Nothing Bundt Cakes

Final Project Deliverable

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IS 4420 - Database Fundamentals

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Project Overview

Our group decided to focus our project on the franchise Nothing Bundt Cakes which specializes in providing customers with gourmet round cakes. Because it can only operate as a brick and mortar store, the franchise has an integrated system that ensures that the operations in the store are optimal. In order to stay efficient and effective with Nothing Bundt Cakes corporate goals, these key entities and their relationships must be tracked and recorded.

Nothing Bundt Cakes was founded by Dena Tripp and Debbie Shwetz, two friends dedicated to making delicious cakes that did not compromise on their ingredient list. What started as their side hobby quickly turned into a real business. Nothing Bundt Cakes has served customers nationwide for just over twenty years with cakes for any occasion. From various sized Bundt Cakes, a tiered cake to a miniature Bundlet, as well as our bite-sized Bundtinis®, any customer will find exactly what they are looking for.

User Requirements

We centered our user requirements on the customer and how our team can optimize receiving and handling orders in the most efficient way possible. By accurately tracking items such as inventory and ingredients, we are able to fulfill our customer's orders with little to no errors.

- Provide customers the ability to order products
- Provide combinations of different products through size and flavor selection
- Products will be contained in orders through various order lines
- Allow customers order as pickup or delivery
- Allow employees to receive and handle orders
- Allow employees to be compensated for hours worked
- Orders will be stored and recorded accurately
- Managers need to be able to track employee shifts and schedules
- Offer deliveries can be made to customers who desire it
- Accurate count of ingredients will be tracked to order from supplier when needed
- Acquire customer order history and personal information
- Positions and tasks are clearly organized for shifts and schedules
- Employees can update inventory count
- Can track inventory costs and purchases
- Clarify employee tasks that utilize different inventory and ingredients
- Allow managers to accurately track employee attendance
- Update Customer information when needed

- Record from which suppliers to purchase inventory and ingredients
- Allow managers to adequately staff schedules
- Track Inventory Orders placed by customers

Business Rules

The Nothing Bundt Cakes business rules include only the entities that we believed to be essential in executing our goals as a team. In order to minimize downtime and overloading of our systems, we have included 13 separate entities that will enhance our business operations and allow us to be successful.

- CUSTOMERS can place one or more ORDERS
- ORDERS are placed by one and only one CUSTOMERS
- ORDERS contain one or more ORDERLINES
- ORDERLINES are part of one and only one ORDERS
- PRODUCTS are part of one or more ORDERLINES
- ORDERLINES contain one and only one PRODUCTS
- EMPLOYEES are managed by one and only one EMPLOYEES
- EMPLOYEES manages one or more EMPLOYEES
- ORDERS can be DELIVERYORDERS
- ORDERS can be PICKUPORDERS
- SHIFTS belong to one and only one EMPLOYEES
- EMPLOYEES have one or more SHIFTS
- SHIFTS belongs to one and only one SCHEDULES
- SCHEDULES consist of one or more SHIFTS
- INGREDIENTS are supplied by one and only one SUPPLIERS
- SUPPLIERS supplies one or more INGREDIENTS
- EMPLOYEES may place one or more INVENTORYORDERS
- INVENTORYORDERS are placed by one and only one EMPLOYEES
- INVENTORYORDERS are part of one or more INVENTORYORDERLINES
- INVENTORYORDERLINES have one and only one INVENTORYORDERS

Business Questions

The business questions we have implemented query the most crucial aspects of our business. Including elements from sales, inventory tracking, and cost measurements, it is essential that the Nothing Bundt Cakes team is aware of all measurements that will bring us closer to our objectives. From these questions, we are able to better understand our positioning as a working group, and adjust necessary elements in our work that will make us successful.

- What are the total sales that we have made this year so far?
- On average, how often do we purchase new ingredients?

- What ingredient is purchased most frequently?
- How many hours did each employee work?
- Which customer orders the most frequently?
- What state do most of our customers reside in?
- How much is each customer spending on average?
- Which products have the highest sales volume?
- What method of ordering is the most used by customers?
- What ingredients have we bought the most of and from which suppliers?
- Which employee orders the most inventory?

Data Outputs

The data outputs that our team created allows us to view and analyze important data points within our operations that help us measure our performance. By viewing these outputs, we are able to adjust necessary elements in production and retailing that will project us towards a profitable future. There are also procedures that have been created to seamlessly incorporate new information into our data structures, eliminating any redundant and repetitive actions. The outputs are as follows:

Views

Display the full customer information and most recent purchase

This allows us to view which customers have recently bought cake in chronological order starting from the most recent. We can use this information to verify which customers has bought what cake, and can minimize confusion on order handling.

CustomerID	FullName	FullAddress	RecentlyBought
5	Robert John Bryant	2938 Goshen Ave Clovis CA 93611	10 inch Confetti Cake
7	Ryan Kelsey McClendon	8983 Spruce Lane Visalia CA 93420	10 inch Red Velvet Cake
11	Carolyn Jillian Shaw	2281 Nees Ave Fresno CA 93722	8 inch Chocolate Cake
4	Jane Erin Swift	892 E 100 S Salt Lake City UT 84102	8 inch Carrot Cake
10	Andrew Hill Rush	736 Locust Ave Fresno CA 93711	10 inch Red Velvet Cake
8	Carlos David Cabrera	3829 Essex Ave Fresno CA 93720	8 inch Red Velvet Cake
9	Ashlyn Marie Brosi	8327 Hickory Hill Ave Fresno CA 93720	8 inch Chocolate Cake
12	Tiffany Frank	3928 Alluvial Ave Fresno CA 93710	10 inch Red Velvet Cake
2	Hannah Lewis	1425 E Teague Ave Fresno CA 93720	10 inch Red Velvet Cake
6	Jonathan David Winn	738 Decatur Ave Fresno CA 93720	10 inch Carrot Cake
1	James Colby Smith	839 Cherry Lane Salt Lake City UT 84…	10 inch Red Velvet Cake
3	Hazel Paige Harrison	2129 W El Paso Ave Clovis CA 93611	8 inch Red Velvet Cake
13	Edgar Tedd Codd	9273 Fundamental Ave Salt Lake City…	NULL

Create an invoice for inventory orders that includes item bought, quantity bought, sales price, and supplier name

This view allows us to use this information to guide how we conduct purchasing new ingredients from suppliers, and analyze methods of lowering costs. It is ordered by most recent purchases, and it allows us to see the quantities that we have bought, its price, and other important measures.

SupplierID	SupplierName	IngredientName	OrderDate	Quantity	SalesPrice	TotalCost
8	FruitsAndVeggies	Carrots	2020-05-15	4	3029.23	12116.92
4	NothingButRed	Red Food Dye	2020-04-25	1	2987.23	2987.23
2	FlourOfFlowers	Flour	2020-04-25	4	4839.02	19356.08
7	EverydayBirthday	Birthday Cake Flavoring	2020-04-21	5	923.20	4616.00
3	KingOfCheese	Cream Cheese	2020-03-12	3	4349.32	13047.96
3	KingOfCheese	Cream Cheese	2020-02-28	5	2093.99	10469.95
2	FlourOfFlowers	Flour	2020-02-28	2	4983.22	9966.44
3	KingOfCheese	Cream Cheese	2020-02-12	4	2324.29	9297.16
4	NothingButRed	Red Food Dye	2020-02-12	5	9094.09	45470.45
1	ButterFields	Butter	2020-02-04	2	3243.32	6486.64
2	FlourOfFlowers	Flour	2020-01-29	2	3902.23	7804.46
3	KingOfCheese	Cream Cheese	2020-01-29	7	2930.23	20511.61
7	EverydayBirthday	Birthday Cake Flavoring	2020-01-12	4	7891.39	31565.56
3	KingOfCheese	Cream Cheese	2020-01-05	8	2934.59	23476.72

Stored Procedures:

Create a way to add a new customer into the customers table

This stored procedure creates a way for us to add new customers to our table. This is a crucial aspect of our operation as we gain new clients each day with our products, and we must be able to collect and organize this information to reduce confusion with order delivery.

```
 DELIMITER //
CREATE PROCEDURE AddNewCustomer
( IN $FirstName            VARCHAR(25),
  IN $MiddleName           VARCHAR(25),
  IN $Lastname             VARCHAR(25),
  IN $StreetAddress        VARCHAR(35),
  IN $City                 VARCHAR(25),
  IN $State                CHAR(2),
  IN $ZipCode              VARCHAR(10)
  )
BEGIN
    DECLARE $CustomerID INT;
    DECLARE EXIT HANDLER FOR SQLEXCEPTION BEGIN ROLLBACK; RESIGNAL; END;
START TRANSACTION;
INSERT INTO Customers (FirstName, MiddleName, LastName, StreetAddress, City, State, ZipCode)
VALUES ( $FirstName, $MiddleName, $LastName, $StreetAddress, $City, $State, $ZipCode );
SET $CustomerID = LAST_INSERT_ID();
COMMIT;
END //
DELIMITER ;
```

Create a way to update Employee information

This procedure allows us to update the information on our current employees. Anticipated changes include adjustments in manager oversight or employee addresses.

```
DELIMITER //
CREATE PROCEDURE UpdateEmployeeInfo
( IN $EmployeeID            SMALLINT,
  IN $ManagerEmployeeID     SMALLINT,
  IN $FirstName             VARCHAR(25),
  IN $MiddleName            VARCHAR(25),
  IN $LastName              VARCHAR(25),
  IN $StreetAddress         VARCHAR(35),
  IN $City                  VARCHAR(25),
  IN $State                 CHAR(2),
  IN $ZipCode               VARCHAR(10)
)
BEGIN
DECLARE EXIT HANDLER FOR SQLEXCEPTION BEGIN ROLLBACK; RESIGNAL; END;

START TRANSACTION;
UPDATE Employees
SET ManagerEmployeeID = $ManagerEmployeeID,
    FirstName = $FirstName,
    MiddleName = $Middlename,
    LastName = $LastName,
    StreetAddress = $StreetAddress,
    City = $City,
    State = $State,
    Zipcode = $Zipcode
WHERE EmployeeID = $EmployeeID;
COMMIT;
END //
DELIMITER ;
```

Create a way to update the number of ingredients that are on hand in inventory

This stored procedure allows us to update the inventory on hand of our current ingredients. This is a crucial aspect of our business as we need to know the number of ingredients we have in our

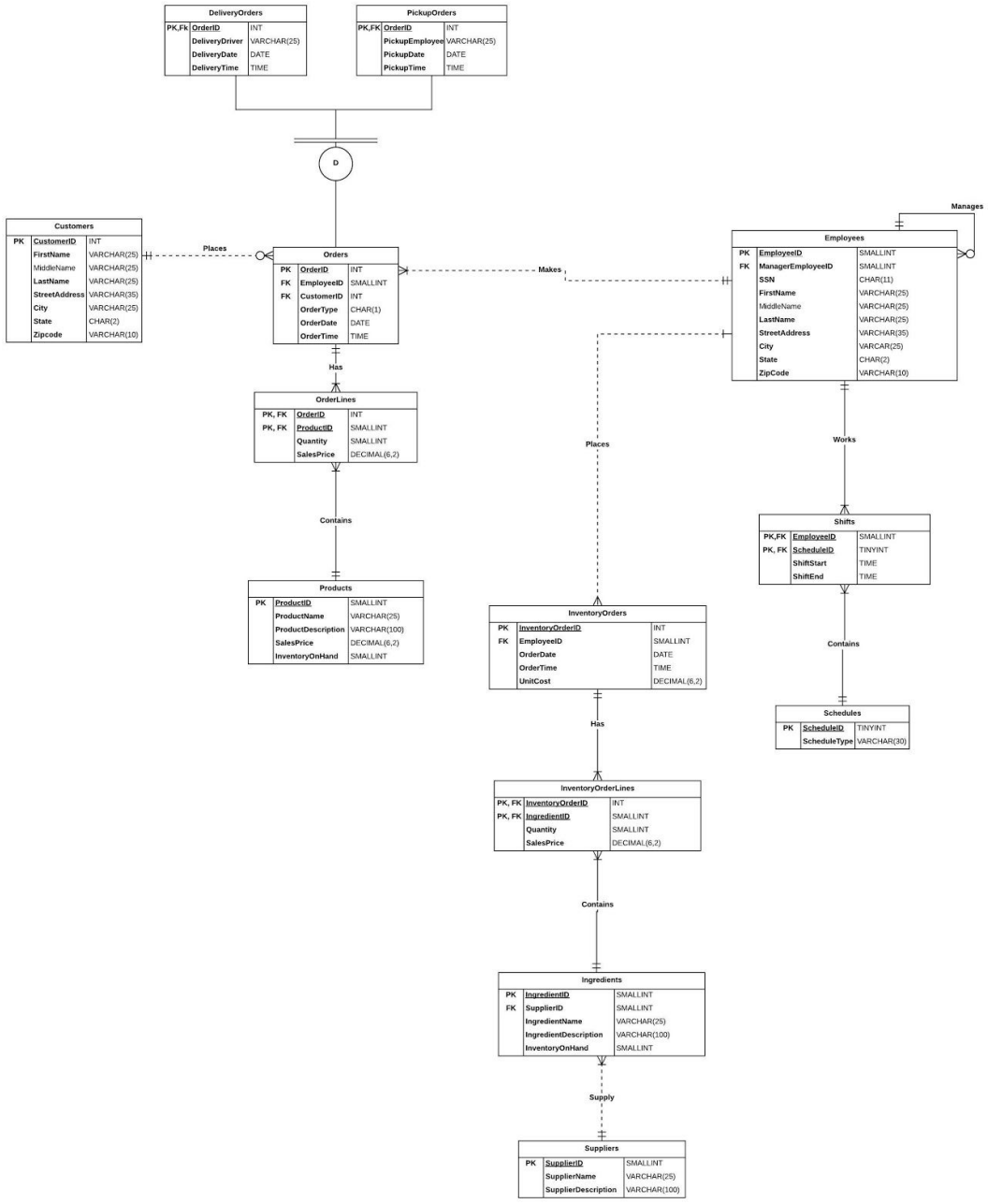
supplies, and when we need to order. By having sufficient inventory, we can ensure that we can deliver to our customers' demands.

```
DELIMITER //
CREATE PROCEDURE UpdateIngredients
( IN $IngredientID          SMALLINT,
  IN $InventoryOnHand       SMALLINT
  )
  BEGIN
  DECLARE EXIT HANDLER FOR SQLEXCEPTION BEGIN ROLLBACK; RESIGNAL; END;

  START TRANSACTION;
  UPDATE Ingredients
  SET InventoryOnHand = $InventoryOnHand
  WHERE IngredientID = $IngredientID;

  COMMIT;
  END //
  DELIMITER ;
```

Physical Data Model



[LucidChart Link]

Database Implementation

Creating the database (Examples)

Create Orders table:

```
DROP TABLE IF EXISTS Orders;
CREATE TABLE Orders
( OrderID               INT NOT NULL AUTO_INCREMENT,
  EmployeeID            SMALLINT NOT NULL,
  CustomerID            INT NOT NULL,
  OrderType             CHAR(1) NOT NULL,
  OrderDate             DATE NOT NULL,
  OrderTime             TIME NOT NULL,
  CONSTRAINT PK_Orders_OrderID PRIMARY KEY ( OrderID ),
  CONSTRAINT FK_Orders_EmployeeID FOREIGN KEY ( EmployeeID ) REFERENCES Employees ( EmployeeID ),
  CONSTRAINT FK_Orders_CustomerID FOREIGN KEY ( CustomerID ) REFERENCES Customers ( CustomerID ),
    CONSTRAINT CHECK_Orders_OrderType CHECK ( OrderType IN ( 'D', 'P' ) )
);
```

Create Shifts table:

```
DROP TABLE IF EXISTS Shifts;
CREATE TABLE Shifts
( EmployeeID            SMALLINT NOT NULL,
  ScheduleID            TINYINT NOT NULL,
  ShiftStart            TIME NOT NULL,
  ShiftEnd              TIME NOT NULL,

  CONSTRAINT PK_Shifts_EmployeeID_ScheduleID PRIMARY KEY ( EmployeeID, ScheduleID ),
  CONSTRAINT FK_Shifts_EmployeeID FOREIGN KEY ( EmployeeID ) REFERENCES Employees ( EmployeeID ),
  CONSTRAINT FK_Shifts_ScheduleID FOREIGN KEY ( ScheduleID ) REFERENCES Schedules ( ScheduleID )
);
```

Create Customers table:

```sql
CREATE DATABASE NothingBundtCakes;
USE NothingBundtCakes;

-- Create the Customers table, no FKs
DROP TABLE IF EXISTS Customers;
CREATE TABLE Customers
( CustomerID        INT NOT NULL AUTO_INCREMENT,
  FirstName         VARCHAR(25) NOT NULL,
  MiddleName        VARCHAR(25) DEFAULT NULL,
  LastName          VARCHAR(25) NOT NULL,
  StreetAddress     VARCHAR(35) NOT NULL,
  City              VARCHAR(25) NOT NULL,
  State             CHAR(2) NOT NULL,
  ZipCode           VARCHAR(10) NOT NULL,

  CONSTRAINT PK_Customers_CustomerID PRIMARY KEY ( CustomerID )
);
```

Table Inserts:

Insert into Customers:

```sql
INSERT INTO Customers (FirstName, MiddleName, LastName, StreetAddress, City, State, ZipCode)
VALUES ('James', 'Colby', 'Smith', '839 Cherry Lane', 'Salt Lake City', 'UT', '84102'),
       ('Hannah', NULL, 'Lewis', '1425 E Teague Ave', 'Fresno', 'CA', '93720'),
       ('Hazel', 'Paige', 'Harrison', '2129 W El Paso Ave', 'Clovis', 'CA', '93611'),
       ('Jane', 'Erin', 'Swift', '892 E 100 S', 'Salt Lake City', 'UT', '84102'),
       ('Robert', 'John', 'Bryant', '2938 Goshen Ave', 'Clovis', 'CA', '93611'),
       ('Jonathan', 'David', 'Winn', '738 Decatur Ave', 'Fresno', 'CA', '93720'),
       ('Ryan', 'Kelsey', 'McClendon', '8983 Spruce Lane', 'Visalia', 'CA', '93420'),
       ('Carlos', 'David', 'Cabrera', '3829 Essex Ave', 'Fresno', 'CA', '93720'),
       ('Ashlyn', 'Marie', 'Brosi', '8327 Hickory Hill Ave', 'Fresno', 'CA', '93720'),
       ('Andrew', 'Hill', 'Rush', '736 Locust Ave', 'Fresno', 'CA', '93711'),
       ('Carolyn','Jillian', 'Shaw', '2281 Nees Ave', 'Fresno', 'CA', '93722'),
       ('Tiffany', NULL, 'Frank', '3928 Alluvial Ave', 'Fresno', 'CA', '93710'),
       ('Edgar', 'Tedd', 'Codd', '9273 Fundamental Ave', 'Salt Lake City','UT',' 84112');
```

Insert into Products:

```
INSERT INTO Products ( ProductName, ProductDescription, SalesPrice, InventoryOnHand )
VALUES ( '8 inch Red Velvet Cake', 'Bundt cake that is 8 inches and Red Velvet', '22.00', '40'),
       ( '10 inch Red Velvet Cake', 'Bundt cake that is 10 inches and Red Velvet', '32.00', '50'),
       ( '8 inch Chocolate Cake', 'Bundt cake that is 8 inches and Chocolate', '22.00', '40'),
       ( '10 inch Chocolate Cake', 'Bundt cake that is 10 inches and Chocolate', '32.00', '50'),
       ( '8 inch Lemon Cake', 'Bundt cake that is 8 inches and Lemon', '22.00', '40'),
       ( '10 inch Lemon Cake', 'Bundt cake that is 10 inches and Lemon', '32.00', '50'),
       ( '8 inch Marble Cake', 'Bundt cake that is 8 inches and Marble', '22.00', '40'),
       ( '10 inch Marble Cake', 'Bundt cake that is 10 inches and Marble', '32.00', '50'),
       ( '8 inch Carrot Cake', 'Bundt cake that is 8 inches and Carrot', '22.00', '40'),
       ( '10 inch Carrot Cake', 'Bundt cake that is 10 inches and Carrot', '32.00', '50'),
       ( '8 inch Confetti Cake', 'Bundt cake that is 8 inches and Confetti', '22.00', '40'),
       ( '10 inch Confetti Cake', 'Bundt cake that is 10 inches and Confetti', '32.00', '50'),
       ( '8 inch Vanilla Cake', 'Bundt cake that is 8 inches and Vanilla', '22.00', '40'),
       ( '10 inch Vanilla Cake', 'Bundt cake that is 10 inches and Vanilla', '32.00', '50');
```

Insert into Ingredients:

```
INSERT INTO Ingredients ( SupplierID, IngredientName, IngredientDescription, InventoryOnHand )
VALUES ( '1', 'Butter', '12 lbs sticks of butter', '30' ),
      ( '2', 'Flour', '50 lbs bag of flour', '25' ),
      ( '3', 'Cream Cheese', '25 lbs sticks of cream cheese', '30' ),
      ( '4', 'Red Food Dye', '20 gal red food shade', '10' ),
      ( '5', 'Vanilla Flavoring', '15 gal vanilla extract flavoring',  '10' ),
      ( '6', 'Chocolate Chips', '35 lbs Unsweetened Hersheys Chocolate Chips', '5' ),
      ( '6', 'Cocoa Powder', '20 lbs bag cocoa powder', '10' ),
      ( '7', 'Birthday Cake Flavoring', '10 gal natural birthday cake flavoring', '10' ),
      ( '7', 'Sprinkles', '10 lbs bag colorful sprinkles', '10' ),
      ( '8', 'Pineapple Chunks', '5 lbs can of pineapples', '30' ),
      ( '8', 'Carrots', '10 lbs bag of garden carrots', ' 15' ),
      ( '9', 'Eggs', '20 lbs container of egg yolk', '20' ),
      ( '9', 'Sour Cream', '15 lbs container of sour cream', '20' ),
      ( '10', 'Raspberry Filling', '10 lbs container of raspberry filling', '30' ),
      ( '11', 'Lemon Extract', '15 gal lemon extract', '10' ),
      ( '12', 'Baking Powder', ' 50 lbs bag of baking powder', '30' );
```

Answering Business Questions

Queries

How many hours did each employee work?

This query finds the number of hours an employee has worked over the course of their most recent scheduling. It is ordered in descending order by time worked. This helps our company see which one of our employees are receiving sufficient working hours throughout their schedules.

EmployeeID	EmployeeName	WorkedTime
15	Ralph Kimpball	24:00:00
14	Devesh Singh	24:00:00
7	Sarah Kate Lyon	18:00:00
3	Grace Marie Falco	18:00:00
4	Sharon Raine Smith	18:00:00
6	Trudi Joy Robertson	18:00:00
1	Jeremy Ryan Scott	18:00:00
9	John Jacob Williams	18:00:00
8	Sally Reagan Neely	18:00:00
5	Carson Jim Plumlee	18:00:00
2	Kathryn May Park	18:00:00
12	Mike Lee Anderson	08:00:00
13	Madhavi Jane Pan…	08:00:00
11	Gary Anthony Cornell	08:00:00
10	Kaitlyn Paige John…	08:00:00

What ingredient is purchased most frequently?

This query finds the number of times we have recently purchased an ingredient from our suppliers. It is ordered by the number of times we have purchased in a descending manner, and it allows us to see what ingredient is used and turned over most often.

IngredientName	PurchaseFrequency
Cream Cheese	5
Flour	3
Birthday Cake Flavoring	2
Red Food Dye	2
Carrots	1
Butter	1

Which customer orders the most frequently?

This query finds the customers who have ordered the most from our company and orders our clients in descending order. From this, it is clear that Hannah Lewis and Hazel Paige Harrison are our most loyal and frequently visited customers. This information can help our group measure customer retention as well as see how many new customers have been added.

CustomerName	OrderCount
Hannah Lewis	7
Hazel Paige Harrison	7
Ashlyn Marie Brosi	5
Andrew Hill Rush	3
Ryan Kelsey McClendon	3
Tiffany Frank	3
Carolyn Jillian Shaw	2
Carlos David Cabrera	2
James Colby Smith	2
Robert John Bryant	1
Jane Erin Swift	1
Jonathan David Winn	1

Which products have the highest sales volume?

This query analyzes which one of our products is being sold in the highest volume and orders it by sales volume in descending order. It also is an indication of which one of our items is the most popular among our customers and allows us to focus production on popular products to meet consumer demand.

ProductID	ProductName	SalesVolume
5	8 inch Lemon Cake	21905.78
7	8 inch Marble Cake	21672.52
11	8 inch Confetti Cake	17424.71
2	10 inch Red Velvet Cake	15428.90
9	8 inch Carrot Cake	14801.39
14	10 inch Vanilla Cake	11076.71
10	10 inch Carrot Cake	10833.12
1	8 inch Red Velvet Cake	7674.85
3	8 inch Chocolate Cake	3188.84
12	10 inch Confetti Cake	603.00
4	10 inch Chocolate Cake	362.97

What ingredients have we bought the most of and from which suppliers?

In order to find the costs and purchase count of our ingredients from suppliers, we have created a query that will allow us to collect all the necessary information. By ordering it from the highest ingredient total cost, and then by the number of times it was purchased, we can see the costs of our supplies as well as the supplier and retailer relationship and how frequently we conduct business with certain groups.

SupplierID	SupplierName	IngredientName	TimesPurchased	IngredientOrderTotal
3	KingOfCheese	Cream Cheese	5	76803.40
4	NothingButRed	Red Food Dye	2	48457.68
2	FlourOfFlowers	Flour	3	37126.98
7	EverydayBirthday	Birthday Cake Flavoring	2	36181.56
8	FruitsAndVeggies	Carrots	1	12116.92
1	ButterFields	Butter	1	6486.64