CASE STUDY

Lecture 1

Topic: Overview of the Database Management System (DBMS)

# Scenario: Online Retail Store (E-Shop)

An online retail company, E-Shop, sells products through its website. It needs to manage customer information, product inventory, orders, and payments efficiently. Initially, the company used file-based systems, but as the business grew, they faced issues like data redundancy, difficulty in retrieving information, and security risks. To overcome these challenges, the company decided to implement a Database Management System (DBMS).

# 1. Purpose of DBMS in the Case

- File-Based Problems Faced:  
 \* Duplicate customer and product records.  
 \* Difficulty in generating consolidated sales reports.  
 \* Security issues in storing payment details.  
 \* Every new business requirement required writing new programs.  
  
- How DBMS Helps:  
 \* Centralized storage and retrieval of data.  
 \* Faster and more efficient order processing.  
 \* Data security and access control.  
 \* Easy handling of concurrent customer requests.  
 \* Scalability for future expansion.

# 2. Domains (Attribute Value Sets)

- CustomerID: Positive integers (unique)  
- Email: Valid email format (\*@\*.\*)  
- ProductID: Positive integers (unique)  
- Price: Numeric values (greater than 0)  
- OrderDate: Date values (YYYY-MM-DD)  
- PaymentStatus: {Paid, Pending, Failed}

# 3. Relations (Tables)

## CUSTOMER

|  |  |  |  |
| --- | --- | --- | --- |
| CustomerID | Name | Email | Phone |
| 1 | Anjali Gupta | anjali@gmail.com | 9876543210 |
| 2 | Rohan Singh | rohan@yahoo.com | 9123456789 |

## PRODUCT

|  |  |  |  |
| --- | --- | --- | --- |
| ProductID | ProductName | Price | Stock |
| 101 | Mobile Phone | 15000 | 25 |
| 102 | Laptop | 60000 | 12 |
| 103 | Headphones | 2000 | 50 |

## ORDER

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| OrderID | CustomerID | ProductID | OrderDate | PaymentStatus |
| 5001 | 1 | 101 | 2025-08-10 | Paid |
| 5002 | 2 | 103 | 2025-08-12 | Pending |

# 4. Keys

- Primary Key:  
 \* CUSTOMER → CustomerID  
 \* PRODUCT → ProductID  
 \* ORDER → OrderID  
  
- Foreign Key:  
 \* ORDER.CustomerID → CUSTOMER(CustomerID)  
 \* ORDER.ProductID → PRODUCT(ProductID)  
  
- Candidate Keys:  
 \* CUSTOMER: {CustomerID}, {Email}  
 \* PRODUCT: {ProductID}, {ProductName}

# 5. Applications of DBMS in E-Shop

- Sales: Track customer orders, payments, and invoices.  
- Inventory Management: Update stock automatically when an order is placed.  
- Accounting: Record receipts, refunds, and payment statuses.  
- Customer Experience: Provide personalized recommendations using stored purchase data.

# 6. Student Activities

1. Identify one advantage of DBMS over file-based systems in this case study.  
2. Suggest a new relation PAYMENT with suitable attributes and keys.  
3. Define the domain for a new attribute DeliveryStatus in the ORDER table.