1- Introduction to the working of the system

Food Express is a database-driven platform that facilitates the seamless operation and management of food ordering, processing, and delivery services. It primarily relies on a robust database architecture to store, manage, and retrieve various types of information. Here's a concise overview of its functionality from a database-oriented perspective:

1. Database Design:

- The system's foundation lies in a well-structured database schema designed to efficiently store information related to customers, restaurants, orders, deliveries, items, branches, and more.
- It consists of multiple interrelated tables designed to maintain data integrity and support complex relationships between entities.

2. User Data Management:

- Customer information, including profiles, addresses, contact details, and order history, is stored securely in the database.
- Authentication mechanisms manage user credentials and access privileges.

3. Restaurant and Menu Management:

- The system's database maintains records of partnered restaurants, their menus, available items, prices, descriptions, and availability status.
- Each restaurant's menu data is stored and linked to ensure real-time updates and accurate listings.

4. Order Processing and Tracking:

- Orders placed by customers are logged in the database, detailing itemized selections, quantities, total costs, delivery information, and status (e.g., 'pending,' 'in progress,' 'delivered').
- The database handles transactional data, capturing payment details, billing information, and order timestamps.

5. Delivery Management:

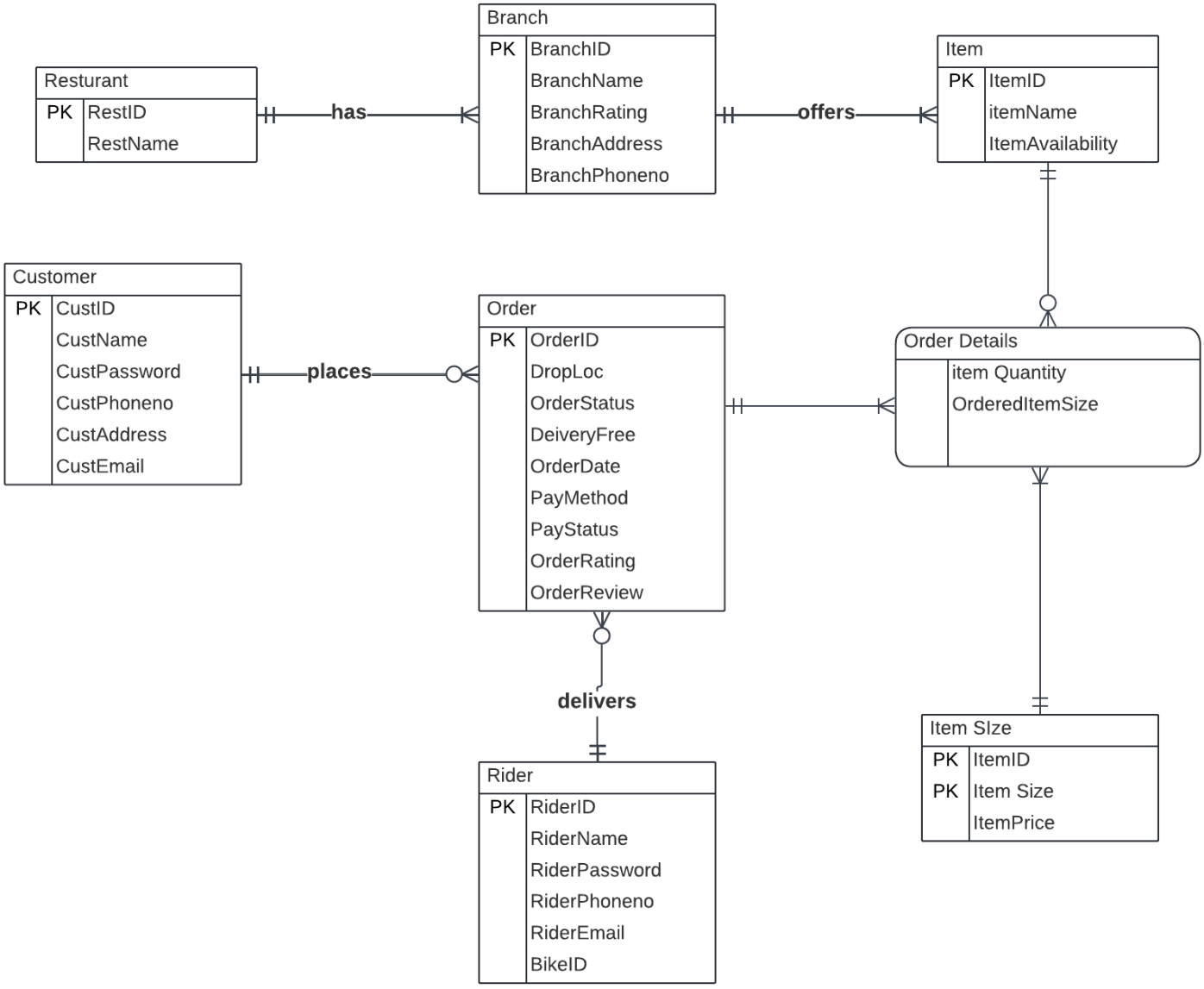
- Details of delivery personnel ('riders'), their availability, assigned orders, routes, and completion status are tracked and managed within the database.
- Real-time assignment and tracking of deliveries leverage database functionalities for efficient logistics management.

2- Problems in the existing system (optional)

Before the introduction of online food delivery systems, traditional food delivery methods faced challenges such as limited food options, manual ordering processes via phone calls, inefficient delivery logistics, restricted payment methods, and a lack of real-time order tracking. These limitations led to

inconvenience for customers and operational inefficiencies for restaurants. The emergence of online food delivery systems addressed these issues by offering a digital platform that provided diverse food choices, streamlined ordering processes, improved delivery logistics, multiple payment options, real-time order tracking, and enhanced customer satisfaction.

3- ERD of the system



4- Construction of the Relational Schema by using both bottom-up approach and top-down approach.

a) Top-Down Approach:

In the top-down approach, we will convert the ERD to the relational schemas by applying the conversion rules.

Step-1
Each regular entity will be converted into a relation.

Customer (CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress)

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating PayMethod, PayStatus)

Rider (RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID)

Item (ItemID, ItemName, ItemAvailibilty)

Branch (BranchID, BranchName, BranchRating, BranchAddress,BranchPhoneno)

Restaurant (RestID, RestName)

ItemSize (ItemID, ItemSize, ItemPrice)

Step-2
Mapping Binary one to many relationships.

For each binary 1:M relationship, the primary key attribute (or attributes) of the entity on the one-side of the relationship will be included as a foreign key in the relation that is on the many-side of the relationship.

- The PK of Customer and Rider will be FK in Order.
- The PK of Restaurant relation will be included in Branch.
- The PK of Branch will be included in the Item Relation.

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, PayMethod, PayStatus, RiderID, CustID)

Rider (RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID)

Item (ItemID, ItemName, ItemAvailibilty, BranchID)

Branch (BranchID, BranchName, BranchRating, BranchAddress,BranchPhoneno, RestID)

Step-4 Mapping Associative Entities

We'll create a separate table for the Order_Details entity and the PKs of the entities which are in relationship with the associative entity will become part of the PK of the Order_Details along with the Ordered_Item_Size and each of them will act as FK as well for their respective relation.

OrderDetails (OrderID, ItemID, OrderedItemSize, ItemQuantity)

So, the relations as the result of the Top-Down Approach are as follow:

Customer (CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress)

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, PayMethod, PayStatus, RiderID, CustID)

CustID references Customer (CustID)

RiderID reference Rider(RiderID)

OrderDetails (OrderID, ItemID, OrderedItemSize, ItemQuantity)

OrderID references Order(OrderId)

ItemID, OrderedItemSize references ItemSize (ItemId, ItemSize)

Rider (RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID)

Item (ItemID, ItemName, ItemAvailibilty, BranchID)

BranchID references Branch(BranchID)

Branch (BranchID, BranchName, BranchRating, BranchAddress,BranchPhoneno, RestID)

RestID references Restaurant(RestID)

Restaurant (RestID, RestName)

ItemSize (ItemID, ItemSize, ItemPrice)

b) Bottom-Up Approach:

Now we are converting the following large, complex, and unstable dataset of our system to the set of small and stable relations.

Order (OrderID, CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword ,RiderBikeID, RestID, RestName, BranchID, BranchName, BranchRating, Branch_Address, BranchPhoneno, ItemID, ItemName, ItemPrice, ItemQuantity, OrderedItemSize, ItemSize, PayMethod, PayStatus, ItemAvailabilty)

We will achieve our goal through the process of normalization up to 3NF.

1NF:

In 1NF we check for the repeating groups/multivalued attributes. We have multiple repeating groups. We will eliminate these in each step of 1NF. One Customer can have multiple orders.

Customer (CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress) in 1NF.

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID, RestID, RestName, BranchID, BranchName, BranchRating, BranchAddress, ItemID, ItemName, ItemPrice, ItemQuantity, OrderedItemSize, ItemSize, PayMethod, PayStatus, ItemAvailabilty, CustID) not in 1NF.

Order relation has repeating group, one order can have multiple items.

Order (OrderID, CustID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, RiderID, RiderPhone, RiderName, RiderEmail, PayMethod, PayStatus, RiderPassword, RiderBikeID) in 1NF.

OrderDetails (OrderID, ItemID, RestID, RestName, BranchID, BranchName, BranchRating, BranchAddress, ItemName, ItemPrice, ItemQuantity, OrderedItemSize, ItemSize, ItemAvailabilty) not in 1NF.

The OrderDetails table has a repeating as well so, we'll remove it.

1NF on OrderDetails:

OrderDetails (OrderID, ItemID, OrderedItemSize ,ItemQuantity) in 1NF.

Item (ItemID, ItemSize, ItemName, ItemPrice, ItemAvailabilty, RestID, RestName, BranchID, BranchName, BranchRating, BranchAddress, BranchPhoneno) in 1NF.

2NF:

We have separated the ItemSize relation because the rest of the attributes in the Item table were determined by the ItemID.

Relations in 2NF:

Customer (CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress)

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, PayMethod, PaymentStatus, RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID, CustID)

OrderDetails (OrderID, ItemID, OrderedItemSize, ItemQuantity)

Item (ItemID, ItemName, ItemAvailibity, RestID, RestName, BranchID, BranchName, BranchRating, BranchAddress, BranchPhoneno)

Item Size (ItemID, ItemSize, ItemPrice)

3NF:

The Rider relation will be separated from the order relation. The Branch Relation will be separated from the Item relation and Restaurant will be separated from the Branch due to transitive dependency.

Relational Schemas as result of 3NF will be:

Customer (CustID, CustName, CustPassword, CustEmail, CustPhone, CustAddress)

Order (OrderID, DropLoc, OrderStatus, DeliveryFee, OrderDate, OrderReview, OrderRating, PayMethod, PayStatus, RiderID, CustID)

CustID references Customer (CustID)

RiderID reference Rider(RiderID)

OrderDetails (OrderID, ItemID, OrderedItemSize, ItemQuantity)

OrderID references Order(OrderId)

ItemID, OrderedItemSize references ItemSize (ItemId, ItemSize)

Rider (RiderID, RiderPhone, RiderName, RiderEmail, RiderPassword, RiderBikeID)

Item (ItemID, ItemName, ItemAvailibilty, BranchID)

BranchID references Branch(BranchID)

Branch (BranchID, BranchName, BranchRating, BranchAddress,BranchPhoneno, RestID)

RestID references Restaurant(RestID)

Restaurant (RestID, RestName)

ItemSize (ItemID, ItemSize, ItemPrice)

5- Description of the relations

RIDER		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
RiderID	Varchar2(10)	PRIMARY KEY
RiderName	Varchar2(30)	
RiderPassword	varchar2(10),	NOT NULL, LENGTH>=8
RiderPhoneNo	number (11),	NOT NULL, UNIQUE, LENGTH=11
RiderEmail	varchar2(30),	NOT NULL
BikeID	Varchar2(10)	

ITEMSIZE		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
ItemID	Varchar2(10)	PRIMARY KEY
ItemSize	Varchar2(25)	PRIMARY KEY
ItemPrice	varchar2(10)	NOT NULL

CUSTOMER		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
CustID	Varchar2(10)	PRIMARY KEY
CustName	Varchar2(30)	NOT NULL
CustPassword	varchar2(10)	NOT NULL, UNIQUE LENGTH>=8
CustPhoneNo	number (11)	NOT NULL, LENGTH=11
CustAddress	varchar2(50)	
CustEmail	Varchar2(30)	NOT NULL

RESTAURANT		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
RestID	Varchar2(10)	PRIMARY KEY
RestName	Varchar2(30)	NOT NULL

BRANCH		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
BranchID	Varchar2(10)	PRIMARY KEY
BranchName	Varchar2(30)	NOT NULL
BranchReview	varchar2(100)	
BranchAddress	Varchar2(50)	NOT NULL
RestaurantID	varchar2(10)	FOREIGN KEY (RESTAURANT)

ITEM		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
ItemID	Varchar2(10)	PRIMARY KEY
ItemName	Varchar2(30)	NOT NULL
BranchID	varchar2(10)	FOREIGN KEY(BRANCH)
ItemAvailability	char(1)	CAN BE 'Y' OR 'N'

ORDERDETAILS		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
ItemQuantity	Number(3)	NOT NULL
OrderedItemSize	Varchar2(50)	PRIMARY KEY, FOREIGN KEY(ITEM_SIZE)
ItemID	varchar2(10)	PRIMARY KEY, FOREIGN KEY(ITEM_SIZE)

ORDERS		
ATTRIBUTES	**DATA TYPES**	**CONSTRAINTS**
	Varchar2(10)	PRIMARY KEY
DropLoc	Varchar2(50)	NOT NULL
Status	varchar2(10)	CAN BE 'PENDING', 'IN PROGRESS','DELIVERED'
DelieveryFee	number(4)	
OrderDate	date	NOT NULL
CustID	Varchar2(10)	FOREIGN KEY(CUSTOMER)
RiderID	Varchar2(10)	FOREIGN KEY(RIDER)
PayMethod	Varchar2(10)	CAN BE 'BANK TRANSFER','COD','CREDIT/DEBIT CARD'
OrderStatus	Varchar2(11)	CAN BE 'IN MAKING', 'IN PROGRESS' ,'DELIVERED'
PayStatus	varchar2(10)	NOT NULL, CAN BE 'PENDING' OR 'COMPLETED'
OrderReview	Varchar2(100)	
OrderRating	Number(1)	BETWEEN 1 AND 5

6- Create Statements for Relations:

```
CREATE TABLE Customer (
    CustID VARCHAR2(10) CONSTRAINT pk_Customer PRIMARY KEY,
    CustName VARCHAR2(30) CONSTRAINT nn_CustName NOT NULL,
    CustPassword VARCHAR2(10) CONSTRAINT nn_CustPassword NOT NULL,
    CustPhone NUMBER(11) CONSTRAINT nn_CustPhone NOT NULL,
    CustAddress VARCHAR2(50) CONSTRAINT nn_CustAddress NOT NULL,
    CustEmail VARCHAR2(30) CONSTRAINT uk_CustEmail UNIQUE,
    CONSTRAINT chk_CustPasswordLength CHECK (LENGTH(CustPassword) >= 8),
```

```
    CONSTRAINT uk_CustPhone UNIQUE (CustPhone)
);

CREATE TABLE Rider (
    RiderID VARCHAR2(10) CONSTRAINT pk_Rider PRIMARY KEY,
    RiderName VARCHAR2(30) CONSTRAINT nn_RiderName NOT NULL,
    RiderPassword VARCHAR2(10) CONSTRAINT nn_RiderPassword NOT NULL,
    RiderPhone NUMBER(11) CONSTRAINT nn_RiderPhone NOT NULL,
    RiderEmail VARCHAR2(30) CONSTRAINT uk_RiderEmail UNIQUE,
    RiderBikeID VARCHAR2(10),
    CONSTRAINT chk_RiderPasswordLength CHECK (LENGTH(RiderPassword) >= 8),
    CONSTRAINT uk_RiderPhone UNIQUE (RiderPhone)
);

CREATE TABLE Restaurant (
    RestID VARCHAR2(10) CONSTRAINT pk_Restaurant PRIMARY KEY,
    RestName VARCHAR2(30) CONSTRAINT nn_RestName NOT NULL
);

CREATE TABLE Branch (
    BranchID VARCHAR2(10) CONSTRAINT pk_Branch PRIMARY KEY,
    BranchName VARCHAR2(30) CONSTRAINT nn_BranchName NOT NULL,
    BranchAddress VARCHAR2(50) CONSTRAINT nn_BranchAddress NOT NULL,
    BranchRating NUMBER CHECK (BranchRating BETWEEN 1 AND 5),
    RestID VARCHAR2(10) CONSTRAINT fk_Branch_Restaurant REFERENCES Restaurant(RestID)
);

CREATE TABLE Item (
    ItemID VARCHAR2(10) CONSTRAINT pk_Item PRIMARY KEY,
```

```
    ItemName VARCHAR2(30) CONSTRAINT nn_ItemName NOT NULL,
    BranchID VARCHAR2(10) CONSTRAINT fk_Item_Branch REFERENCES Branch(BranchID),
    ItemAvailability CHAR(1) CHECK (ItemAvailability IN ('Y', 'N'))
);

CREATE TABLE ItemSize (
    ItemID VARCHAR2(10),
    ItemSize VARCHAR2(25),
    ItemPrice NUMBER(5) CONSTRAINT nn_ItemPrice NOT NULL,
    CONSTRAINT pk_ItemSize PRIMARY KEY (ItemID, ItemSize)
);

CREATE TABLE Orders (
    OrderID VARCHAR2(10) CONSTRAINT pk_Orders PRIMARY KEY,
    DropLoc VARCHAR2(50) CONSTRAINT nn_DropLoc NOT NULL,
    OrderStatus VARCHAR2(11) CONSTRAINT chk_OrderStatus CHECK (OrderStatus IN ('IN MAKING', 'IN
PROGRESS', 'DELIVERED')),
    DeliveryFee NUMBER(4),
    PayMethod VARCHAR2(17) CONSTRAINT chk_PayMethod CHECK (PayMethod IN ('BANK TRANSFER',
'COD', 'CREDIT/DEBIT CARD')),
    PayStatus VARCHAR2(9) CONSTRAINT chk_PayStatus CHECK (PayStatus IN ('PENDING', 'COMPLETED')),
    OrderDate DATE DEFAULT SYSDATE,
    CustID VARCHAR2(10) CONSTRAINT fk_Order_Customer REFERENCES Customer(CustID),
    RiderID VARCHAR2(10) CONSTRAINT fk_Order_Rider REFERENCES Rider(RiderID),
    OrderReview VARCHAR2(100),
    OrderRating NUMBER CONSTRAINT chk_OrderRating CHECK (OrderRating BETWEEN 1 AND 5)
);
```

```
CREATE TABLE OrderDetails (
    ItemQuantity NUMBER(3) DEFAULT 1 CONSTRAINT nn_ItemQuantity NOT NULL,
    OrderedItemSize VARCHAR2(50),
    ItemID VARCHAR2(10),
    OrderID VARCHAR2(10) CONSTRAINT fk_OrderDetails_Order REFERENCES Orders(OrderID),
    CONSTRAINT pk_OrderDetails PRIMARY KEY (OrderedItemSize, ItemID, OrderID),
    CONSTRAINT fk_OrderDetails FOREIGN KEY (ItemID, OrderedItemSize) REFERENCES ItemSize
(ItemID,ItemSize)
);
```

7- Views

1) To display menu items of a restaurant's branch:

```
CREATE OR REPLACE VIEW Menu AS
SELECT I.ItemId, I.ItemName, I.ItemAvailability,
B.BranchId, B.BranchName, B.BranchAddress, B.BranchRating, B.RestID
FROM Item I JOIN Branch B
ON I.BranchId = B.BranchId;
```

Working:

```
SELECT * FROM Menu
WHERE BranchName = 'Jalal Sons Karachi';
```

Results | Explain | Describe | Saved SQL | History

ITEMID	ITEMNAME	ITEMAVAILABILITY	BRANCHID	BRANCHNAME	BRANCHADDRESS	BRANCHRATING	RESTID
808	Cheeseburger	N	704	Jalal Sons Karachi	101 PQR Lane, Karachi	3.9	602
810	Chicken Tenders	Y	704	Jalal Sons Karachi	101 PQR Lane, Karachi	3.9	602
809	Fries	Y	704	Jalal Sons Karachi	101 PQR Lane, Karachi	3.9	602
811	Pepperoni Pizza	Y	704	Jalal Sons Karachi	101 PQR Lane, Karachi	3.9	602

2) To display order history of a customer:

```
CREATE OR REPLACE VIEW OrderHistory AS
        SELECT C.CustId, C.CustName, O.OrderID, O.OrderDate,
        D.ItemId, I.ItemName, D.ItemQuantity, D.OrderedItemSize
        FROM Customer C JOIN OrderS O ON C.CustId = O.CustId
        JOIN OrderDetails D ON O.OrderId = D.OrderId
        JOIN Item I ON I.ItemId = D.ItemId;
```

Working:

```
SELECT * FROM OrderHistory
WHERE CustId = 401
ORDER BY OrderId;
```

Results Explain Describe Saved SQL History

CUSTID	CUSTNAME	ORDERID	ORDERDATE	ITEMID	ITEMNAME	ITEMQUANTITY	ORDEREDITEMSIZE
401	Ali Khan	901	12/18/2023	802	Chocolate Cake	2	Small
401	Ali Khan	901	12/18/2023	801	Chicken Sandwich	1	Large
401	Ali Khan	901	12/18/2023	804	Chocolate Cake	1	Small (1 Pound)
401	Ali Khan	905	12/18/2023	810	Chicken Tenders	1	Large Pack (15 pieces)
401	Ali Khan	905	12/18/2023	809	Fries	2	Large Pack
401	Ali Khan	911	12/18/2023	801	Chicken Sandwich	1	Large
401	Ali Khan	911	12/18/2023	802	Chocolate Cake	2	Small
401	Ali Khan	911	12/18/2023	803	Chicken Sandwich	1	Small
401	Ali Khan	912	12/18/2023	804	Chocolate Cake	2	Large (2 Pounds)
401	Ali Khan	912	12/18/2023	805	Chicken Wings	1	Small Pack (10 wings)
401	Ali Khan	920	12/18/2023	802	Chocolate Cake	2	Small
401	Ali Khan	920	12/18/2023	801	Chicken Sandwich	2	Small
401	Ali Khan	920	12/18/2023	803	Chicken Sandwich	1	Large

9- Five Common Reports

i. Branch-wise Revenue Report 2023

SELECT Branch.BranchID, Branch.BranchName, Restaurant.RestName, NVL(SUM(ItemSize.ItemPrice * OrderDetails.ItemQuantity), 0) AS BranchRevenue FROM Branch JOIN Restaurant ON Branch.RestID = Restaurant.RestID JOIN Item ON Branch.BranchID = Item.BranchID JOIN OrderDetails ON Item.ItemID = OrderDetails.ItemID JOIN ItemSize ON OrderDetails.ItemID = ItemSize.ItemID and OrderDetails.ordereditemsize=ItemSize.itemsize JOIN Order ON OrderDetails.OrderID = Order.OrderID

WHERE TO_CHAR(Order.OrderDate, 'YYYY') = '2023' GROUP BY Branch.BranchID, Branch.BranchName, Restaurant.RestName ORDER BY BranchRevenue DESC;

BRANCHID	BRANCHNAME	RESTNAME	BRANCHREVENUE
704	Jalal Sons Karachi	Jalal Sons	30050
703	Jalal Sons Lahore	Jalal Sons	19400
701	Cafe Euphoria Lahore 1	Cafe Euphoria	11100
702	Cafe Euphoria Lahore 2	Cafe Euphoria	10100
710	Malmo Karachi	Malmo Bakers & Sweets	5400
708	Malmo Lahore 1	Malmo Bakers & Sweets	2800
706	Malmo Islamabad 1	Malmo Bakers & Sweets	2000
709	Malmo Lahore 2	Malmo Bakers & Sweets	750
705	Makhbiz Peshawar	Makhbiz Kebab Corner	310

9 rows returned in 0.01 seconds Download

ii. Rider Performance Report

SELECT Rider.RiderID, Rider.RiderName, COUNT(Orders.OrderID) AS TotalDeliveries

FROM Rider

JOIN Orders ON Rider.RiderID = Orders.RiderID

WHERE Orders.OrderStatus = 'DELIVERED'

GROUP BY Rider.RiderID, Rider.RiderName

ORDER BY TotalDeliveries DESC;

RIDERID	RIDERNAME	TOTALDELIVERIES
505	Faisal Khan	2
508	Saima Malik	2
504	Zaviyar Ahmed	1
507	Tariq Ahmed	1
503	Arif Malik	1
509	Noman Hassan	1
501	Hassan Ali	1

iii. Most Ordered items Report

```
SELECT *  FROM (  SELECT Item.ItemName, Branch.BranchName, Restaurant.RestName,
SUM(OrderDetails.ItemQuantity) AS TotalQuantityOrdered  FROM OrderDetails
JOIN Item ON OrderDetails.ItemID = Item.ItemID
JOIN Branch ON Item.BranchID = Branch.BranchID  JOIN Restaurant ON Branch.RestID = Restaurant.RestID  GROUP BY Item.ItemName, Branch.BranchName, Restaurant.RestName
ORDER BY SUM(OrderDetails.ItemQuantity) DESC
)
WHERE ROWNUM <= 5;
```

Results | Explain | Describe | Saved SQL | History

ITEMNAME	BRANCHNAME	RESTNAME	TOTALQUANTITYORDERED
Chocolate Cake	Cafe Euphoria Lahore 1	Cafe Euphoria	6
Chicken Sandwich	Cafe Euphoria Lahore 1	Cafe Euphoria	6
Fries	Jalal Sons Karachi	Jalal Sons	6
Pepperoni Pizza	Jalal Sons Karachi	Jalal Sons	5
Chicken Wings	Jalal Sons Lahore	Jalal Sons	5

5 rows returned in 0.01 seconds Download

iv. Top Customers by order count

```
SELECT c.CustID, c.CustName, c.CustEmail, order_counts.TotalOrdersPlaced  FROM Customer c  JOIN (
SELECT CustID, COUNT(OrderID) AS TotalOrdersPlaced FROM Orders  GROUP BY CustID  HAVING COUNT(OrderID) = (SELECT MAX(OrderCount)  FROM ( SELECT COUNT(OrderID) AS OrderCount  FROM Orders  GROUP BY CustID  )  )
) order_counts ON c.CustID = order_counts.CustID;
```

CUSTID	CUSTNAME	CUSTEMAIL	TOTALORDERSPLACED
401	Ali Khan	alikhan123@gmail.com	5

v. "Orders in Progress with Customer Details Report"

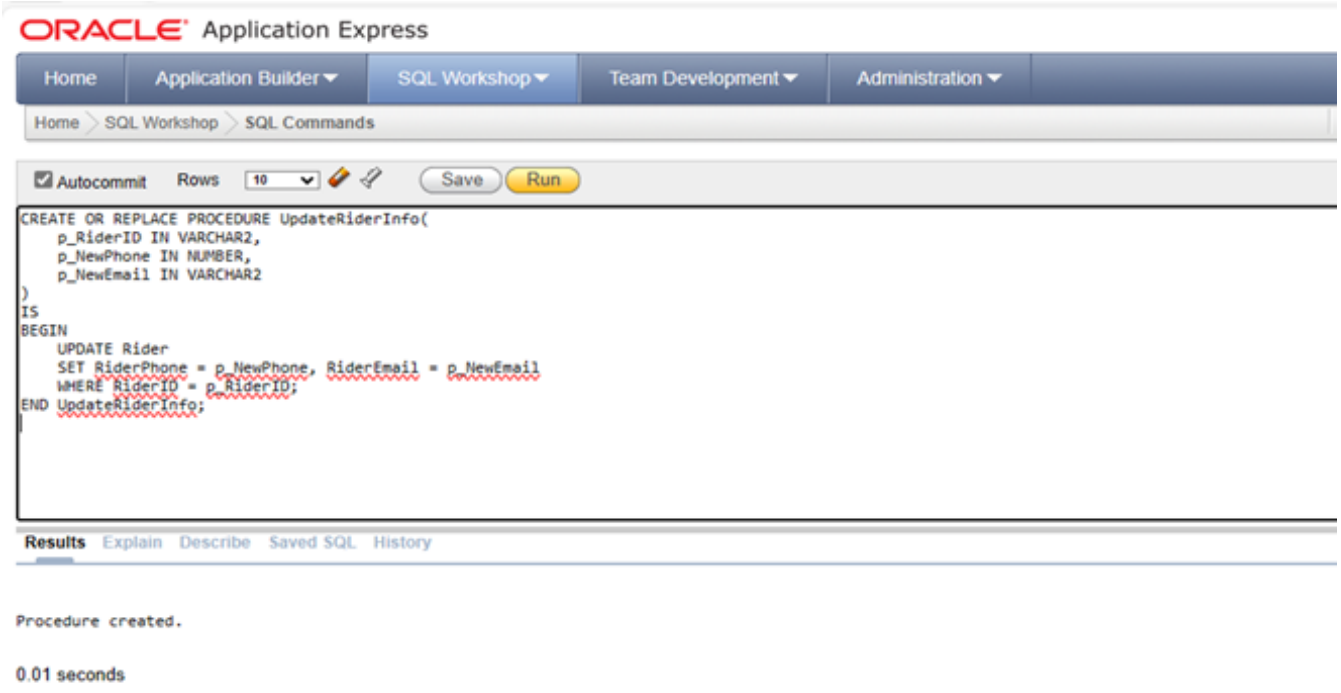
SELECT o.OrderID, o.OrderDate, o.OrderStatus, o.DROPLOC, c.CustID, c.CustName, c.CustPhone FROM Orders o JOIN Customer c ON o.CustID = c.CustID WHERE o.OrderStatus = 'IN PROGRESS';

ORDERID	ORDERDATE	ORDERSTATUS	DROPLOC	CUSTID	CUSTNAME	CUSTPHONE
902	12/21/2023	IN PROGRESS	456 Park Avenue, Islamabad	402	Sara Ahmed	3111234567
913	12/21/2023	IN PROGRESS	333 Beach Avenue, Karachi	403	Ahmed Hassan	3221234567
906	12/21/2023	IN PROGRESS	303 Skyline Avenue, Lahore	406	Nida Ali	3551234567
917	12/21/2023	IN PROGRESS	777 Seaside Street, Karachi	407	Imran Ahmed	3661234567
910	12/21/2023	IN PROGRESS	707 Galaxy Avenue, Peshawar	410	Kamran Ali	3991234567

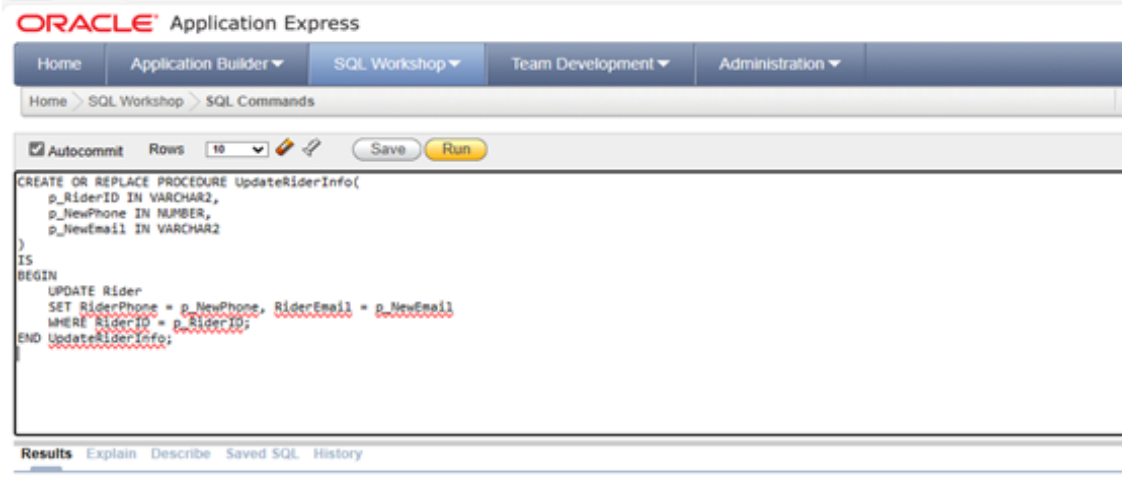
8- Procedures, Functions and Triggers

Procedures:

1) Procedure to Update Rider Information



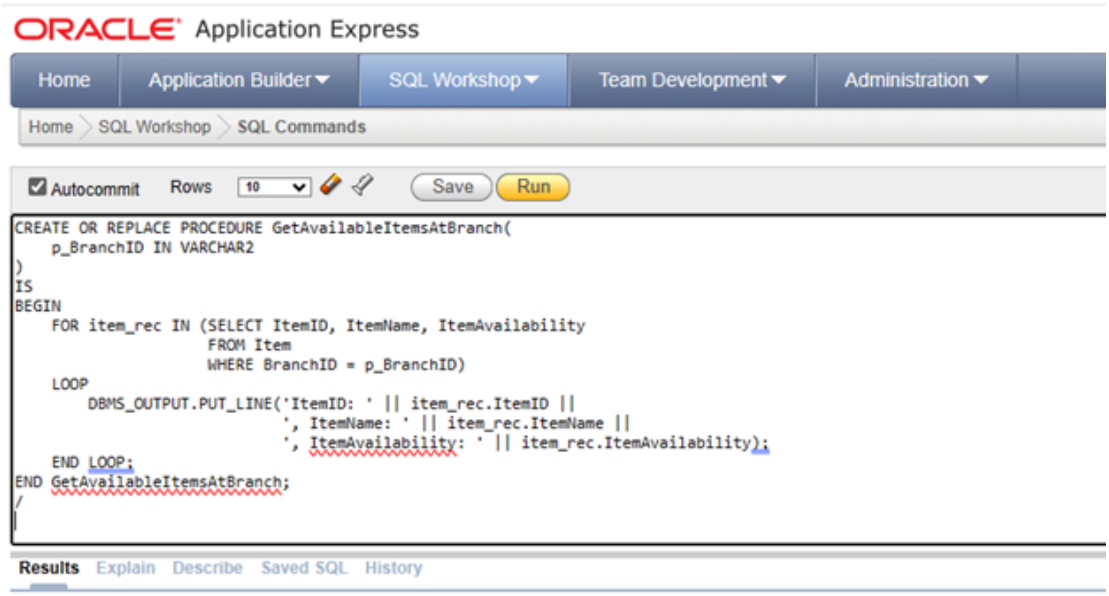
Working:



Procedure created.

0.01 seconds

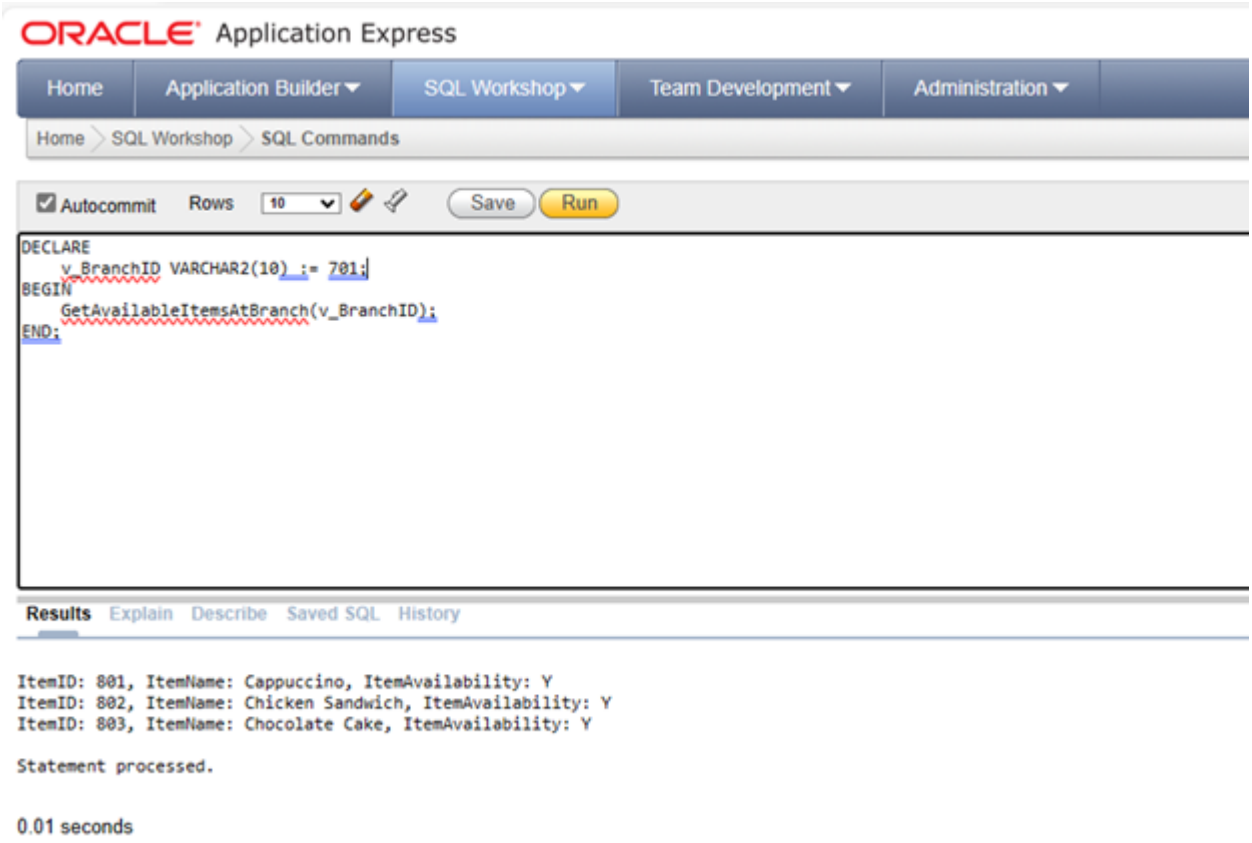
2) Procedure to Retrieve Available Items at a Branch:



Procedure created.

0.03 seconds

Working:



Triggers:

1) To check if an item is available before placing an order

```
CREATE OR REPLACE TRIGGER CheckItemAvailability BEFORE INSERT ON OrderDetails
 FOR EACH ROW
DECLARE
Avail Item.ItemAvailability%type;
BEGIN
SELECT ItemAvailability INTO Avail FROM Item WHERE ItemId = :NEW.ItemId;
IF (Avail = 'N') THEN
 RAISE_APPLICATION_ERROR (-20003,'Item is not currently available');
END IF;
END;
```

Working:

```
INSERT INTO OrderDetails
VALUES (1,'Small (1 Pound)',804,921);
```

Results Explain Describe Saved SQL History

```
ORA-20003: Item is not currently available
ORA-06512: at "BSEF21M001.CHECKITEMAVAILABILITY", line 6
ORA-04088: error during execution of trigger 'BSEF21M001.CHECKITEMAVAILABILITY'
```

2) To update a restaurant branch's rating based on the rating of its orders

```
CREATE OR REPLACE TRIGGER UpdateBranchRating
AFTER UPDATE OF OrderRating ON Orders
FOR EACH ROW
DECLARE
  PRAGMA AUTONOMOUS_TRANSACTION;
  AvgRating   Branch.BranchRating%TYPE;
  BrId        Branch.BranchId%TYPE;
  OldRating   Branch.BranchRating%TYPE;
BEGIN
   -- Retrieve information for the updated order
   SELECT BranchId INTO BrId FROM Item WHERE ItemId = (SELECT ItemId FROM OrderDetails
WHERE OrderId = : NEW.OrderId AND ROWNUM = 1);
   SELECT BranchRating INTO OldRating FROM Branch WHERE BranchId = BrId;
   -- Calculate the new average rating
   SELECT AVG(O.OrderRating) INTO AvgRating
   FROM OrderDetails D JOIN Orders O ON D.OrderId = O.OrderId
   WHERE D.ItemId IN (SELECT ItemId FROM Item WHERE BranchId = BrId);
   -- Update the branch rating using an autonomous transaction
   COMMIT; -- Commit the current transaction
   BEGIN
    -- Start a new transaction
    UPDATE Branch
    SET BranchRating = AvgRating
    WHERE BranchId = BrId;
    DBMS_OUTPUT.PUT_LINE('Old Rating : ' || OldRating);
    DBMS_OUTPUT.PUT_LINE('New Rating : ' || AvgRating);
```

```
        COMMIT;
    END;
END;
```

Working:

```
UPDATE Orders
SET OrderRating = 4.1
WHERE OrderId = 915
```

Results Explain Describe Saved SQL

```
Old Rating : 4.5
New Rating : 4.3

1 row(s) updated.
```

Function:

1- calculate the total cost of an order

```
CREATE OR REPLACE FUNCTION CalculateTotalOrderCost(p_order_id  Orders.OrderID%TYPE)
RETURN NUMBER IS
v_total_cost NUMBER := 0;
delivery_fee NUMBER:=0;
BEGIN
SELECT SUM(ItemSize.ItemPrice * OrderDetails.ItemQuantity) INTO v_total_cost FROM OrderDetails
 JOIN ItemSize ON OrderDetails.ItemID = ItemSize.ItemID  and OrderDetails.ordereditemsize = ItemSize.itemsize
 WHERE OrderDetails.OrderID = p_order_id;
SELECT orders.deliveryfee INTO delivery_fee FROM Orders where orderid= p_order_id;
RETURN v_total_cost + delivery_fee;
END;
```

Results Explain Describe Saved SQL History

```
Function created.

0.00 seconds
```

Working:

```
select  orderid,'Rs ' || CalculateTotalOrderCost(orderid) totalordercost from orders;
```

Results Explain Describe Saved SQL History

ORDERID	TOTALORDERCOST
901	Rs 1950
902	Rs 3600
903	Rs 1300
904	Rs 2030
905	Rs 1570
906	Rs 1210
907	Rs 690
908	Rs 810
909	Rs 2470
910	Rs 2780
More than 10 rows available. Increase rows selector to view more rows.	

10 rows returned in 0.01 seconds Download

2- Function that calculates the number of orders in a branch of a restaurant.

```
CREATE OR REPLACE FUNCTION GetTotalOrdersAtBranch(p_branch_id IN Branch.BranchID%TYPE)
RETURN NUMBER
IS
   v_total_orders NUMBER := 0;
BEGIN
   SELECT COUNT(*)
   INTO v_total_orders
   FROM Orders
   WHERE OrderID IN (
      SELECT OrderID
      FROM OrderDetails
      WHERE ItemID IN (
         SELECT ItemID
         FROM Item
         WHERE BranchID = p_branch_id
      )
   );

   RETURN v_total_orders;
EXCEPTION
   WHEN NO_DATA_FOUND THEN
      RETURN NULL;
END;
```

Results Explain Describe Saved SQL History

```
Function created.
```

Working:

```
select branchid,branchname,GetTotalOrdersAtBranch(branchid) totalorders,branch.restid,restname resturantname from branch  join restaurant on branch.restid=restaurant.restid;
```

Results Explain Describe Saved SQL History

BRANCHID	BRANCHNAME	TOTALORDERS	RESTID	RESTURANTNAME
701	Cafe Euphoria Lahore 1	4	601	Cafe Euphoria
702	Cafe Euphoria Lahore 2	4	601	Cafe Euphoria
703	Jalal Sons Lahore	5	602	Jalal Sons
704	Jalal Sons Karachi	7	602	Jalal Sons
705	Makhbiz Peshawar	1	603	Makhbiz Kebab Corner
706	Malmo Islamabad 1	1	605	Malmo Bakers & Sweets
707	Malmo Islamabad 2	0	605	Malmo Bakers & Sweets
708	Malmo Lahore 1	3	605	Malmo Bakers & Sweets
709	Malmo Lahore 2	1	605	Malmo Bakers & Sweets
710	Malmo Karachi	1	605	Malmo Bakers & Sweets

More than 10 rows available. Increase rows selector to view more rows.

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8- Relational data model