, 'Dairy'),
(2, 'Tea'),
(3, 'Staples'),
(4, 'Snacks'),
(5, 'Frozen Food'),
(6, 'Condiments'),
(7, 'Household'),
(8, 'Beverages'),
(9, 'Personal Care'),
(10, 'Baby Care'),
(11, 'Pet Supplies'),
(12, 'Health & Wellness'),
(13, 'Bakery'),
(14, 'Breakfast Items'),
(15, 'Canned Goods'),
(16, 'Fresh Produce'),
(17, 'Meat & Seafood'),
(18, 'Spices'),
(19, 'Cleaning Supplies'),
(20, 'Electronics');
SET IDENTITY_INSERT Category OFF;
```

100 %

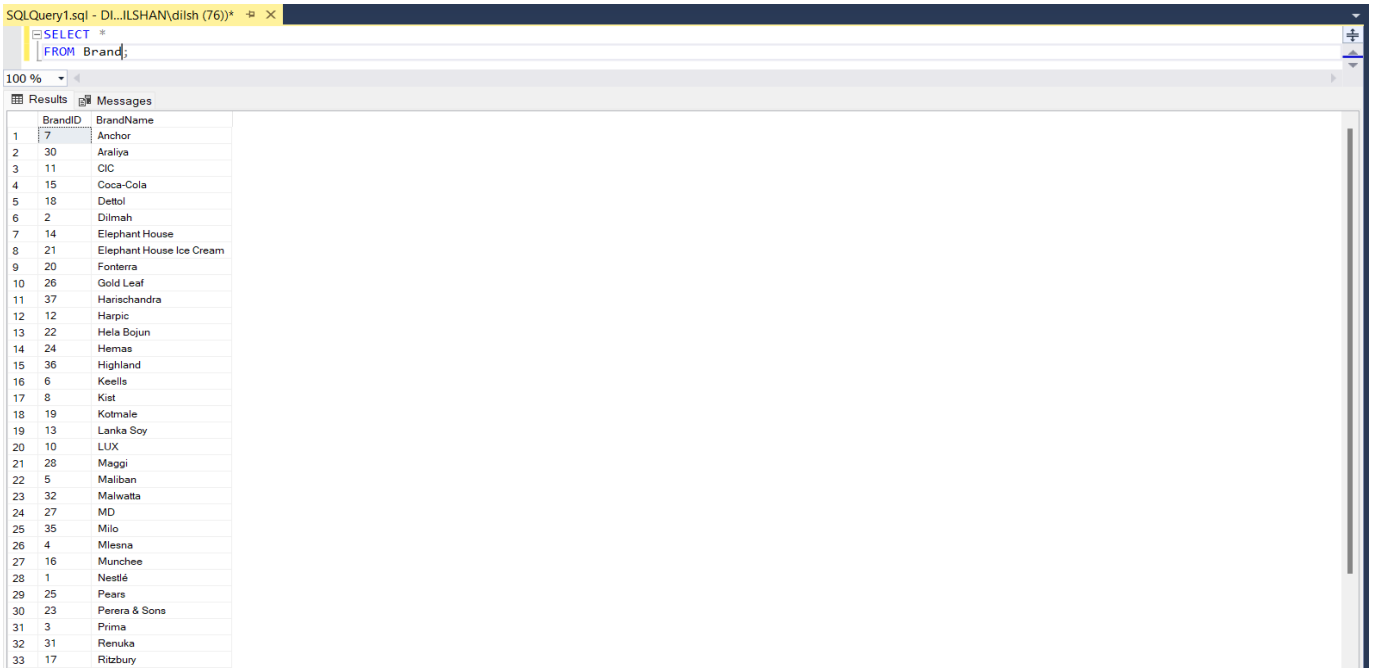
Messages

```
(20 rows affected)

Completion time: 2024-12-24T18:33:47.0256459+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.4.3. “BRAND” TABLE



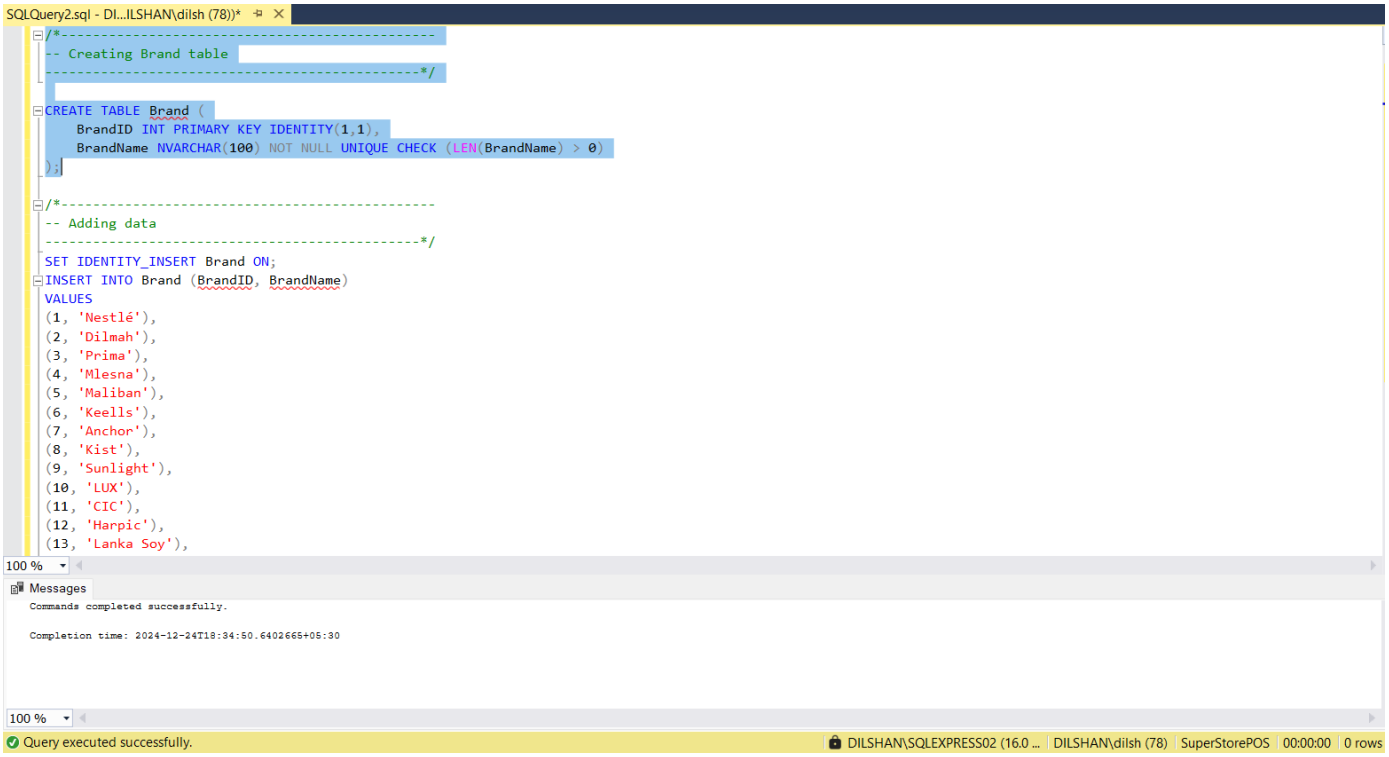
	BrandID	BrandName
1	7	Anchor
2	30	Araliya
3	11	CIC
4	15	Coca-Cola
5	18	Dettol
6	2	Dilmah
7	14	Elephant House
8	21	Elephant House Ice Cream
9	20	Fonterra
10	26	Gold Leaf
11	37	Harischandra
12	12	Harpic
13	22	Hela Bojun
14	24	Hemas
15	36	Highland
16	6	Keells
17	8	Kist
18	19	Kotmale
19	13	Lanka Soy
20	10	LUX
21	28	Maggi
22	5	Maliban
23	32	Malwatta
24	27	MD
25	35	Milo
26	4	Mlesna
27	16	Munchee
28	1	Nestlé
29	25	Pears
30	23	Perera & Sons
31	3	Prima
32	31	Renuka
33	17	Ritzbury

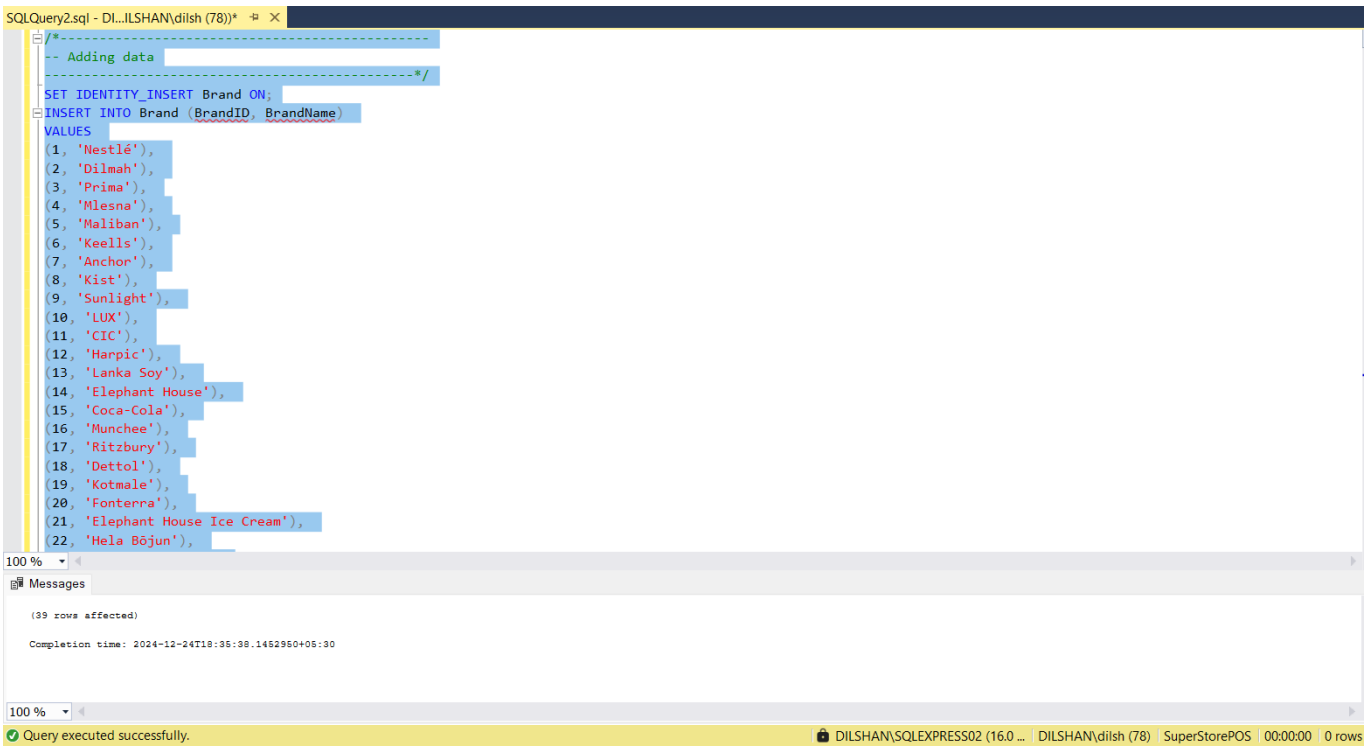
PURPOSE

Manages information about product brands, and helps in brand-based product searches.

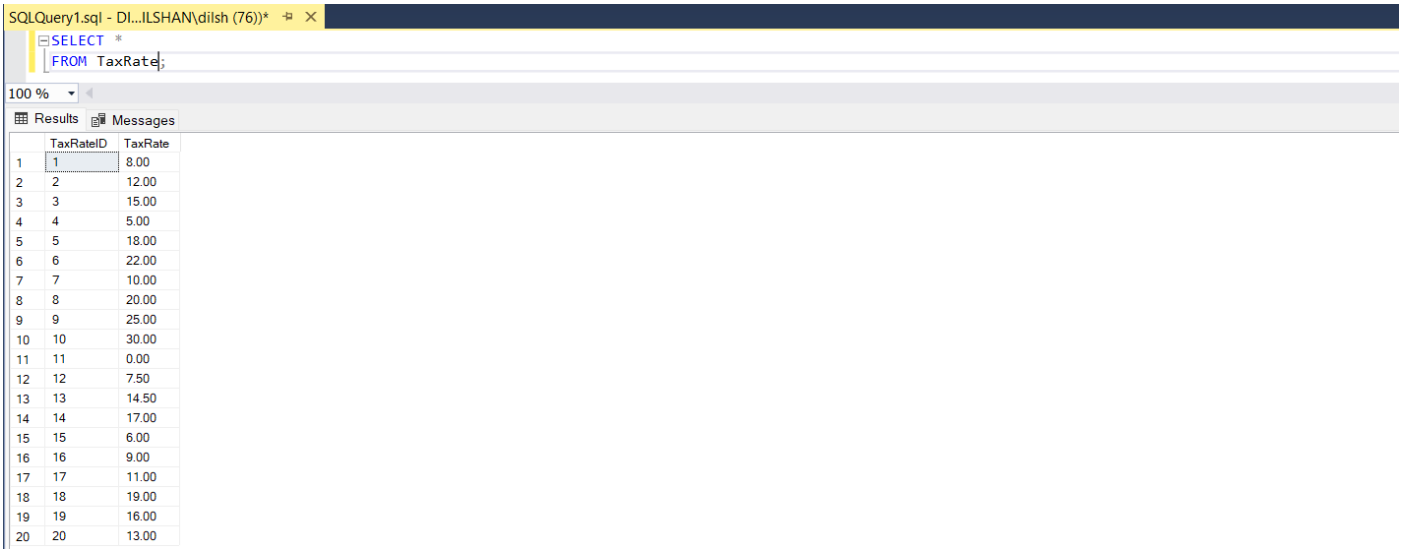
DATA VALIDATION

- **Primary Key Constraint:** (BrandID) Unique identifier for brands.
- **NOT NULL Constraints:** Ensure (BrandName) is not empty.
- **CHECK Constraints:**
  - Ensures (BrandName) is unique and valid.


SQLQuery2.sql - DI...ILSHAN\dilsh (78))*
/*---
-- Creating Brand table
---*/
CREATE TABLE Brand (
BrandID INT PRIMARY KEY IDENTITY(1,1),
BrandName NVARCHAR(100) NOT NULL UNIQUE CHECK (LEN(BrandName) > 0)
);
/*---
-- Adding data
---*/
SET IDENTITY_INSERT Brand ON;
INSERT INTO Brand (BrandID, BrandName)
VALUES
(1, 'Nestlé'),
(2, 'Dilmah'),
(3, 'Prima'),
(4, 'Mlesna'),
(5, 'Maliban'),
(6, 'Keells'),
(7, 'Anchor'),
(8, 'Kist'),
(9, 'Sunlight'),
(10, 'LUX'),
(11, 'CIC'),
(12, 'Harpic'),
(13, 'Lanka Soy'),
100 %
Messages
Commands completed successfully.
Completion time: 2024-12-24T18:34:50.6402665+05:30
100 %
Query executed successfully.
DILSHAN\SQLEXPRESS02 (16.0 ...
DILSHAN\dilsh (78)
SuperStorePOS
00:00:00
0 rows


SQLQuery2.sql - DI...ILSHAN\dilsh (78))*
/*---
-- Adding data
---*/
SET IDENTITY_INSERT Brand ON;
INSERT INTO Brand (BrandID, BrandName)
VALUES
(1, 'Nestlé'),
(2, 'Dilmah'),
(3, 'Prima'),
(4, 'Mlesna'),
(5, 'Maliban'),
(6, 'Keells'),
(7, 'Anchor'),
(8, 'Kist'),
(9, 'Sunlight'),
(10, 'LUX'),
(11, 'CIC'),
(12, 'Harpic'),
(13, 'Lanka Soy'),
(14, 'Elephant House'),
(15, 'Coca-Cola'),
(16, 'Munchee'),
(17, 'Ritzbury'),
(18, 'Dettol'),
(19, 'Kotmale'),
(20, 'Fonterra'),
(21, 'Elephant House Ice Cream'),
(22, 'Hela Bōjun'),
100 %
Messages
(39 rows affected)
Completion time: 2024-12-24T18:35:38.1452950+05:30
100 %
Query executed successfully.
DILSHAN\SQLEXPRESS02 (16.0 ...
DILSHAN\dilsh (78)
SuperStorePOS
00:00:00
0 rows

6.4.4. “TAXRATE” TABLE



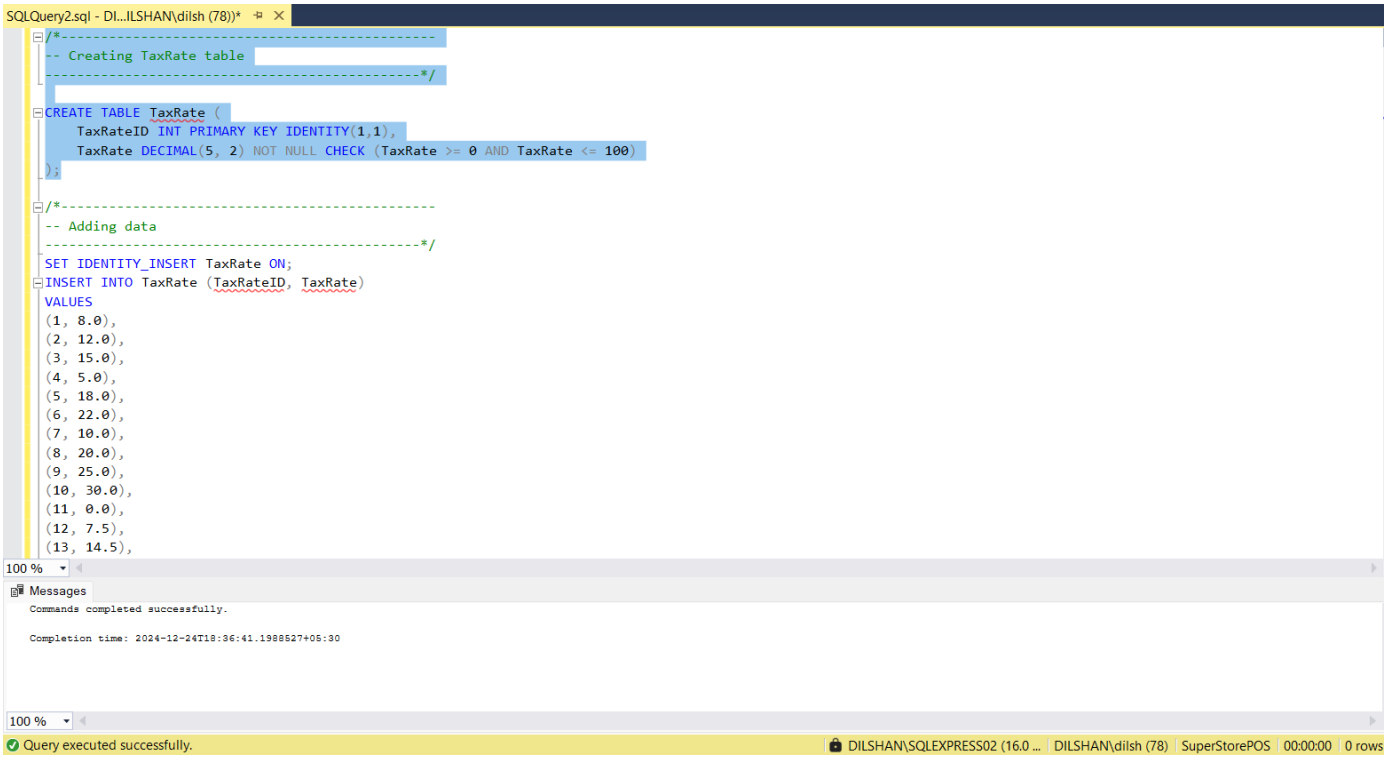
	TaxRateID	TaxRate
1	1	8.00
2	2	12.00
3	3	15.00
4	4	5.00
5	5	18.00
6	6	22.00
7	7	10.00
8	8	20.00
9	9	25.00
10	10	30.00
11	11	0.00
12	12	7.50
13	13	14.50
14	14	17.00
15	15	6.00
16	16	9.00
17	17	11.00
18	18	19.00
19	19	16.00
20	20	13.00

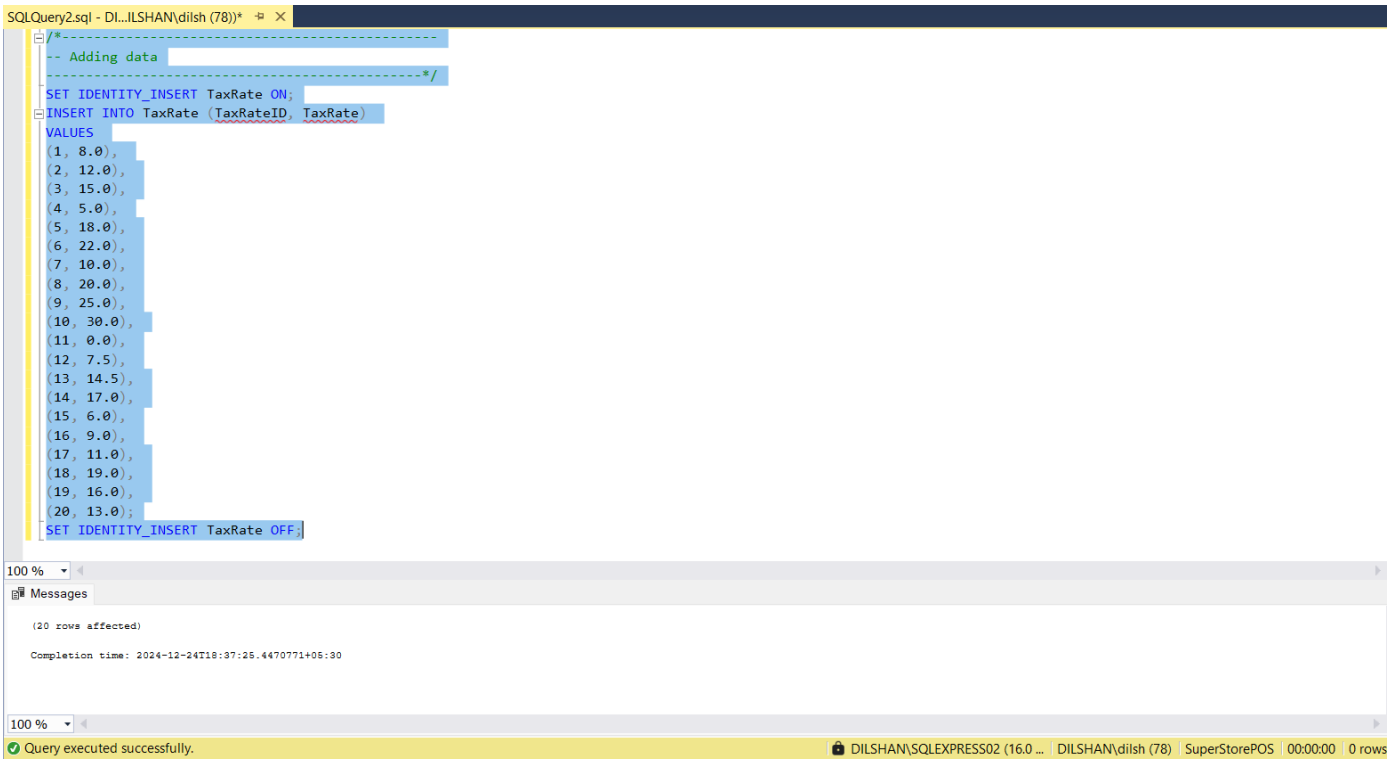
PURPOSE

Stores applicable tax rates for products, simplifying tax calculations.

DATA VALIDATION

- **Primary Key Constraint:** (TaxRateID) Unique identifier for tax rates.
- **NOT NULL Constraints:** Ensure (TaxRate) is not empty.
- **CHECK Constraints:**
  - Restricts (TaxRate) to a valid percentage (0-100).


SQLQuery2.sql - DI...ILSHAN\dilsh (78))*
/*---
-- Creating TaxRate table
---*/
CREATE TABLE TaxRate (
TaxRateID INT PRIMARY KEY IDENTITY(1,1),
TaxRate DECIMAL(5, 2) NOT NULL CHECK (TaxRate >= 0 AND TaxRate <= 100)
);
/*---
-- Adding data
---*/
SET IDENTITY_INSERT TaxRate ON;
INSERT INTO TaxRate (TaxRateID, TaxRate)
VALUES
(1, 8.0),
(2, 12.0),
(3, 15.0),
(4, 5.0),
(5, 18.0),
(6, 22.0),
(7, 10.0),
(8, 20.0),
(9, 25.0),
(10, 30.0),
(11, 0.0),
(12, 7.5),
(13, 14.5),
100 %
Messages
Commands completed successfully.
Completion time: 2024-12-24T18:36:41.1988527+05:30
100 %
Query executed successfully.
DILSHAN\SQLEXPRESS02 (16.0 ...
DILSHAN\dilsh (78)
SuperStorePOS
00:00:00
0 rows


SQLQuery2.sql - DI...ILSHAN\dilsh (78))*
/*---
-- Adding data
---*/
SET IDENTITY_INSERT TaxRate ON;
INSERT INTO TaxRate (TaxRateID, TaxRate)
VALUES
(1, 8.0),
(2, 12.0),
(3, 15.0),
(4, 5.0),
(5, 18.0),
(6, 22.0),
(7, 10.0),
(8, 20.0),
(9, 25.0),
(10, 30.0),
(11, 0.0),
(12, 7.5),
(13, 14.5),
(14, 17.0),
(15, 6.0),
(16, 9.0),
(17, 11.0),
(18, 19.0),
(19, 16.0),
(20, 13.0);
SET IDENTITY_INSERT TaxRate OFF;
100 %
Messages
(20 rows affected)
Completion time: 2024-12-24T18:37:25.4470771+05:30
100 %
Query executed successfully.
DILSHAN\SQLEXPRESS02 (16.0 ...
DILSHAN\dilsh (78)
SuperStorePOS
00:00:00
0 rows

6.4.5. “WHEREHOSE” TABLE

SQLQuery1.sql - DI...ILSHAN\dilsh (76))*

```
SELECT *
FROM Warehouse;
```

100 %

Results | Messages

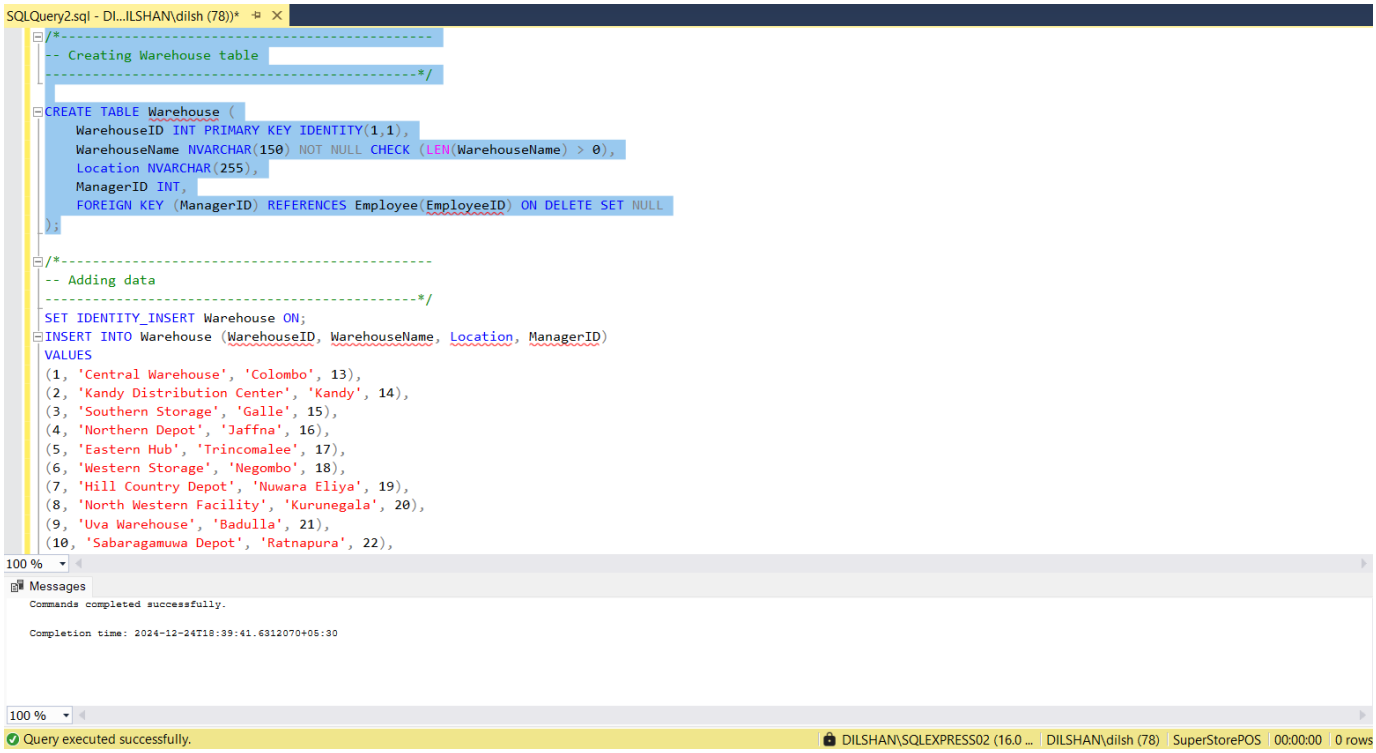
	WarehouseID	WarehouseName	Location	ManagerID
1	1	Central Warehouse	Colombo	13
2	2	Kandy Distribution Center	Kandy	14
3	3	Southern Storage	Galle	15
4	4	Northern Depot	Jaffna	16
5	5	Eastern Hub	Trincomalee	17
6	6	Western Storage	Negombo	18
7	7	Hill Country Depot	Nuwara Eliya	19
8	8	North Western Facility	Kurunegala	20
9	9	Uva Warehouse	Badulla	21
10	10	Sabaragamuwa Depot	Ratnapura	22
11	11	Eastern Highlands Center	Ampara	23
12	12	Coastal Hub	Matara	24
13	13	Dry Zone Depot	Anuradhapura	25
14	14	Urban Storage	Batticaloa	26
15	15	Central Highlands Depot	Hatton	27
16	16	Industrial Hub	Kalutara	28
17	17	Administrative Warehouse	Chilaw	29
18	18	Port Storage	Hambantota	30
19	19	Heritage Hub	Polonnaruwa	31
20	20	Frontier Depot	Monaragala	32

PURPOSE

Tracks warehouse details, including location and manager assignment.

DATA VALIDATION

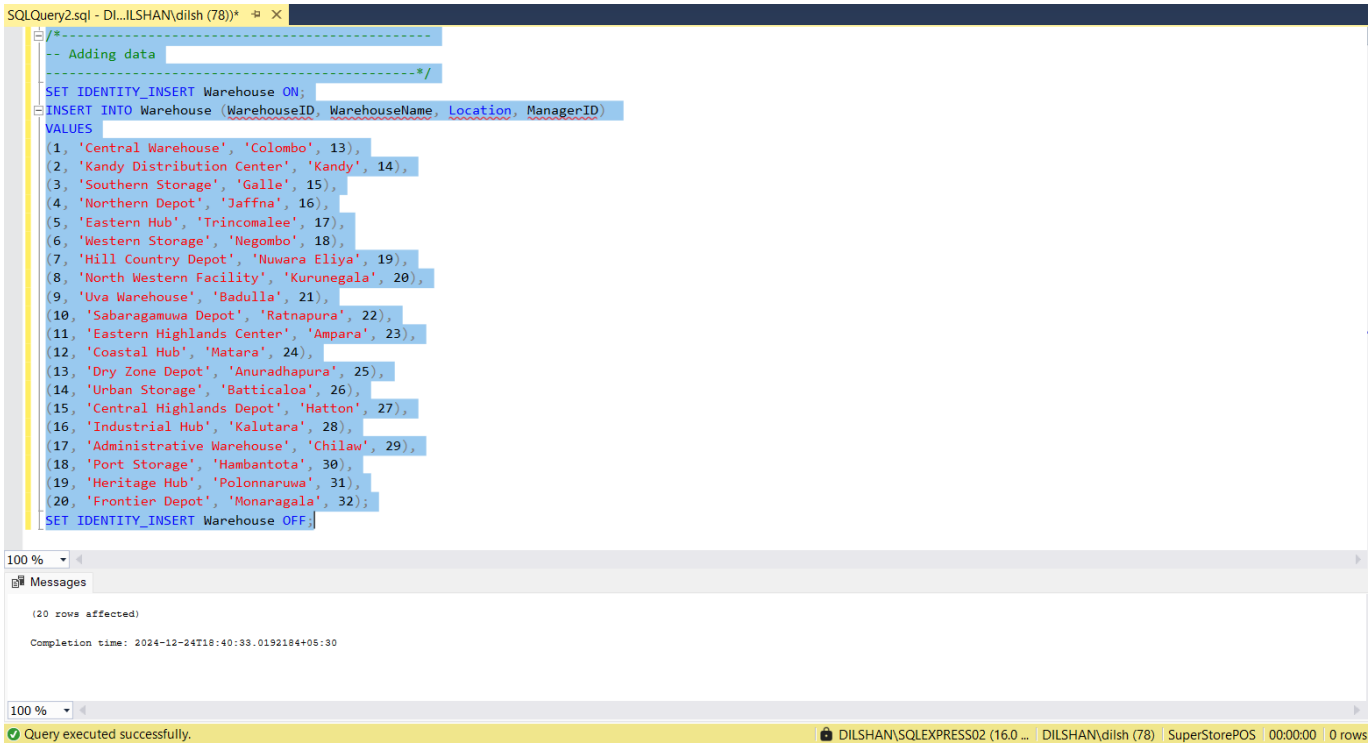
- **Primary Key Constraint:** (WarehouseID) Unique identifier for warehouses.
- **Foreign Key Constraint:** (ManagerID) Links managers to warehouses, allowing NULL.
- **NOT NULL Constraints:** Ensure (WarehouseName) is not empty.
- **CHECK Constraints:**
  - Check (WarehouseName) is valid.



```
/*-----------------------------------------------
-- Creating Warehouse table
-----------------------------------------------*/

CREATE TABLE Warehouse (
    WarehouseID INT PRIMARY KEY IDENTITY(1,1),
    WarehouseName NVARCHAR(150) NOT NULL CHECK (LEN(WarehouseName) > 0),
    Location NVARCHAR(255),
    ManagerID INT,
    FOREIGN KEY (ManagerID) REFERENCES Employee(EmployeeID) ON DELETE SET NULL
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Warehouse ON;
INSERT INTO Warehouse (WarehouseID, WarehouseName, Location, ManagerID)
VALUES
(1, 'Central Warehouse', 'Colombo', 13),
(2, 'Kandy Distribution Center', 'Kandy', 14),
(3, 'Southern Storage', 'Galle', 15),
(4, 'Northern Depot', 'Jaffna', 16),
(5, 'Eastern Hub', 'Trincomalee', 17),
(6, 'Western Storage', 'Negombo', 18),
(7, 'Hill Country Depot', 'Nuwara Eliya', 19),
(8, 'North Western Facility', 'Kurunegala', 20),
(9, 'Uva Warehouse', 'Badulla', 21),
(10, 'Sabaragamuwa Depot', 'Ratnapura', 22),
```

```
Messages
Commands completed successfully.

Completion time: 2024-12-24T18:39:41.6312070+05:30
```

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

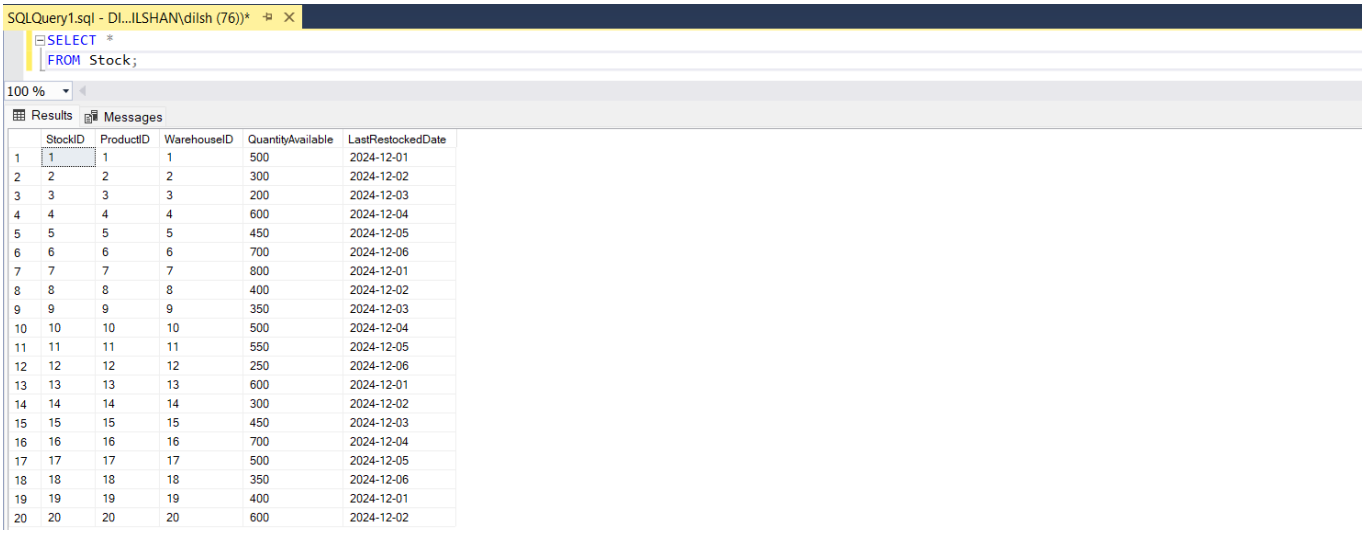


```
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT Warehouse ON;
INSERT INTO Warehouse (WarehouseID, WarehouseName, Location, ManagerID)
VALUES
(1, 'Central Warehouse', 'Colombo', 13),
(2, 'Kandy Distribution Center', 'Kandy', 14),
(3, 'Southern Storage', 'Galle', 15),
(4, 'Northern Depot', 'Jaffna', 16),
(5, 'Eastern Hub', 'Trincomalee', 17),
(6, 'Western Storage', 'Negombo', 18),
(7, 'Hill Country Depot', 'Nuwara Eliya', 19),
(8, 'North Western Facility', 'Kurunegala', 20),
(9, 'Uva Warehouse', 'Badulla', 21),
(10, 'Sabaragamuwa Depot', 'Ratnapura', 22),
(11, 'Eastern Highlands Center', 'Ampara', 23),
(12, 'Coastal Hub', 'Matara', 24),
(13, 'Dry Zone Depot', 'Anuradhapura', 25),
(14, 'Urban Storage', 'Batticaloa', 26),
(15, 'Central Highlands Depot', 'Hatton', 27),
(16, 'Industrial Hub', 'Kalutara', 28),
(17, 'Administrative Warehouse', 'Chilaw', 29),
(18, 'Port Storage', 'Hambantota', 30),
(19, 'Heritage Hub', 'Polonnaruwa', 31),
(20, 'Frontier Depot', 'Monaragala', 32);
SET IDENTITY_INSERT Warehouse OFF;
```

```
Messages
(20 rows affected)

Completion time: 2024-12-24T18:40:33.0192184+05:30
```

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

“STOCK” TABLE



```
SELECT *
FROM Stock;
```

100 %

Results | Messages

	StockID	ProductID	WarehouseID	QuantityAvailable	LastRestockedDate
1	1	1	1	500	2024-12-01
2	2	2	2	300	2024-12-02
3	3	3	3	200	2024-12-03
4	4	4	4	600	2024-12-04
5	5	5	5	450	2024-12-05
6	6	6	6	700	2024-12-06
7	7	7	7	800	2024-12-01
8	8	8	8	400	2024-12-02
9	9	9	9	350	2024-12-03
10	10	10	10	500	2024-12-04
11	11	11	11	550	2024-12-05
12	12	12	12	250	2024-12-06
13	13	13	13	600	2024-12-01
14	14	14	14	300	2024-12-02
15	15	15	15	450	2024-12-03
16	16	16	16	700	2024-12-04
17	17	17	17	500	2024-12-05
18	18	18	18	350	2024-12-06
19	19	19	19	400	2024-12-01
20	20	20	20	600	2024-12-02

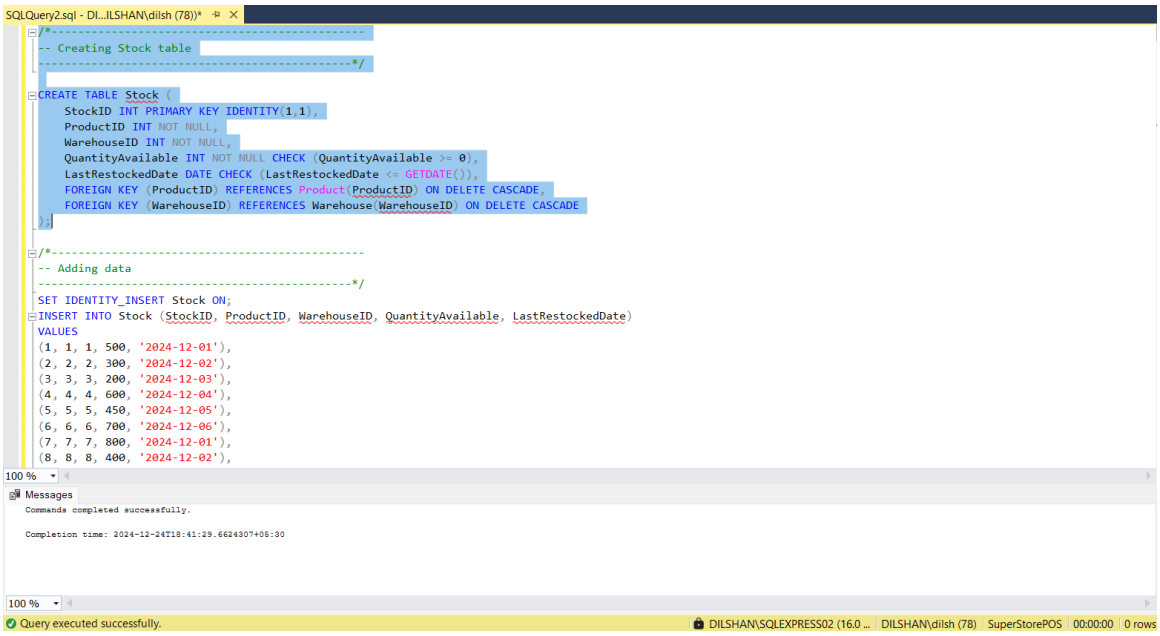
PURPOSE

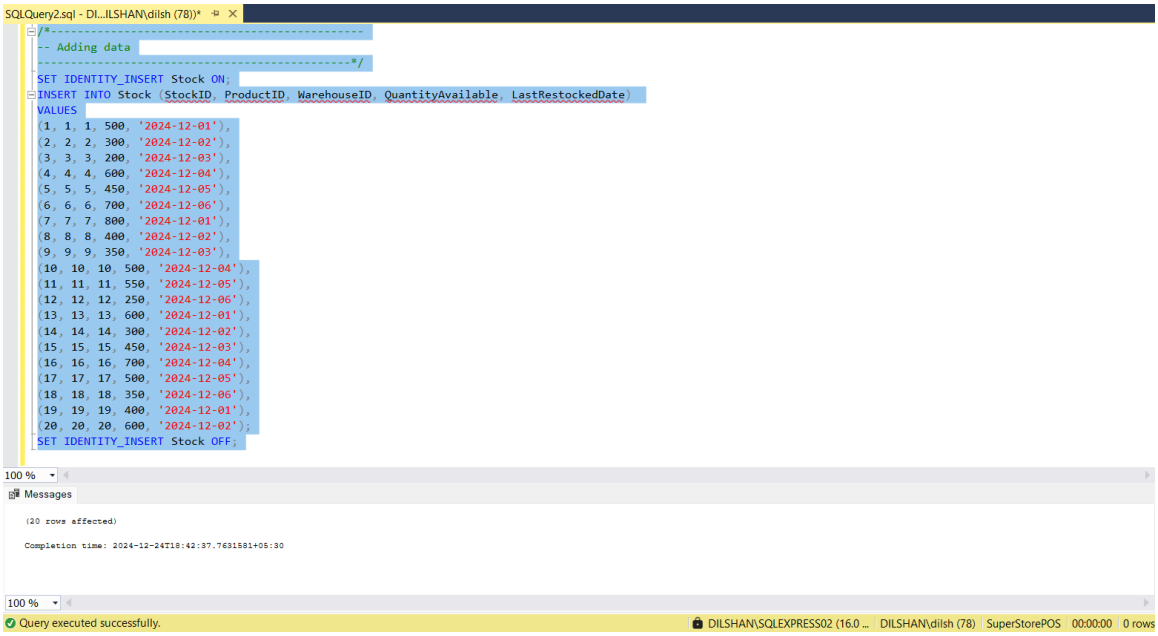
Tracks product quantities available in warehouses and the last restocking date.

DATA VALIDATION

- **Primary Key Constraint:** (StockID) Unique identifier for stock records.
- **Foreign Key Constraints:** (ProductID), (WarehouseID) Link stocks to Product and Warehouse.
- **NOT NULL Constraints:** Ensure (QuantityAvailable) is not empty.
- **CHECK Constraints:**
  - Ensure (QuantityAvailable) is non-negative.
  - Validate (LastRestockedDate) is not in the future.

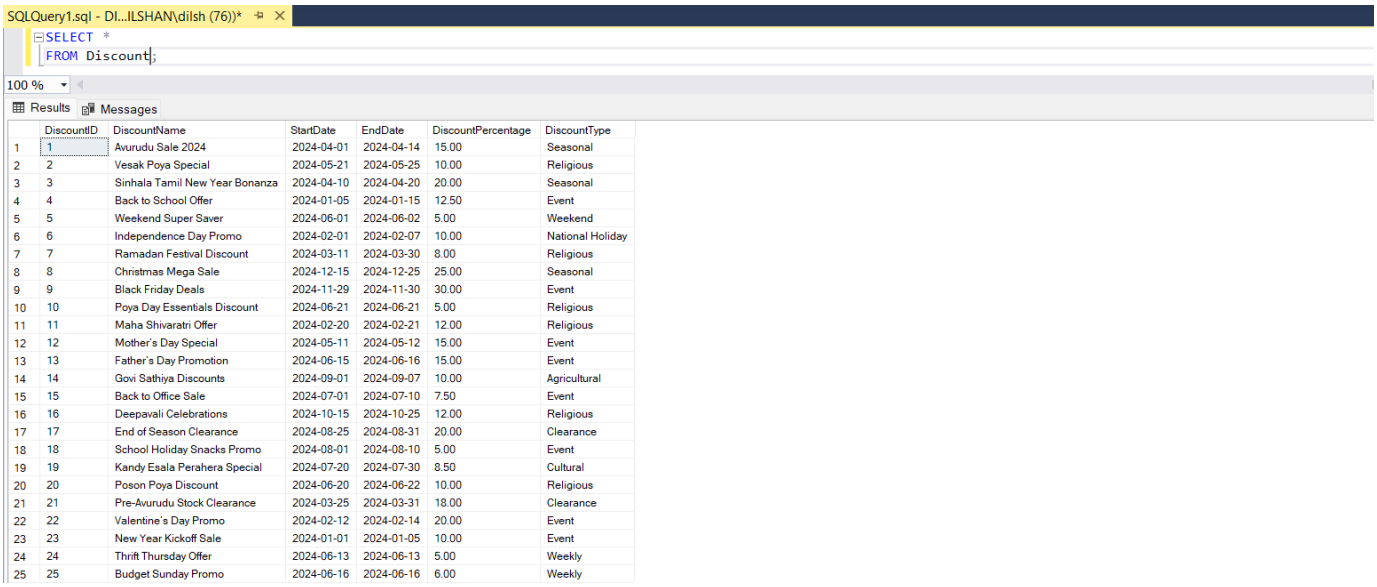
CODE & OUTPUT RESULTS





6.5 DISCOUNT MANAGEMENT

6.5.1. "DISCOUNT" TABLE



```
SELECT *
FROM Discount;
```

100 %

Results | Messages

	DiscountID	DiscountName	StartDate	EndDate	DiscountPercentage	DiscountType
1	1	Avurudu Sale 2024	2024-04-01	2024-04-14	15.00	Seasonal
2	2	Vesak Poya Special	2024-05-21	2024-05-25	10.00	Religious
3	3	Sinhala Tamil New Year Bonanza	2024-04-10	2024-04-20	20.00	Seasonal
4	4	Back to School Offer	2024-01-05	2024-01-15	12.50	Event
5	5	Weekend Super Saver	2024-06-01	2024-06-02	5.00	Weekend
6	6	Independence Day Promo	2024-02-01	2024-02-07	10.00	National Holiday
7	7	Ramadan Festival Discount	2024-03-11	2024-03-30	8.00	Religious
8	8	Christmas Mega Sale	2024-12-15	2024-12-25	25.00	Seasonal
9	9	Black Friday Deals	2024-11-29	2024-11-30	30.00	Event
10	10	Poya Day Essentials Discount	2024-06-21	2024-06-21	5.00	Religious
11	11	Maha Shivaratri Offer	2024-02-20	2024-02-21	12.00	Religious
12	12	Mother's Day Special	2024-05-11	2024-05-12	15.00	Event
13	13	Father's Day Promotion	2024-06-15	2024-06-16	15.00	Event
14	14	Govi Sathiya Discounts	2024-09-01	2024-09-07	10.00	Agricultural
15	15	Back to Office Sale	2024-07-01	2024-07-10	7.50	Event
16	16	Deepavali Celebrations	2024-10-15	2024-10-25	12.00	Religious
17	17	End of Season Clearance	2024-08-25	2024-08-31	20.00	Clearance
18	18	School Holiday Snacks Promo	2024-08-01	2024-08-10	5.00	Event
19	19	Kandy Esala Perahera Special	2024-07-20	2024-07-30	8.50	Cultural
20	20	Poson Poya Discount	2024-06-20	2024-06-22	10.00	Religious
21	21	Pre-Avurudu Stock Clearance	2024-03-25	2024-03-31	18.00	Clearance
22	22	Valentine's Day Promo	2024-02-12	2024-02-14	20.00	Event
23	23	New Year Kickoff Sale	2024-01-01	2024-01-05	10.00	Event
24	24	Thrift Thursday Offer	2024-06-13	2024-06-13	5.00	Weekly
25	25	Budget Sunday Promo	2024-06-16	2024-06-16	6.00	Weekly

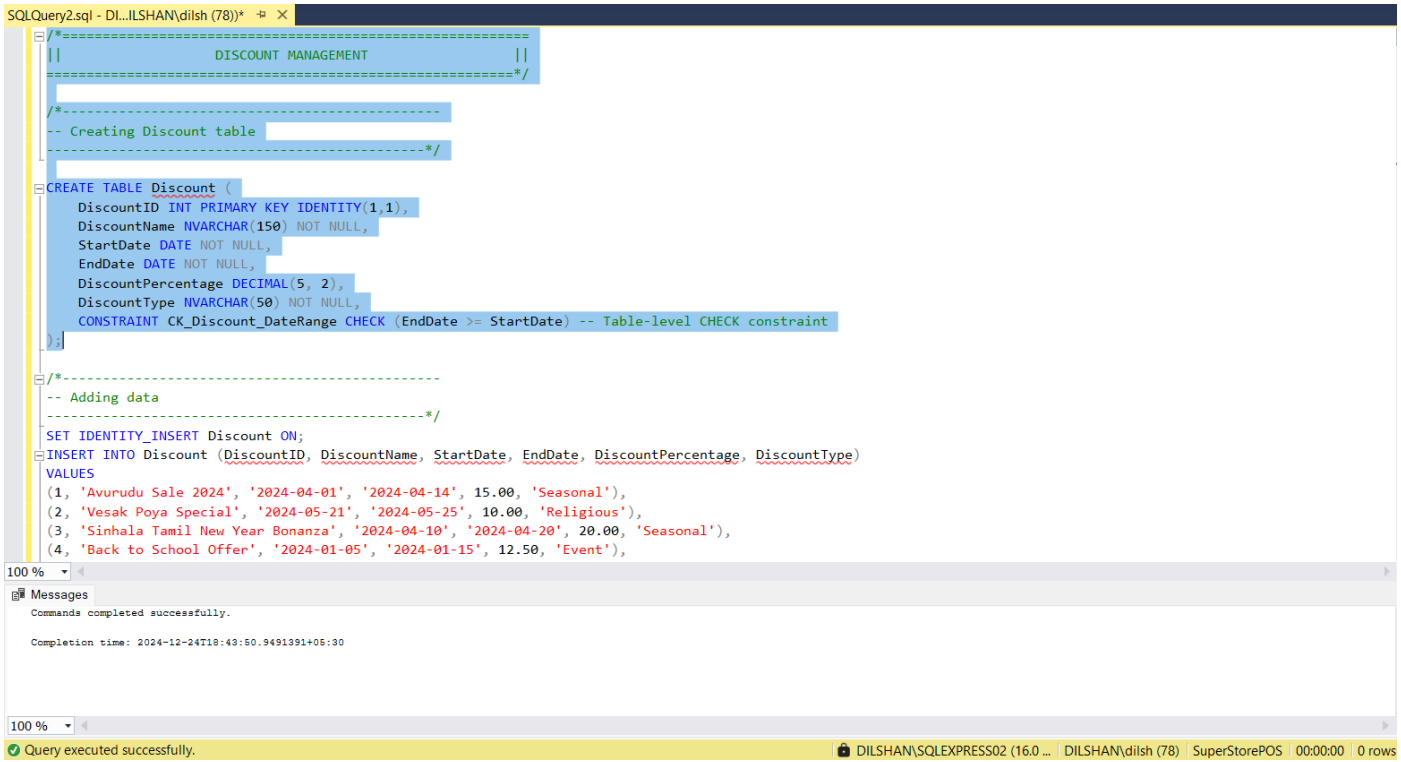
PURPOSE

Manages discounts, ensuring valid date ranges and percentage constraints.

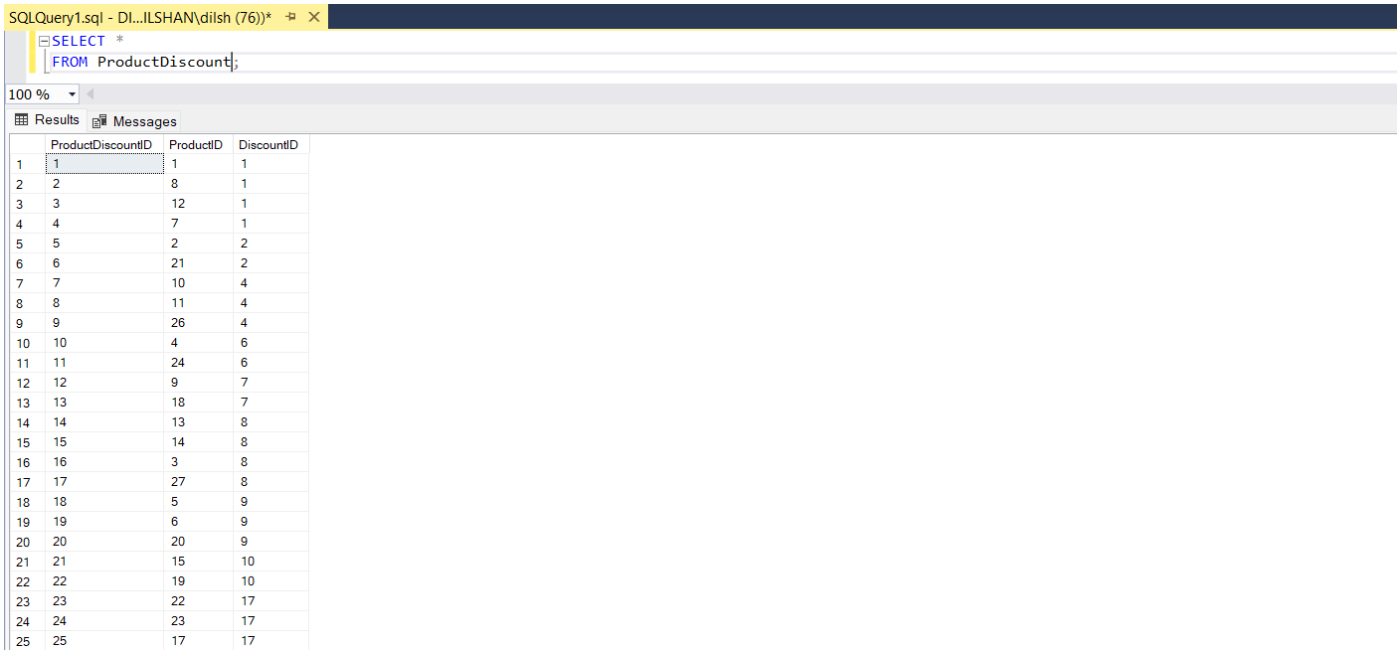
DATA VALIDATION

- **Primary Key Constraint:** (DiscountID) Unique identifier for discounts.
- **NOT NULL Constraints:** Prevent missing essential details like (DiscountName), (DiscountType), (StartDate) and (EndDate).
- **CHECK Constraints:**
  - Ensures (EndDate) is not before (StartDate).

CODE & OUTPUT RESULTS



6.5.2. “PRODUCTDISCOUNT” TABLE



	ProductDiscountID	ProductID	DiscountID
1	1	1	1
2	2	8	1
3	3	12	1
4	4	7	1
5	5	2	2
6	6	21	2
7	7	10	4
8	8	11	4
9	9	26	4
10	10	4	6
11	11	24	6
12	12	9	7
13	13	18	7
14	14	13	8
15	15	14	8
16	16	3	8
17	17	27	8
18	18	5	9
19	19	6	9
20	20	20	9
21	21	15	10
22	22	19	10
23	23	22	17
24	24	23	17
25	25	17	17

PURPOSE

Maps products to specific discounts, enabling easy application of discounts.

DATA VALIDATION

- **Primary Key Constraint:** (ProductDiscountID) Unique identifier for discount mappings.
- **Foreign Key Constraints:** (ProductID), (DiscountID) Link mappings to Product and Discount.

CODE & OUTPUT RESULTS

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Creating ProductDiscount table
-----------------------------------------------*/

CREATE TABLE ProductDiscount (
    ProductDiscountID INT PRIMARY KEY IDENTITY(1,1),
    ProductID INT NOT NULL,
    DiscountID INT NOT NULL,
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID) ON DELETE CASCADE,
    FOREIGN KEY (DiscountID) REFERENCES Discount(DiscountID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT ProductDiscount ON;
INSERT INTO ProductDiscount (ProductDiscountID, ProductID, DiscountID)
VALUES
-- Avurudu Sale 2024
(1, 1, 1),  -- Anchor Full Cream Milk Powder
(2, 8, 1),  -- Ruhunu Red Rice 5kg
(3, 12, 1), -- Maliban Lemon Puff 300g
(4, 7, 1),  -- Prima Wheat Flour 1kg
-- Vesak Poya Special
(5, 2, 2),  -- Kotmale Fresh Milk 1L
(6, 21, 2), -- Dettol Antibacterial Soap 100g
-- Back to School Offer
(7, 10, 4), -- Munchee Marie Biscuits 400g
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T18:45:39.2886572+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT ProductDiscount ON;
INSERT INTO ProductDiscount (ProductDiscountID, ProductID, DiscountID)
VALUES
-- Avurudu Sale 2024
(1, 1, 1),  -- Anchor Full Cream Milk Powder
(2, 8, 1),  -- Ruhunu Red Rice 5kg
(3, 12, 1), -- Maliban Lemon Puff 300g
(4, 7, 1),  -- Prima Wheat Flour 1kg
-- Vesak Poya Special
(5, 2, 2),  -- Kotmale Fresh Milk 1L
(6, 21, 2), -- Dettol Antibacterial Soap 100g
-- Back to School Offer
(7, 10, 4), -- Munchee Marie Biscuits 400g
(8, 11, 4), -- Ritzbury Chocolate Fingers 200g
(9, 26, 4), -- Pears Baby Lotion 200ml
-- Independence Day Promo
(10, 4, 6), -- Dilmah Premium Tea 200g
(11, 24, 6), -- Nestlé Milo 400g
-- Ramadan Festival Discount
(12, 9, 7), -- CIC Basmati Rice 1kg
(13, 18, 7), -- Maggi Coconut Milk Powder 300g
-- Christmas Mega Sale
(14, 13, 8), -- Elephant House Chicken Sausages 1kg
(15, 14, 8), -- Keells Chicken Drumsticks 1kg
(16, 3, 8),  -- Highland Butter 200g
```

100 %

Messages

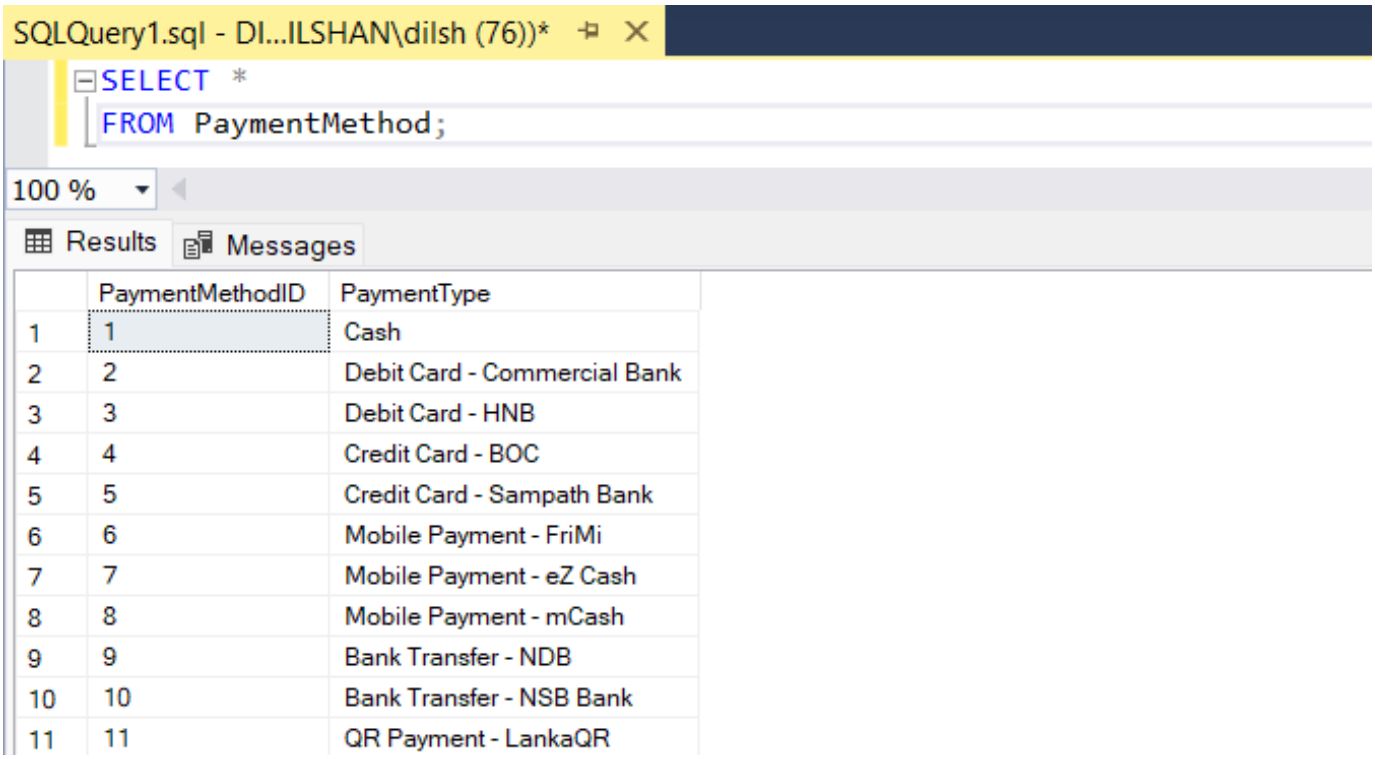
```
(25 rows affected)

Completion time: 2024-12-24T19:02:26.4483386+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.6 SALES MANAGEMENT

6.6.1. "PAYMENTMETHOD" TABLE



	PaymentMethodID	PaymentType
1	1	Cash
2	2	Debit Card - Commercial Bank
3	3	Debit Card - HNB
4	4	Credit Card - BOC
5	5	Credit Card - Sampath Bank
6	6	Mobile Payment - FriMi
7	7	Mobile Payment - eZ Cash
8	8	Mobile Payment - mCash
9	9	Bank Transfer - NDB
10	10	Bank Transfer - NSB Bank
11	11	QR Payment - LankaQR

PURPOSE

Lists accepted payment methods, ensuring proper classification of transactions.

DATA VALIDATION

- **Primary Key Constraint:** (PaymentMethodID) Unique identifier for payment methods.
- **NOT NULL Constraints:** Ensure (PaymentType) is not empty.
- **CHECK Constraints:**
  - Check (PaymentType) is valid.

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*=========================================================
||                    SALES MANAGEMENT                   ||
=========================================================*/

/*-----------------------------------------------
-- Creating PaymentMethod table
-----------------------------------------------*/

CREATE TABLE PaymentMethod (
    PaymentMethodID INT PRIMARY KEY IDENTITY(1,1),
    PaymentType NVARCHAR(100) NOT NULL CHECK (LEN(PaymentType) > 0)
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT PaymentMethod ON;
INSERT INTO PaymentMethod (PaymentMethodID, PaymentType)
VALUES
(1, 'Cash'),
(2, 'Debit Card - Commercial Bank'),
(3, 'Debit Card - HNB'),
(4, 'Credit Card - BOC'),
(5, 'Credit Card - Sampath Bank'),
(6, 'Mobile Payment - FriMi'),
(7, 'Mobile Payment - eZ Cash'),
(8, 'Mobile Payment - mCash'),
(9, 'Bank Transfer - NDB'),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T19:03:12.0974769+05:30
```

100 %

Query executed successfully. | DILSHAN\SQLEXPRESS02 (16.0 ... | DILSHAN\dilsh (78) | SuperStorePOS | 00:00:00 | 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT PaymentMethod ON;
INSERT INTO PaymentMethod (PaymentMethodID, PaymentType)
VALUES
(1, 'Cash'),
(2, 'Debit Card - Commercial Bank'),
(3, 'Debit Card - HNB'),
(4, 'Credit Card - BOC'),
(5, 'Credit Card - Sampath Bank'),
(6, 'Mobile Payment - FriMi'),
(7, 'Mobile Payment - eZ Cash'),
(8, 'Mobile Payment - mCash'),
(9, 'Bank Transfer - NDB'),
(10, 'Bank Transfer - NSB Bank'),
(11, 'QR Payment - LankaQR');
SET IDENTITY_INSERT PaymentMethod OFF;
```

100 %

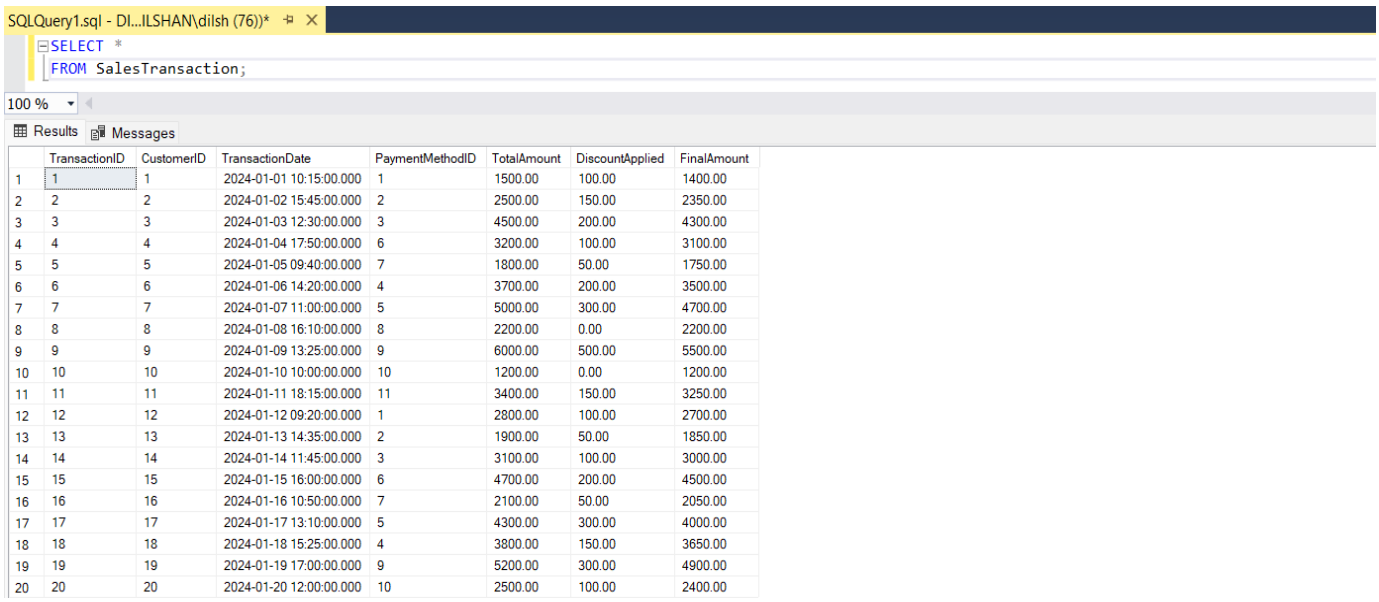
Messages

```
(11 rows affected)

Completion time: 2024-12-24T19:03:43.9763041+05:30
```

100 %

Query executed successfully. | DILSHAN\SQLEXPRESS02 (16.0 ... | DILSHAN\dilsh (78) | SuperStorePOS | 00:00:00 | 0 rows

6.6.2. “SALESTRANSACTION” TABLE



	TransactionID	CustomerID	TransactionDate	PaymentMethodID	TotalAmount	DiscountApplied	FinalAmount
1	1	1	2024-01-01 10:15:00.000	1	1500.00	100.00	1400.00
2	2	2	2024-01-02 15:45:00.000	2	2500.00	150.00	2350.00
3	3	3	2024-01-03 12:30:00.000	3	4500.00	200.00	4300.00
4	4	4	2024-01-04 17:50:00.000	6	3200.00	100.00	3100.00
5	5	5	2024-01-05 09:40:00.000	7	1800.00	50.00	1750.00
6	6	6	2024-01-06 14:20:00.000	4	3700.00	200.00	3500.00
7	7	7	2024-01-07 11:00:00.000	5	5000.00	300.00	4700.00
8	8	8	2024-01-08 16:10:00.000	8	2200.00	0.00	2200.00
9	9	9	2024-01-09 13:25:00.000	9	6000.00	500.00	5500.00
10	10	10	2024-01-10 10:00:00.000	10	1200.00	0.00	1200.00
11	11	11	2024-01-11 18:15:00.000	11	3400.00	150.00	3250.00
12	12	12	2024-01-12 09:20:00.000	1	2800.00	100.00	2700.00
13	13	13	2024-01-13 14:35:00.000	2	1900.00	50.00	1850.00
14	14	14	2024-01-14 11:45:00.000	3	3100.00	100.00	3000.00
15	15	15	2024-01-15 16:00:00.000	6	4700.00	200.00	4500.00
16	16	16	2024-01-16 10:50:00.000	7	2100.00	50.00	2050.00
17	17	17	2024-01-17 13:10:00.000	5	4300.00	300.00	4000.00
18	18	18	2024-01-18 15:25:00.000	4	3800.00	150.00	3650.00
19	19	19	2024-01-19 17:00:00.000	9	5200.00	300.00	4900.00
20	20	20	2024-01-20 12:00:00.000	10	2500.00	100.00	2400.00

PURPOSE

Records sales transactions, including customer, payment method, and final amounts.

DATA VALIDATION

- **Primary Key Constraint:** (TransactionID) Uniquely identifies transactions.
- **Foreign Key Constraints:** (CustomerID), (PaymentMethodID) Link transactions to Customer and PaymentMethod tables.
- **NOT NULL Constraints:** Prevent missing essential details (TransactionDate), (TotalAmount) and (FinalAmount).
- **CHECK Constraints:**

Ensure (TotalAmount), (DiscountApplied), and (FinalAmount) are non-negative.

CODE & OUTPUT RESULTS

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Creating SalesTransaction table
-----------------------------------------------*/

CREATE TABLE SalesTransaction (
    TransactionID INT PRIMARY KEY IDENTITY(1,1),
    CustomerID INT,
    TransactionDate DATETIME NOT NULL DEFAULT GETDATE(),
    PaymentMethodID INT NOT NULL,
    TotalAmount DECIMAL(10, 2) NOT NULL CHECK (TotalAmount >= 0),
    DiscountApplied DECIMAL(10, 2) CHECK (DiscountApplied >= 0),
    FinalAmount DECIMAL(10, 2) NOT NULL CHECK (FinalAmount >= 0),
    FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID) ON DELETE SET NULL,
    FOREIGN KEY (PaymentMethodID) REFERENCES PaymentMethod(PaymentMethodID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransaction ON;
INSERT INTO SalesTransaction (TransactionID, CustomerID, TransactionDate, PaymentMethodID, TotalAmount, DiscountApplied, FinalAmount)
VALUES
(1, 1, '2024-01-01 10:15:00', 1, 1500.00, 100.00, 1400.00),
(2, 2, '2024-01-02 15:45:00', 2, 2500.00, 150.00, 2350.00),
(3, 3, '2024-01-03 12:30:00', 3, 4500.00, 200.00, 4300.00),
(4, 4, '2024-01-04 17:50:00', 6, 3200.00, 100.00, 3100.00),
(5, 5, '2024-01-05 09:40:00', 7, 1800.00, 50.00, 1750.00),
(6, 6, '2024-01-06 14:20:00', 4, 3700.00, 200.00, 3500.00),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T19:04:35.5173395+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```sql
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransaction ON;
INSERT INTO SalesTransaction (TransactionID, CustomerID, TransactionDate, PaymentMethodID, TotalAmount, DiscountApplied, FinalAmount)
VALUES
(1, 1, '2024-01-01 10:15:00', 1, 1500.00, 100.00, 1400.00),
(2, 2, '2024-01-02 15:45:00', 2, 2500.00, 150.00, 2350.00),
(3, 3, '2024-01-03 12:30:00', 3, 4500.00, 200.00, 4300.00),
(4, 4, '2024-01-04 17:50:00', 6, 3200.00, 100.00, 3100.00),
(5, 5, '2024-01-05 09:40:00', 7, 1800.00, 50.00, 1750.00),
(6, 6, '2024-01-06 14:20:00', 4, 3700.00, 200.00, 3500.00),
(7, 7, '2024-01-07 11:00:00', 5, 5000.00, 300.00, 4700.00),
(8, 8, '2024-01-08 16:10:00', 8, 2200.00, 0.00, 2200.00),
(9, 9, '2024-01-09 13:25:00', 9, 6000.00, 500.00, 5500.00),
(10, 10, '2024-01-10 10:00:00', 10, 1200.00, 0.00, 1200.00),
(11, 11, '2024-01-11 18:15:00', 11, 3400.00, 150.00, 3250.00),
(12, 12, '2024-01-12 09:20:00', 1, 2800.00, 100.00, 2700.00),
(13, 13, '2024-01-13 14:35:00', 2, 1900.00, 50.00, 1850.00),
(14, 14, '2024-01-14 11:45:00', 3, 3100.00, 100.00, 3000.00),
(15, 15, '2024-01-15 16:00:00', 6, 4700.00, 200.00, 4500.00),
(16, 16, '2024-01-16 10:50:00', 7, 2100.00, 50.00, 2050.00),
(17, 17, '2024-01-17 13:10:00', 5, 4300.00, 300.00, 4000.00),
(18, 18, '2024-01-18 15:25:00', 4, 3800.00, 150.00, 3650.00),
(19, 19, '2024-01-19 17:00:00', 9, 5200.00, 300.00, 4900.00),
(20, 20, '2024-01-20 12:00:00', 10, 2500.00, 100.00, 2400.00);
SET IDENTITY_INSERT SalesTransaction OFF;
```

100 %

Messages

```
(20 rows affected)

Completion time: 2024-12-24T19:06:05.9078951+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.6.3. “SALESTRANSACTION” TABLE

SQLQuery1.sql - DI...ILSHAN\dilsh (76))*

```
SELECT *
FROM SalesTransactionDetail;
```

100 %

Results | Messages

	TransactionDetailID	TransactionID	ProductID	Quantity	UnitPrice	LineTotal
1	1	1	7	3	180.00	540.00
2	2	1	10	4	240.00	960.00
3	3	2	2	5	240.00	1200.00
4	4	2	21	2	150.00	300.00
5	5	2	6	1	850.00	850.00
6	6	3	19	2	1500.00	3000.00
7	7	3	12	2	300.00	600.00
8	8	3	3	1	950.00	950.00
9	9	4	5	2	600.00	1200.00
10	10	4	8	1	1500.00	1500.00
11	11	4	25	1	450.00	450.00
12	12	5	1	1	1000.00	1000.00
13	13	5	24	1	800.00	800.00
14	14	6	15	2	800.00	1600.00
15	15	6	17	2	450.00	900.00
16	16	6	13	1	1500.00	1500.00
17	17	7	11	3	380.00	1140.00
18	18	7	9	2	1100.00	2200.00
19	19	7	20	1	550.00	550.00
20	20	8	14	2	1200.00	2400.00
21	21	9	4	2	750.00	1500.00
22	22	9	18	3	600.00	1800.00
23	23	9	22	2	300.00	600.00
24	24	10	16	1	500.00	500.00
25	25	10	27	7	100.00	700.00

PURPOSE

Break down each sales transaction into individual product-level details.

DATA VALIDATION

- **Primary Key Constraint:** (TransactionDetailID) Unique identifier for transaction details.
- **Foreign Key Constraint:** (TransactionID), (ProductID) Link details to SalesTransaction and Product.
- **NOT NULL Constraints:** Ensure (Quantity), (UnitPrice) and (LineTotal) are not empty.
- **CHECK Constraints:**

Ensure (Quantity), (UnitPrice), and (LineTotal) are positive values.

CODE & OUTPUT RESULTS

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Creating SalesTransactionDetail table
-----------------------------------------------*/

CREATE TABLE SalesTransactionDetail (
    TransactionDetailID INT PRIMARY KEY IDENTITY(1,1),
    TransactionID INT NOT NULL,
    ProductID INT NOT NULL,
    Quantity INT NOT NULL CHECK (Quantity > 0),
    UnitPrice DECIMAL(10, 2) NOT NULL CHECK (UnitPrice >= 0),
    LineTotal DECIMAL(10, 2) NOT NULL CHECK (LineTotal >= 0),
    FOREIGN KEY (TransactionID) REFERENCES SalesTransaction(TransactionID) ON DELETE CASCADE,
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransactionDetail ON;
INSERT INTO SalesTransactionDetail (TransactionDetailID, TransactionID, ProductID, Quantity, UnitPrice, LineTotal)
VALUES
-- Transaction 1
(1, 1, 7, 3, 180.00, 540.00),
(2, 1, 10, 4, 240.00, 960.00),
-- Transaction 2
(3, 2, 2, 5, 240.00, 1200.00),
(4, 2, 21, 2, 150.00, 300.00),
(5, 2, 6, 1, 850.00, 850.00),
```

100 %

Messages

```
Commands completed successfully.

Completion time: 2024-12-24T19:07:22.7133313+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

SQLQuery2.sql - DI...ILSHAN\dilsh (78))*

```
/*-----------------------------------------------
-- Adding data
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransactionDetail ON;
INSERT INTO SalesTransactionDetail (TransactionDetailID, TransactionID, ProductID, Quantity, UnitPrice, LineTotal)
VALUES
-- Transaction 1
(1, 1, 7, 3, 180.00, 540.00),
(2, 1, 10, 4, 240.00, 960.00),
-- Transaction 2
(3, 2, 2, 5, 240.00, 1200.00),
(4, 2, 21, 2, 150.00, 300.00),
(5, 2, 6, 1, 850.00, 850.00),
-- Transaction 3
(6, 3, 19, 2, 1500.00, 3000.00),
(7, 3, 12, 2, 300.00, 600.00),
(8, 3, 3, 1, 950.00, 950.00),
-- Transaction 4
(9, 4, 5, 2, 600.00, 1200.00),
(10, 4, 8, 1, 1500.00, 1500.00),
(11, 4, 25, 1, 450.00, 450.00),
-- Transaction 5
(12, 5, 1, 1, 1000.00, 1000.00),
(13, 5, 24, 1, 800.00, 800.00),
-- Transaction 6
(14, 6, 15, 2, 800.00, 1600.00),
(15, 6, 17, 2, 450.00, 900.00),
(16, 6, 13, 1, 1500.00, 1500.00),
```

100 %

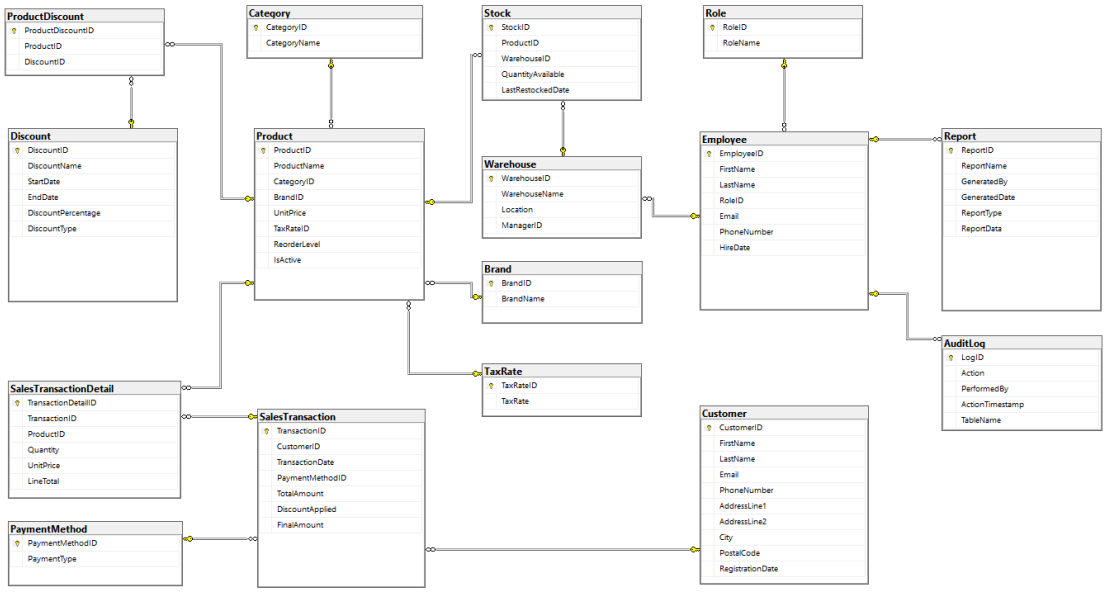
Messages

```
(25 rows affected)

Completion time: 2024-12-24T19:08:08.4654235+05:30
```

100 %

Query executed successfully. DILSHAN\SQLEXPRESS02 (16.0 ... DILSHAN\dilsh (78) SuperStorePOS 00:00:00 0 rows

6.7 DATABASE DIAGRAM



7. PROCEDURES & TRIGGERS

7.1 STORED PROCEDURES

sp_InsertCustomer

The sp_InsertCustomer procedure will put a new customer into the database and log such an operation into an audit log at the same time. It requires various factors as input, which include: first name, last name, and email of the customer, which are necessary, and other details such as phone number and address which are optional. It then inserts the customer record in the Customer table, chooses the new CustomerID with SCOPE_IDENTITY(), and logs the operation to the AuditLog table. Error handling is in place to report any error in execution through the procedure.

sp_GenerateSalesReport

This stored procedure provides a sales report for any specified time. This stored procedure includes two parameters: one for the date commencing the period of the report, and one for the date concluding the report period. This stored method collects all the transactions within the supplied range, together with the transaction ID, customer name, product details, quantity, and money per transaction. Also, the action of report production gets noted in the AuditLog table for tracking accountability purposes. Error management (Wikipedia, 2024) has also been provided to control possible execution issues.

sp_AssignProductDiscount

The sp_AssignProductDiscount process guarantees a product is awarded a discount only once. It takes a ProductID and a DiscountID as inputs. Before making the assignment, it verifies whether the combination already exists in the ProductDiscount database. If not, it does the insert of the new association and returns a success message. If the combination already exists, the method advises the user. Errors are recorded and reported using an error-handling block.

trg_UpdateStockAfterSale

The trg_UpdateStockAfterSale trigger updates the quantities in stock after the recording of a new sale in the SalesTransactionDetail database. It decreases the quantity of the sold product in the Stock table following an entry, according to the information in the inserted record. Additionally, it logs in the AuditLog table the operation performed to update the stock. This trigger is designed to ensure that, after each sale, the stock is updated correctly.

trg_ReorderNotification

The trg_ReorderNotification trigger will constantly watch any updates to the Stock table and log an alert if the available quantity of any product goes below the reorder level. This trigger will be invoked following the execution of an update operation to make sure that any low-stock condition will promptly be noted in the AuditLog table for further action, as this would signal serious stock shortages and therefore enhance inventory efficiency.

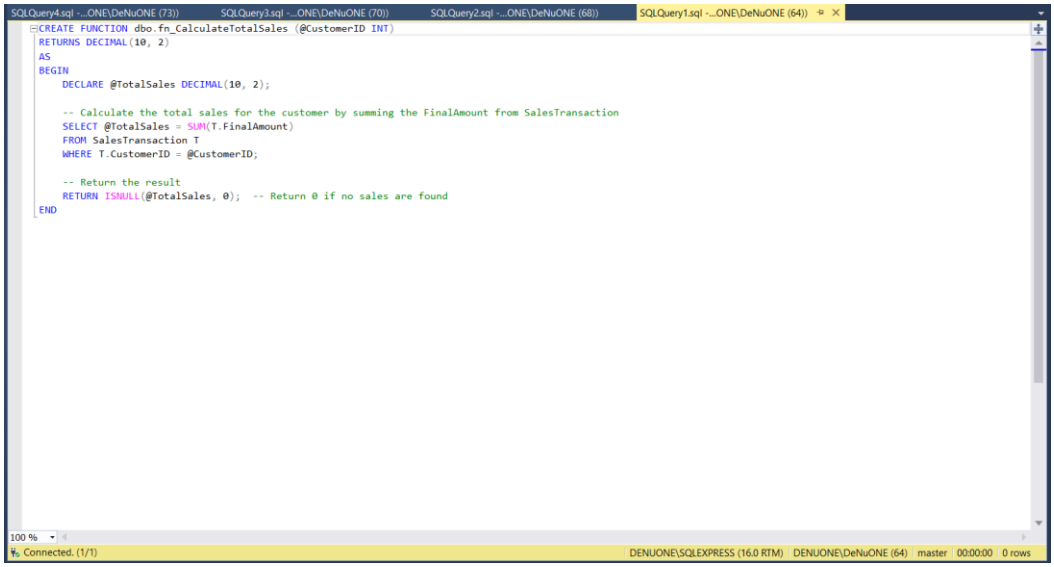
trg_LogCustomerDeletion

The trg_LogCustomerDeletion trigger writes into the AuditLog database facts about which customer records have been removed. Whenever a client is deleted from the client table, the trigger extracts data from the DELETED pseudo-table, including the customer name and email, and logs an audit trail. This offers traceability of all client data deletions and promotes system responsibility.

8. FUNCTIONS & VIEWS

8.1 CALCULATE TOTAL SALES

FN_CALCULATETOTALSALES



PURPOSE

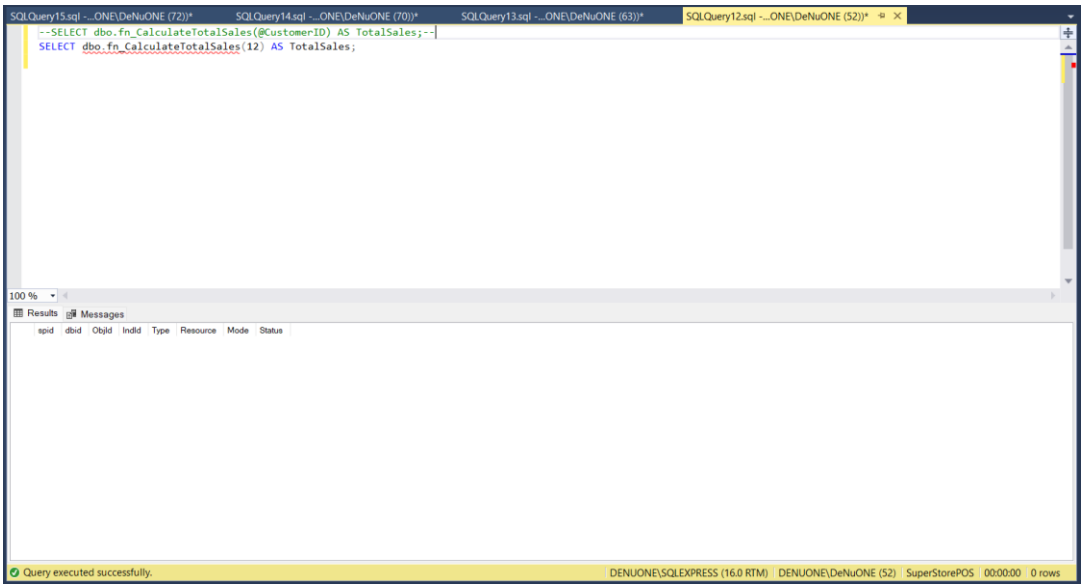
Calculates the total amount spent by a customer on all transactions.

INPUTS & RETURNS

Input - CustomerID (INT) - The ID of the customer.

Return - The total amount spent by the customer.

CODE & OUTPUT RESULTS



8.2 CALCULATE PRODUCT SALEFN_CALCULATORPRODUCTSALES

PURPOSE

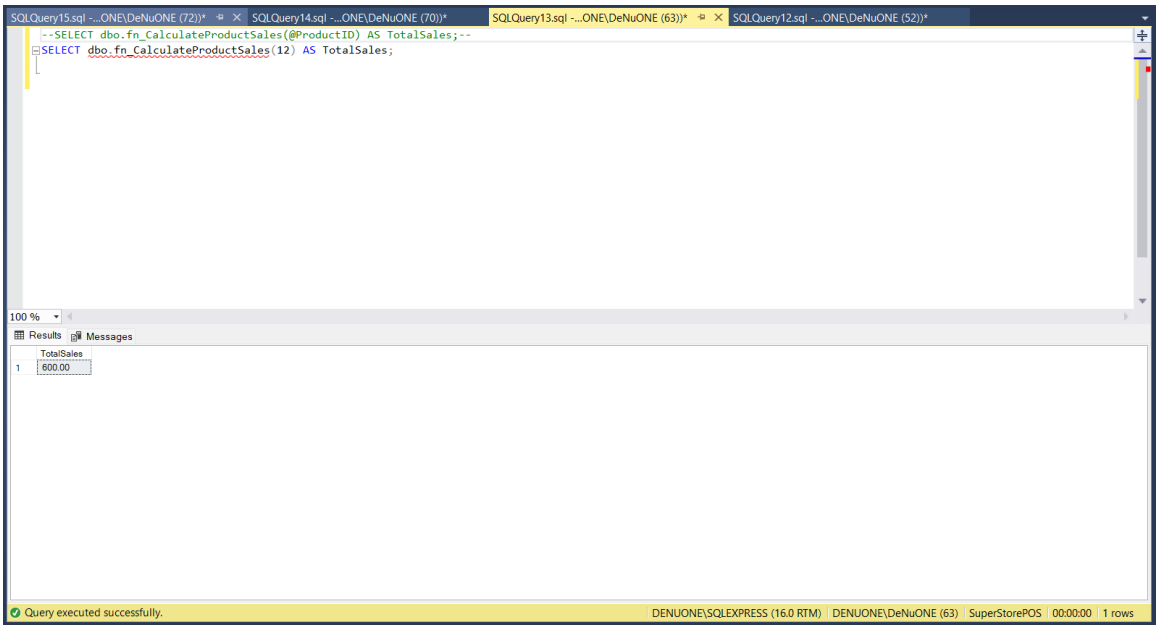
Calculates the total sales for a given product.

INPUTS & RETURNS

Input - ProductID (INT) - The ID of the product.

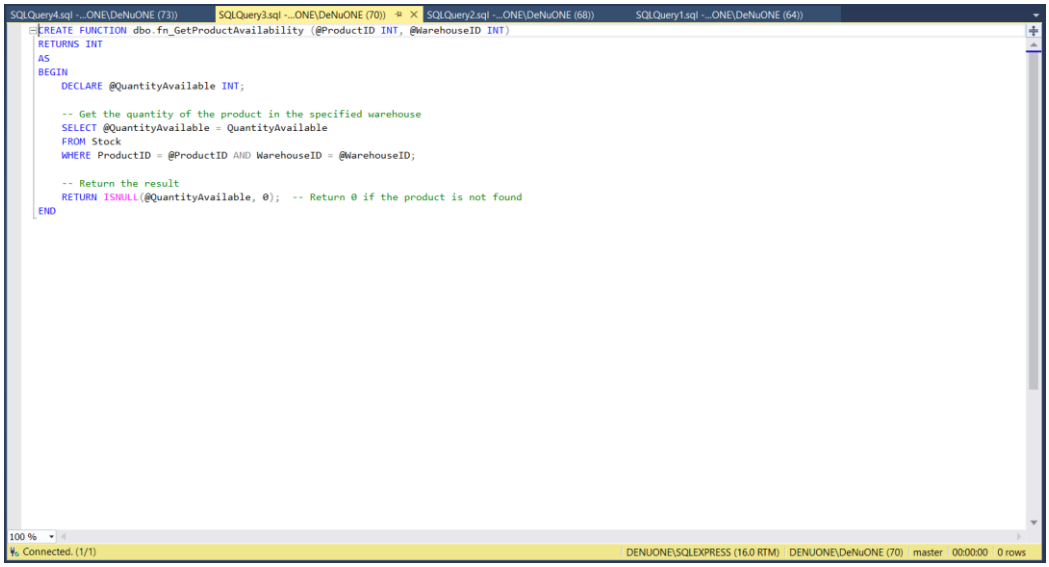
Return - DECIMAL - The total sales for the product.

CODE & OUTPUT RESULTS



8.3 GET PRODUCT AVAILABILITY

FN_GETPRODUCTAVAILABILITY



```sql
CREATE FUNCTION dbo.fn_GetProductAvailability (@ProductID INT, @WarehouseID INT)
RETURNS INT
AS
BEGIN
    DECLARE @QuantityAvailable INT;

    -- Get the quantity of the product in the specified warehouse
    SELECT @QuantityAvailable = QuantityAvailable
    FROM Stock
    WHERE ProductID = @ProductID AND WarehouseID = @WarehouseID;

    -- Return the result
    RETURN ISNULL(@QuantityAvailable, 0);  -- Return 0 if the product is not found
END
```

PURPOSE

Returns the available quantity of a product in a specific warehouse.

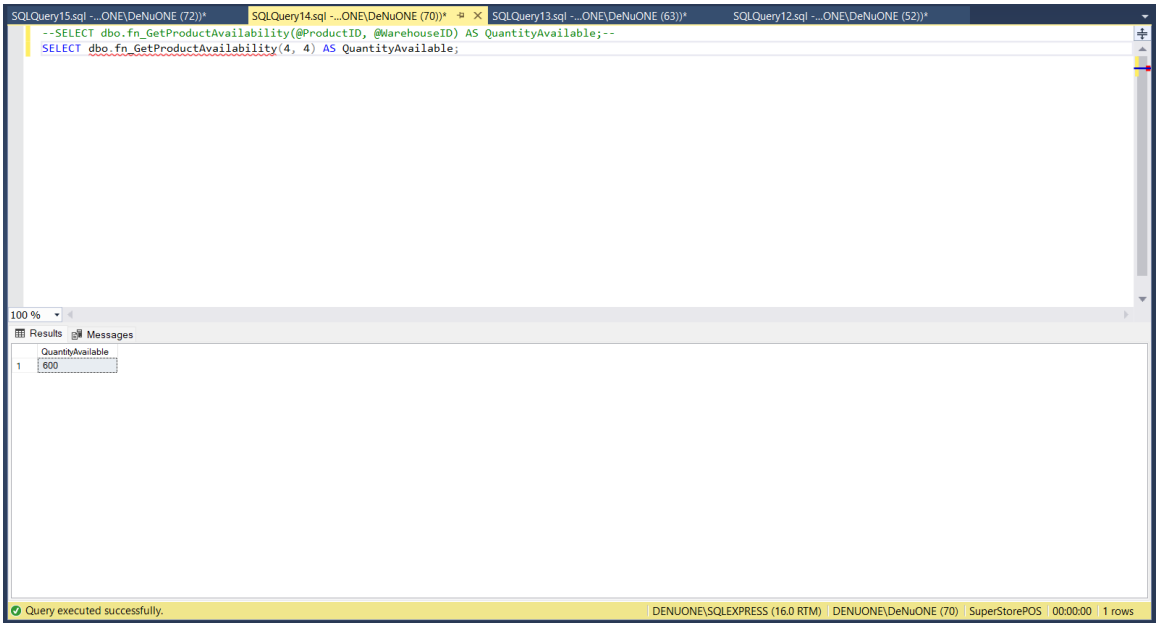
INPUTS & RETURNS

Inputs - ProductID (INT) - The ID of the product.

WarehouseID (INT) - The ID of the warehouse.

Return - The available quantity of the product in the warehouse.

CODE & OUTPUT RESULTS

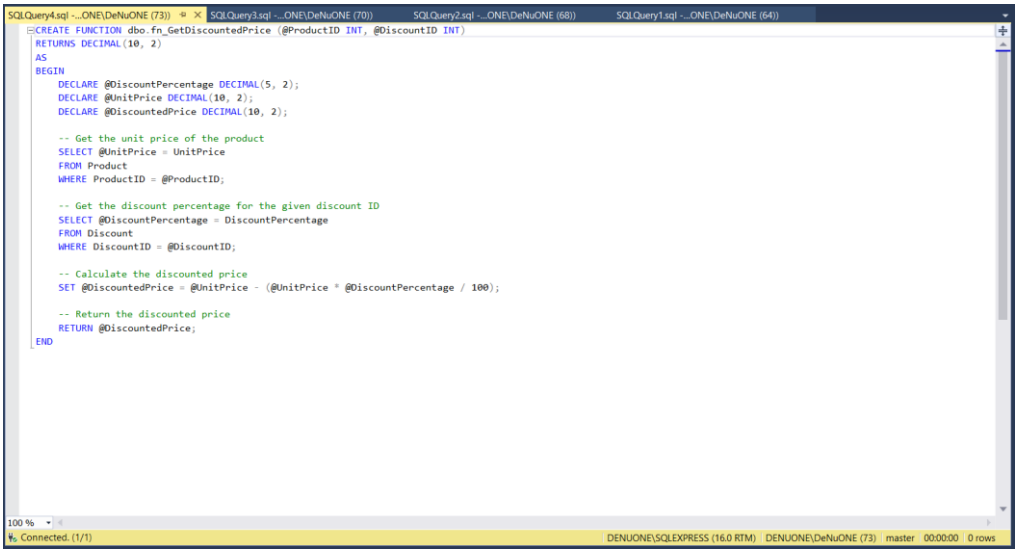


```sql
--SELECT dbo.fn_GetProductAvailability(@ProductID, @WarehouseID) AS QuantityAvailable;--
SELECT dbo.fn_GetProductAvailability(4, 4) AS QuantityAvailable;
```

	QuantityAvailable
1	600

8.4 GET DISCOUNT PRICE

FN_GETDISCOUNTPRICE



```
CREATE FUNCTION dbo.fn_GetDiscountedPrice (@ProductID INT, @DiscountID INT)
RETURNS DECIMAL(10, 2)
AS
BEGIN
    DECLARE @DiscountPercentage DECIMAL(5, 2);
    DECLARE @UnitPrice DECIMAL(10, 2);
    DECLARE @DiscountedPrice DECIMAL(10, 2);

    -- Get the unit price of the product
    SELECT @UnitPrice = UnitPrice
    FROM Product
    WHERE ProductID = @ProductID;

    -- Get the discount percentage for the given discount ID
    SELECT @DiscountPercentage = DiscountPercentage
    FROM Discount
    WHERE DiscountID = @DiscountID;

    -- Calculate the discounted price
    SET @DiscountedPrice = @UnitPrice - (@UnitPrice * @DiscountPercentage / 100);

    -- Return the discounted price
    RETURN @DiscountedPrice;
END
```

PURPOSE

Calculate the price of a product after applying for a discount.

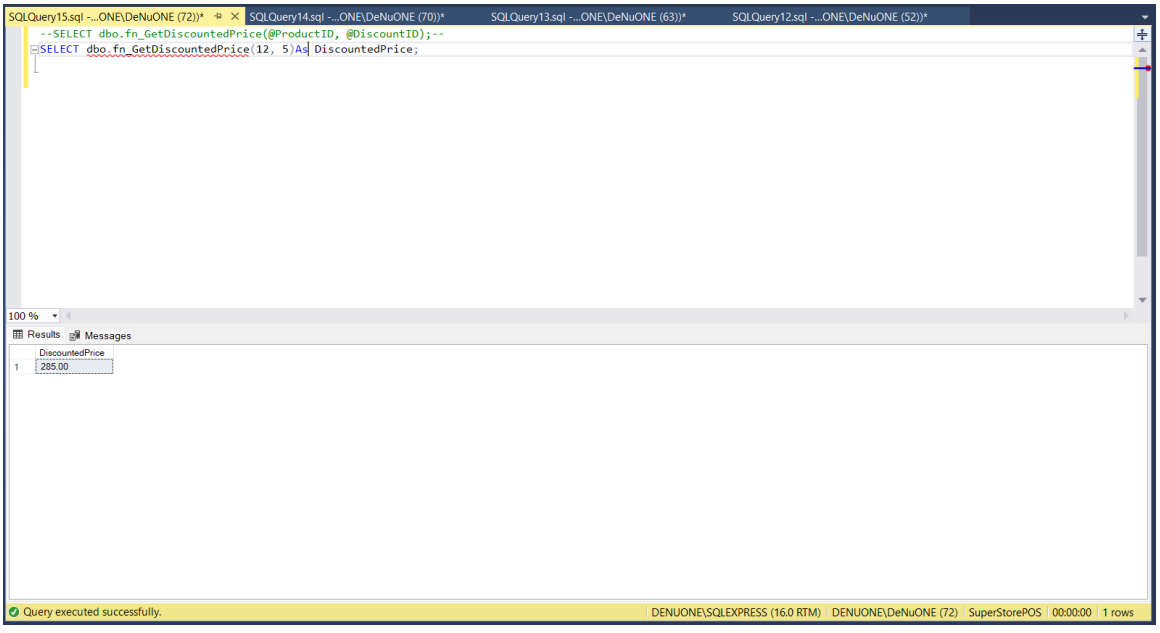
INPUTS & RETURNS

Inputs – ProductID (INT) - The ID of the product.

DiscountID (INT) - The ID of the discount to be applied.

Return - The discounted price of the product.

CODE & OUTPUT RESULTS



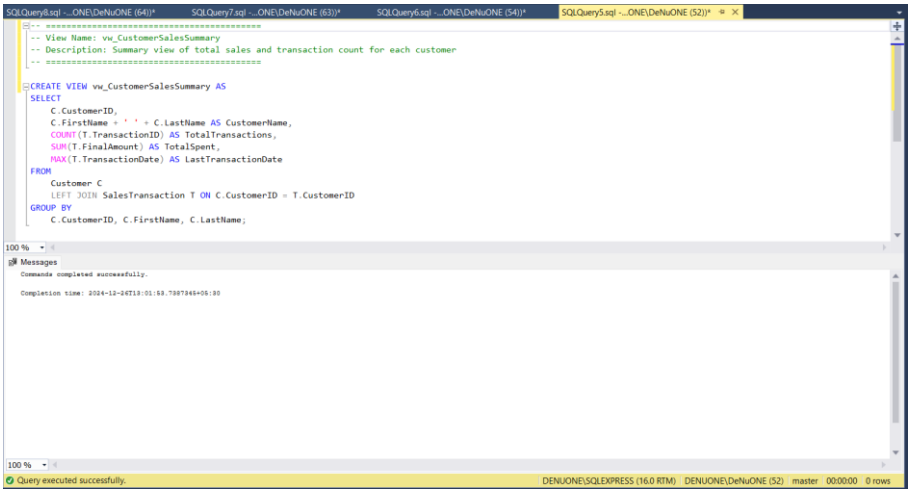
```
--SELECT dbo.fn_GetDiscountedPrice(@ProductID, @DiscountID);--
SELECT dbo.fn_GetDiscountedPrice(12, 5)As DiscountedPrice;
```

Results | Messages

	DiscountedPrice
1	285.00

8.5 CUSTOMER SALES SUMMERY

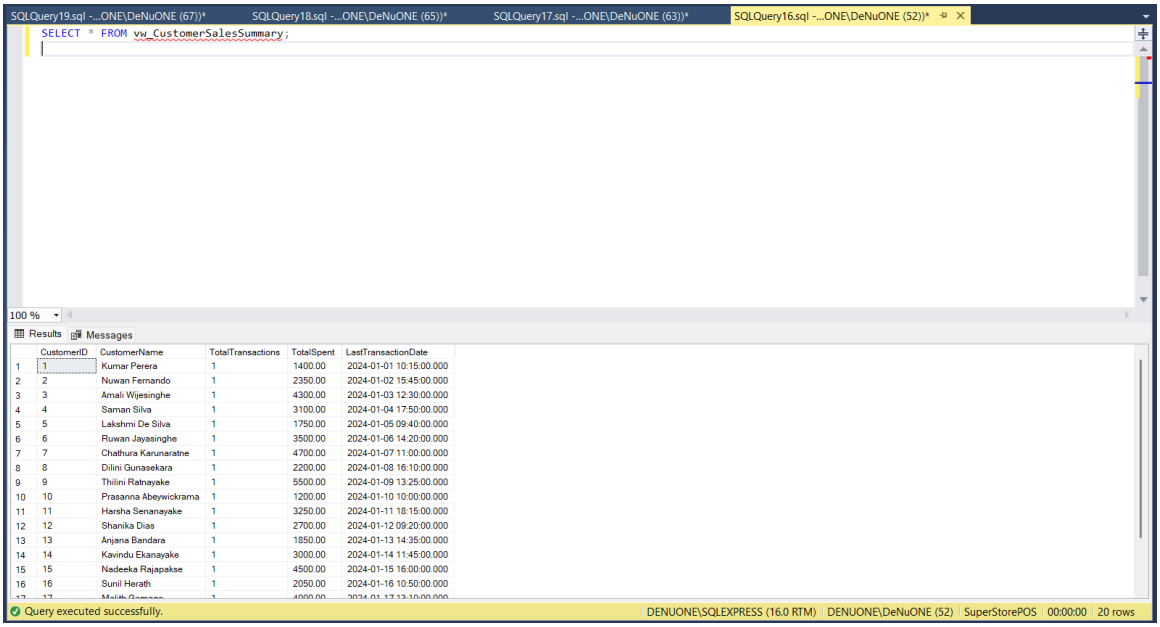
VW_CUSTOMERSALESSUMMERY



PURPOSE

Summary view of total sales and transaction count for each customer.

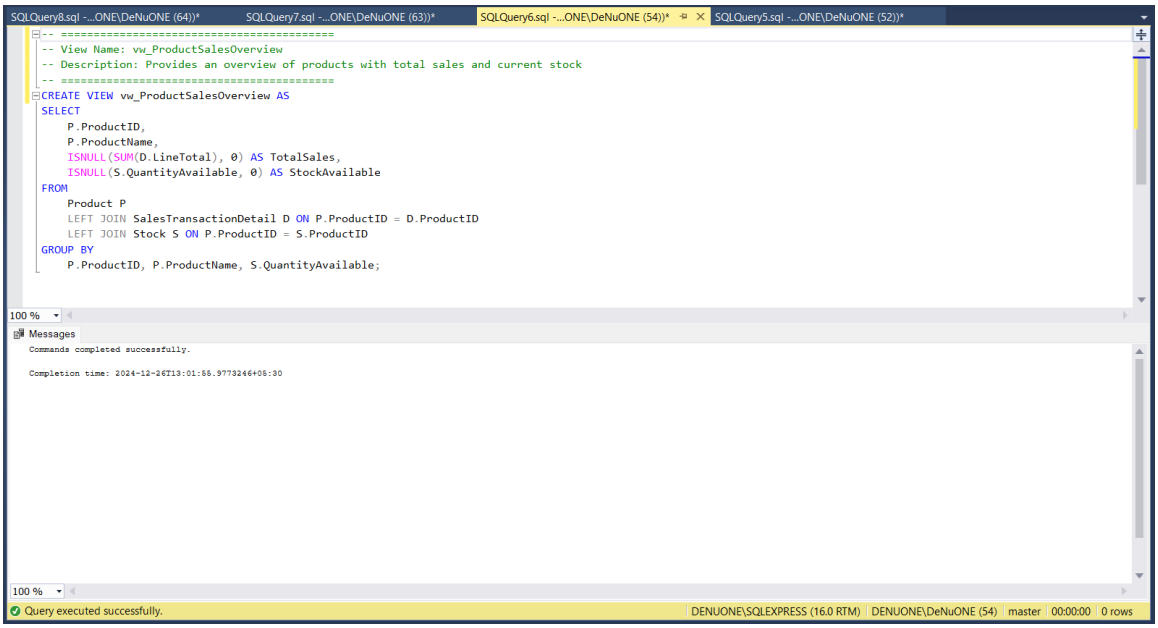
CODE & OUTPUT RESULTS



	CustomerID	CustomerName	TotalTransactions	TotalSpent	LastTransactionDate
1	1	Kumar Perera	1	1400.00	2024-01-01 10:15:00.000
2	2	Nuwan Fernando	1	2350.00	2024-01-02 15:45:00.000
3	3	Amali Wijesinghe	1	4300.00	2024-01-03 12:30:00.000
4	4	Saman Silva	1	3100.00	2024-01-04 17:50:00.000
5	5	Lakshmi De Silva	1	1750.00	2024-01-05 09:40:00.000
6	6	Ruwan Jayasinghe	1	3500.00	2024-01-06 14:20:00.000
7	7	Chathura Karunaratne	1	4700.00	2024-01-07 11:00:00.000
8	8	Dilini Gunasekara	1	2200.00	2024-01-08 16:10:00.000
9	9	Thilini Ratnayake	1	5500.00	2024-01-09 13:25:00.000
10	10	Prasanna Abeywickrama	1	1200.00	2024-01-10 10:00:00.000
11	11	Harsha Senanayake	1	3250.00	2024-01-11 18:15:00.000
12	12	Shanika Dias	1	2700.00	2024-01-12 09:20:00.000
13	13	Anjana Bandara	1	1850.00	2024-01-13 14:35:00.000
14	14	Kavindu Ekanayake	1	3000.00	2024-01-14 11:45:00.000
15	15	Nadeeka Rajapakse	1	4500.00	2024-01-15 16:00:00.000
16	16	Sunil Herath	1	2050.00	2024-01-16 10:50:00.000

8.6 PRODUCT SALES OVERVIEW

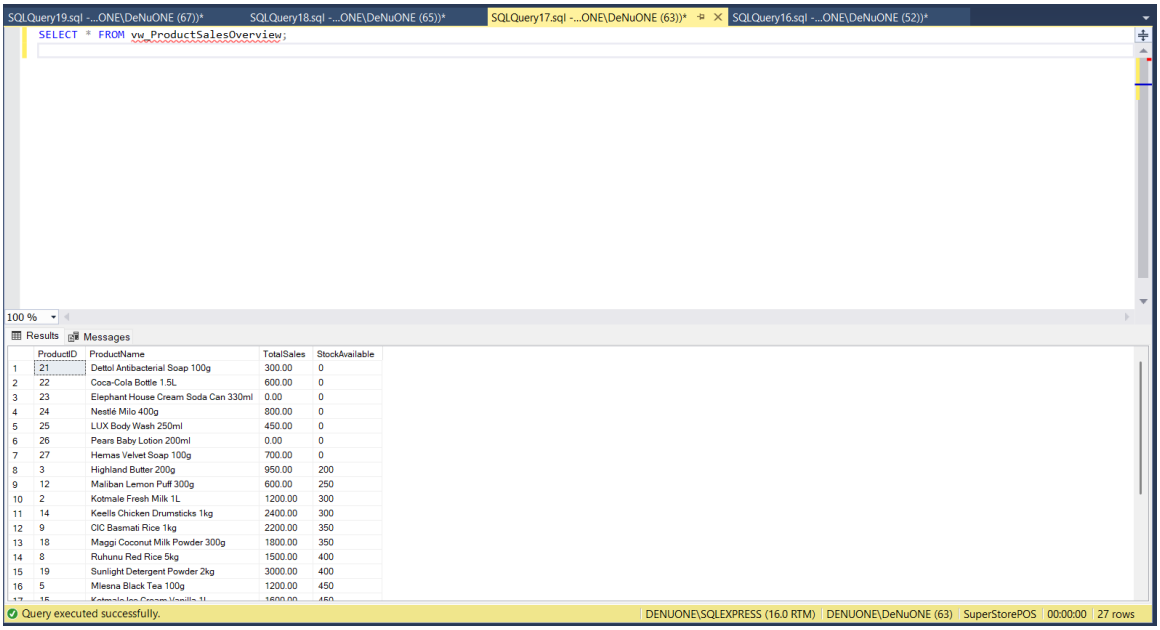
VW_PRODUCTSALESOVERVIEW



PURPOSE

Provides an overview of products with total sales and current stock.

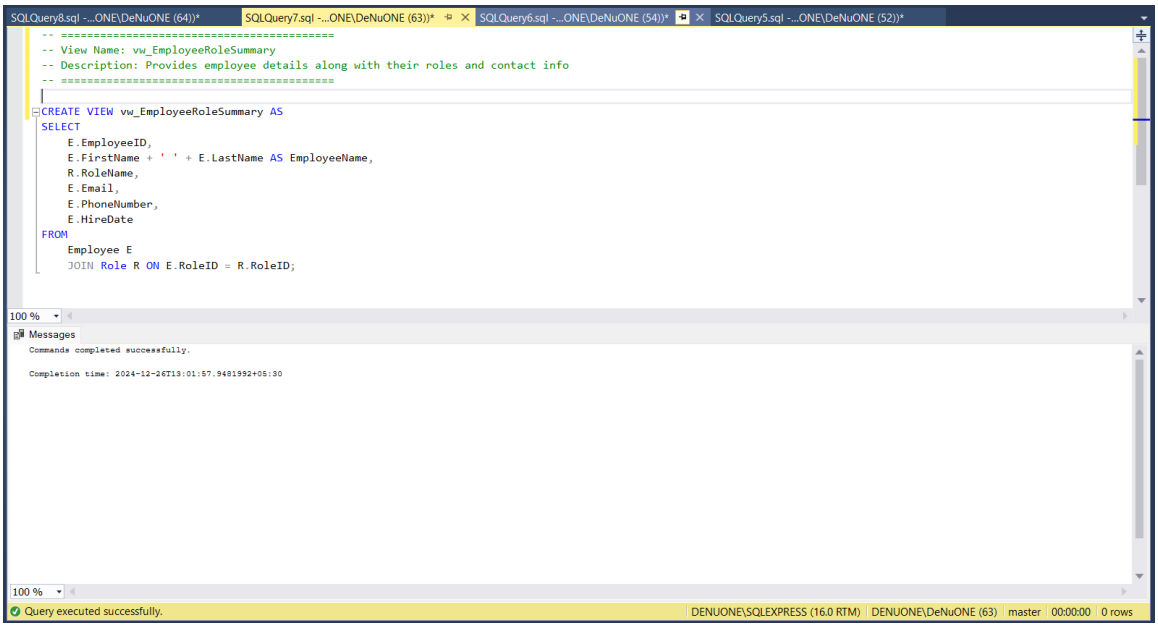
CODE & OUTPUTS RESULTS



	ProductID	ProductName	TotalSales	StockAvailable
1	21	Dettol Antibacterial Soap 100g	300.00	0
2	22	Coca-Cola Bottle 1.5L	600.00	0
3	23	Elephant House Cream Soda Can 330ml	0.00	0
4	24	Nestlé Milo 400g	800.00	0
5	25	LUX Body Wash 250ml	450.00	0
6	26	Pears Baby Lotion 200ml	0.00	0
7	27	Hemas Velvet Soap 100g	700.00	0
8	3	Highland Butter 200g	950.00	200
9	12	Maliban Lemon Puff 300g	600.00	250
10	2	Kotmale Fresh Milk 1L	1200.00	300
11	14	Keells Chicken Drumsticks 1kg	2400.00	300
12	9	CIC Basmati Rice 1kg	2200.00	350
13	18	Maggi Coconut Milk Powder 300g	1800.00	350
14	8	Ruhunu Red Rice 5kg	1500.00	400
15	19	Sunlight Detergent Powder 2kg	3000.00	400
16	5	Mlesna Black Tea 100g	1200.00	450

8.7 EMPLOYEE ROLE SUMMERY

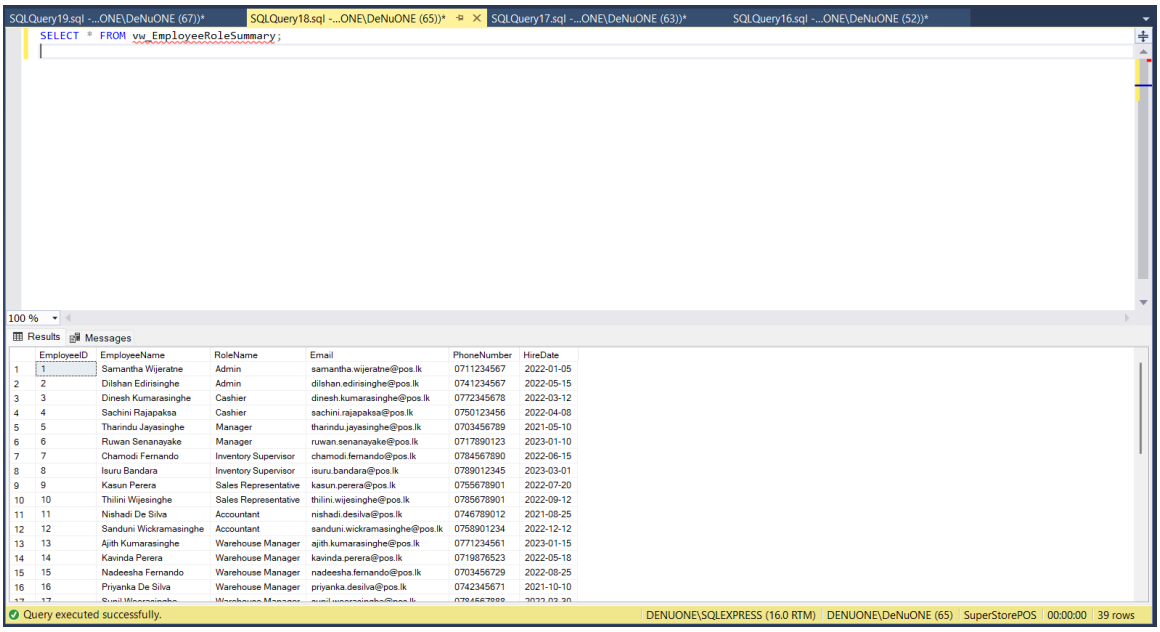
VW_EMPLOYEEROLESUMMERY



PURPOSE

Provides employees with details along with their roles and contact info.

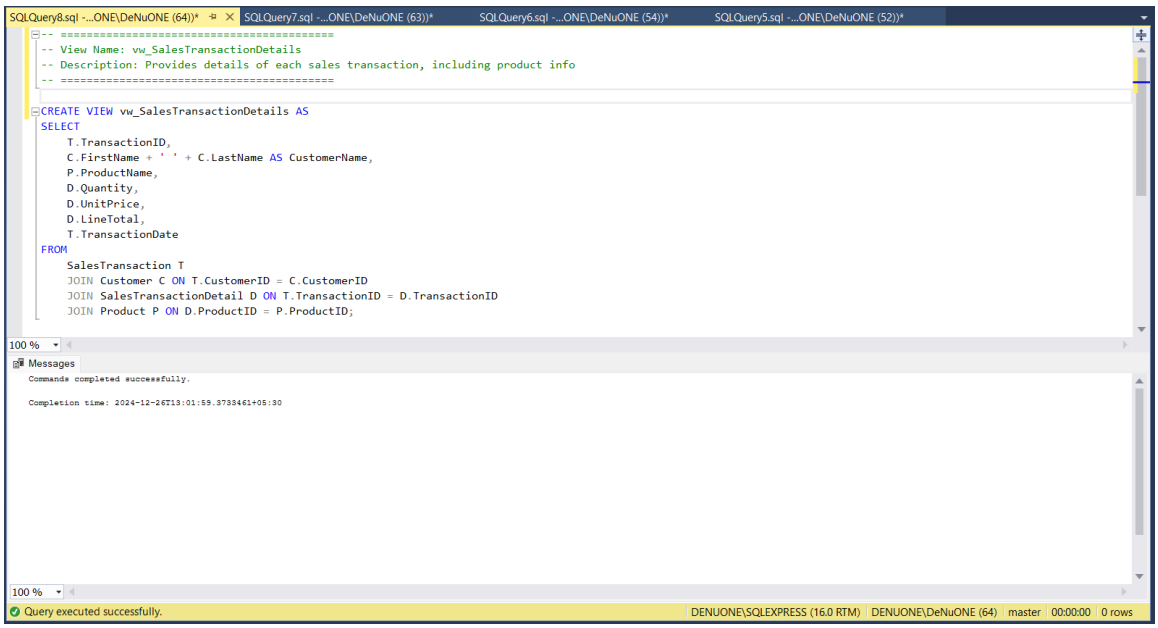
CODE & OUTPU RESULTS



	EmployeeID	EmployeeName	RoleName	Email	PhoneNumber	HireDate
1	1	Samantha Wijeratne	Admin	samantha.wijeratne@pos.lk	0711234567	2022-01-05
2	2	Dilshan Edirisinghe	Admin	dilshan.edirisinghe@pos.lk	0741234567	2022-05-15
3	3	Dinesh Kumarasinghe	Cashier	dinesh.kumarasinghe@pos.lk	0772345678	2022-03-12
4	4	Sachini Rajapaksa	Cashier	sachini.rajapaksa@pos.lk	0750123456	2022-04-08
5	5	Tharindu Jayasinghe	Manager	tharindu.jayasinghe@pos.lk	0703456789	2021-05-10
6	6	Ruwan Senanayake	Manager	ruwan.senanayake@pos.lk	0717890123	2023-01-10
7	7	Chamodi Fernando	Inventory Supervisor	chamodi.fernando@pos.lk	0784567890	2022-06-15
8	8	Isuru Bandara	Inventory Supervisor	isuru.bandara@pos.lk	0789012345	2023-03-01
9	9	Kasun Perera	Sales Representative	kasun.perera@pos.lk	0755678901	2022-07-20
10	10	Thilini Wijesinghe	Sales Representative	thilini.wijesinghe@pos.lk	0785678901	2022-09-12
11	11	Nishadi De Silva	Accountant	nishadi.desilva@pos.lk	0746789012	2021-08-25
12	12	Sanduni Wickramasinghe	Accountant	sanduni.wickramasinghe@pos.lk	0758901234	2022-12-12
13	13	Ajith Kumarasinghe	Warehouse Manager	ajith.kumarasinghe@pos.lk	0771234561	2023-01-15
14	14	Kavinda Perera	Warehouse Manager	kavinda.perera@pos.lk	0719876523	2022-05-18
15	15	Nadeesha Fernando	Warehouse Manager	nadeesha.fernando@pos.lk	0703456729	2022-08-25
16	16	Priyanka De Silva	Warehouse Manager	priyanka.desilva@pos.lk	0742345671	2021-10-10

8.8 SALES TRANSACTION DETAILS

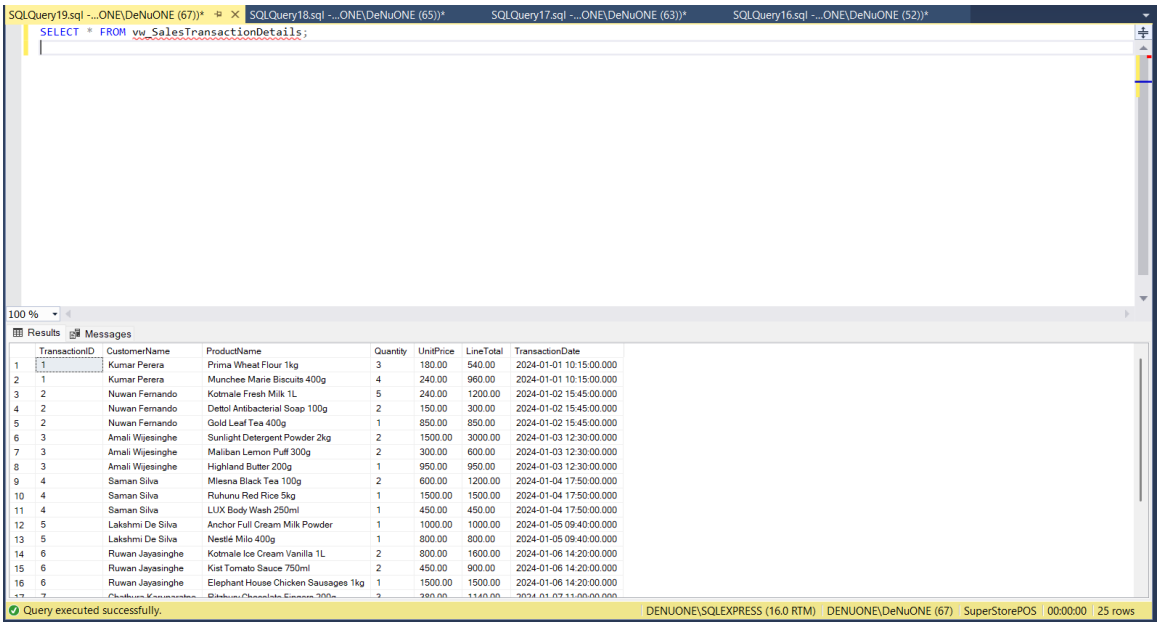
VW_SALESTRANSACTIONDETAILS



PURPOSE

Provides details of each sales transaction, including product info.

CODE & OUTPUT RESULTS



	TransactionID	CustomerName	ProductName	Quantity	UnitPrice	LineTotal	TransactionDate
1	1	Kumar Perera	Prima Wheat Flour 1kg	3	180.00	540.00	2024-01-01 10:15:00.000
2	1	Kumar Perera	Munchee Marie Biscuits 400g	4	240.00	960.00	2024-01-01 10:15:00.000
3	2	Nuwan Fernando	Kotmale Fresh Milk 1L	5	240.00	1200.00	2024-01-02 15:45:00.000
4	2	Nuwan Fernando	Dettol Antibacterial Soap 100g	2	150.00	300.00	2024-01-02 15:45:00.000
5	2	Nuwan Fernando	Gold Leaf Tea 400g	1	850.00	850.00	2024-01-02 15:45:00.000
6	3	Amali Wijesinghe	Sunlight Detergent Powder 2kg	2	1500.00	3000.00	2024-01-03 12:30:00.000
7	3	Amali Wijesinghe	Maliban Lemon Puff 300g	2	300.00	600.00	2024-01-03 12:30:00.000
8	3	Amali Wijesinghe	Highland Butter 200g	1	950.00	950.00	2024-01-03 12:30:00.000
9	4	Saman Silva	Mlesna Black Tea 100g	2	600.00	1200.00	2024-01-04 17:50:00.000
10	4	Saman Silva	Ruhunu Red Rice 5kg	1	1500.00	1500.00	2024-01-04 17:50:00.000
11	4	Saman Silva	LUX Body Wash 250ml	1	450.00	450.00	2024-01-04 17:50:00.000
12	5	Lakshmi De Silva	Anchor Full Cream Milk Powder	1	1000.00	1000.00	2024-01-05 09:40:00.000
13	5	Lakshmi De Silva	Nestlé Milo 400g	1	800.00	800.00	2024-01-05 09:40:00.000
14	6	Ruwan Jayasinghe	Kotmale Ice Cream Vanilla 1L	2	800.00	1600.00	2024-01-06 14:20:00.000
15	6	Ruwan Jayasinghe	Kist Tomato Sauce 750ml	2	450.00	900.00	2024-01-06 14:20:00.000
16	6	Ruwan Jayasinghe	Elephant House Chicken Sausages 1kg	1	1500.00	1500.00	2024-01-06 14:20:00.000

9. DATA SECURITY MEASURES

9.1. SECURITY MEASURES

I. DATA ENCRYPTION

Data encryption ensures that sensitive information stored in the database is inaccessible to unauthorized users. For the supermarket POS system:

- **Sensitive Data Encryption**: Encrypt customer personal details, payment methods, and transaction records using advanced encryption standards, such as AES-256.
- **Encrypted Communication**: SSL/TLS for secure data transmission between client and server, preventing man-in-the-middle attacks.
- **Database Encryption**: Implement Transparent Data Encryption (TDE) at the database level to secure data at rest, ensuring that even backups and live data are safe from breaches.

II. USER ROLES

User roles define access levels for database users based on their responsibilities:

- **Role-based Access Control (RBAC):** Assign roles such as Admin, Manager, Cashier, and Analyst.

Admin: Full access, including modifying database schemas and managing permissions.

Manager: Access to reports and sales data is restricted from schema changes.

Cashier: Limited to sales and billing modules only.

Analyst: Can only analyze consolidated sales and stock data.

- Regularly review and update roles to ensure minimal privilege and avoid unauthorized access.

III. PERMISSIONS

Permissions control what users can do:

- **Granular Permissions**: Assign detailed permissions for each role, like SELECT, INSERT, UPDATE, and DELETE.
- **Limit High-Risk Operations**: Limit permissions for data deletion and schema alteration to a few users.
- **Audit Logs**: Enable auditing for all permission changes to track unauthorized modifications.

9.2. DISCUSSION ON POTENTIAL RISKS

I. DATA BREACHES

A data breach occurs when sensitive information is accessed by unauthorized individuals, leading to financial losses, reputation damage, and regulatory penalties.

KEY RISKS:

- Weak passwords or unencrypted data storage.
- Exposure of sensitive information via unsecured APIs.

MITIGATION STRATEGIES:

- Use strong password policies (e.g., 12+ characters, including uppercase, lowercase, numbers, and special characters).
- Implement multi-factor authentication (MFA) for database access.
- Use tools like firewalls and intrusion detection/prevention systems (IDS/IPS) to secure the network perimeter.

II. INSIDER THREATS

Employees or contractors with legitimate access to the database could misuse their access for personal gain or malicious purposes.

KEY RISKS:

- Unauthorized export or manipulation of data.

MITIGATION STRATEGIES:

- Conduct background checks before granting access.
- Enable database activity monitoring (DAM) to track and flag unusual behavior, such as large data exports.
- Use time-limited access for sensitive roles (e.g., temporary admin privileges).

III. WEAK SECURITY CONFIGURATIONS

Misconfigured databases can leave them exposed to attacks.

EXAMPLES:

- Default passwords left unchanged.
- Databases accessible over the internet without proper restrictions.

MITIGATION STRATEGIES:

- Disable unused services and close unnecessary ports.
- Regularly update database systems to address security vulnerabilities.
- Follow CIS Benchmarks or other hardening guides for secure configurations.

IV. SQL INJECTION

Attackers can exploit vulnerable input fields in applications to execute malicious SQL commands (Port Swigger, 2024).

KEY RISKS:

- Unauthorized data extraction, manipulation, or deletion.

MITIGATION STRATEGIES:

- Use parameterized queries or ORM frameworks to prevent direct query injection.
- Sanitize and validate user inputs rigorously.
- Regularly perform penetration testing to identify and fix vulnerabilities.

V. BACKUP THEFT

Database backups often contain sensitive data and are a common target for attackers.

KEY RISKS:

- Unencrypted backups can be copied and exploited.

MITIGATION STRATEGIES:

- Encrypt backups using strong encryption methods.
- Store backups in secure, access-controlled environments, both on-premises and in the cloud.
- Use off-site backup replication with controlled access.

VI. MALWARE AND RANSOMWARE

Malware attacks can encrypt or corrupt data, disrupting operations and leading to data loss.

KEY RISKS:

- Ransom demands for access to encrypted data.

MITIGATION STRATEGIES:

- Install and regularly update anti-malware tools.
- Conduct regular backups and verify the ability to restore data from them.
- Educate employees about phishing and other malware delivery methods.

VII. DENIAL OF SERVICE (DOS) ATTACKS

An attacker could overwhelm the database server, rendering it unavailable.

KEY RISKS:

- Loss of access to critical business systems.

MITIGATION STRATEGIES:

- Implement rate limiting and traffic filtering to mitigate DoS attacks.
- Use load balancers and redundant systems to handle traffic surges.

10. CRITICAL ANALYSIS

10.1 HIGHLIGHT THE 'KEY FEATURES' OF OUR SOLUTION [STRENGTHS]

I. DRAWING ER DIAGRAM (ENTITY-RELATIONSHIP DIAGRAM)

- ✓ **Clear Data Structure Representation:** By visualizing the entities and relationships in your system, the ER diagram aids stakeholders in comprehending the database's structure.
- ✓ **Integrity and Consistency:** It aids in making sure that one-to-many and many-to-many data connections are appropriately specified, guaranteeing accurate and consistent data mapping in the finished product.
- ✓ **Communication Ease:** Developers, designers, and stakeholders can use the diagram as a guide for development and communication.

II. DATA MAPPING

- ✓ **Data Transformation and Flow:** Guarantees the proper flow of data from one system element (also called target) to another while applying different transformations of the source data to the target data.
- ✓ **Consistency in Data Types:** Mappings (talend a quick company, 2024) done properly guarantee that the source and destination systems have consistent data types, formats, and values, hence data inconsistency is avoided.
- ✓ **Data Quality Control:** Achieving a clear mapping business process makes it possible to easily tell if there are potential errors or misaAutomated Workflows and Actions: Stored procedures eliminate the requirement for application-level coding by enabling the execution of preset, reusable logic, guaranteeing consistent system behavior.
- ✓ Enforcement of Business Rules: When certain database actions (like inserts, updates, or deletions) take place, triggers can automatically enforce business rules (such prohibiting invalid data insertion) to guarantee data integrity and compliance.
- ✓ Performance Optimization: By moving business logic to the database layer, you may minimize data processing at the application level, which lowers network traffic and boosts performance.

- ✓ Error Handling: To ensure that unforeseen problems are effectively handled, procedures and triggers might incorporate error handling techniques.
- ✓ lignment that can make the data lose quality.

III. DATA DICTIONARY

- ✓ **Centralized Data Documentation**: The data dictionary (Science Direct, 2024) describes in detail each element of the database, including tables, columns, data types, and constraints ensuring that there are no hidden meanings.
- ✓ **Improved Collaboration:** Since all the participants involved in the designing or the maintenance of the database system use a single base of information, it improves collaboration and reduces chances of miscommunication.
- ✓ **Facilitates Maintenance:** The data dictionary is a useful tool in case of any problems with the database, which makes subsequent changes and maintenance easier.

IV. DATA NORMALIZATION

- ✓ **Decreases Redundancy**: Normalization achieves minimum redundancy of data by structuring information into several inter related tables where each data item is entered only one time.
- ✓ **Greater Data Quality**: Through normalization (up to 3NF or beyond), you reduce the chances of various anomalies occurring such as insertion, deletion or update anomalies to better the state of the data.
- ✓ **Improved Performance of Queries**: Tables that are efficiently normalized are said to enhance the performance of the queries by eliminating the duplication of data that is not required.

V. CREATING DATABASES AND TABLES

- ✓ **Systematic Storage Construction**: Systematizing database schema design and tables construction enhances logical storage and organization of data.
- ✓ **Scalability And Flexibility**: The design gives the provision of scaling up of solution and modification of the schema according to the changing needs of the system.
- ✓ **Data Integrity:** The tables are designed with the right number of constraints (primary keys, foreign keys, unique constraints) so that the data is accurate and consistent.

VI. FUNCTIONS AND VIEWS IN TABLES

- ✓ **Implementation of Custom Business Logic**: Functions make it possible to directly encapsulate business logic in the database, which enhances performance and streamlines the application layer.
- ✓ **Simplified Data Retrieval:** Views offer a practical means of displaying data without altering the underlying schema, which facilitates straightforward queries on complicated data.
- ✓ **Security and Access Control**: By revealing only the information that is required, views can help limit user access to sensitive data, improving security.

VII. STORED PROCEDURES AND TRIGGERS

- **Automated Workflows and Actions**: Stored procedures eliminate the requirement for application-level coding by enabling the execution of preset, reusable logic, guaranteeing consistent system behavior.
- **Enforcement of Business Rules**: When certain database actions (like inserts, updates, or deletions) take place, triggers can automatically enforce business rules (such prohibiting invalid data insertion) to guarantee data integrity and compliance.
- **Performance Optimization**: By moving business logic to the database layer, you may minimize data processing at the application level, which lowers network traffic and boosts performance.
- **Error Handling:** To ensure that unforeseen problems are effectively handled, procedures and triggers might incorporate error handling techniques.

10.2 IDENTIFY AND EXPLAIN THE 'AREAS THAT NEED IMPROVEMENTS' [WEAKNESSES]

I. ER DIAGRAMS (ENTITY-RELATIONSHIP DIAGRAMS)

WEAKNESSES:

- ✓ **Relationship ambiguity**: Relationships between entities can occasionally be unclear, making it difficult to grasp how various system components interact. For instance, ambiguous many-to-many or one-to-many connections.
- ✓ **Overcomplication:** When there are too many entities and relationships in an ER diagram, it might become difficult for stakeholders (BYJU'S, 2024) to understand.
- ✓ **Inaccurate cardinalities**: Poor database architecture and inaccurate associations can result from the misuse or nonexistence of suitable cardinalities (such as many-to-many, one-to-many, and one-to-one).
- ✓ **Lack of normalization**: Inefficient and duplicated data might result from improperly normalized data models, which are occasionally reflected in ER diagrams.
- ✓ **Ignoring business rules**: Complex business rules, constraints, or conditional logic that need to be implemented at the database level are frequently overlooked by ER diagrams.

IMPROVEMENTS:

- ✓ Make sure the relationships are explicit and well-defined.
- ✓ Simplify intricate diagrams by concentrating on high-level entities or dividing them into smaller sub-diagrams.
- ✓ Verify each relationship's cardinality in light of practical needs.
- ✓ To prevent redundant data, take normalization principles into account when designing.
- ✓ As much as you can, incorporate business rules into the ER diagram.

II. DATA MAPPING

WEAKNESS

- ✓ **Data types that are inconsistent**: When various data sources are mapped, it may result in data types that are incompatible or mismatched (e.g., integer vs. string).
- ✓ **Incomplete mapping**: Missing characteristics or tables might result from not always capturing all the data necessary.
- ✓ **Absence of mapping documentation**: Team members and developers working on the system may become confused if the mapping procedure is not adequately documented.
- ✓ **mistakes in layer mapping**: Inadequate layer mapping (such as database, business logic, and user interface) can result in mistakes and inconsistent data.

IMPROVEMENTS:

- ✓ Verify that data types are appropriately aligned across systems and that conversion methods are used when needed.
- ✓ Make a thorough mapping document that incorporates all of the data relationships and properties.
- ✓ Verify the data mapping on a regular basis with business stakeholders to make sure the design satisfies practical requirements.
- ✓ Create a structured procedure for managing data inconsistencies and modifications during the mapping process.

III. DATA DICTIONARY

WEAKNESS

- ✓ **Lack of standardization**: Teams may become confused if the data dictionary does not adhere to a common naming practice.
- ✓ **Inadequate definitions**: Some fields, tables, and relationships are not well explained, which makes it difficult to grasp their use or purpose.
- ✓ **Absence of rules or constraints**: Data dictionaries can lack crucial rules for data validation or restrictions (such unique, foreign keys).
- ✓ Outdated or erroneous information The data dictionary may become a source of errors and false information if it is not updated on a regular basis.

IMPROVEMENTS

- ✓ Create and implement uniform naming guidelines.
- ✓ Give each table, column, constraint, and relationship a precise definition.
- ✓ Make that the dictionary contains all applicable validation, rules, and constraints for the data.
- ✓ Update the data dictionary frequently to take into account modifications to the data structure or schema.

IV. DATA NORMALIZATION

WEAKNESSES

- ✓ **Over-normalization**: Too many tables may result from excessive normalization, which may slow down queries by requiring too many joins.
- ✓ **Under-normalization**: Inadequate normalization can result in abnormalities, redundant data, and trouble preserving consistency.
- ✓ **Ignorance of trade-offs**: It's common to ignore the need to strike a balance between normalization and performance considerations (e.g., denormalization for speed).
- ✓ **Inconsistent application**: A difficult-to-maintain design may arise from applying normalization inconsistently across tables.

IMPROVEMENTS

- ✓ Maintain performance requirements while applying normalization up to the proper level, which is often 3NF.
- ✓ Review the schema frequently to make sure normalization is applied correctly.
- ✓ When performance optimizations are required, such as for large-scale reporting, take into account denormalization or partial normalization.
- ✓ Assess the normalization procedure in light of the database workload and the particular requirements of the application.

V. CREATING DATABASE AND TABLES

WEAKNESSES

- ✓ **accurate relationships between primary and foreign keys**: Inconsistencies in the database and problems with referential integrity might result from improper key configuration.
- ✓ Ignoring indexing Performance issues may arise if frequently searched columns are not indexed.
- ✓ **Disregarding performance and scalability requirements**: Inadequate table design may function well for little datasets but not well at scale.
- ✓ **Absence of nullability constraints or default values**: Certain columns may not have default values or may permit null values in inappropriate places.

IMPROVEMENTS:

- ✓ Give primary keys, foreign keys, and any required restrictions careful definitions.
- ✓ Take indexing on commonly used columns into account while designing for performance
- ✓ Use sharding, partitioning, or other effective data distribution strategies to account for scalability.
- ✓ Establish nullability constraints and reasonable defaults to implement business rules at the database level.

VI. FUNCTIONS AND VIEWS IN TABLES

WEAKNESSES:

- ✓ **Performance problems**: Functions and views can have a detrimental impact on performance if they are abused or misused, particularly if they are not optimized or include intricate logic.
- ✓ **Poor visibility**: It may be challenging to debug or comprehend the underlying actions due to complex logic within functions or views.
- ✓ **Lack of reusability**: Sometimes the design of functions or views makes it difficult to use them in different queries or contexts.

IMPROVEMENTS

- ✓ Reduce performance overhead by optimizing functions and views, especially when they are utilized in complex queries.
- ✓ Make sure that views and functions have adequate documentation so that other developers can understand them.
- ✓ Make an effort to create reusable views and functions that can be used in other application sections.

VII. PROCEDURES AND TRIGGERS IN TABLES AND DATABASE

WEAKNESSES

- ✓ **Overcomplicating logic:** Complex or business-specific logic may be more difficult to maintain and debug when stored procedures and triggers are used.
- ✓ **Absence of transaction management**: When processes and triggers don't manage transactions correctly, it might result in inconsistent data.
- ✓ **Performance issues**: If triggers and procedures are not properly optimized, they may cause data manipulation activities to lag.
- ✓ **Dependencies that are difficult to control**: Triggers may produce unforeseen side effects or circular dependencies in the database.

IMPROVEMENTS

- ✓ To prevent adding needless complexity, keep stored processes and triggers as basic as possible.
- ✓ Implement appropriate transaction management and error handling within triggers and methods.
- ✓ Analyze how triggers and procedures affect database operations to maximize their performance.
- ✓ Make sure stored procedures and triggers don't generate performance bottlenecks or hidden dependencies by reviewing and refactoring them on a regular basis.

10.3 FUTURE IMPLEMENTATIONS

I. ER DIAGRAM DRAWING

FUTURE IMPLEMENTATIONS:

- ✓ **include sophisticated connection types**: To better simulate real-world situations, include more intricate relationships such ternary relationships, recursive relationships, and subtype/supertype hierarchies.
- ✓ Implementing tools that can automatically create ER diagrams from the database schema or code will help to ensure that design and implementation are in sync.
- ✓ Enable real-time collaboration on ER diagrams so that various stakeholders, like as developers and business analysts, can work together to update and discuss the diagram.
- ✓ **Tracking changes and managing versions:** To monitor changes over time and facilitate the reversal or review of design choices, use version control for ER diagrams.
- ✓ **Combining more tools**: Permit the ER diagram tool to interface with CI/CD, testing, and project management systems.

II. DATA MAPPING

FUTURE IMPLEMENTATIONS:

- ✓ **Automation of data mapping**: Use algorithms or automated technologies to help with data mapping, which can expedite the process and minimize human mistake. Based on past trends, machine learning may be able to forecast data mapping.
- ✓ Enable data lineage features to monitor the movement of data from its source to its destination, improving transparency and comprehension of data transformations.
- ✓ **Advanced validation of mapping**: To find discrepancies, mismatches, or missing properties in data mappings, use automated validation. This guarantees error-free and seamless data integration.
- ✓ **Assistance with a variety of data sources**: Allow data mapping to accommodate a greater range of data sources (such as NoSQL databases, external APIs, and cloud storage) and formats (such as JSON, XML) as systems grow more complicated.

III. DATA DICTIONARY

FUTURE IMPLEMENTATIONS:

- ✓ **Data dictionary updates that happen automatically**: Create tools that update the data dictionary automatically whenever the schema is modified. This would lessen the possibility of missing or out-of-date documentation.
- ✓ **Advanced search and tagging:** Enhance the data dictionary's search capabilities to enable looking for information using relationships, business terms, or data lineage.

- ✓ **Features of collaboration**: Allow several team members to participate and check definitions, restrictions, and other metadata by enabling real-time collaboration when changing and evaluating the data dictionary.
- ✓ **Connecting to tools for managing metadata**: Provide insights into data consumption, linkages, and impact across systems by integrating the data dictionary with more comprehensive metadata management frameworks.
- ✓ **Metadata version control**: Implement version control for the data dictionary to manage several schema versions and monitor changes over time.

IV. DATA NORMALIZATION

FUTURE IMPLEMENTATIONS:

- ✓ Use tools that can automatically recommend different levels of normalization depending on the quantity of the data, query patterns, and performance requirements. These are known as dynamic normalization tools.
- ✓ **In favor of hybrid normalization:** Permit hybrid approaches in which some tables are denormalized for performance reasons (e.g., in reporting or OLAP systems) while others can be highly normalized.
- ✓ **Denormalization with intelligence**: Use machine learning models to predict when and when denormalization will enhance performance, such as in workloads that require a lot of reading or reporting.
- ✓ **Use case-based normalization guidelines**: To balance data integrity and performance, define normalization standards according to particular use cases, such as transactional systems (OLTP) or analytical systems (OLAP).
- ✓ **NoSQL database normalization**: Provide normalization strategies appropriate for non-relational databases as NoSQL databases proliferate.

V. CREATING DATABASE AND TABLES

FUTURE IMPLEMENTATIONS:

- ✓ **Automated database schema generation**: Programs that can produce database schema straight from user stories, business requirements, or ER diagrams will help create databases more quickly and with fewer errors.
- ✓ **Database sharding and partitioning**: Use automated sharding and partitioning techniques to provide scalability and effective data distribution for extremely big databases.
- ✓ **Multi-model database support**: Allow the system to support and smoothly integrate several database types (such as relational, graph, and document-based) as database technology advances.
- ✓ **Management of database evolution**: As the system develops over time, handle schema changes with database versioning and migration tools to maintain backward compatibility and seamless version transitions.
- ✓ **Cloud database optimization:** Provide capabilities like automatic scalability, backup, and recovery to enable the best possible database creation and scaling in cloud environments.

VI. FUNCTIONS AND VIEWS IN TABLES

FUTURE IMPLEMENTATIONS:

- ✓ **Materialized views**: Add support for materialized views, which store and refresh query results on a regular basis to enhance performance, particularly for intricate, often-used queries.
- ✓ Using performance optimization tools that automatically recommend or restructure SQL functions in response to query performance metrics is known as automated function optimization.
- ✓ **Serverless functions**: Reduce operational cost by using serverless compute to handle sophisticated functions that can scale dynamically without requiring infrastructure management.
- ✓ Implementing a more adaptable data access layer will enable functions and views to be abstracted into reusable modules, making it simpler to integrate them across various application components.
- ✓ **AI-assisted views**: By automatically combining frequently accessed data, AI can be used to help construct complicated views based on user behavior or data trends, enhancing query efficiency.

VII. PROCEDURES AND TRIGGERS IN TABLES AND DATABASE

FUTURE IMPLEMENTATIONS:

- ✓ Transition to event-driven architectures, which allow for dynamic and responsive database interactions by having triggers respond in real-time to system events.
- ✓ **Distributed procedures**: Allow stored procedures to be defined and run across distributed databases or microservices architectures as databases grow, guaranteeing consistent logic execution throughout the system.
- ✓ **Procedural versioning**: When a new version of the database is released or schema changes are made, incorporate version control for triggers and procedures to guarantee backward compatibility.
- ✓ **Automated error handling and logging**: Improve error handling, logging, and monitoring in triggers and stored procedures to aid in system tracking and debugging.
- ✓ **AI for trigger optimization**: Make sure that triggers don't result in performance snags by using AI to examine trigger behavior.

11. APPENDICES

11.1 TABLES WITH CONSTRAINTS

```
/*============================================================
||                  CUSTOMER MANAGEMENT                     ||
============================================================*/

/*------------------------------------------------
-- Creating Customer table
------------------------------------------------*/

CREATE TABLE Customer (
    CustomerID INT PRIMARY KEY IDENTITY(1,1),
    FirstName NVARCHAR(100) NOT NULL CHECK (LEN(FirstName) > 1),
    LastName NVARCHAR(100) NOT NULL CHECK (LEN(LastName) > 1),
    Email NVARCHAR(255) UNIQUE CHECK (Email LIKE '%@%.%'),
    PhoneNumber NVARCHAR(15) CHECK (PhoneNumber LIKE '[0-9]%'),
    AddressLine1 NVARCHAR(255),
    AddressLine2 NVARCHAR(255),
    City NVARCHAR(100),
    PostalCode NVARCHAR(20) CHECK (LEN(PostalCode) <= 20),
    RegistrationDate DATE NOT NULL DEFAULT GETDATE()
);

/*============================================================
||                  EMPLOYEE MANAGEMENT                     ||
============================================================*/

/*------------------------------------------------
-- Creating Role table
------------------------------------------------*/

CREATE TABLE Role (
    RoleID INT PRIMARY KEY IDENTITY(1,1),
    RoleName NVARCHAR(100) NOT NULL CHECK (LEN(RoleName) > 0)
);

/*------------------------------------------------
-- Creating Employee table
------------------------------------------------*/

CREATE TABLE Employee (
    EmployeeID INT PRIMARY KEY IDENTITY(1,1),
    FirstName NVARCHAR(100) NOT NULL CHECK (LEN(FirstName) > 1),
    LastName NVARCHAR(100) NOT NULL CHECK (LEN(LastName) > 1),
    RoleID INT NOT NULL,
    Email NVARCHAR(255) UNIQUE NOT NULL CHECK (Email LIKE '%@%.%'),
    PhoneNumber NVARCHAR(15) CHECK (PhoneNumber LIKE '[0-9]%'),
    HireDate DATE NOT NULL CHECK (HireDate <= GETDATE()),
    FOREIGN KEY (RoleID) REFERENCES Role(RoleID) ON DELETE CASCADE
);
```

```sql
/*------------------------------------------------
-- Creating AuditLog table
------------------------------------------------*/

CREATE TABLE AuditLog (
    LogID INT PRIMARY KEY IDENTITY(1,1),
    Action NVARCHAR(255) NOT NULL,
    PerformedBy INT NULL, -- Allow NULL values for SET NULL action
    ActionTimestamp DATETIME NOT NULL,
    TableName NVARCHAR(100),
    FOREIGN KEY (PerformedBy) REFERENCES Employee(EmployeeID) ON DELETE SET NULL
);

/*============================================================
||                   REPORT GENERATION                     ||
============================================================*/

/*------------------------------------------------
-- Creating Report table
------------------------------------------------*/

CREATE TABLE Report (
    ReportID INT PRIMARY KEY IDENTITY(1,1),
    ReportName NVARCHAR(255) NOT NULL CHECK (LEN(ReportName) > 0),
    GeneratedBy INT NOT NULL,
    GeneratedDate DATETIME NOT NULL DEFAULT GETDATE(),
    ReportType NVARCHAR(100) NOT NULL,
    ReportData NVARCHAR(MAX),
    FOREIGN KEY (GeneratedBy) REFERENCES Employee(EmployeeID) ON DELETE CASCADE
);

/*============================================================
||              PRODUCT AND STOCK MANAGEMENT               ||
============================================================*/

/*------------------------------------------------
-- Creating Category table
------------------------------------------------*/

CREATE TABLE Category (
    CategoryID INT PRIMARY KEY IDENTITY(1,1),
    CategoryName NVARCHAR(100) NOT NULL UNIQUE CHECK (LEN(CategoryName) > 0)
);

/*------------------------------------------------
-- Creating Brand table
------------------------------------------------*/

CREATE TABLE Brand (
    BrandID INT PRIMARY KEY IDENTITY(1,1),
    BrandName NVARCHAR(100) NOT NULL UNIQUE CHECK (LEN(BrandName) > 0)
);
```

```sql
/*-----------------------------------------------
-- Creating TaxRate table
-----------------------------------------------*/

CREATE TABLE TaxRate (
    TaxRateID INT PRIMARY KEY IDENTITY(1,1),
    TaxRate DECIMAL(5, 2) NOT NULL CHECK (TaxRate >= 0 AND TaxRate <= 100)
);

/*-----------------------------------------------
-- Creating Product table
-----------------------------------------------*/

CREATE TABLE Product (
    ProductID INT PRIMARY KEY IDENTITY(1,1),
    ProductName NVARCHAR(150) NOT NULL CHECK (LEN(ProductName) > 0),
    CategoryID INT NOT NULL,
    BrandID INT NOT NULL,
    UnitPrice DECIMAL(10, 2) NOT NULL CHECK (UnitPrice >= 0),
    TaxRateID INT NOT NULL,
    ReorderLevel INT NOT NULL CHECK (ReorderLevel >= 0),
    IsActive BIT NOT NULL DEFAULT 1,
    FOREIGN KEY (CategoryID) REFERENCES Category(CategoryID) ON DELETE CASCADE,
    FOREIGN KEY (BrandID) REFERENCES Brand(BrandID) ON DELETE CASCADE,
    FOREIGN KEY (TaxRateID) REFERENCES TaxRate(TaxRateID) ON DELETE CASCADE
);

/*-----------------------------------------------
-- Creating Warehouse table
-----------------------------------------------*/

CREATE TABLE Warehouse (
    WarehouseID INT PRIMARY KEY IDENTITY(1,1),
    WarehouseName NVARCHAR(150) NOT NULL CHECK (LEN(WarehouseName) > 0),
    Location NVARCHAR(255),
    ManagerID INT,
    FOREIGN KEY (ManagerID) REFERENCES Employee(EmployeeID) ON DELETE SET NULL
);

/*-----------------------------------------------
-- Creating Stock table
-----------------------------------------------*/

CREATE TABLE Stock (
    StockID INT PRIMARY KEY IDENTITY(1,1),
    ProductID INT NOT NULL,
    WarehouseID INT NOT NULL,
    QuantityAvailable INT NOT NULL CHECK (QuantityAvailable >= 0),
    LastRestockedDate DATE CHECK (LastRestockedDate <= GETDATE()),
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID) ON DELETE CASCADE,
    FOREIGN KEY (WarehouseID) REFERENCES Warehouse(WarehouseID) ON DELETE CASCADE
```

```
);

/*============================================================
||                   DISCOUNT MANAGEMENT                    ||
============================================================*/

/*-----------------------------------------------
-- Creating Discount table
-----------------------------------------------*/

CREATE TABLE Discount (
    DiscountID INT PRIMARY KEY IDENTITY(1,1),
    DiscountName NVARCHAR(150) NOT NULL,
    StartDate DATE NOT NULL,
    EndDate DATE NOT NULL,
    DiscountPercentage DECIMAL(5, 2),
    DiscountType NVARCHAR(50) NOT NULL,
    CONSTRAINT CK_Discount_DateRange CHECK (EndDate >= StartDate) -- Table-level CHECK
constraint
);

/*-----------------------------------------------
-- Creating ProductDiscount table
-----------------------------------------------*/

CREATE TABLE ProductDiscount (
    ProductDiscountID INT PRIMARY KEY IDENTITY(1,1),
    ProductID INT NOT NULL,
    DiscountID INT NOT NULL,
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID) ON DELETE CASCADE,
    FOREIGN KEY (DiscountID) REFERENCES Discount(DiscountID) ON DELETE CASCADE
);

/*============================================================
||                   SALES MANAGEMENT                       ||
============================================================*/

/*-----------------------------------------------
-- Creating PaymentMethod table
-----------------------------------------------*/

CREATE TABLE PaymentMethod (
    PaymentMethodID INT PRIMARY KEY IDENTITY(1,1),
    PaymentType NVARCHAR(100) NOT NULL CHECK (LEN(PaymentType) > 0)
);

/*-----------------------------------------------
-- Creating SalesTransaction table
-----------------------------------------------*/

CREATE TABLE SalesTransaction (
    TransactionID INT PRIMARY KEY IDENTITY(1,1),
```

```
    CustomerID INT,
    TransactionDate DATETIME NOT NULL DEFAULT GETDATE(),
    PaymentMethodID INT NOT NULL,
    TotalAmount DECIMAL(10, 2) NOT NULL CHECK (TotalAmount >= 0),
    DiscountApplied DECIMAL(10, 2) CHECK (DiscountApplied >= 0),
    FinalAmount DECIMAL(10, 2) NOT NULL CHECK (FinalAmount >= 0),
    FOREIGN KEY (CustomerID) REFERENCES Customer(CustomerID) ON DELETE SET NULL,
    FOREIGN KEY (PaymentMethodID) REFERENCES PaymentMethod(PaymentMethodID) ON DELETE
CASCADE
);

/*-----------------------------------------------
-- Creating SalesTransactionDetail table
-----------------------------------------------*/

CREATE TABLE SalesTransactionDetail (
    TransactionDetailID INT PRIMARY KEY IDENTITY(1,1),
    TransactionID INT NOT NULL,
    ProductID INT NOT NULL,
    Quantity INT NOT NULL CHECK (Quantity > 0),
    UnitPrice DECIMAL(10, 2) NOT NULL CHECK (UnitPrice >= 0),
    LineTotal DECIMAL(10, 2) NOT NULL CHECK (LineTotal >= 0),
    FOREIGN KEY (TransactionID) REFERENCES SalesTransaction(TransactionID) ON DELETE
CASCADE,
    FOREIGN KEY (ProductID) REFERENCES Product(ProductID) ON DELETE CASCADE
);
```

11.2 SAMPLE DATA

```
/*============================================================
||                   CUSTOMER MANAGEMENT                    ||
============================================================*/

/*-----------------------------------------------
-- Adding data to Customer table
-----------------------------------------------*/
SET IDENTITY_INSERT Customer ON;
INSERT INTO Customer (CustomerID, FirstName, LastName, Email, PhoneNumber, AddressLine1,
AddressLine2, City, PostalCode, RegistrationDate)
VALUES
(1, 'Kumar', 'Perera', 'kumar.perera@example.com', '0771234567', '123 Temple Road',
'Apartment 4B', 'Colombo', '00100', '2023-01-15'),
(2, 'Nuwan', 'Fernando', 'nuwan.fernando@example.com', '0719876543', '45 Beach Drive',
NULL, 'Galle', '80000', '2023-02-10'),
(3, 'Amali', 'Wijesinghe', 'amali.wijesinghe@example.com', '0723456789', '78 Lake View',
'Suite 3', 'Kandy', '20000', '2023-03-05'),
(4, 'Saman', 'Silva', 'saman.silva@example.com', '0751234560', '89 High Street', NULL,
'Matara', '81000', '2023-04-12'),
(5, 'Lakshmi', 'De Silva', 'lakshmi.desilva@example.com', '0762345671', '15 Palm Grove',
'Near Park', 'Negombo', '11500', '2023-05-18'),
(6, 'Ruwan', 'Jayasinghe', 'ruwan.jayasinghe@example.com', '0783456782', '52 Hill Crest',
'Flat 6A', 'Nuwara Eliya', '22200', '2023-06-07'),
(7, 'Chathura', 'Karunaratne', 'chathura.k@example.com', '0709876544', '102 Green Lane',
NULL, 'Jaffna', '40000', '2023-07-02'),
(8, 'Dilini', 'Gunasekara', 'dilini.g@example.com', '0775671234', '56 River Side',
'Opposite School', 'Batticaloa', '30000', '2023-08-19'),
(9, 'Thilini', 'Ratnayake', 'thilini.ratnayake@example.com', '0743456789', '28 Mountain
Pass', NULL, 'Badulla', '90000', '2023-09-03'),
(10, 'Prasanna', 'Abeywickrama', 'prasanna.abeywickrama@example.com', '0712349876', '16
Lotus Street', 'Near Temple', 'Kurunegala', '60000', '2023-10-01'),
(11, 'Harsha', 'Senanayake', 'harsha.senanayake@example.com', '0721234568', '9 Orchid
Path', NULL, 'Ratnapura', '70000', '2023-10-15'),
(12, 'Shanika', 'Dias', 'shanika.d@example.com', '0784567890', '67 Cinnamon Drive', NULL,
'Trincomalee', '31000', '2023-11-20'),
(13, 'Anjana', 'Bandara', 'anjana.bandara@example.com', '0702345679', '34 Jasmine Avenue',
'Apartment 5C', 'Anuradhapura', '50000', '2023-12-01'),
(14, 'Kavindu', 'Ekanayake', 'kavindu.ekanayake@example.com', '0753456781', '77 Sunset
Boulevard', 'Flat 2B', 'Polonnaruwa', '51000', '2023-12-05'),
(15, 'Nadeeka', 'Rajapakse', 'nadeeka.r@example.com', '0715678901', '101 Palm Court',
'Opposite Market', 'Hambantota', '82000', '2023-12-08'),
(16, 'Sunil', 'Herath', 'sunil.herath@example.com', '0767890123', '12 Garden Path', NULL,
'Kalutara', '12000', '2023-12-12'),
(17, 'Malith', 'Gamage', 'malith.gamage@example.com', '0778901234', '24 Cliff Road',
'Suite 101', 'Ampara', '32000', '2023-12-15'),
(18, 'Rashmi', 'Liyanage', 'rashmi.liyanage@example.com', '0759012345', '88 Oak Lane',
NULL, 'Puttalam', '61000', '2023-12-20'),
(19, 'Janaka', 'Dissanayake', 'janaka.d@example.com', '0701237890', '40 Main Street',
'Building A', 'Vavuniya', '43000', '2023-12-25'),
```

```
(20, 'Ishara', 'Peiris', 'ishara.peiris@example.com', '0713456782', '17 Cherry Blossom',
NULL, 'Kilinochchi', '44000', '2023-12-30');
SET IDENTITY_INSERT Customer OFF;




/*============================================================
||                  EMPLOYEE MANAGEMENT                     ||
============================================================*/

/*-----------------------------------------------
-- Adding data to Role table
-----------------------------------------------*/
SET IDENTITY_INSERT Role ON;
INSERT INTO Role (RoleID, RoleName)
VALUES
(1, 'Admin'),
(2, 'Cashier'),
(3, 'Manager'),
(4, 'Inventory Supervisor'),
(5, 'Sales Representative'),
(6, 'Accountant'),
(7, 'Warehouse Manager'),
(8, 'Customer Service Representative'),
(9, 'IT Support Specialist'),
(10, 'Marketing Executive'),
(11, 'Delivery Coordinator');
SET IDENTITY_INSERT Role OFF;


/*-----------------------------------------------
-- Adding data to Employee table
-----------------------------------------------*/
SET IDENTITY_INSERT Employee ON;
INSERT INTO Employee (EmployeeID, FirstName, LastName, RoleID, Email, PhoneNumber,
HireDate)
VALUES
-- Admins
(1, 'Samantha', 'Wijeratne', 1, 'samantha.wijeratne@pos.lk', '0711234567', '2022-01-05'),
(2, 'Dilshan', 'Edirisinghe', 1, 'dilshan.edirisinghe@pos.lk', '0741234567', '2022-05-
15'),
-- Cashiers
(3, 'Dinesh', 'Kumarasinghe', 2, 'dinesh.kumarasinghe@pos.lk', '0772345678', '2022-03-
12'),
(4, 'Sachini', 'Rajapaksa', 2, 'sachini.rajapaksa@pos.lk', '0750123456', '2022-04-08'),
-- Managers
(5, 'Tharindu', 'Jayasinghe', 3, 'tharindu.jayasinghe@pos.lk', '0703456789', '2021-05-
10'),
(6, 'Ruwan', 'Senanayake', 3, 'ruwan.senanayake@pos.lk', '0717890123', '2023-01-10'),
```

```
-- Inventory Supervisors
(7, 'Chamodi', 'Fernando', 4, 'chamodi.fernando@pos.lk', '0784567890', '2022-06-15'),
(8, 'Isuru', 'Bandara', 4, 'isuru.bandara@pos.lk', '0789012345', '2023-03-01'),
-- Sales Representatives
(9, 'Kasun', 'Perera', 5, 'kasun.perera@pos.lk', '0755678901', '2022-07-20'),
(10, 'Thilini', 'Wijesinghe', 5, 'thilini.wijesinghe@pos.lk', '0785678901', '2022-09-12'),
-- Accountants
(11, 'Nishadi', 'De Silva', 6, 'nishadi.desilva@pos.lk', '0746789012', '2021-08-25'),
(12, 'Sanduni', 'Wickramasinghe', 6, 'sanduni.wickramasinghe@pos.lk', '0758901234', '2022-
12-12'),
-- Warehouse Managers
(13, 'Ajith', 'Kumarasinghe', 7, 'ajith.kumarasinghe@pos.lk', '0771234561', '2023-01-15'),
(14, 'Kavinda', 'Perera', 7, 'kavinda.perera@pos.lk', '0719876523', '2022-05-18'),
(15, 'Nadeesha', 'Fernando', 7, 'nadeesha.fernando@pos.lk', '0703456729', '2022-08-25'),
(16, 'Priyanka', 'De Silva', 7, 'priyanka.desilva@pos.lk', '0742345671', '2021-10-10'),
(17, 'Sunil', 'Weerasinghe', 7, 'sunil.weerasinghe@pos.lk', '0784567888', '2022-03-30'),
(18, 'Rasika', 'Jayawardena', 7, 'rasika.jayawardena@pos.lk', '0775678998', '2022-06-12'),
(19, 'Tharaka', 'Senanayake', 7, 'tharaka.senanayake@pos.lk', '0746789001', '2022-09-17'),
(20, 'Chathura', 'Gunathilaka', 7, 'chathura.gunathilaka@pos.lk', '0787891234', '2023-04-
22'),
(21, 'Janaka', 'Dissanayake', 7, 'janaka.dissanayake@pos.lk', '0758901239', '2022-02-14'),
(22, 'Dilini', 'Ranawaka', 7, 'dilini.ranawaka@pos.lk', '0719012346', '2023-07-19'),
(23, 'Chaminda', 'Senarath', 7, 'chaminda.senarath@pos.lk', '0779123450', '2022-11-05'),
(24, 'Sanjeewa', 'Wickramaratne', 7, 'sanjeewa.wickramaratne@pos.lk', '0701234568', '2023-
01-25'),
(25, 'Ruwanthi', 'Karunathilaka', 7, 'ruwanthi.karunathilaka@pos.lk', '0782345679', '2022-
12-01'),
(26, 'Dulanjali', 'Madushanka', 7, 'dulanjali.madushanka@pos.lk', '0713456789', '2022-07-
15'),
(27, 'Lakshman', 'Gunasekara', 7, 'lakshman.gunasekara@pos.lk', '0744567890', '2022-04-
09'),
(28, 'Shanika', 'Wijerathne', 7, 'shanika.wijerathne@pos.lk', '0755678902', '2022-08-20'),
(29, 'Supun', 'Ranasinghe', 7, 'supun.ranasinghe@pos.lk', '0706789013', '2023-02-11'),
(30, 'Harindra', 'Wijesooriya', 7, 'harindra.wijesooriya@pos.lk', '0787890124', '2023-03-
27'),
(31, 'Menaka', 'Jayasekara', 7, 'menaka.jayasekara@pos.lk', '0758901235', '2022-06-30'),
(32, 'Ishani', 'Wimalasuriya', 7, 'ishani.wimalasuriya@pos.lk', '0719012347', '2022-12-
15'),
-- Customer Service Representatives
(33, 'Amali', 'Gunaratne', 8, 'amali.gunaratne@pos.lk', '0708901234', '2023-02-05'),
(34, 'Lakshan', 'Fernando', 8, 'lakshan.fernando@pos.lk', '0709012345', '2023-01-20'),
-- IT Support Specialists
(35, 'Sameera', 'Ranasinghe', 9, 'sameera.ranasinghe@pos.lk', '0746789012', '2023-10-09'),
-- Marketing Executives
(36, 'Ashani', 'Mendis', 10, 'ashani.mendis@pos.lk', '0704567890', '2023-08-01'),
-- Delivery Coordinators
(37, 'Dilini', 'Ratnayake', 11, 'dilini.ratnayake@pos.lk', '0780123456', '2023-02-25'),
(38, 'Tharuka', 'Wijesooriya', 11, 'tharuka.wijesooriya@pos.lk', '0756783456', '2023-03-
15'),
(39, 'Mahesh', 'Senarath', 11, 'mahesh.senarath@pos.lk', '0719234567', '2023-04-10');
SET IDENTITY_INSERT Employee OFF;
```

```sql
/*-----------------------------------------------
-- Adding data to AuditLog table
-----------------------------------------------*/
SET IDENTITY_INSERT AuditLog ON;
INSERT INTO AuditLog (LogID, Action, PerformedBy, ActionTimestamp, TableName)
VALUES
-- Admin Actions
(1, 'Added new employee: Amali Gunaratne', 1, '2023-02-05 09:15:30', 'Employee'),
(2, 'Updated product price for Ceylon Tea 500g', 2, '2023-06-12 10:22:15', 'Product'),
(3, 'Deleted inactive customer record', 1, '2023-08-01 14:45:05', 'Customer'),
-- Cashier Actions
(4, 'Processed sales transaction #10123', 3, '2023-05-25 13:34:50', 'SalesTransaction'),
(5, 'Applied discount on sales transaction #10256', 4, '2023-06-18 15:25:10',
'SalesTransactionDetail'),
(6, 'Updated payment method for transaction #10321', 4, '2023-07-02 16:40:00',
'PaymentMethod'),
-- Manager Actions
(7, 'Approved bulk order request for Lanka Spices Ltd.', 5, '2023-09-10 11:10:45',
'Stock'),
(8, 'Assigned new warehouse manager to Warehouse #3', 6, '2023-10-20 10:00:15',
'Warehouse'),
(9, 'Updated stock reorder level for Rice 10kg', 5, '2023-11-11 09:45:30', 'Product'),
-- Inventory Supervisor Actions
(10, 'Stock restocked for Product #205 (Milk Powder)', 7, '2023-08-23 14:15:55', 'Stock'),
(11, 'Updated supplier details for Product #109 (Coconut Oil)', 8, '2023-09-30 12:10:25',
'Product'),
(12, 'Performed monthly stock audit for Warehouse #1', 7, '2023-12-01 11:00:00',
'AuditLog'),
-- Sales Representative Actions
(13, 'Generated sales report for July 2023', 9, '2023-07-31 17:45:30', 'Report'),
(14, 'Generated promotional sales summary', 10, '2023-09-12 18:00:00', 'Report'),
(15, 'Submitted customer feedback report', 9, '2023-10-18 15:20:15', 'Report'),
-- Accountants Actions
(16, 'Processed supplier invoice #20435', 11, '2023-09-05 10:05:40', 'AuditLog'),
(17, 'Generated tax report for Q2 2023', 12, '2023-07-01 12:45:55', 'Report'),
(18, 'Corrected payment record for Invoice #20987', 11, '2023-08-20 14:30:25',
'PaymentMethod'),
-- Warehouse Manager Actions
(19, 'Added new stock location: Warehouse #4', 13, '2023-04-01 10:20:00', 'Warehouse'),
(20, 'Updated manager details for Warehouse #2', 14, '2023-05-18 15:15:35', 'Warehouse'),
(21, 'Approved stock transfer to Warehouse #3', 15, '2023-06-22 09:50:30', 'Stock'),
-- Customer Service Actions
(22, 'Resolved customer complaint for Order #23145', 33, '2023-07-25 11:30:15',
'Customer'),
(23, 'Updated customer phone number for account #12345', 34, '2023-08-10 14:05:50',
'Customer'),
-- IT Support Actions
(24, 'Performed system backup for Q3 2023', 35, '2023-10-15 20:00:00', 'AuditLog'),
(25, 'Restored customer database from backup', 35, '2023-11-20 22:10:05', 'Customer');
SET IDENTITY_INSERT AuditLog OFF;
```

```
/*============================================================
||                   REPORT GENERATION                      ||
============================================================*/

/*-----------------------------------------------
-- Adding data to Report table
-----------------------------------------------*/
SET IDENTITY_INSERT Report ON;
INSERT INTO Report (ReportID, ReportName, GeneratedBy, GeneratedDate, ReportType,
ReportData)
VALUES
-- Daily Sales Reports
(1, 'Daily Sales Report - 2023-09-15', 9, '2023-09-15 20:10:00', 'Daily', '{TotalSales:
456700, Transactions: 158}'),
(2, 'Daily Sales Report - 2023-09-16', 10, '2023-09-16 20:10:00', 'Daily', '{TotalSales:
512300, Transactions: 172}'),
(3, 'Daily Sales Report - 2023-09-17', 9, '2023-09-17 20:10:00', 'Daily', '{TotalSales:
478200, Transactions: 164}'),
-- Monthly Sales Summary
(4, 'Monthly Sales Summary - August 2023', 12, '2023-09-01 09:15:00', 'Monthly',
'{TotalSales: 14567000, TotalTransactions: 4520, TopProduct: "Ceylon Tea 500g"}'),
(5, 'Monthly Sales Summary - September 2023', 12, '2023-10-01 09:15:00', 'Monthly',
'{TotalSales: 15784000, TotalTransactions: 4805, TopProduct: "Rice 10kg"}'),
-- Stock and Inventory Reports
(6, 'Low Stock Alert - September 2023', 7, '2023-09-20 14:30:00', 'Monthly', '{Products:
["Milk Powder", "Sugar", "Flour"]}'),
(7, 'Stock Reorder Summary - October 2023', 8, '2023-10-05 14:30:00', 'Monthly',
'{Products: ["Rice 5kg", "Coconut Oil"]}'),
-- Customer Reports
(8, 'New Customer Registrations - September 2023', 33, '2023-09-30 16:00:00', 'Monthly',
'{TotalCustomers: 325, NewCustomers: 115}'),
(9, 'Inactive Customers Report - Q3 2023', 34, '2023-10-05 16:30:00', 'Quarterly',
'{InactiveCustomers: 45}'),
-- Financial Reports
(10, 'Profit & Loss Statement - August 2023', 11, '2023-09-01 12:45:00', 'Monthly',
'{Revenue: 15784000, Expenses: 10230000, NetProfit: 5554000}'),
(11, 'Tax Summary Report - Q3 2023', 12, '2023-10-10 13:00:00', 'Quarterly', '{VAT:
2045000, OtherTaxes: 150000}'),
-- Employee Performance Reports
(12, 'Employee Performance - Sales Reps Q3 2023', 5, '2023-10-12 10:45:00', 'Quarterly',
'{TopEmployee: "Kasun Perera", TotalSales: 740500}'),
(13, 'Employee Attendance - September 2023', 6, '2023-09-30 17:00:00', 'Monthly',
'{TotalAbsences: 12, BestAttendance: "Tharindu Jayasinghe"}'),
-- Promotional Campaigns and Marketing
(14, 'Promotion Impact Report - Mid-Year Sale 2023', 10, '2023-08-10 15:15:00',
'Campaign', '{SalesBoost: "25%", TopSelling: "Ceylon Tea"}'),
(15, 'Festival Campaign Summary - Sinhala New Year 2023', 10, '2023-04-20 16:00:00',
'Campaign', '{TotalSales: 9500000, TopCategory: "Food & Beverages"}'),
```

```
-- Supplier and Delivery Performance Reports
(16, 'Supplier Performance - Q3 2023', 8, '2023-10-15 14:30:00', 'Quarterly',
'{TopSupplier: "Lanka Spices Ltd.", DeliverySuccessRate: "98%"}'),
(17, 'Delivery Timeliness Report - September 2023', 11, '2023-09-30 16:00:00', 'Monthly',
'{OnTimeDeliveries: 350, LateDeliveries: 15}'),
-- System Logs and Security
(18, 'System Audit Log Summary - Q3 2023', 35, '2023-10-01 12:00:00', 'Quarterly',
'{CriticalActions: 18, SystemErrors: 5}'),
(19, 'System Backup Report - October 2023', 35, '2023-10-31 21:30:00', 'Monthly',
'{BackupStatus: "Successful", BackupSize: "120GB"}'),
-- Business Development Reports
(20, 'Store Expansion Plan - 2024', 1, '2023-11-01 10:30:00', 'Planning', '{NewStores:
["Galle", "Kandy", "Jaffna"]}'),
(21, 'Market Trend Analysis - Q3 2023', 10, '2023-10-25 14:15:00', 'Analysis', '{Trend:
"Organic Food Demand Increase"}'),
-- Custom Reports
(22, 'Top Selling Products Report - Q3 2023', 9, '2023-10-10 11:00:00', 'Custom',
'{Products: ["Rice 10kg", "Milk Powder", "Ceylon Tea 500g"]}'),
(23, 'Year-End Sales Forecast - 2023', 1, '2023-11-30 10:00:00', 'Forecast',
'{ExpectedSales: 62000000, KeySeasons: ["Christmas", "New Year"]}'),
(24, 'Supplier Cost Summary - October 2023', 11, '2023-11-01 13:15:00', 'Monthly',
'{TotalCost: 8400000, KeySuppliers: ["Lanka Spices Ltd."]}'),
(25, 'Customer Loyalty Program Impact - 2023', 34, '2023-12-01 15:45:00', 'Analysis',
'{TotalMembers: 1250, ActiveMembers: 850}');
SET IDENTITY_INSERT Report OFF;




/*============================================================
||              PRODUCT AND STOCK MANAGEMENT                ||
============================================================*/

/*-----------------------------------------------
-- Adding data to Category table
-----------------------------------------------*/
SET IDENTITY_INSERT Category ON;
INSERT INTO Category (CategoryID, CategoryName)
VALUES
(1, 'Dairy'),
(2, 'Tea'),
(3, 'Staples'),
(4, 'Snacks'),
(5, 'Frozen Food'),
(6, 'Condiments'),
(7, 'Household'),
(8, 'Beverages'),
(9, 'Personal Care'),
(10, 'Baby Care'),
(11, 'Pet Supplies'),
```

```
(12, 'Health & Wellness'),
(13, 'Bakery'),
(14, 'Breakfast Items'),
(15, 'Canned Goods'),
(16, 'Fresh Produce'),
(17, 'Meat & Seafood'),
(18, 'Spices'),
(19, 'Cleaning Supplies'),
(20, 'Electronics');
SET IDENTITY_INSERT Category OFF;


/*-----------------------------------------------
-- Adding data to Brand table
-----------------------------------------------*/
SET IDENTITY_INSERT Brand ON;
INSERT INTO Brand (BrandID, BrandName)
VALUES
(1, 'Nestlé'),
(2, 'Dilmah'),
(3, 'Prima'),
(4, 'Mlesna'),
(5, 'Maliban'),
(6, 'Keells'),
(7, 'Anchor'),
(8, 'Kist'),
(9, 'Sunlight'),
(10, 'LUX'),
(11, 'CIC'),
(12, 'Harpic'),
(13, 'Lanka Soy'),
(14, 'Elephant House'),
(15, 'Coca-Cola'),
(16, 'Munchee'),
(17, 'Ritzbury'),
(18, 'Dettol'),
(19, 'Kotmale'),
(20, 'Fonterra'),
(21, 'Elephant House Ice Cream'),
(22, 'Hela Bōjun'),
(23, 'Perera & Sons'),
(24, 'Hemas'),
(25, 'Pears'),
(26, 'Gold Leaf'),
(27, 'MD'),
(28, 'Maggi'),
(29, 'Samaposha'),
(30, 'Araliya'),
(31, 'Renuka'),
(32, 'Malwatta'),
(33, 'Ruhunu Foods'),
(34, 'Singer'),
```

```
(35, 'Milo'),
(36, 'Highland'),
(37, 'Harischandra'),
(38, 'Seven Seas'),
(39, 'Unilever');
SET IDENTITY_INSERT Brand OFF;


/*-----------------------------------------------
-- Adding data to TaxRate table
-----------------------------------------------*/
SET IDENTITY_INSERT TaxRate ON;
INSERT INTO TaxRate (TaxRateID, TaxRate)
VALUES
(1, 8.0),
(2, 12.0),
(3, 15.0),
(4, 5.0),
(5, 18.0),
(6, 22.0),
(7, 10.0),
(8, 20.0),
(9, 25.0),
(10, 30.0),
(11, 0.0),
(12, 7.5),
(13, 14.5),
(14, 17.0),
(15, 6.0),
(16, 9.0),
(17, 11.0),
(18, 19.0),
(19, 16.0),
(20, 13.0);
SET IDENTITY_INSERT TaxRate OFF;


/*-----------------------------------------------
-- Adding data to Product table
-----------------------------------------------*/
SET IDENTITY_INSERT Product ON;
INSERT INTO Product (ProductID, ProductName, CategoryID, BrandID, UnitPrice, TaxRateID,
ReorderLevel, IsActive)
VALUES
-- Dairy Products
(1, 'Anchor Full Cream Milk Powder', 1, 7, 1000.00, 3, 50, 1),
(2, 'Kotmale Fresh Milk 1L', 1, 19, 240.00, 1, 30, 1),
(3, 'Highland Butter 200g', 1, 37, 950.00, 3, 20, 1),
-- Tea
(4, 'Dilmah Premium Tea 200g', 2, 2, 750.00, 2, 40, 1),
(5, 'Mlesna Black Tea 100g', 2, 4, 600.00, 2, 25, 1),
(6, 'Gold Leaf Tea 400g', 2, 26, 850.00, 3, 50, 1),
```

```
-- Staples
(7, 'Prima Wheat Flour 1kg', 3, 3, 180.00, 1, 100, 1),
(8, 'Ruhunu Red Rice 5kg', 3, 34, 1500.00, 2, 50, 1),
(9, 'CIC Basmati Rice 1kg', 3, 11, 1100.00, 2, 30, 1),
-- Snacks
(10, 'Munchee Marie Biscuits 400g', 4, 16, 240.00, 2, 70, 1),
(11, 'Ritzbury Chocolate Fingers 200g', 4, 17, 380.00, 3, 40, 1),
(12, 'Maliban Lemon Puff 300g', 4, 5, 300.00, 2, 60, 1),
-- Frozen Food
(13, 'Elephant House Chicken Sausages 1kg', 5, 14, 1500.00, 3, 20, 1),
(14, 'Keells Chicken Drumsticks 1kg', 5, 6, 1200.00, 3, 25, 1),
(15, 'Kotmale Ice Cream Vanilla 1L', 5, 19, 800.00, 3, 15, 1),
-- Condiments
(16, 'MD Mango Chutney 250g', 6, 27, 500.00, 2, 40, 1),
(17, 'Kist Tomato Sauce 750ml', 6, 8, 450.00, 2, 50, 1),
(18, 'Maggi Coconut Milk Powder 300g', 6, 28, 600.00, 2, 35, 1),
-- Household
(19, 'Sunlight Detergent Powder 2kg', 7, 9, 1500.00, 3, 20, 1),
(20, 'Harpic Toilet Cleaner 500ml', 7, 12, 550.00, 2, 25, 1),
(21, 'Dettol Antibacterial Soap 100g', 7, 18, 150.00, 2, 60, 1),
-- Beverages
(22, 'Coca-Cola Bottle 1.5L', 8, 15, 300.00, 2, 100, 1),
(23, 'Elephant House Cream Soda Can 330ml', 8, 14, 120.00, 2, 150, 1),
(24, 'Nestlé Milo 400g', 8, 35, 800.00, 3, 30, 1),
-- Personal Care
(25, 'LUX Body Wash 250ml', 9, 10, 450.00, 2, 20, 1),
(26, 'Pears Baby Lotion 200ml', 9, 25, 550.00, 2, 15, 1),
(27, 'Hemas Velvet Soap 100g', 9, 24, 100.00, 1, 50, 1);
SET IDENTITY_INSERT Product OFF;


/*-----------------------------------------------
-- Adding data to Warehouse table
-----------------------------------------------*/
SET IDENTITY_INSERT Warehouse ON;
INSERT INTO Warehouse (WarehouseID, WarehouseName, Location, ManagerID)
VALUES
(1, 'Central Warehouse', 'Colombo', 13),
(2, 'Kandy Distribution Center', 'Kandy', 14),
(3, 'Southern Storage', 'Galle', 15),
(4, 'Northern Depot', 'Jaffna', 16),
(5, 'Eastern Hub', 'Trincomalee', 17),
(6, 'Western Storage', 'Negombo', 18),
(7, 'Hill Country Depot', 'Nuwara Eliya', 19),
(8, 'North Western Facility', 'Kurunegala', 20),
(9, 'Uva Warehouse', 'Badulla', 21),
(10, 'Sabaragamuwa Depot', 'Ratnapura', 22),
(11, 'Eastern Highlands Center', 'Ampara', 23),
(12, 'Coastal Hub', 'Matara', 24),
(13, 'Dry Zone Depot', 'Anuradhapura', 25),
(14, 'Urban Storage', 'Batticaloa', 26),
(15, 'Central Highlands Depot', 'Hatton', 27),
```

```
(16, 'Industrial Hub', 'Kalutara', 28),
(17, 'Administrative Warehouse', 'Chilaw', 29),
(18, 'Port Storage', 'Hambantota', 30),
(19, 'Heritage Hub', 'Polonnaruwa', 31),
(20, 'Frontier Depot', 'Monaragala', 32);
SET IDENTITY_INSERT Warehouse OFF;


/*-----------------------------------------------
-- Adding data to Stock table
-----------------------------------------------*/
SET IDENTITY_INSERT Stock ON;
INSERT INTO Stock (StockID, ProductID, WarehouseID, QuantityAvailable, LastRestockedDate)
VALUES
(1, 1, 1, 500, '2024-12-01'),
(2, 2, 2, 300, '2024-12-02'),
(3, 3, 3, 200, '2024-12-03'),
(4, 4, 4, 600, '2024-12-04'),
(5, 5, 5, 450, '2024-12-05'),
(6, 6, 6, 700, '2024-12-06'),
(7, 7, 7, 800, '2024-12-01'),
(8, 8, 8, 400, '2024-12-02'),
(9, 9, 9, 350, '2024-12-03'),
(10, 10, 10, 500, '2024-12-04'),
(11, 11, 11, 550, '2024-12-05'),
(12, 12, 12, 250, '2024-12-06'),
(13, 13, 13, 600, '2024-12-01'),
(14, 14, 14, 300, '2024-12-02'),
(15, 15, 15, 450, '2024-12-03'),
(16, 16, 16, 700, '2024-12-04'),
(17, 17, 17, 500, '2024-12-05'),
(18, 18, 18, 350, '2024-12-06'),
(19, 19, 19, 400, '2024-12-01'),
(20, 20, 20, 600, '2024-12-02');
SET IDENTITY_INSERT Stock OFF;




/*============================================================
||                   DISCOUNT MANAGEMENT                   ||
============================================================*/

/*-----------------------------------------------
-- Adding data to Discount table
-----------------------------------------------*/
SET IDENTITY_INSERT Discount ON;
INSERT INTO Discount (DiscountID, DiscountName, StartDate, EndDate, DiscountPercentage,
DiscountType)
VALUES
```

```
(1, 'Avurudu Sale 2024', '2024-04-01', '2024-04-14', 15.00, 'Seasonal'),
(2, 'Vesak Poya Special', '2024-05-21', '2024-05-25', 10.00, 'Religious'),
(3, 'Sinhala Tamil New Year Bonanza', '2024-04-10', '2024-04-20', 20.00, 'Seasonal'),
(4, 'Back to School Offer', '2024-01-05', '2024-01-15', 12.50, 'Event'),
(5, 'Weekend Super Saver', '2024-06-01', '2024-06-02', 5.00, 'Weekend'),
(6, 'Independence Day Promo', '2024-02-01', '2024-02-07', 10.00, 'National Holiday'),
(7, 'Ramadan Festival Discount', '2024-03-11', '2024-03-30', 8.00, 'Religious'),
(8, 'Christmas Mega Sale', '2024-12-15', '2024-12-25', 25.00, 'Seasonal'),
(9, 'Black Friday Deals', '2024-11-29', '2024-11-30', 30.00, 'Event'),
(10, 'Poya Day Essentials Discount', '2024-06-21', '2024-06-21', 5.00, 'Religious'),
(11, 'Maha Shivaratri Offer', '2024-02-20', '2024-02-21', 12.00, 'Religious'),
(12, 'Mother's Day Special', '2024-05-11', '2024-05-12', 15.00, 'Event'),
(13, 'Father's Day Promotion', '2024-06-15', '2024-06-16', 15.00, 'Event'),
(14, 'Govi Sathiya Discounts', '2024-09-01', '2024-09-07', 10.00, 'Agricultural'),
(15, 'Back to Office Sale', '2024-07-01', '2024-07-10', 7.50, 'Event'),
(16, 'Deepavali Celebrations', '2024-10-15', '2024-10-25', 12.00, 'Religious'),
(17, 'End of Season Clearance', '2024-08-25', '2024-08-31', 20.00, 'Clearance'),
(18, 'School Holiday Snacks Promo', '2024-08-01', '2024-08-10', 5.00, 'Event'),
(19, 'Kandy Esala Perahera Special', '2024-07-20', '2024-07-30', 8.50, 'Cultural'),
(20, 'Poson Poya Discount', '2024-06-20', '2024-06-22', 10.00, 'Religious'),
(21, 'Pre-Avurudu Stock Clearance', '2024-03-25', '2024-03-31', 18.00, 'Clearance'),
(22, 'Valentine's Day Promo', '2024-02-12', '2024-02-14', 20.00, 'Event'),
(23, 'New Year Kickoff Sale', '2024-01-01', '2024-01-05', 10.00, 'Event'),
(24, 'Thrift Thursday Offer', '2024-06-13', '2024-06-13', 5.00, 'Weekly'),
(25, 'Budget Sunday Promo', '2024-06-16', '2024-06-16', 6.00, 'Weekly');
SET IDENTITY_INSERT Discount OFF;


/*-----------------------------------------------
-- Adding data to ProductDiscount table
-----------------------------------------------*/
SET IDENTITY_INSERT ProductDiscount ON;
INSERT INTO ProductDiscount (ProductDiscountID, ProductID, DiscountID)
VALUES
-- Avurudu Sale 2024
(1, 1, 1),  -- Anchor Full Cream Milk Powder
(2, 8, 1),  -- Ruhunu Red Rice 5kg
(3, 12, 1), -- Maliban Lemon Puff 300g
(4, 7, 1),  -- Prima Wheat Flour 1kg
-- Vesak Poya Special
(5, 2, 2),  -- Kotmale Fresh Milk 1L
(6, 21, 2), -- Dettol Antibacterial Soap 100g
-- Back to School Offer
(7, 10, 4), -- Munchee Marie Biscuits 400g
(8, 11, 4), -- Ritzbury Chocolate Fingers 200g
(9, 26, 4), -- Pears Baby Lotion 200ml
-- Independence Day Promo
(10, 4, 6), -- Dilmah Premium Tea 200g
(11, 24, 6), -- Nestlé Milo 400g
-- Ramadan Festival Discount
(12, 9, 7), -- CIC Basmati Rice 1kg
(13, 18, 7), -- Maggi Coconut Milk Powder 300g
```

```sql
-- Christmas Mega Sale
(14, 13, 8), -- Elephant House Chicken Sausages 1kg
(15, 14, 8), -- Keells Chicken Drumsticks 1kg
(16, 3, 8),  -- Highland Butter 200g
(17, 27, 8), -- Hemas Velvet Soap 100g
-- Black Friday Deals
(18, 5, 9),  -- Mlesna Black Tea 100g
(19, 6, 9),  -- Gold Leaf Tea 400g
(20, 20, 9), -- Harpic Toilet Cleaner 500ml
-- Poya Day Essentials Discount
(21, 15, 10), -- Kotmale Ice Cream Vanilla 1L
(22, 19, 10), -- Sunlight Detergent Powder 2kg
-- End of Season Clearance
(23, 22, 17), -- Coca-Cola Bottle 1.5L
(24, 23, 17), -- Elephant House Cream Soda Can 330ml
(25, 17, 17); -- Kist Tomato Sauce 750ml
SET IDENTITY_INSERT ProductDiscount OFF;




/*============================================================
||                   SALES MANAGEMENT                       ||
============================================================*/

/*-----------------------------------------------
-- Adding data to PaymentMethod table
-----------------------------------------------*/
SET IDENTITY_INSERT PaymentMethod ON;
INSERT INTO PaymentMethod (PaymentMethodID, PaymentType)
VALUES
(1, 'Cash'),
(2, 'Debit Card - Commercial Bank'),
(3, 'Debit Card - HNB'),
(4, 'Credit Card - BOC'),
(5, 'Credit Card - Sampath Bank'),
(6, 'Mobile Payment - FriMi'),
(7, 'Mobile Payment - eZ Cash'),
(8, 'Mobile Payment - mCash'),
(9, 'Bank Transfer - NDB'),
(10, 'Bank Transfer - NSB Bank'),
(11, 'QR Payment - LankaQR');
SET IDENTITY_INSERT PaymentMethod OFF;


/*-----------------------------------------------
-- Adding data to SalesTransaction table
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransaction ON;
```

```sql
INSERT INTO SalesTransaction (TransactionID, CustomerID, TransactionDate, PaymentMethodID,
TotalAmount, DiscountApplied, FinalAmount)
VALUES
(1, 1, '2024-01-01 10:15:00', 1, 1500.00, 100.00, 1400.00),
(2, 2, '2024-01-02 15:45:00', 2, 2500.00, 150.00, 2350.00),
(3, 3, '2024-01-03 12:30:00', 3, 4500.00, 200.00, 4300.00),
(4, 4, '2024-01-04 17:50:00', 6, 3200.00, 100.00, 3100.00),
(5, 5, '2024-01-05 09:40:00', 7, 1800.00, 50.00, 1750.00),
(6, 6, '2024-01-06 14:20:00', 4, 3700.00, 200.00, 3500.00),
(7, 7, '2024-01-07 11:00:00', 5, 5000.00, 300.00, 4700.00),
(8, 8, '2024-01-08 16:10:00', 8, 2200.00, 0.00, 2200.00),
(9, 9, '2024-01-09 13:25:00', 9, 6000.00, 500.00, 5500.00),
(10, 10, '2024-01-10 10:00:00', 10, 1200.00, 0.00, 1200.00),
(11, 11, '2024-01-11 18:15:00', 11, 3400.00, 150.00, 3250.00),
(12, 12, '2024-01-12 09:20:00', 1, 2800.00, 100.00, 2700.00),
(13, 13, '2024-01-13 14:35:00', 2, 1900.00, 50.00, 1850.00),
(14, 14, '2024-01-14 11:45:00', 3, 3100.00, 100.00, 3000.00),
(15, 15, '2024-01-15 16:00:00', 6, 4700.00, 200.00, 4500.00),
(16, 16, '2024-01-16 10:50:00', 7, 2100.00, 50.00, 2050.00),
(17, 17, '2024-01-17 13:10:00', 5, 4300.00, 300.00, 4000.00),
(18, 18, '2024-01-18 15:25:00', 4, 3800.00, 150.00, 3650.00),
(19, 19, '2024-01-19 17:00:00', 9, 5200.00, 300.00, 4900.00),
(20, 20, '2024-01-20 12:00:00', 10, 2500.00, 100.00, 2400.00);
SET IDENTITY_INSERT SalesTransaction OFF;


/*-----------------------------------------------
-- Adding data to SalesTransactionDetail table
-----------------------------------------------*/
SET IDENTITY_INSERT SalesTransactionDetail ON;
INSERT INTO SalesTransactionDetail (TransactionDetailID, TransactionID, ProductID,
Quantity, UnitPrice, LineTotal)
VALUES
-- Transaction 1
(1, 1, 7, 3, 180.00, 540.00),
(2, 1, 10, 4, 240.00, 960.00),
-- Transaction 2
(3, 2, 2, 5, 240.00, 1200.00),
(4, 2, 21, 2, 150.00, 300.00),
(5, 2, 6, 1, 850.00, 850.00),
-- Transaction 3
(6, 3, 19, 2, 1500.00, 3000.00),
(7, 3, 12, 2, 300.00, 600.00),
(8, 3, 3, 1, 950.00, 950.00),
-- Transaction 4
(9, 4, 5, 2, 600.00, 1200.00),
(10, 4, 8, 1, 1500.00, 1500.00),
(11, 4, 25, 1, 450.00, 450.00),
-- Transaction 5
(12, 5, 1, 1, 1000.00, 1000.00),
(13, 5, 24, 1, 800.00, 800.00),
-- Transaction 6
```

```
(14, 6, 15, 2, 800.00, 1600.00),
(15, 6, 17, 2, 450.00, 900.00),
(16, 6, 13, 1, 1500.00, 1500.00),
-- Transaction 7
(17, 7, 11, 3, 380.00, 1140.00),
(18, 7, 9, 2, 1100.00, 2200.00),
(19, 7, 20, 1, 550.00, 550.00),
-- Transaction 8
(20, 8, 14, 2, 1200.00, 2400.00),
-- Transaction 9
(21, 9, 4, 2, 750.00, 1500.00),
(22, 9, 18, 3, 600.00, 1800.00),
(23, 9, 22, 2, 300.00, 600.00),
-- Transaction 10
(24, 10, 16, 1, 500.00, 500.00),
(25, 10, 27, 7, 100.00, 700.00);
SET IDENTITY_INSERT SalesTransactionDetail OFF;
```

```
/*============================================================

||                        Functions                         ||
============================================================*/

-- ========================================
-- Function Name: dbo.fn_CalculateTotalSales
-- Description: Calculates the total amount spent by a customer on all transactions
-- Inputs:
--  @CustomerID (INT) - The ID of the customer
-- Returns:
--  DECIMAL - The total amount spent by the customer
-- ========================================

CREATE FUNCTION dbo.fn_CalculateTotalSales (@CustomerID INT)
RETURNS DECIMAL(10, 2)
AS
BEGIN
    DECLARE @TotalSales DECIMAL(10, 2);

    -- Calculate the total sales for the customer by summing the FinalAmount from
SalesTransaction
    SELECT @TotalSales = SUM(T.FinalAmount)
    FROM SalesTransaction T
    WHERE T.CustomerID = @CustomerID;

    -- Return the result
    RETURN ISNULL(@TotalSales, 0);  -- Return 0 if no sales are found
END



-- ========================================
-- Function Name: dbo.fn_CalculateProductSales
-- Description: Calculates the total sales for a given product
-- Inputs:
--  @ProductID (INT) - The ID of the product
-- Returns:
--  DECIMAL - The total sales for the product
-- ========================================

CREATE FUNCTION dbo.fn_CalculateProductSales (@ProductID INT)
RETURNS DECIMAL(10, 2)
AS
BEGIN
    DECLARE @TotalSales DECIMAL(10, 2);

    -- Calculate the total sales for the product by summing the LineTotal from
SalesTransactionDetail
    SELECT @TotalSales = SUM(D.LineTotal)
```

```
    FROM SalesTransactionDetail D
    WHERE D.ProductID = @ProductID;

    -- Return the result
    RETURN ISNULL(@TotalSales, 0);  -- Return 0 if no sales are found
END


-- ========================================
-- Function Name: dbo.fn_GetProductAvailability
-- Description: Returns the available quantity of a product in a specific warehouse
-- Inputs:
--  @ProductID (INT) - The ID of the product
--  @WarehouseID (INT) - The ID of the warehouse
-- Returns:
--  INT - The available quantity of the product in the warehouse
-- ========================================

CREATE FUNCTION dbo.fn_GetProductAvailability (@ProductID INT, @WarehouseID INT)
RETURNS INT
AS
BEGIN
    DECLARE @QuantityAvailable INT;

    -- Get the quantity of the product in the specified warehouse
    SELECT @QuantityAvailable = QuantityAvailable
    FROM Stock
    WHERE ProductID = @ProductID AND WarehouseID = @WarehouseID;

    -- Return the result
    RETURN ISNULL(@QuantityAvailable, 0);  -- Return 0 if the product is not found
END


-- ========================================
-- Function Name: dbo.fn_GetDiscountedPrice
-- Description: Calculates the price of a product after applying a discount
-- Inputs:
--  @ProductID (INT) - The ID of the product
--  @DiscountID (INT) - The ID of the discount to be applied
-- Returns:
--  DECIMAL - The discounted price of the product
-- ========================================

CREATE FUNCTION dbo.fn_GetDiscountedPrice (@ProductID INT, @DiscountID INT)
RETURNS DECIMAL(10, 2)
AS
BEGIN
    DECLARE @DiscountPercentage DECIMAL(5, 2);
    DECLARE @UnitPrice DECIMAL(10, 2);
    DECLARE @DiscountedPrice DECIMAL(10, 2);
```

```
    -- Get the unit price of the product
    SELECT @UnitPrice = UnitPrice
    FROM Product
    WHERE ProductID = @ProductID;

    -- Get the discount percentage for the given discount ID
    SELECT @DiscountPercentage = DiscountPercentage
    FROM Discount
    WHERE DiscountID = @DiscountID;

    -- Calculate the discounted price
    SET @DiscountedPrice = @UnitPrice - (@UnitPrice * @DiscountPercentage / 100);

    -- Return the discounted price
    RETURN @DiscountedPrice;
END


/*============================================================
||                        Views                             ||
============================================================*/

-- ========================================
-- View Name: vw_CustomerSalesSummary
-- Description: Summary view of total sales and transaction count for each customer
-- ========================================

CREATE VIEW vw_CustomerSalesSummary AS
SELECT
    C.CustomerID,
    C.FirstName + ' ' + C.LastName AS CustomerName,
    COUNT(T.TransactionID) AS TotalTransactions,
    SUM(T.FinalAmount) AS TotalSpent,
    MAX(T.TransactionDate) AS LastTransactionDate
FROM
    Customer C
    LEFT JOIN SalesTransaction T ON C.CustomerID = T.CustomerID
GROUP BY
    C.CustomerID, C.FirstName, C.LastName;


-- ========================================
-- View Name: vw_ProductSalesOverview
-- Description: Provides an overview of products with total sales and current stock
-- ========================================

CREATE VIEW vw_ProductSalesOverview AS
SELECT
    P.ProductID,
    P.ProductName,
    ISNULL(SUM(D.LineTotal), 0) AS TotalSales,
    ISNULL(S.QuantityAvailable, 0) AS StockAvailable
```

```sql
FROM
    Product P
    LEFT JOIN SalesTransactionDetail D ON P.ProductID = D.ProductID
    LEFT JOIN Stock S ON P.ProductID = S.ProductID
GROUP BY
    P.ProductID, P.ProductName, S.QuantityAvailable;



-- ========================================
-- View Name: vw_EmployeeRoleSummary
-- Description: Provides employee details along with their roles and contact info
-- ========================================

CREATE VIEW vw_EmployeeRoleSummary AS
SELECT
    E.EmployeeID,
    E.FirstName + ' ' + E.LastName AS EmployeeName,
    R.RoleName,
    E.Email,
    E.PhoneNumber,
    E.HireDate
FROM
    Employee E
    JOIN Role R ON E.RoleID = R.RoleID;



-- ========================================
-- View Name: vw_SalesTransactionDetails
-- Description: Provides details of each sales transaction, including product info
-- ========================================

CREATE VIEW vw_SalesTransactionDetails AS
SELECT
    T.TransactionID,
    C.FirstName + ' ' + C.LastName AS CustomerName,
    P.ProductName,
    D.Quantity,
    D.UnitPrice,
    D.LineTotal,
    T.TransactionDate
FROM
    SalesTransaction T
    JOIN Customer C ON T.CustomerID = C.CustomerID
    JOIN SalesTransactionDetail D ON T.TransactionID = D.TransactionID
    JOIN Product P ON D.ProductID = P.ProductID;
```

```
/*============================================================
||                        Procedure                         ||
============================================================*/

-- ========================================
-- Procedure Name: sp_InsertCustomer
-- Description: Inserts a new customer into the Customer table and logs the action in
AuditLog
-- Inputs:
--  @FirstName (NVARCHAR) - First name of the customer
--  @LastName (NVARCHAR) - Last name of the customer
--  @Email (NVARCHAR) - Email of the customer (must be unique)
--  @PhoneNumber (NVARCHAR) - Phone number of the customer (optional)
--  @AddressLine1, @AddressLine2, @City, @PostalCode - Customer address details (optional)
-- ========================================

CREATE PROCEDURE sp_InsertCustomer
    @FirstName NVARCHAR(100),
    @LastName NVARCHAR(100),
    @Email NVARCHAR(255),
    @PhoneNumber NVARCHAR(15) = NULL,
    @AddressLine1 NVARCHAR(255) = NULL,
    @AddressLine2 NVARCHAR(255) = NULL,
    @City NVARCHAR(100) = NULL,
    @PostalCode NVARCHAR(20) = NULL
AS
BEGIN
    -- Begin error handling block
    BEGIN TRY
        -- Insert new customer into the Customer table
        INSERT INTO Customer
            (FirstName, LastName, Email, PhoneNumber, AddressLine1, AddressLine2, City,
PostalCode, RegistrationDate)
        VALUES
            (@FirstName, @LastName, @Email, @PhoneNumber, @AddressLine1, @AddressLine2,
@City, @PostalCode, GETDATE());

        -- Get the CustomerID of the newly inserted record
        DECLARE @CustomerID INT = SCOPE_IDENTITY();

        -- Log the action in the AuditLog
        INSERT INTO AuditLog (Action, PerformedBy, ActionTimestamp, TableName)
        VALUES ('Insert New Customer', 1, GETDATE(), 'Customer'); -- Assuming PerformedBy
= 1 for now

        -- Print success message
        PRINT 'Customer inserted successfully with CustomerID = ' + CAST(@CustomerID AS
NVARCHAR(20));
    END TRY
    BEGIN CATCH
```

```
        -- Print error message
        PRINT 'Error: ' + ERROR_MESSAGE();
    END CATCH
END




-- ========================================
-- Procedure Name: sp_GenerateSalesReport
-- Description: Generate a sales report for a given date range
-- Inputs:
--  @StartDate (DATE) - The start date of the report
--  @EndDate (DATE) - The end date of the report
-- ========================================

CREATE PROCEDURE sp_GenerateSalesReport
    @StartDate DATE,
    @EndDate DATE
AS
BEGIN
    -- Begin error handling block
    BEGIN TRY
        -- Select all transactions that happened in the date range
        SELECT
            T.TransactionID,
            C.FirstName + ' ' + C.LastName AS CustomerName,
            T.TransactionDate,
            P.ProductName,
            D.Quantity,
            D.LineTotal
        FROM
            SalesTransaction T
            JOIN Customer C ON T.CustomerID = C.CustomerID
            JOIN SalesTransactionDetail D ON T.TransactionID = D.TransactionID
            JOIN Product P ON D.ProductID = P.ProductID
        WHERE
            T.TransactionDate BETWEEN @StartDate AND @EndDate;

        -- Log the report generation
        INSERT INTO AuditLog (Action, PerformedBy, ActionTimestamp, TableName)
        VALUES ('Generate Sales Report', 1, GETDATE(), 'SalesTransaction');
    END TRY
    BEGIN CATCH
        -- Print error message
        PRINT 'Error: ' + ERROR_MESSAGE();
    END CATCH
END


-- ========================================
-- Procedure Name: sp_AssignProductDiscount
```

```sql
-- Description: Assigns a discount to a product and ensures no duplicates
-- Inputs:
--  @ProductID (INT) - The ID of the product to which the discount will be assigned
--  @DiscountID (INT) - The ID of the discount to be applied
-- ========================================

CREATE PROCEDURE sp_AssignProductDiscount
    @ProductID INT,
    @DiscountID INT
AS
BEGIN
    -- Begin error handling block
    BEGIN TRY
        -- Check if this product-discount combination already exists
        IF NOT EXISTS (
            SELECT 1
            FROM ProductDiscount
            WHERE ProductID = @ProductID AND DiscountID = @DiscountID
        )
        BEGIN
            -- Insert a new product-discount association
            INSERT INTO ProductDiscount (ProductID, DiscountID)
            VALUES (@ProductID, @DiscountID);

            -- Print success message
            PRINT 'Product assigned to discount successfully.';
        END
        ELSE
        BEGIN
            -- Notify if the product-discount combo already exists
            PRINT 'Product is already assigned to this discount.';
        END
    END TRY
    BEGIN CATCH
        -- Print error message
        PRINT 'Error: ' + ERROR_MESSAGE();
    END CATCH
END

/*============================================================
||                      Triggers                            ||
============================================================*/

-- ========================================
-- Trigger Name: trg_UpdateStockAfterSale
-- Description: After a new sale, reduce the stock of the sold product
-- Trigger Fires: AFTER INSERT on SalesTransactionDetail
-- ========================================

CREATE TRIGGER trg_UpdateStockAfterSale
ON SalesTransactionDetail
AFTER INSERT
```

```sql
AS
BEGIN
    -- Turn off additional result sets for the trigger
    SET NOCOUNT ON;

    -- Reduce the stock quantity based on the product and quantity sold
    UPDATE S
    SET S.QuantityAvailable = S.QuantityAvailable - I.Quantity
    FROM Stock S
    INNER JOIN INSERTED I ON S.ProductID = I.ProductID
    WHERE S.WarehouseID = 1; -- Adjust WarehouseID as required

    -- Log the stock update action
    INSERT INTO AuditLog (Action, PerformedBy, ActionTimestamp, TableName)
    VALUES ('Stock Updated After Sale', 1, GETDATE(), 'Stock');
END


-- ========================================
-- Trigger Name: trg_ReorderNotification
-- Description: Triggers when stock is updated, logs an alert if quantity falls below
reorder level
-- Trigger Fires: AFTER UPDATE on Stock
-- ========================================

CREATE TRIGGER trg_ReorderNotification
ON Stock
AFTER UPDATE
AS
BEGIN
    -- Turn off additional result sets for the trigger
    SET NOCOUNT ON;

    -- Insert an alert into the AuditLog if stock is below reorder level
    INSERT INTO AuditLog (Action, PerformedBy, ActionTimestamp, TableName)
    SELECT
        'Reorder Alert: Stock Low for ProductID ' + CAST(I.ProductID AS NVARCHAR(10)),
        1,
        GETDATE(),
        'Stock'
    FROM INSERTED I
    JOIN Product P ON I.ProductID = P.ProductID
    WHERE I.QuantityAvailable < P.ReorderLevel;
END


-- ========================================
-- Trigger Name: trg_LogCustomerDeletion
-- Description: Logs the deletion of a customer in the AuditLog
-- Trigger Fires: AFTER DELETE on Customer
-- ========================================
```

```
CREATE TRIGGER trg_LogCustomerDeletion
ON Customer
AFTER DELETE
AS
BEGIN
    -- Turn off additional result sets for the trigger
    SET NOCOUNT ON;

    -- Insert log into AuditLog table
    INSERT INTO AuditLog (Action, PerformedBy, ActionTimestamp, TableName)
    SELECT
        'Deleted Customer: ' + D.FirstName + ' ' + D.LastName + ' (Email: ' + D.Email +
')',
        1, -- Assuming PerformedBy = 1 (can be adjusted based on user context)
        GETDATE(),
        'Customer'
    FROM DELETED D;
END
```

11.5 PROJECT LINKS

GITHUB REPOSITORY

Consists Of :

- Final Coursework Deliverables
    - Report
    - Database Backup
    - Presentation
- Report Sections
- SQL Code Sections
- Database Screenshots
- Application Screenshots
- Windows Application [C#]

Link : https://github.com/DilshanIBY/Supermarket-POS-System

GITHUB PROJECT

Consists Of :

- Task Assignees
- Sprint Workloads
- Tasks Completion states
- Product Backlog
- Teams
- Gantt Chat

Link : https://github.com/users/DilshanIBY/projects/6/views/1

CANVA PRESENTATION

Consists Of Each Member's :

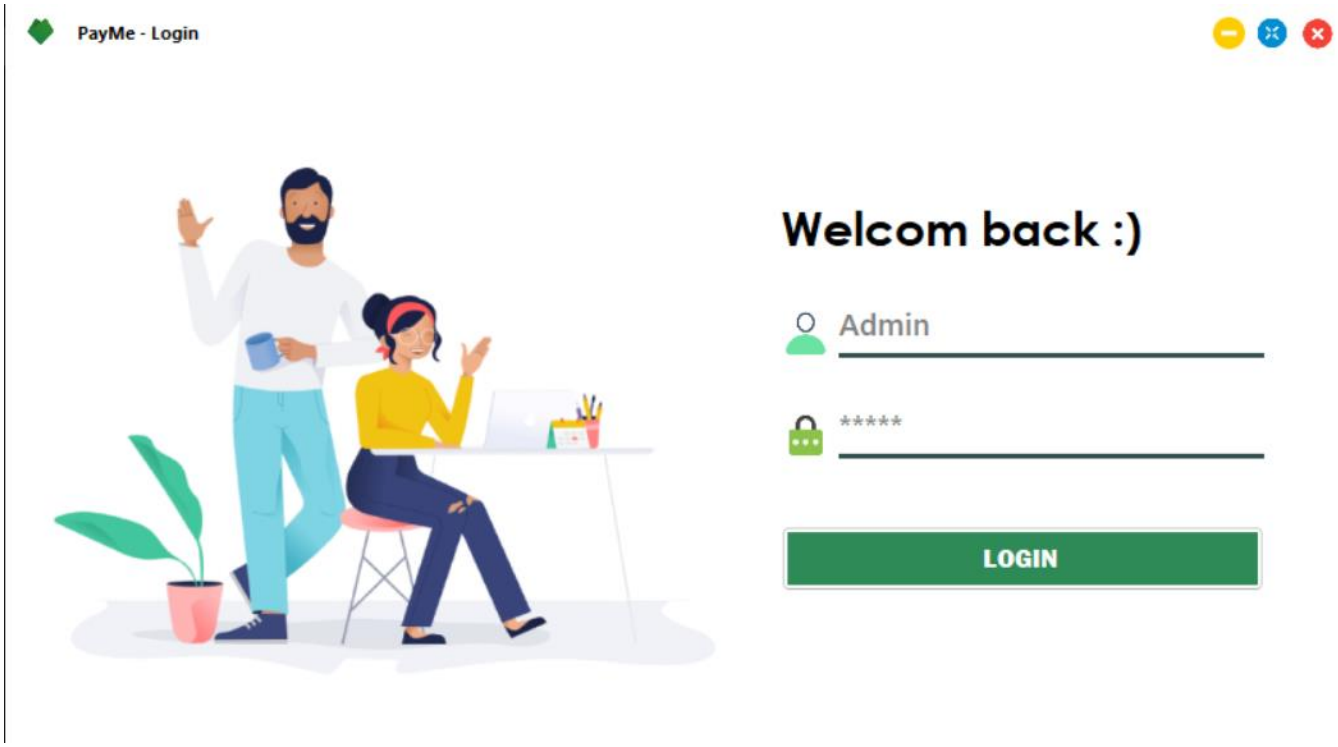
- Workload
- Contact details

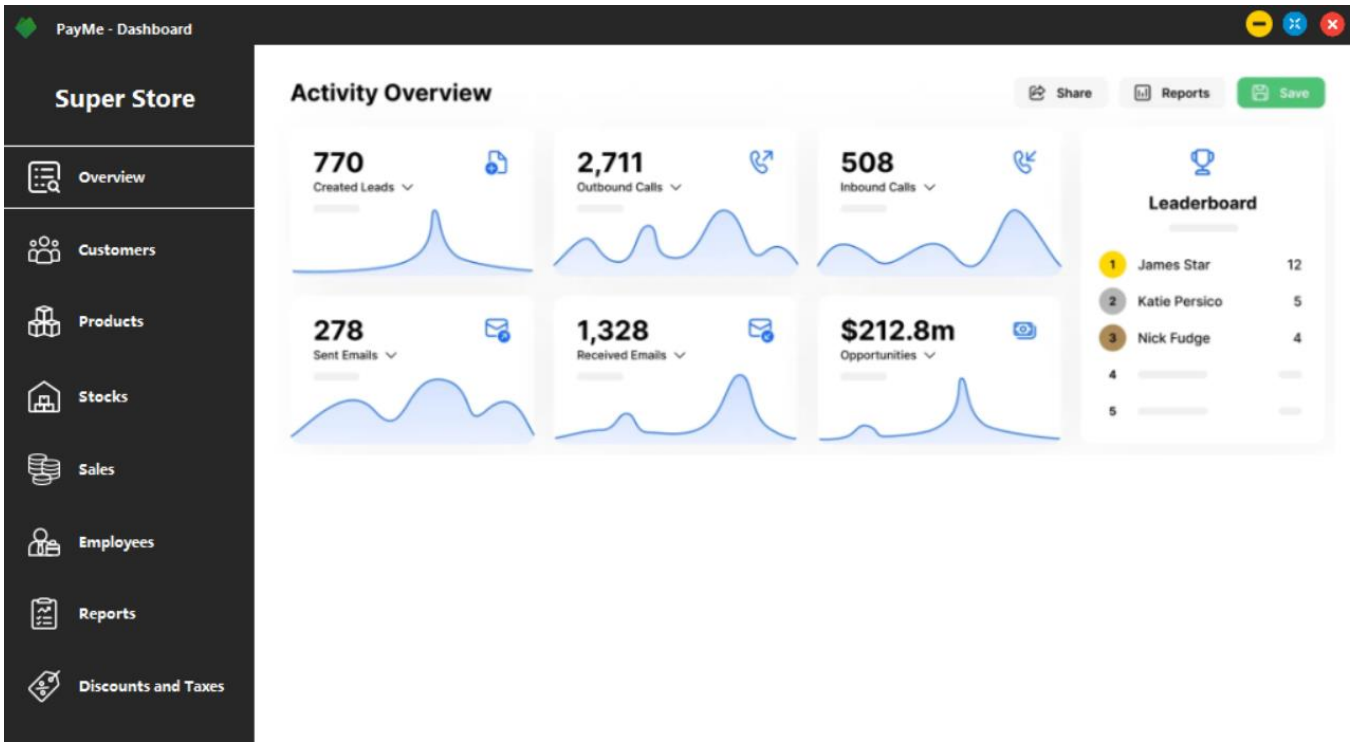
Link : https://www.canva.com/design/DAGaRxZBWyc/04gwCSZ7jRxjjoAvZ_7rVg/edit

12. SYSTEM SCREENSHOTS

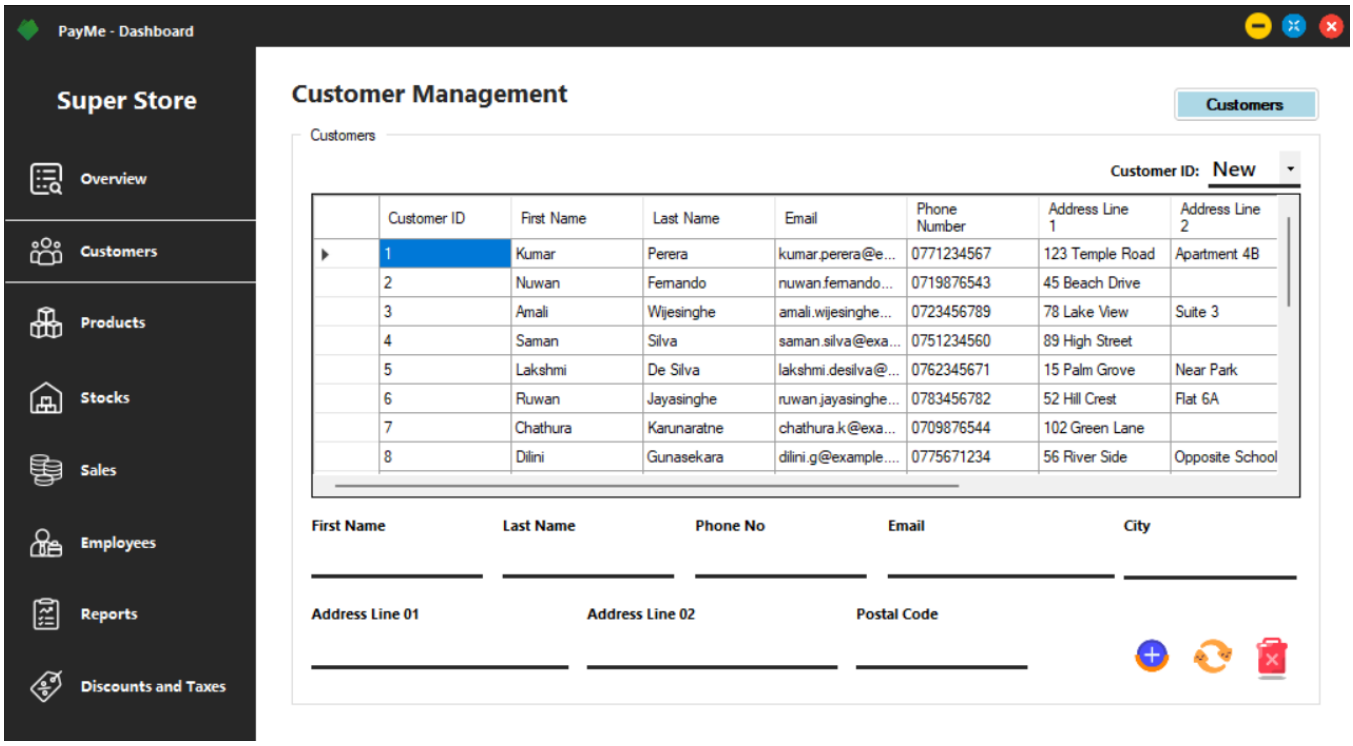
12.1 APPLICATION

12.1.1 OVERVIEW

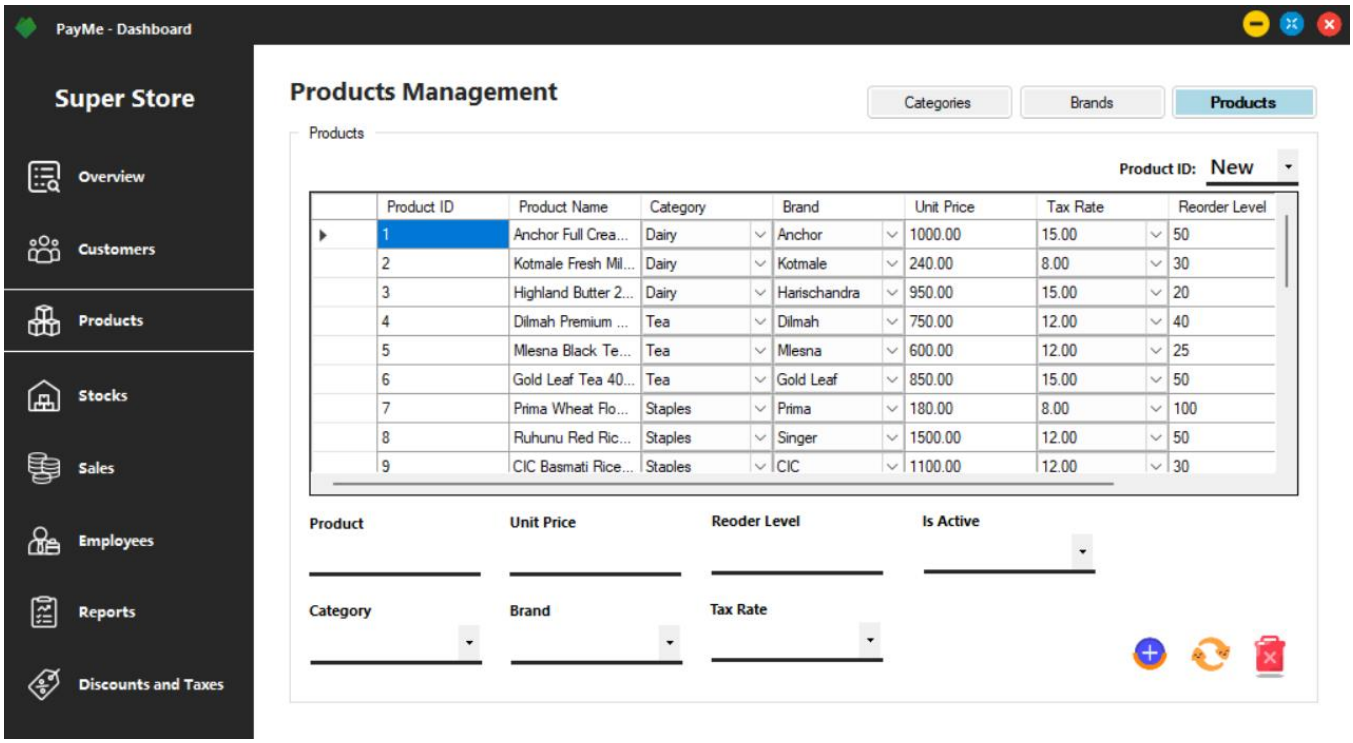

PayMe - Login
Welcom back :)
Admin
*****
LOGIN

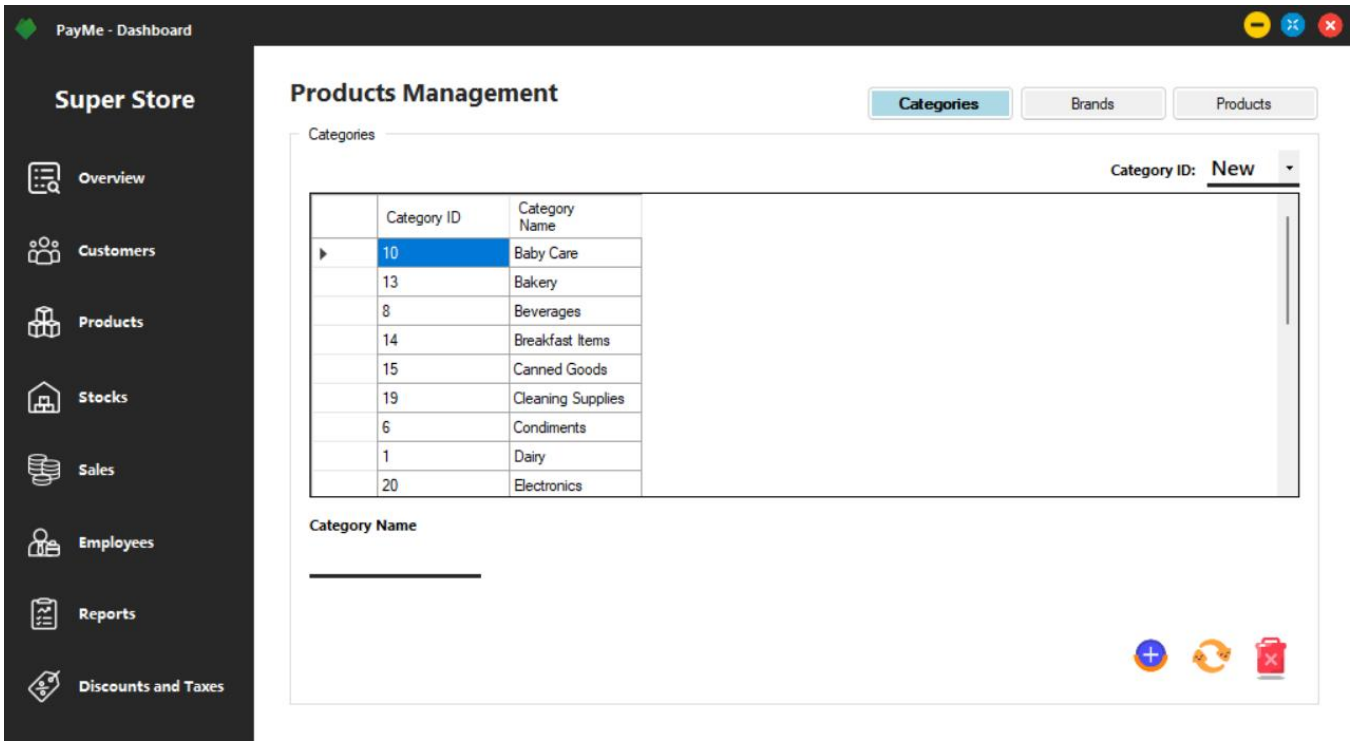

PayMe - Dashboard
Super Store
Overview
Customers
Products
Stocks
Sales
Employees
Reports
Discounts and Taxes
Activity Overview
Share
Reports
Save
770
Created Leads
2,711
Outbound Calls
508
Inbound Calls
278
Sent Emails
1,328
Received Emails
$212.8m
Opportunities
Leaderboard
1 James Star 12
2 Katie Persico 5
3 Nick Fudge 4
4
5

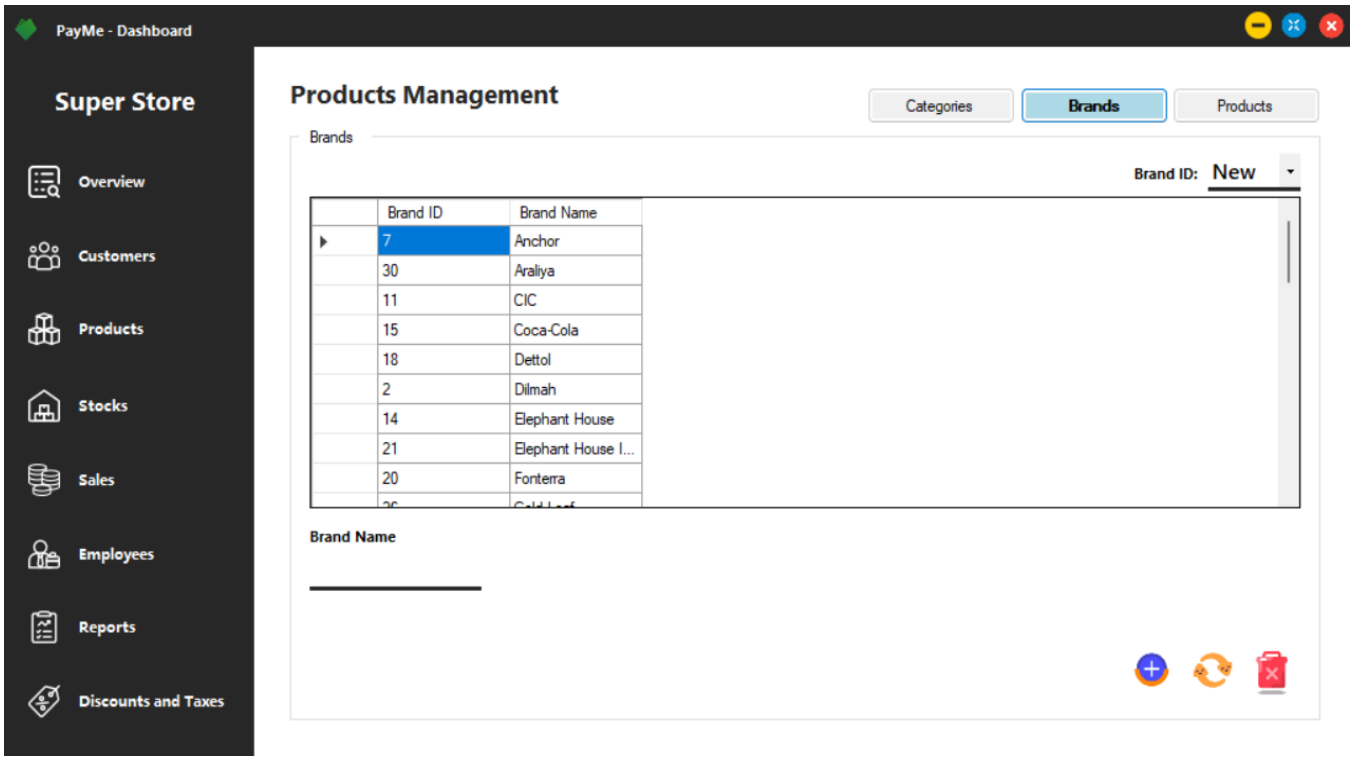
12.1.2. CUSTOMER MANAGEMENT



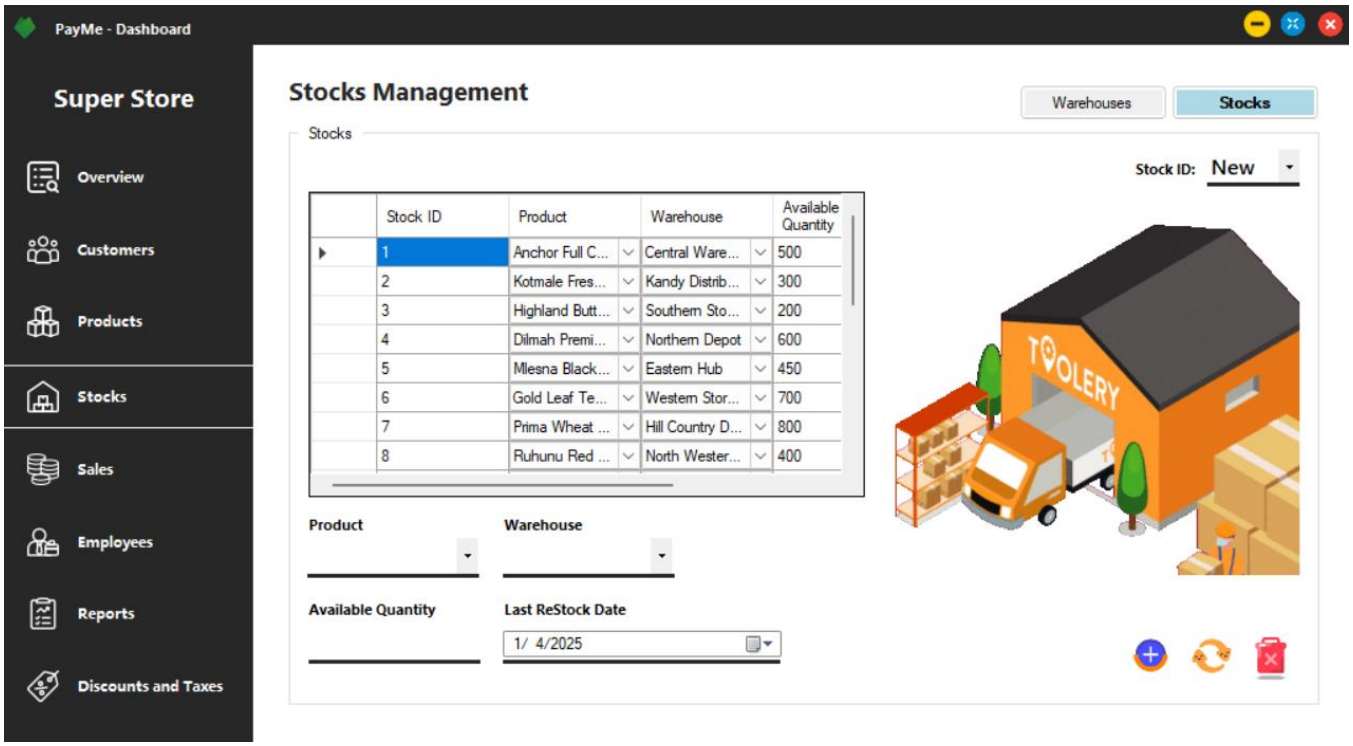
12.1.3. PRODUCT MANAGEMENT

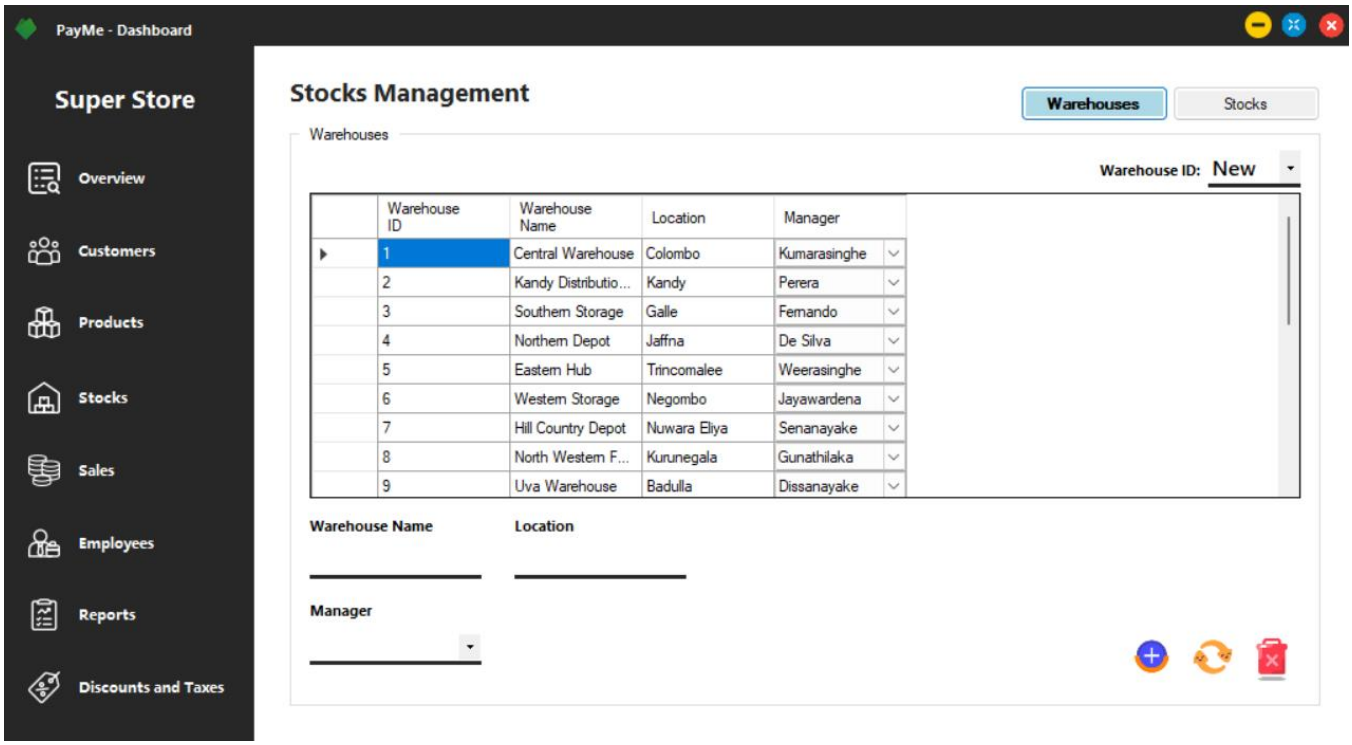



PayMe - Dashboard
Super Store
Overview
Customers
Products
Stocks
Sales
Employees
Reports
Discounts and Taxes
Products Management
Categories
Brands
Products
Categories
Category ID:
New
Category ID
Category Name
10
Baby Care
13
Bakery
8
Beverages
14
Breakfast Items
15
Canned Goods
19
Cleaning Supplies
6
Condiments
1
Dairy
20
Electronics
Category Name

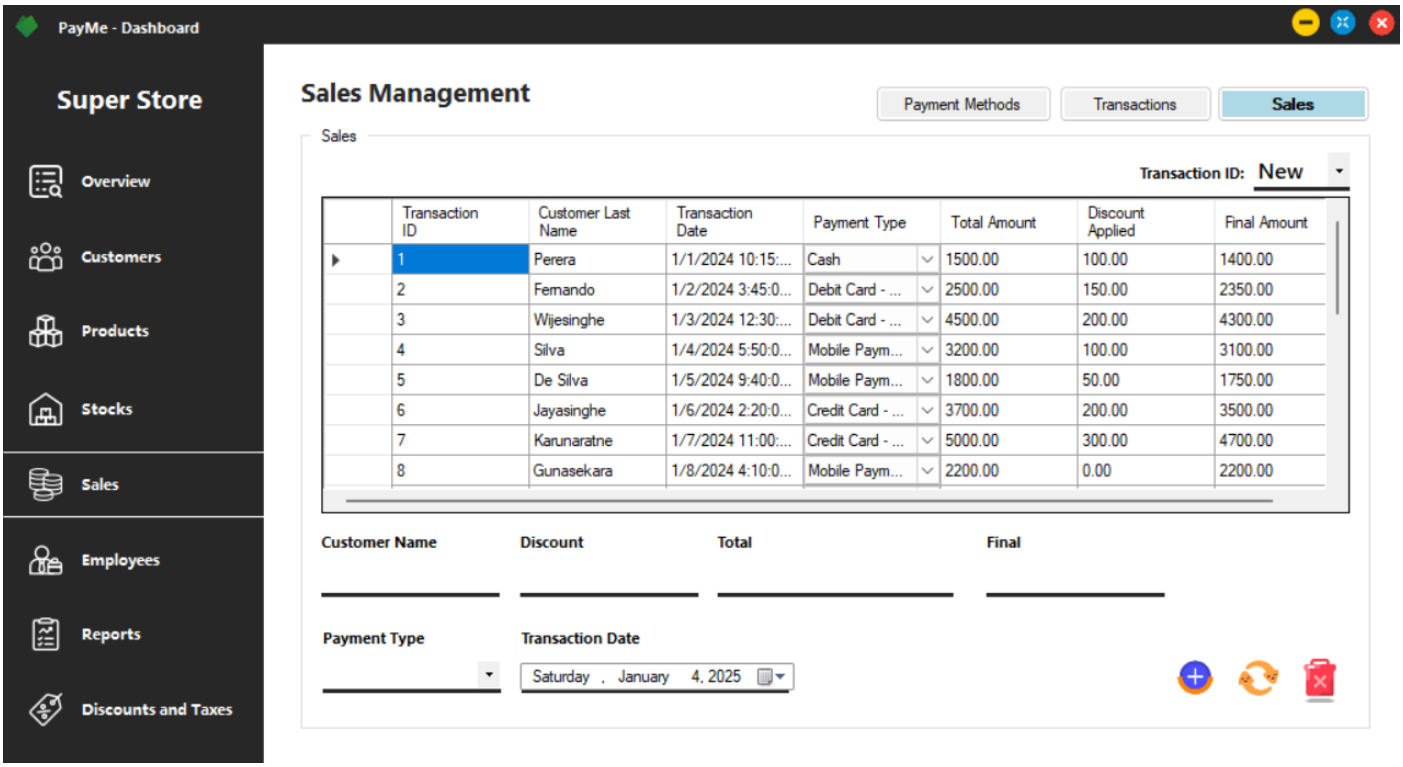

PayMe - Dashboard
Super Store
Overview
Customers
Products
Stocks
Sales
Employees
Reports
Discounts and Taxes
Products Management
Categories
Brands
Products
Brands
Brand ID:
New
Brand ID
Brand Name
7
Anchor
30
Araliya
11
CIC
15
Coca-Cola
18
Dettol
2
Dilmah
14
Elephant House
21
Elephant House I...
20
Fonterra
Brand Name

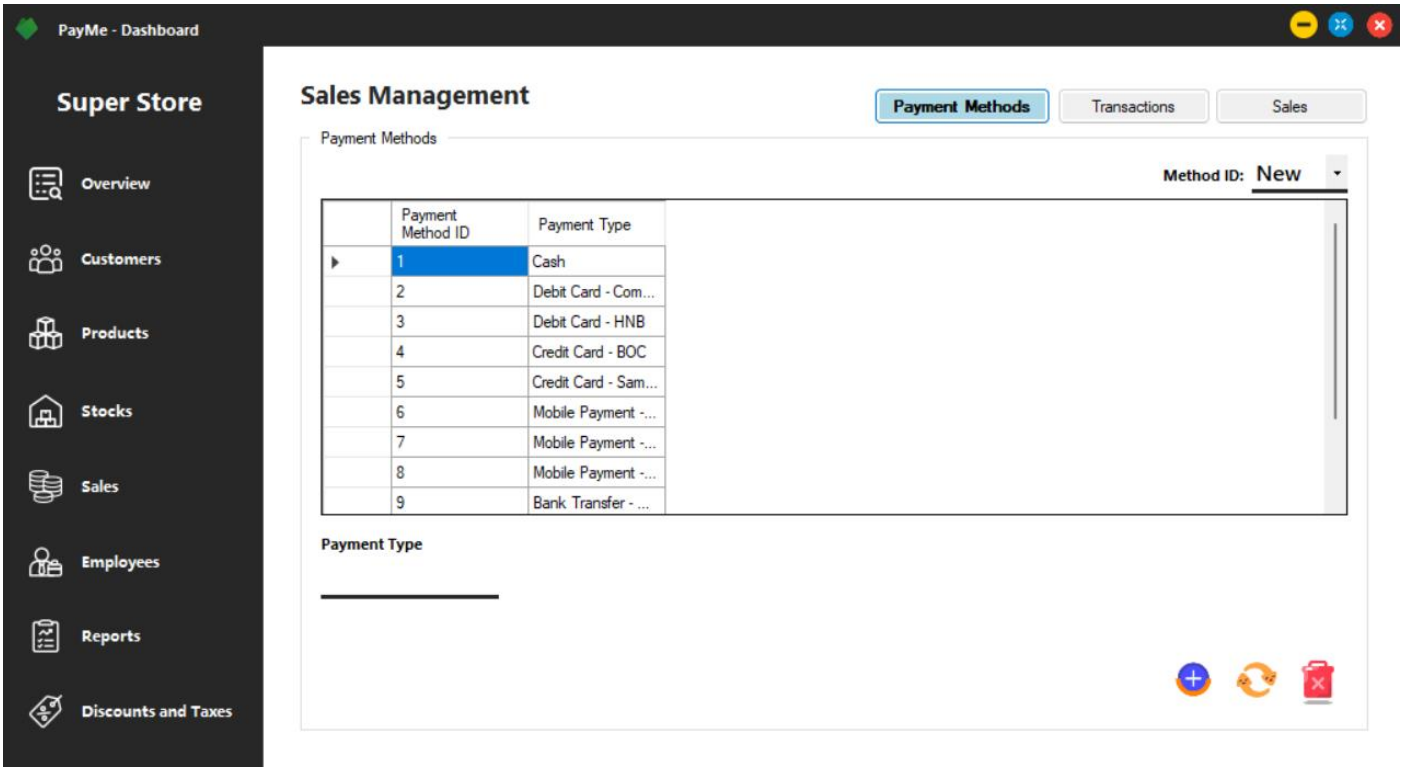
12.1.4. STOCK MANAGEMENT

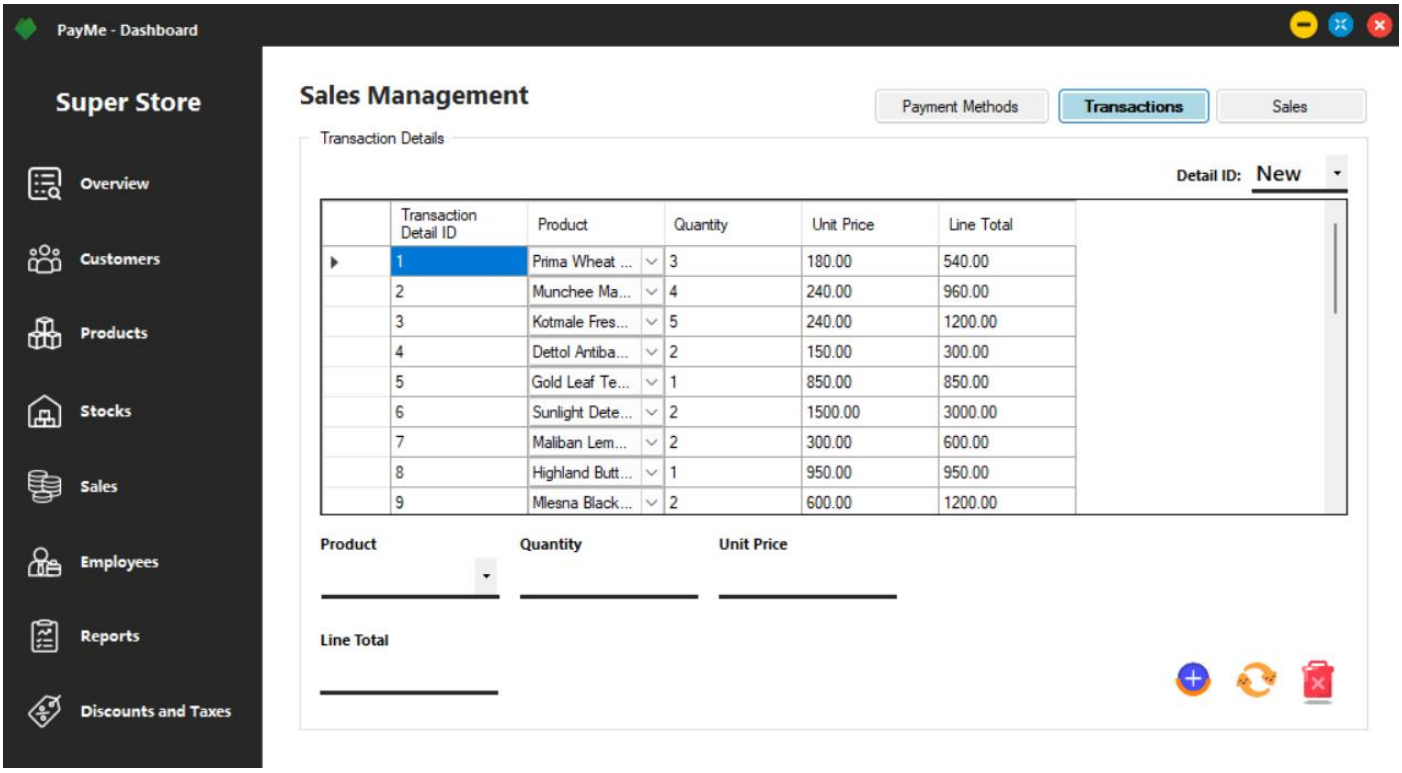




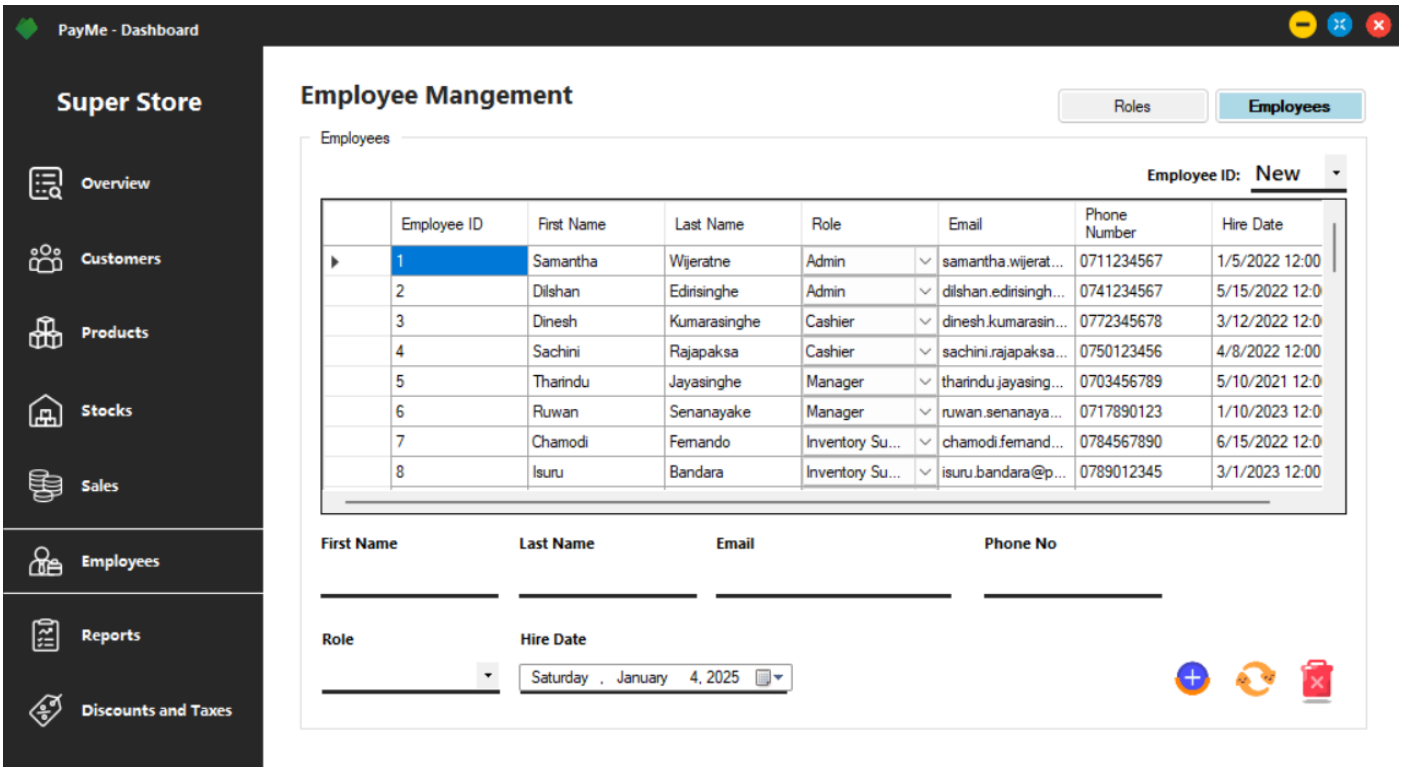
12.1.5. SALES MANAGEMENT

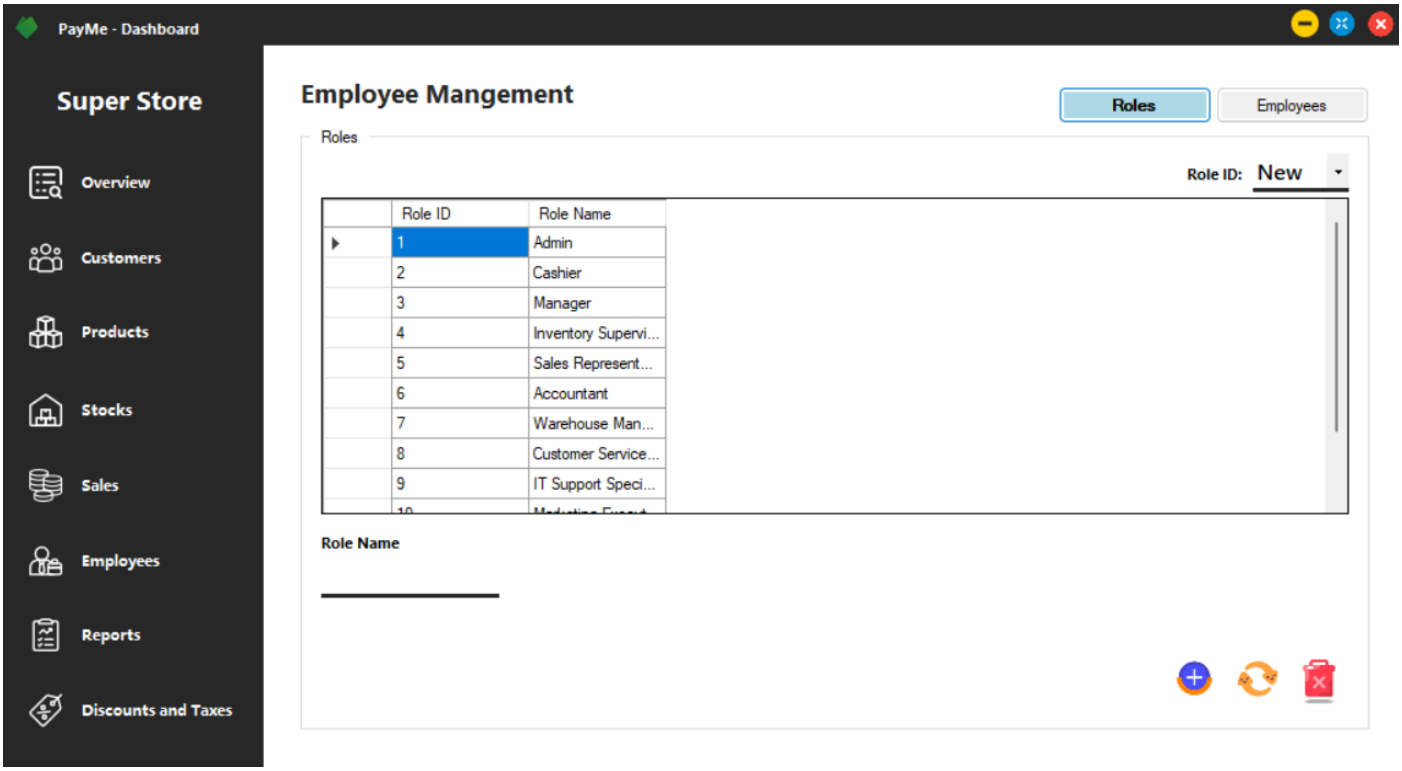




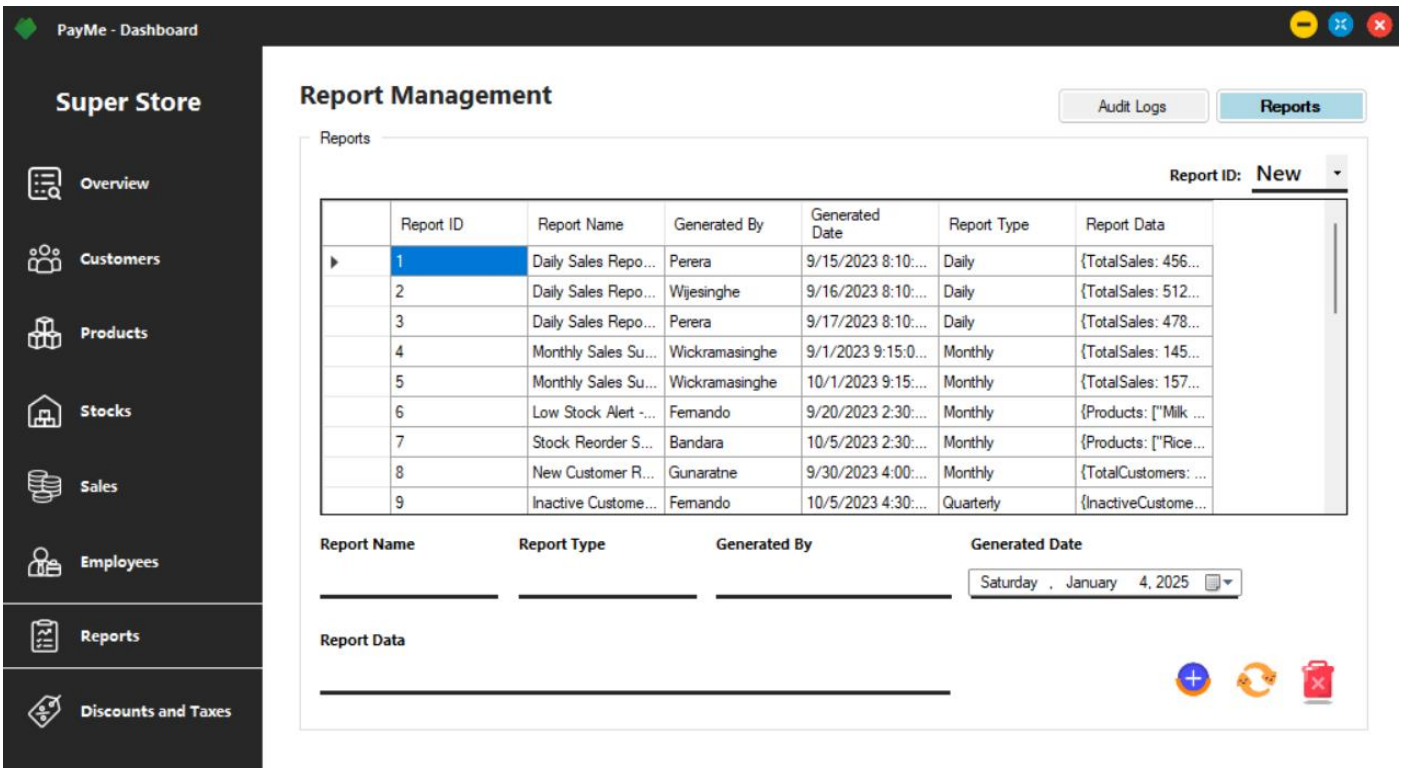

PayMe - Dashboard
Super Store
Overview
Customers
Products
Stocks
Sales
Employees
Reports
Discounts and Taxes
Sales Management
Payment Methods
Transactions
Sales
Transaction Details
Detail ID: New
Transaction Detail ID
Product
Quantity
Unit Price
Line Total
1 Prima Wheat ... 3 180.00 540.00
2 Munchee Ma... 4 240.00 960.00
3 Kotmale Fres... 5 240.00 1200.00
4 Dettol Antiba... 2 150.00 300.00
5 Gold Leaf Te... 1 850.00 850.00
6 Sunlight Dete... 2 1500.00 3000.00
7 Maliban Lem... 2 300.00 600.00
8 Highland Butt... 1 950.00 950.00
9 Mlesna Black... 2 600.00 1200.00
Product
Quantity
Unit Price
Line Total

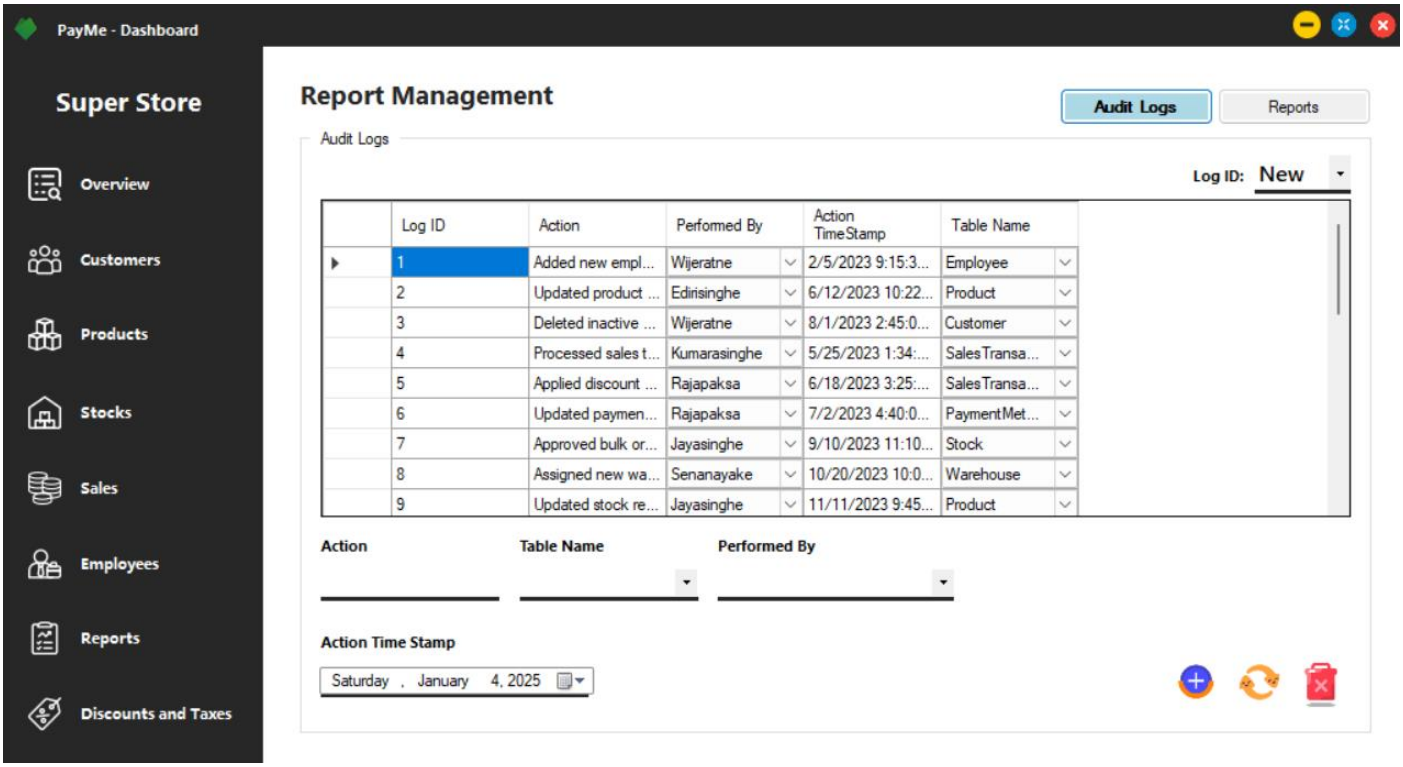
12.1.6. EMPLOYEE MANAGEMENT



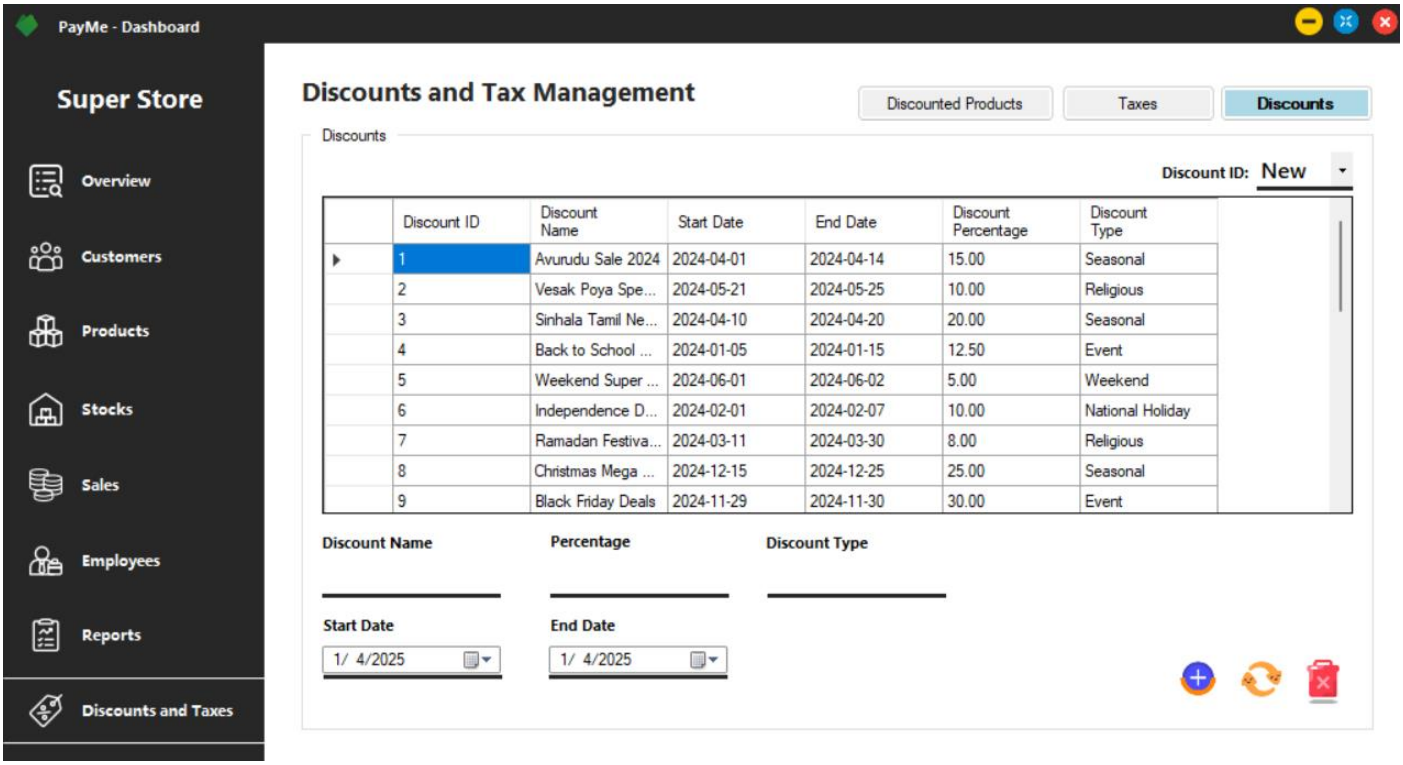


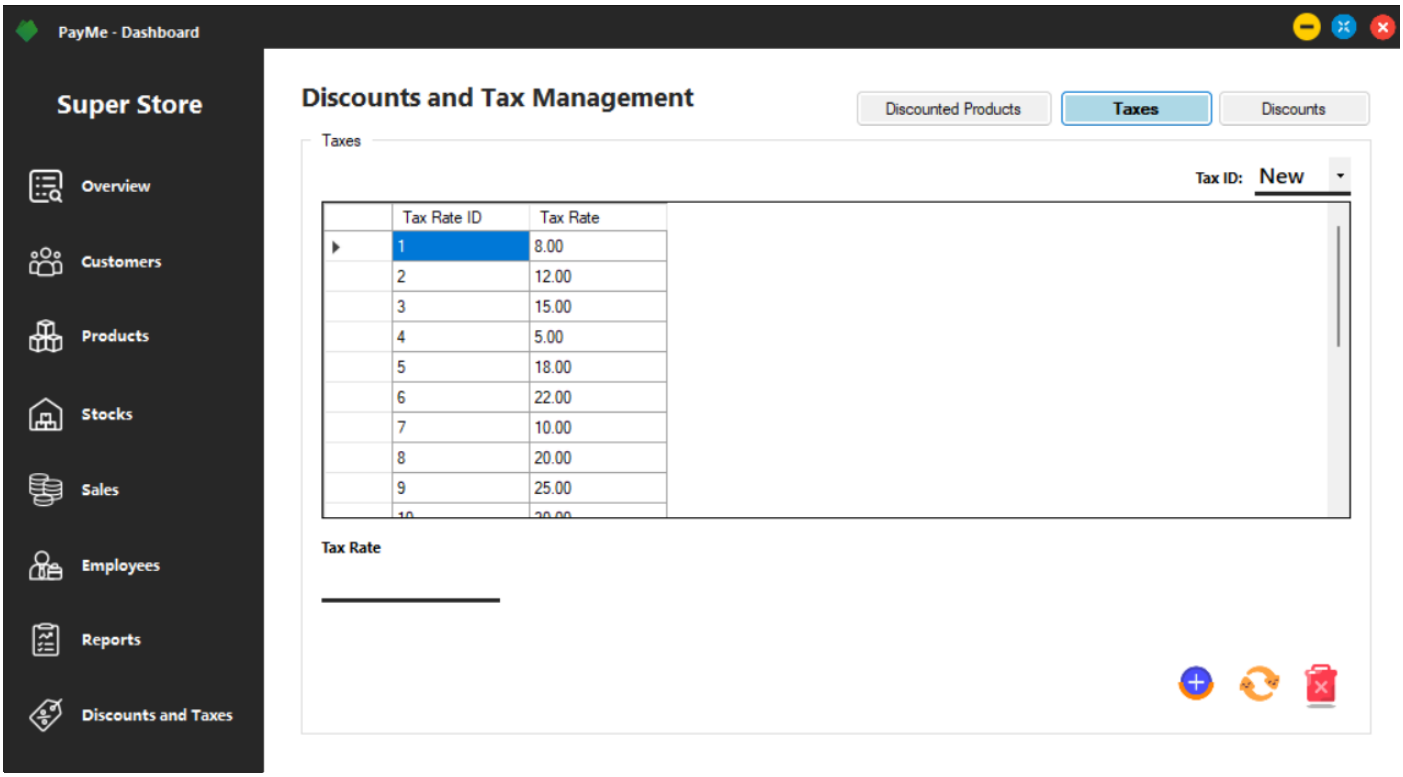
12.1.7. REPORT GENARATION





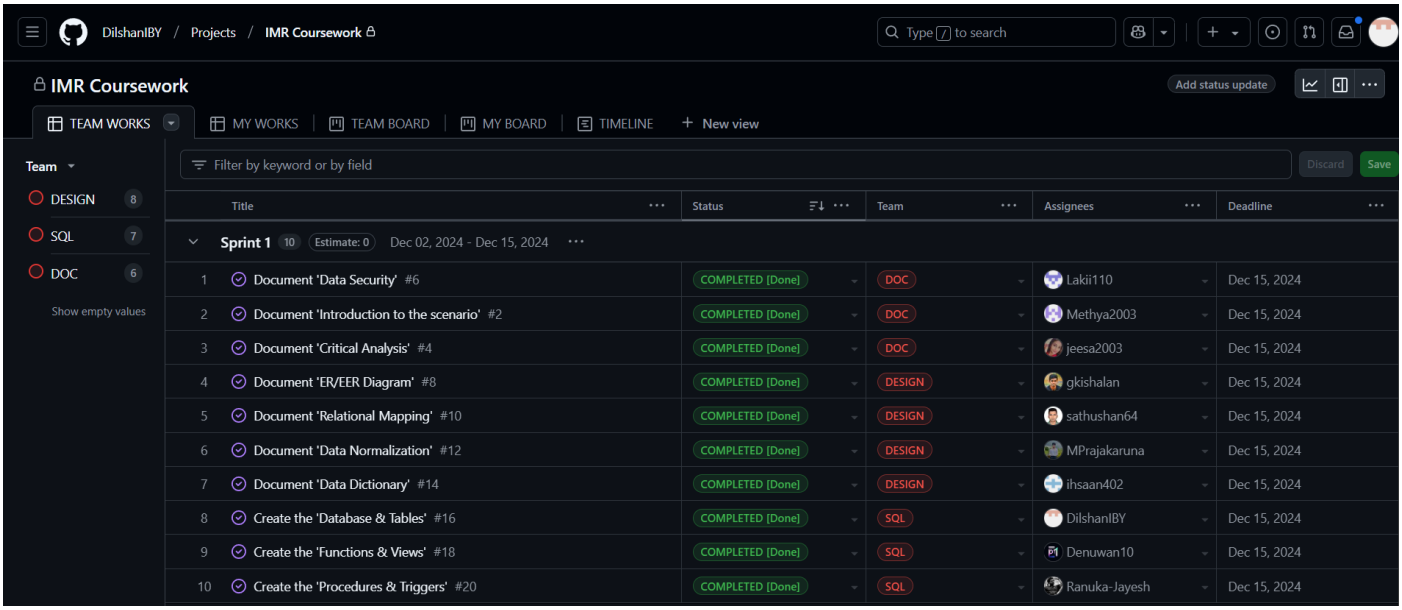
12.1.8. DISCOUNTS & TAXES

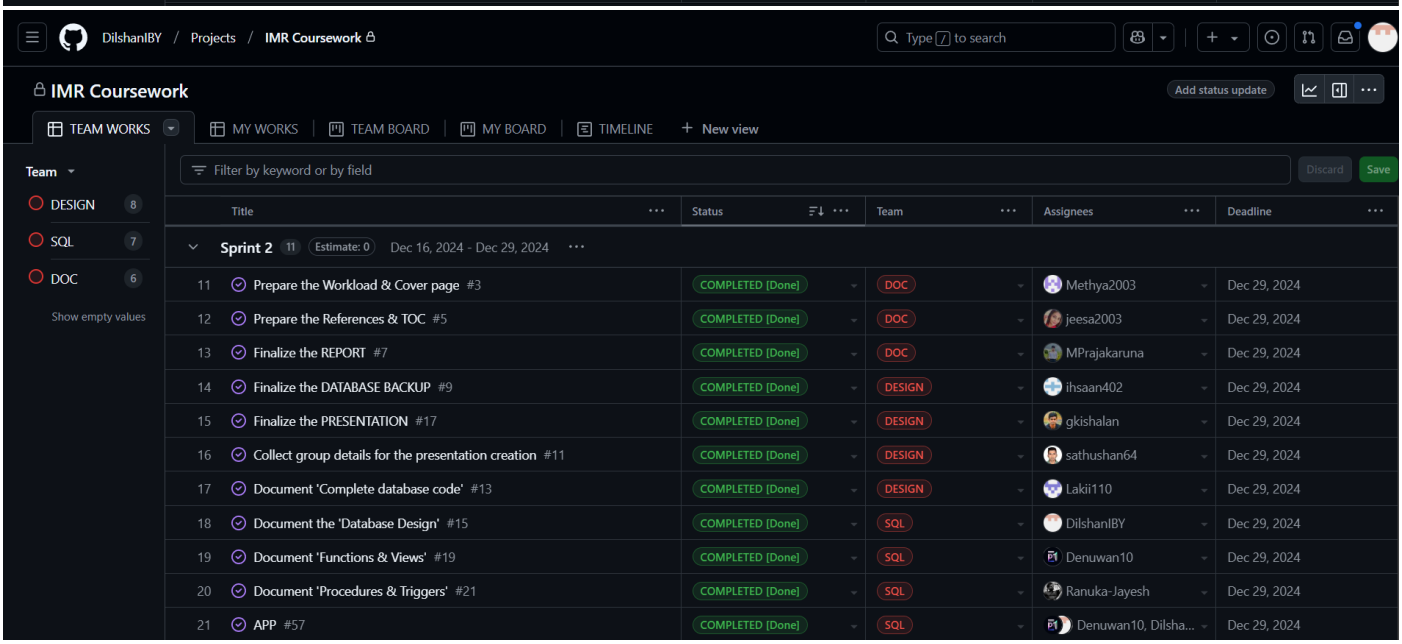




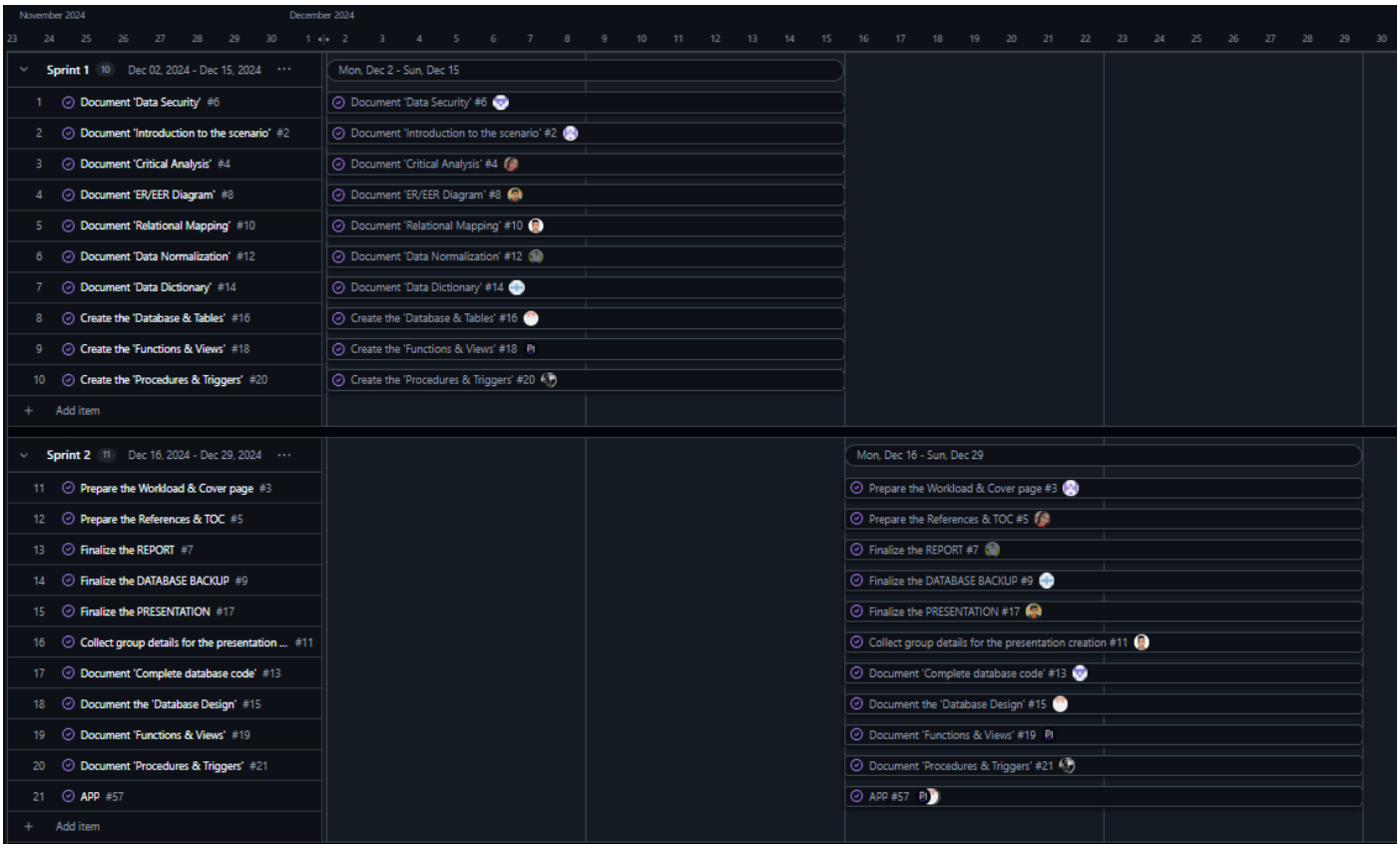
12.2 PROJECT MANAGEMENT

12.2.1. SPRINTS WORKLOADS





12.2.2. GANTT CHART



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