Nitya CloudTech
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Nitya CloudTech Pvt Ltd.

SQL Scenario-Based Interview Questions & Answers

1. Customer Purchase History Analysis

Question: You are tasked with analyzing customer purchase behavior for a retail store. You have a table `Orders` with columns `OrderID`, `CustomerID`, `OrderDate`, and `OrderAmount`. Write a query to find the average order amount per customer for customers who placed at least 3 orders in the past year.

Table Structure and Data:

```
CREATE TABLE Orders (
    OrderID INT PRIMARY KEY,
    CustomerID INT,
    OrderDate DATE,
    OrderAmount DECIMAL(10, 2)
);

-- Sample Data Insertion
INSERT INTO Orders (OrderID, CustomerID, OrderDate, OrderAmount) VALUES
(1, 101, '2023-02-15', 200.00),
(2, 101, '2023-05-18', 150.00),
(3, 102, '2023-07-12', 300.00),
(4, 103, '2023-08-23', 400.00),
(5, 101, '2023-09-14', 120.00);
```

Query:

```
SELECT CustomerID, AVG(OrderAmount) AS AverageOrderAmount
FROM Orders
WHERE OrderDate >= DATEADD(YEAR, -1, GETDATE())
GROUP BY CustomerID
HAVING COUNT(OrderID) >= 3;
```

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2. Employee Attendance Analysis

Question: You have an `Attendance` table with columns `EmployeeID`, `AttendanceDate`, and `Status` (either 'Present' or 'Absent'). Write a query to find employees who have been absent for more than 5 days in the last month.

Table Structure and Data:

```
CREATE TABLE Attendance (
    EmployeeID INT,
    AttendanceDate DATE,
    Status VARCHAR(10)
```

```
);

-- Sample Data Insertion
INSERT INTO Attendance (EmployeeID, AttendanceDate, Status) VALUES
(1, '2023-09-01', 'Present'),
(1, '2023-09-02', 'Absent'),
(2, '2023-09-02', 'Present'),
(1, '2023-09-03', 'Absent');
```

Query:

```
SELECT EmployeeID, COUNT(*) AS AbsentDays
FROM Attendance
WHERE Status = 'Absent' AND AttendanceDate >= DATEADD(MONTH, -1, GETDATE())
GROUP BY EmployeeID
HAVING COUNT(*) > 5;
```

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3. Top-Selling Product in Each Category

Question: You are working with an e-commerce database that includes a `Products` table with columns `ProductID`, `CategoryID`, and `Price`, and a `Sales` table with columns `SaleID`, `ProductID`, and `QuantitySold`. Write a query to find the product with the highest total sales amount in each category.

Table Structure and Data:

```
CREATE TABLE Products (
    ProductID INT PRIMARY KEY,
    CategoryID INT,
    Price DECIMAL(10, 2)
);

CREATE TABLE Sales (
    SaleID INT PRIMARY KEY,
    ProductID INT,
    QuantitySold INT
);

-- Sample Data Insertion
INSERT INTO Products (ProductID, CategoryID, Price) VALUES
(1, 10, 15.00),
(2, 10, 20.00),
(3, 20, 10.00);

INSERT INTO Sales (SaleID, ProductID, QuantitySold) VALUES
(1, 1, 5),
(2, 2, 10),
(3, 3, 15);
```

Query:

```
WITH SalesAmount AS (
    SELECT
        P.CategoryID,
        S.ProductID,
        SUM(P.Price * S.QuantitySold) AS TotalSales
    FROM Sales S
    JOIN Products P ON S.ProductID = P.ProductID
    GROUP BY P.CategoryID, S.ProductID
), RankedProducts AS (
    SELECT
        CategoryID,
        ProductID,
        TotalSales,
        RANK() OVER (PARTITION BY CategoryID ORDER BY TotalSales DESC) AS
SalesRank
    FROM SalesAmount
)
SELECT CategoryID, ProductID, TotalSales
FROM RankedProducts
WHERE SalesRank = 1;
```

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4. Finding Consecutive Absentees

Question: You are asked to find employees who were absent for 3 consecutive days. You have an `Attendance` table with `EmployeeID`, `AttendanceDate`, and `Status`.

Query:

```
SELECT EmployeeID, MIN(AttendanceDate) AS StartDate, MAX(AttendanceDate) AS
EndDate
FROM (
    SELECT
        EmployeeID,
        AttendanceDate,
        ROW_NUMBER() OVER (PARTITION BY EmployeeID ORDER BY AttendanceDate)
-
        ROW_NUMBER() OVER (PARTITION BY EmployeeID, Status ORDER BY
AttendanceDate) AS ConsecutiveGroup
    FROM Attendance
    WHERE Status = 'Absent'
) AbsentDays
GROUP BY EmployeeID, ConsecutiveGroup
HAVING COUNT(*) >= 3;
```

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5. Customer Churn Prediction

Question: A customer is considered churned if they haven't made a purchase in the last 6 months. You have a `Customers` table with `CustomerID` and `LastPurchaseDate`. Write a query to identify churned customers.

Table Structure and Data:

```
CREATE TABLE Customers (
    CustomerID INT PRIMARY KEY,
    LastPurchaseDate DATE
);

-- Sample Data Insertion
INSERT INTO Customers (CustomerID, LastPurchaseDate) VALUES
(1, '2023-01-15'),
(2, '2023-07-20'),
(3, '2023-05-10');
```

Query:

```
SELECT CustomerID
FROM Customers
WHERE LastPurchaseDate < DATEADD(MONTH, -6, GETDATE());
```

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6. Identifying Overlapping Shifts

Question: You are managing employee shifts and have a `Shifts` table with `EmployeeID`, `ShiftStart`, and `ShiftEnd` times. Write a query to identify any shifts that overlap for the same employee.

Table Structure and Data:

```
CREATE TABLE Shifts (
    EmployeeID INT,
    ShiftStart DATETIME,
    ShiftEnd DATETIME
);

-- Sample Data Insertion
INSERT INTO Shifts (EmployeeID, ShiftStart, ShiftEnd) VALUES
(1, '2023-09-01 08:00', '2023-09-01 16:00'),
(1, '2023-09-01 15:00', '2023-09-01 23:00');
```

Query:

```
SELECT S1.EmployeeID, S1.ShiftStart, S1.ShiftEnd, S2.ShiftStart, S2.ShiftEnd
FROM Shifts S1
JOIN Shifts S2 ON S1.EmployeeID = S2.EmployeeID AND S1.ShiftStart <
S2.ShiftEnd AND S1.ShiftEnd > S2.ShiftStart
WHERE S1.ShiftStart < S2.ShiftStart;
```

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7. Daily Revenue Calculation

Question: You have an `Orders` table with columns `OrderID`, `OrderDate`, and `OrderAmount`. Write a query to calculate the total revenue per day for the past week.

Query:

```
SELECT CAST(OrderDate AS DATE) AS OrderDay, SUM(OrderAmount) AS DailyRevenue
FROM Orders
WHERE OrderDate >= DATEADD(DAY, -7, GETDATE())
GROUP BY CAST(OrderDate AS DATE)
ORDER BY OrderDay;
```

These real-time scenarios challenge you to apply skills to practical business situations, focusing on aspects like pattern detection, aggregations, time-based calculations, and relational data analysis.