



UNIVERSITY OF MAURITIUS

Semester 2 Database Assignment

NAME	ID
Milena Jacquette	2416866
Akash Beedaysee	2315011
Nemchand Hayilsing	2412971
Toushal Sampat	2413826
Farhaan Beegoo	2416664

Group Name: **NULL TERMINATOR**



Contents

Overview.....	2
Database Structure	3
ER Diagram.....	4
Functional Dependencies.....	5
Normalisation.....	6
Database Schema	8
Functionality of field and description of table.....	9
Insert Dataset	14
Stored Procedures	18
Triggers	19
Views.....	19
Contribution of Work.....	20

Overview

A database application for an online business-FlowMart- is essential for managing and organizing data efficiently. It serves as the backbone for storing customer details, product inventories, orders, and transactions in an organized manner. By utilizing a relational database management system, we can ensure data integrity, security, and scalability. This application allows for quick retrieval and modification of records, enabling smooth operations and a seamless customer experience.

This database system has been designed to be user-friendly and to navigate and manage the operations of a store online. The system makes sure that there ensuring seamless interaction between clients, orders, suppliers, and payment methods while also making shipping facilities easier.

The database system also focuses on these main functionalities:

1. **Manage users:** Ability for clients to sign up (register, being able to log in and make changes to their account)
2. **Manage products:** Products are classified and details about their name, stock, price, quantity and supplier information are stored.
3. **Process orders:** Customers are able to make their orders correctly (add items, confirm and receive order purchases)
4. **Properly able to handle payment:** make sure that safe transactions are being made and the payments made by the clients can be tracked.
5. **Control stock:** make sure that the stock present is based currently on the purchases made and the suppliers restock.
6. **Manage deliveries and shipping:** keeps track of shipments and estimate delivery time.
7. **Supplier management:** keeps information about the suppliers and their contact details.

Database Structure

The application of this database has been implemented using SQL server management studio.

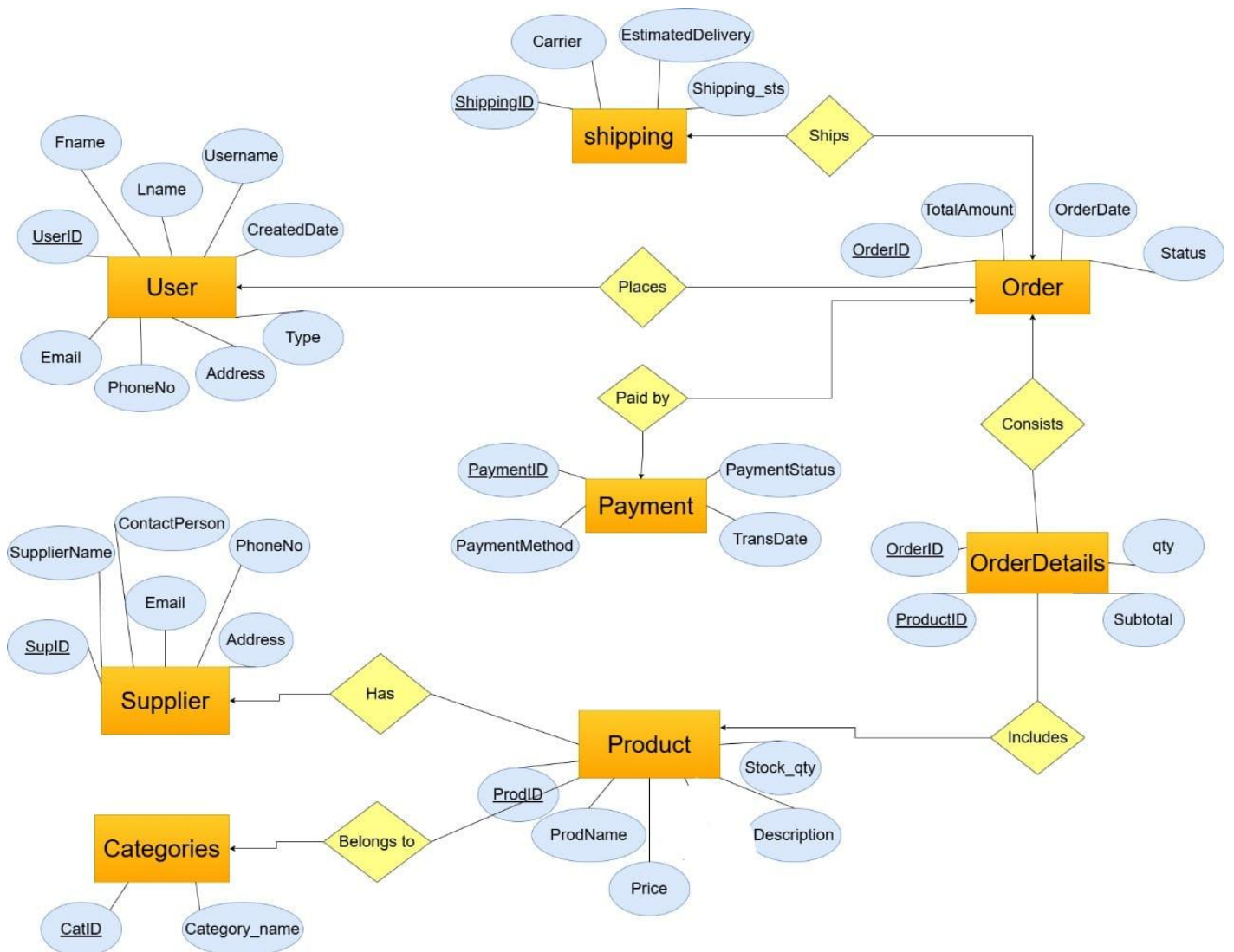
The database includes 8 tables, namely:

1. Users: contains information about users
2. Products: includes details about the product, its pricing and stock quantity
3. Categories: classifies products into different categories
4. Orders: keeps a record of all the orders made by the users through their purchase
5. OrderDetails: tracks specific products within each order
6. Payments: stores payments details for orders
7. Suppliers: stores supplier information
8. Shipping: contains shipping information and tracks shipments

All the tables are related to each other through primary key and foreign key relationships constraints which will be further described in the database schema diagrams section. This is done to make sure that data consistency and integrity is maintained.

It is also to be noted that ERD diagrams have been used to present a better mapping and relationship between the tables

ER Diagram



Functional Dependencies

1. **Users**

userID -> (Fname, Lname, username, Uemail, UphoneNo, Uaddress, type, createdDate)

2. **Categories**

catID -> (category_name)

3. **Suppliers**

supID -> (supplier_name, contact_person, email, phone_no, address)

4. **Products**

prodID -> (prod_name, description, price, stock_qty, catID, supID)

5. **Order**

orderID -> (userID, paymentID, shippingID, total_amount, order_date, order_sts)

6. **OrderDetails**

orderID, prodID -> (quantity, subtotal)

7. **Payments**

paymentID -> (payment_method, payment_sts, trans_date)

8. **Shipping**

shippingID -> (carrier, shipping_sts, estimated_delivery)

Normalisation

0NF: Showing repeated attributes

OrderDetails { UserID, fname, lname, username, Uemail, UphoneNo, Uaddress, type, created_date, paymentID, payment_method, payment_sts, trans_date, shippingID, carrier, shipping_sts, estimated_delivery, OrderID, total_amount, order_date, order_sts, (productID, product_name, description, price, quantity, subtotal, stock_qty, catID, category_name, supID, supplier_name, contact_person, su_email) }

1NF: Removing repeated attributes and showing primary keys

OrderDetails { UserID, fname, lname, username, Uemail, UphoneNo, Uaddress, type, created_date, paymentID, payment_method, payment_sts, trans_date, shippingID, carrier, shipping_sts, estimated_delivery, **OrderID**, total_amount, order_date, order_sts, **productID**, product_name, description, price, quantity, subtotal, stock_qty, catID, category_name, supID, supplier_name, contact_person, su_email }

2NF: Removing partial Dependencies

OrderDetails { **OrderID**, **productID**, quantity, subtotal }

Order { **OrderID**, total_amount, order_date, order_status, UserID, fname, lname, username, Uemail, UphoneNo, Uaddress, type, created_date, paymentID, payment_method, payment_sts, trans_date, shippingID, carrier, shipping_sts, estimated_delivery }

Product { **ProductID**, product_name, description, price, stock_qty, catID, category_name, supID, supplier_name, contact_person, su_email }

3NF: Removing transitive dependencies

OrderDetails { OrderID, productID, quantity, subtotal }

Order { OrderID, total_amount, order_date, order_status, UserID, PaymentID, shippindID }

User { UserID, fname, lname, username, email, UphoneNo, Uaddress, type, created_date }

Payment { PaymentID, payment_method, payment_sts, trans_date }

Shipping { ShippingID, carrier, shipping_sts, estimated_delivery }

Product { ProductID, product_name, description, price, stock_qty, catID, supID }

Category { CatID, category_name }

Supplier { SupID, supplier_name, contact_person, su_email }

Database Schema

1. Users

<u>userID</u>	fname	lname	username	email	phone_no	address	user_type	created_date
---------------	-------	-------	----------	-------	----------	---------	-----------	--------------

2. Categories

<u>catID</u>	Category_name
--------------	---------------

3. Suppliers

<u>supID</u>	supplier_name	contact_person	phone_no	email	address
--------------	---------------	----------------	----------	-------	---------

4. Products

<u>prodID</u>	prod_name	description	price	stock_qty	catID	supID
---------------	-----------	-------------	-------	-----------	-------	-------

5. Orders

<u>orderID</u>	userID	total_amount	order_date	order_sts
----------------	--------	--------------	------------	-----------

6. OrderDetails

<u>orderID</u>	<u>prodID</u>	quantity	subtotal
----------------	---------------	----------	----------

7. Payments

<u>paymentID</u>	orderID	payment_method	payment_sts	trans_date
------------------	---------	----------------	-------------	------------

8. Shipping

<u>shippingID</u>	orderID	carrier	shipping_sts	estimated_delivery
-------------------	---------	---------	--------------	--------------------

Functionality of field and description of table

1. User

Field	Datatype	Constraint	Description
userID	INT	PRIMARY KEY IDENTITY(25000001,2)	Unique identifier for each user
fname	VARCHAR(50)	NOT NULL	First name of user
lname	VARCHAR(50)	NOT NULL	Last name of user
username	VARCHAR(25)	UNIQUE NOT NULL	Username of the user
email	VARCHAR(100)	UNIQUE NOT NULL CHECK email LIKE '%@%.%'	Email of the user
phone_no	VARCHAR(15)	NOT NULL	Phone number of the user
address	TEXT		Address of the user
user_type	VARCHAR(20)	NOT NULL CHECK IN 'Customer','Employee'	The user can be either a customer or an employee
created_date	DATETIME	DEFAULT GETDATE()	Stores date when a new user account is created

2. Categories

Field	Datatype	Constraints	Description
catID	CAHR(3)	PRIMARY KEY CHECK LIKE 'C%'	Unique identifier for category
category_name	VARCHAR(50)	UNIQUE NOT NULL	Name of category

3. Suppliers

Field	Datatype	Constraints	Description
supID	VARCHAR(10)	PRIMARY KEY CHECK LIKE 'SU%'	Unique identifier of the supplier
supplier_name	VARCHAR(100)	NOT NULL	Name of the supplier
contact_person	VARCHAR(100)		Name of person who represents the supplier
phone_no	VARCHAR(15)	NOT NULL	Phone number of the supplier
email	VARCHAR(100)	UNIQUE CHECK LIKE '%@%.%'	Email of the supplier
address	TEXT		Address of the supplier

4. Products

Field	Datatype	Constraint	Description
prodID	CHAR(10)	PRIMARY KEY	Unique identifier of product
prod_name	VARCHAR(100)	NOT NULL	Name of product
description	TEXT		Description of product
Price	DECIMAL(7,2)	NOT NULL CHECK GREATER THAN 0	Price of the product
stock_qty	INT	NOT NULL DEFAULT 0	Quantity of the products available
catID	CHAR(3)	NOT NULL FOREIGN KEY REF Categories ON DELETE CASCADE ON UPDATE CASCADE	Unique identifier of category
supID	VARCHAR(10)	NOT NULL FOERIGN KEY REF Suppliers ON DELETE CASCADE ON UPDATE CASCADE	Unique identifier of the supplier

5. Orders

Field	Datatype	Constraint	Description
orderID	INT	PRIMARY KEY IDENTITY(1010100001,1)	Unique identifier of order
userID	INT	NOT NULL	Unique identifier of user
total_amount	DECIMAL(10,2)	DECIMAL(10,2) NOT NULL	Total fees for the order
order_date	DATETIME	DATETIME DEFAULT GETDATE()	Date of when an order was made
order_sts	VARCHAR(20)	CHECK IN 'Processing', 'Completed', 'Cancelled' DEFAULT 'Processing'	Status of the order

6. OrderDetails

Fields	Datatypes	Constraints	Description
orderID	INT	NOT NULL PRIMARY KEY FOREIGN KEY REF Orders	Unique identifier of the order
prodID	CHAR(10)	PRIMARY KEY FOREIGN KEY REF Products NOT NULL ON UPDATE CASCADE ON DELETE CASCADE	Unique identifier of the order
quantity	INT	NOT NULL CHECK Greater than 0	Quantity of products that have been ordered
subtotal	DECIMAL(10,2)		Total cost of a product that has been ordered.

7. Payments

Field	Datatype	Constraints	Description
paymentID	INT	PRIMARY KEY IDENTITY(111000000,2)	Unique identifier of payment
orderID	INT	NOT NULL FOREIGN KEY REF Orders	Unique identifier of order
payment_method	VARCHAR(20)	NOT NULL CHECK IN 'Card', 'Juice', 'Cash on delivery'	Method of payment
payment_sts	VARCHAR(10)	NOT NULL CHECK IN 'Paid', 'Pending', 'Refunded', 'Cancelled', DEFAULT 'Pending'	Status of payment
trans_date	DATETIME		Date of transaction

8. Shipping

Field	Datatype	Constraints	Description
shippingID	INT	PRIMARY KEY IDENTITY(1000000001,3)	Unique identifier of shipment
orderID	INT	FOREIGN KEY REF Orders NOT NULL	Unique identifier of order
carrier	VARCHAR(25)		Name of shipping company or carrier service
shipping_sts	VARCHAR(20)	CHECK IN 'Pending processing', 'Shipped', 'Delivered', 'Cancelled' DEFAULT 'Pending processing'	Status of the shipment
estimated_delivery	DATE	DEFAULT DATEADD(DAY,3,GETDATE())	Stores the estimate date of delivery

Insert Dataset

1. Users

userID	fname	lname	username	email	phone_no	address	User_type	created_date
25000001	Michael	Brown	mikeB	michael.brown@outlook.com	57785521	Pine Road, Port Louis, Mauritius	Customer	2025-03-19 10:00:00
25000003	Sarah	Davis	s1234davis	sarahdavis@gmail.com	50552345	Hassin Lane, Bell Air, Mauritius	Customer	2025-03-19 10:01:00
25000005	Laura	Martinez	martinez	martinezlaura@yahoo.com	53054321	Paul Pierre Jack Street, Plaine Magnien, MU	Employee	2025-03-19 10:02:00
25000007	Robert	Taylor	taylorrob	robertGAMER@icloud.com	57725666	NULL	Customer	2025-03-19 10:03:00
25000009	Jennifer	Anderson	Jenni	jennifer12345@gmail.com	57028765	London Way Maghbourg, Mauritius	Employee	2025-03-19 10:04:00
25000011	Lisa	Hernandez	lisa01	lisahernandez@yahoo.com	55127890	Aslan Lane, Surinam, Mauritius	Customer	2025-03-19 10:05:00
25000013	Pravin	Ramgoolam	pravinR	pranvinRam@outlook.com	58455241	Morc. Pravin Navin Lane, Reduit, Mauritius	Customer	2025-03-19 10:06:00
25000015	Matthew	White	MaTTwhite	matthewwhite@aol.com	58223210	Magnolia Road, Triollet, Mauritius	Customer	2025-03-19 10:07:00
25000017	Daniel	Clark	clark001	clark535@icloud.com	59972100	NULL	Customer	2025-03-19 10:08:00
25000019	Kelly	Rodriguez	kellyR1234	kellyRod999@gmail.com	59382678	NULL	Customer	2025-03-19 10:09:00

2. Categories

catID	category_name
C02	Automotive & Tools
C06	Office Supplies & Stationery
C10	DIY & Home Improvement
C12	Electronics & Accessories
C13	Fashion & Apparel
C14	Garden & Outdoor
C18	Home & Kitchen
C27	Sports & Outdoor
C28	Toys & Games

3. Suppliers

<u>supID</u>	<u>supplier_name</u>	<u>contact_peerson</u>	<u>phone_no</u>	<u>email</u>	<u>address</u>
SU09003821	TechTrend Innovations	Robert Assirvaden	58550123	john@techtrend.com	Tech Avenue, Ebene, MU
SU00108552	Espace Maisson Supplies	Tee Lin Chan	57655456	chen@emaison.com	456 Builders Rd, Phoenix, MU
SU00309200	OfficeMax Distributors	Chen	58540789	robert@officemaxdist.com	Office Park, Bell Village, MU
SU04040101	SportsGear Inc	Ravi Juggnat	59321011	ravi@sportsgear.com	Fitness Way, Port Louis, MU
SU00001016	GreenGarden Co	NULL	58851617	ashil.M@greengarden.com	303 Plant Lane, Rose Hill, MU
SU20300217	FashionTrend Ltd	Renganaden Penalaiti	57761920	penaLaiti@fashiontrend.com	Style Blvd, Bell Air, MU
SU20235558	FoodMasters Inc	NULL	59882223	FM.purchasing@foodmasters.com	Culinary Dr, Curepipe, MU
SU25251330	IndustrialTech	Paul Jagurnat	55762829	p.jag@industrialtech.com	Machinery Rd, Phoenix, MU

4. Products

<u>prodID</u>	<u>prod_name</u>	<u>description</u>	<u>price</u>	<u>stock_qty</u>	<u>catID</u>	<u>supID</u>
SPOR0003P1	Yoga Mat	Non-slip, 6mm thick	350.00	100	C27	SU04040101
FITN0006R4	Running Shoes	Men's size 10, lightweight	2650.00	45	C27	SU04040101
BALL0005B3	Soccer Ball	NULL	400.00	150	C27	SU04040101
ELEC00K9P2	Wireless Headphones	Bluetooth 5.0, Noise-Canceling	3825.00	50	C12	SU09003821
GADGT55R72	LED TV 55-inch	4K Ultra HD, Smart TV	25900.00	5	C12	SU09003821
DCRL000LCP	Laptop Cooling Pad	RGB Lighting, 5 Fans	975.00	75	C12	SU09003821
TECH002N8Q	Smartphone Charger	Fast-charging USB-C	150.00	200	C12	SU09003821
SHRD00PS90	Paper Shredder	10-sheet capacity, cross-cut	3265.00	0	C06	SU00309200
NOTE000008	Sticky Notes Pack	Assorted colors, 500 sheets	200.00	500	C06	SU00309200
SUPP0111F7	Printer Ink Set	4-color pack, high yield 5000pgs	1750.00	100	C06	SU00309200
FASHT002N3	Leather Jacket	NULL	5500.00	25	C13	SU20300217
JEAN0008D9	Denim Jeans	Women's size 8, slim fit	1450.00	100	C13	SU20300217
INDUS008W4	Power Drill	Cordless, 20V	4650.00	25	C10	SU25251330
GARHR00509	Garden Hose 50ft	Flexible, kink-resistant	1350.00	80	C14	SU00108552
PATI9Y8B22	Patio Umbrella	3Mt, UV-resistant	1250.00	8	C14	SU00108552
AUTO0001T5	Car Wax	High-gloss finish, 500ml	450.00	60	C02	SU25251330
DIY00003H7	Hammer	Steel head, rubber grip	300.00	80	C10	SU25251330
HOME0007C3	Ceramic Vase	Hand-painted, 30cm	1200	15	C18	SU00108552

5. Orders

<u>orderID</u>	<u>userID</u>	<u>total_amount</u>	<u>Order_date</u>	<u>order_sts</u>
1010100001	25000001	6150.00	2025-03-19 21:30:15.417	Processing
1010100002	25000009	8850.00	2025-03-19 21:30:15.417	Completed
1010100003	25000015	26875.00	2025-03-19 21:30:15.417	Processing
1010100004	25000017	5700.00	2025-03-19 21:30:15.417	Processing
1010100005	25000019	2600.00	2025-03-19 21:30:15.417	Processing
1010100006	25000019	15200.00	2025-03-19 21:30:15.417	Completed

6. OrderDetails

<u>orderID</u>	<u>prodID</u>	<u>quantity</u>	<u>subtotal</u>
1010100001	INDUS008W4	1	4650.00
1010100001	NOTE000008	4	800.00
1010100001	SPOR0003P1	2	700.00
1010100002	FASHT002N3	1	5500.00
1010100002	JEAN0008D9	2	2900.00
1010100002	TECH002N8Q	3	450.00
1010100003	DCRL000LCP	1	975.00
1010100003	GADGT55R72	1	25900.00
1010100004	BALL0005B3	1	400.00
1010100004	FITN0006R4	2	5300.00
1010100005	GARHR00509	1	1350.00
1010100005	PAT19Y8B22	1	1250.00
1010100006	INDUS008W4	3	13950.00
1010100006	PAT19Y8B22	1	1250.00

7. Payments

<u>paymentID</u>	<u>orderID</u>	<u>payment_method</u>	<u>payment_sts</u>	<u>trans_date</u>
111000000	1010100001	Card	Paid	2025-03-19 14:48:54.607
111000002	1010100002	Cash on Delivery	Paid	2025-03-19 15:02:11.527
111000004	1010100003	Card	Paid	2025-03-19 14:48:54.610
111000006	1010100004	Card	Paid	2025-03-19 14:48:54.610
111000008	1010100005	Cash on Delivery	Pending	NULL
111000010	1010100006	Juice	Paid	2025-03-19 14:54:40.657

8. **Shipping**

<u>shippingID</u>	orderID	carrier	shipping_sts	estimated_delivery
1000000001	1010100001	NULL	Pending processing	2025-03-22
1000000004	1010100002	SELF	Delivered	2025-03-22
1000000007	1010100003	FedEx	Shipped	2025-03-22
1000000010	1010100004	NULL	Pending processing	2025-03-22
1000000013	1010100005	NULL	Pending processing	2025-03-22
1000000016	1010100006	FedEx	Delivered	2025-03-22

Stored Procedures

Stored Procedure Name	Function
sp_add_user	Adds a new user to the database.
sp_add_category	Adds a new category to the database.
sp_add_supplier	Adds a new supplier to the database.
sp_add_product	Adds a new product, ensuring the supplier and category exist before allowing addition.
sp_buying_product	Allows up to 5 products to be purchased at a time. Validates user existence, checks stock quantity (via trg_CheckStockQuantity), calculates subtotal, updates stock (via trg_UpdateStockOrder), and inserts data into Orders, OrderDetails, Payments, and Shipping tables.
sp_update_juice_payment_sts	Checks if the payment uses the Juice method and updates the status to 'Failed' or 'Paid'.
sp_cancel_order	Cancels an order if conditions are met. Activates trg_RestockCancel to return purchased quantities to stock.
sp_order_shipped	Updates the shipping status of an order after verifying conditions.
sp_order_delivered	Checks if an order exists and updates the shipping status to 'Delivered'.
sp_check_low_stock	Allows users to check stock levels for all products, products below a threshold, or a specific product.
sp_restock_product	Ensures proper restocking and updates stock levels accordingly.
sp_UserOrders	Allows users to view all their orders or a specific order with details.
sp_prt_OrderSts	Displays the order status of a given order ID.
sp_update_product_price	Checks if a product exists and updates its price.
sp_update_supplier_contact_person	Checks if the supplier exists and updates the contact person of the corresponding supplier.
sp_update_user_address	Checks if the user exists and updates their address.
sp_update_user_username	Checks if the user exists and updates the username if it is not already taken.

Triggers

Trigger Name	Function
trg_CheckStockQuantity	Activates before stock changes when purchasing products. Cancels the transaction if stock is insufficient and warns the user.
trg_RestockCancel	Activates after sp_cancel_order to return canceled product quantities to stock.
trg_UpdateStockOrder	Activates after sp_buying_product and trg_CheckStockQuantity to deduct purchased product quantities from stock.
trg_AutoCompleteOrderOnDelivery	Sets Orders.order_sts to 'Completed' when Shipping.shipping_sts becomes 'Delivered'.
trg_UpdatePaymentOnDelivery	Sets Payments.payment_sts to 'Paid' and updates trans_date for 'Cash on Delivery' orders when Shipping.shipping_sts becomes 'Delivered'.

Views

View Name	Function
vw_CustomerOrderHistory	To view the history of customer orders.
vw_EmployeeProductStock	To view the product, it's stock and some additional details.
vw_lowStockAlerts	Views the details of a product that has low quantity

Contribution of Work

Task Allocation	Team Members	StudentID	%Contribution
Overview	Beedaysee Akash	2315011	100%
Database Structure	Beedaysee Akash	2315011	100%
ER	Milena Jacquette	2416866	100%
Functional Dependencies	Toushal Sampat	2413826	90%
	Milena Jacquette	2416866	10%
Normalization	Milena Jacquette	2416866	100%
Database Schema	Beegoo Farhaan	2416664	100%
Functionality of Fields and description of table	Beedaysee Akash	2315011	100%
Insert Dataset	Toushal Sampat	2413826	100%
Stores Procedures	Nemchand Hayilsing	2412971	40%
	Toushal Sampat	2413826	54%
	Milena Jacquette	2416866	6%
Triggers	Nemchand Hayilsing	2412971	40%
	Toushal Sampat	2413826	20%
	Milena Jacquette	2416866	40%
Views	Nemchand Hayilsing	2412971	100%