



8 SQL Optimization Techniques



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#1

Use **MAX** Instead of **RANK**



```
SELECT ID, Name, RANK() OVER (ORDER BY Salary DESC) AS  
SalaryRank  
FROM Employees  
WHERE SalaryRank = 1;
```



```
SELECT ID, Name, MAX(Salary) AS MaxSalary  
FROM Employees;
```



#2

Use **EXISTS** Instead of **IN**



```
SELECT Name FROM Customers WHERE ID IN (SELECT  
CustomerID FROM Orders);
```



```
SELECT Name FROM Customers WHERE EXISTS (SELECT 1  
FROM Orders WHERE Orders.CustomerID = Customers.ID);
```



#3

Avoid OR in WHERE Clause



```
SELECT * FROM Orders WHERE Status = 'Pending' OR Status  
= 'Processing';
```



```
SELECT * FROM Orders WHERE Status IN ('Pending',  
'Processing');
```



#4

Use **WHERE** Instead of **HAVING**



```
SELECT City, COUNT(*) FROM Customers GROUP BY City  
HAVING City = 'Berlin';
```



```
SELECT City, COUNT(*) FROM Customers WHERE City =  
'Berlin' GROUP BY City;
```



#5

Joining products (large), orders (medium), and customers (small)



```
SELECT *
FROM customers
JOIN orders ON customers.customer_id = orders.customer_id
JOIN products ON orders.product_id = products.product_id;
```



```
SELECT *
FROM products
JOIN orders ON products.product_id = orders.product_id
JOIN customers ON orders.customer_id = customers.customer_id;
```



#6

Use **JOIN** Instead of **Subqueries**



```
SELECT Name  
FROM Customers  
WHERE ID IN (SELECT CustomerID FROM Orders WHERE  
OrderDate > '2023-01-01');
```



```
SELECT DISTINCT Customers.Name  
FROM Customers  
JOIN Orders ON Customers.ID = Orders.CustomerID  
WHERE Orders.OrderDate > '2023-01-01';
```



#7

Use the attribute or column with the highest number of unique values when applying a "GROUP BY" clause.



```
SELECT  
    country,  
    city,  
    customer_id,  
    COUNT(order_id) AS TotalOrders  
FROM  
    orders  
GROUP BY  
    country, city, customer_id;
```



```
SELECT  
    country,  
    city,  
    customer_id,  
    COUNT(order_id) AS TotalOrders  
FROM  
    orders  
GROUP BY  
    customer_id, country, city;
```



#8

Index Frequently Used Columns



```
SELECT *  
FROM Products  
WHERE ProductName = 'Widget';
```



```
CREATE INDEX idx_product_name ON  
Products(ProductName);
```

```
SELECT *  
FROM Products  
WHERE ProductName = 'Widget';
```



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