

Lecture Notes – Applications & Uses

Section 1: Lecture Summary

Databases are applied across various industries including **e-commerce**, banking, healthcare, education, government, telecommunications, and social media to manage data such as customers, accounts, patients, students, citizens, and users. Users of databases include **DBA** who creates and organizes tables using **SQL**, developers who embed **SQL** in programming languages like Python or Java, data analysts who query data for reports, and end users who interact via applications without writing **SQL**.

Section 2: Key Concepts and Explanations

Applications of databases cover e-commerce for orders and products, banking for customer accounts and transactions, hospitals for patients and treatments, universities for students and courses, government for citizen and property data, telecom for customer services, and social media for user data. **DBA** manages tables, relationships, and data using **SQL**. Developers integrate **SQL** into software for data retrieval. Data analysts use **SQL** or tools for business performance reports. End users access data through apps like Amazon without direct **SQL** queries. **SQL** is essential for DBA, developers, and analysts.

Section 3: Example Code and Use Cases

```
-- Find customers who ordered from the category with highest average
product price
SELECT DISTINCT c.CustomerID, c.FirstName, c.LastName
FROM Customers c
JOIN Orders o ON c.CustomerID = o.CustomerID
JOIN OrderItems oi ON o.OrderID = oi.OrderID
JOIN Products p ON oi.ProductID = p.ProductID
WHERE p.CategoryID IN (
    SELECT CategoryID
    FROM Products
    GROUP BY CategoryID
    HAVING AVG(Price) = (
        SELECT MAX(avg_price)
        FROM (
            SELECT AVG(Price) AS avg_price
            FROM Products
            GROUP BY CategoryID
```

```
    ) AS cat_avgs  
  )  
);
```

```
-- Products with stock less than average stock in their category  
(correlated subquery)  
SELECT ProductID, ProductName, Stock  
FROM Products p1  
WHERE Stock < (  
    SELECT AVG(Stock)  
    FROM Products p2  
    WHERE p2.CategoryID = p1.CategoryID  
);
```

```
-- Orders with payments where payment amount exceeds average order total  
SELECT o.OrderID, o.TotalAmount  
FROM Orders o  
WHERE EXISTS (  
    SELECT 1  
    FROM Payments pay  
    WHERE pay.OrderID = o.OrderID  
    AND pay.Amount > (  
        SELECT AVG(TotalAmount)  
        FROM Orders  
    )  
);
```

Section 4: Key Takeaways

Databases support diverse businesses from e-commerce to government. **DBA**, developers, and data analysts require strong **SQL** skills, while end users rely on applications. **SQL** enables direct database interaction for management, development, and analysis.