**BUDT 703: Database Management Systems**

**GROUP:** 0503\_11

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**BRAND NAME:** PHARMLABS

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**Business Process:**

Pharmlabs is pharmaceutical company that sells medicine to customers over the counter and

online. We are designing a Pharmacy inventory system for our company Pharmlabs where we have

the following entities:

1. Each employee is described by a unique identifier employee ID, employee name, Date of birth,

hours worked, bank details and social security number, and their annual salary

1. Each product is described by a unique Identifier, the name of the product, the price of the

product and the quantity of the product currently available in the inventory.

1. For each order, there is a unique identifier order ID, the price of the total order, the date when

the order was placed, and the total quantity(number of total items bought).

1. Each order contains one or many products while each product may be associated with zero

or multiple orders.

1. Each employee may sell multiple orders while each order is associated with only one employee.
2. Each client can place one or more orders while each order has exactly one client.
3. Each client has a unique identifier client ID, the name of the client, the client’s phone number,

client email and their address

1. The pay statement for each employee contains a unique identifier pay statement ID, pay

statement date, the amount paid to the employee, the type of payment(Salaried or bonus)

and the tax deduction from the payment.

This is subdivided into Full time pay statements for full time employees and Part time pay

statements for part time employees. However, only full-time employees get dental deduction,

medical deduction and life insurance deduction.

1. Each employee receives one or more pay statements while each pay statement is directed to

exactly one employee.

**ER Schema:**

Entities, Attributes and Primary Keys

Employee (**employeeID**, employeeName,-employeeFirstName,-employeeLastName,employeeDOB,

employeeHours, employeeBankDetails, employeSSN, employeeAnnualSalary)

Product (**productID**, productName, productPrice, productInventoryQuantity)

Client (**clientID**, clientName, -clientFirstName, -clientLastName, clientPhoneNumber, clientEmail,

clientAddress)

PayStatement (**payStatementID**, payStatementDate, payStatementAmount,

payStatementTaxDeduction, payStatementType)

-FullTimePayStatementt (dentalDeduction, medicalDeduction, lifeInsuranceDeduction)

-PartTimePayStatement ( )

Order (**orderID**, orderDate, orderPaymentType)

Relationships, Attributes, Degrees, Participating Entities and Constraints

Contain (containedQuantity): Binary relationship  
1 product to 0 or more orders  
1 order to 1 or more products

Sell: Binary relationship  
1 order to 1 employee  
1 employee to 0 or more orders

Place: Binary relationship  
1 order to 1 client  
1 client to 1 or more orders

Receive: Binary relationship

1 employee to 1 or more PayStatements

1 PayStatement to 1 employee

**ER Diagram:**

**Diagram

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## **Relational Schema:**

Employee (**employeeID**, employeeFirstName, employeeLastName,employeeDOB,

employeeHours, employeeBankDetails, employeSSN, employeeAnnualSalary)

Product (**productID**, productName, productPrice, productInventoryQuantity)

Client (**clientID**, clientFirstName, clientLastName, clientPhoneNumber, clientEmail,

clientAddress)

Order (**orderID**, *clientID*, *employeeID,* orderDate, orderPaymentType)

Contain (***orderID***, ***productID,*** containedQuantity)

PayStatement (**payStatementID**, *employeeID*, payStatementDate, payStatementAmount,

payStatementTaxDeduction, payStatementType)

FullTimePayStatement (***payStatementID***, dentalDeduction, medicalDeduction, lifeInsuranceDeduction)

PartTimePayStatement (***payStatementID***)

**Referential Integrity:**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Relation | Foreign Key | Base Relation | Primary Key | Business Rule | Constraint: ON DELETE | Business Rule | Constraint: ON UPDATE |
| Order | clientID | Client | clientID | R1 | NO ACTION | R2 | CASCADE |
| Contain | productID | Product | productID | R3 | NO ACTION | R4 | CASCADE |
| Order | employeeID | Employee | employeeID | R5 | NO ACTION | R6 | CASCADE |
| FullTimePayStatement | payStatementID | PayStatement | payStatementID | R7 | NO ACTION | R8 | CASCADE |
| PartTimePayStatement | payStatementID | PayStatement | payStatementID | R9 | NO ACTION | R10 | CASCADE |
| Contain | orderID | Order | orderID | R11 | NO ACTION | R12 | CASCADE |
| PayStatement | employeeID | Employee | employeeID | R13 | NO ACTION | R14 | CASCADE |

**Functional Dependencies in 3NF:**

employeeID – >employeeFirstName, employeeLastName,employeeDOB,

employeeHours, employeeBankDetails, employeSSN, employeeAnnualSalary

productID – > productName, productPrice, productInventoryQuantity

orderID – > clientID, employeeID, orderDate, orderPaymentType

orderID, productID -- > containedQuantity

clientID – >  clientFirstName, clientLastName, clientPhoneNumber, clientEmail,

clientAddress

payStatementID – > employeeID, payStatementDate, payStatementAmount,

payStatementTaxDeduction, payStatementType

**3NF FORM:**

Employee (**employeeID**, employeeFirstName, employeeLastName,employeeDOB,

employeeHours, employeeBankDetails, employeSSN, employeeAnnualSalary)

Product (**productID**, productName, productPrice, productInventoryQuantity

Contain (***orderID***, ***productID***, containedQuantity)

Order (**orderId**, *employeeID*,*clientID*, orderDate, orderPaymentType)

Client (**clientID**, clientFirstName, clientLastName, clientPhoneNumber, clientEmail,

clientAddress)

PayStatement (**payStatementID**, *employeeID*, payStatementDate, payStatementAmount,

payStatementTaxDeduction, payStatementType)

**Business rules:**

(R1) If client information is deleted, then employee and order information cannot be deleted.

(R2) If client information is updated, then employee and order information should be updated accordingly.

(R3) If product information is deleted, then the product information contained in an order should not be deleted.

(R4) If product information is updated, then product information contained in an order should be updated accordingly.

(R5) If employee information is deleted, then the client and order information should not be deleted.

(R6) If employee information is updated, then the client and order information should be updated accordingly.

(R7) When pay statement information is deleted, then the full time pay statement information cannot be deleted.

(R8) When pay statement information is updated, then the full time pay statement information is also updated.

(R9) When pay statement information is deleted, then the part time pay statement information cannot be deleted.

(R10) When pay statement information is updated, then the part time pay statement information is also updated.

(R11) If order information is deleted, then the product information contained in an order should not be deleted.

(R12) If order information is updated, then product information contained in an order should be updated accordingly.

(R13) If employee information is deleted, then the pay statement information for that employee should not be deleted.

(R14) If employee information is updated, then the pay statement information for that employee should also be updated.

**Mission Statement & Objective**

We want to build an effective database for Pharm Labs. To do that, we need to implement detailed data about individual elements of the business. Based on the information Pharmlabs has provided us, it is pertinent that we include detailed information about the client, sales and employees. After analyzing the sample data and catalog provided by Pharmlabs, it is clear that the company has a wide variety of products available to the client and many orders of each product sold, with varieties. With a catalog this varied and with a large amount of data, we are building a database, along with the goals mentioned below, in order to simplify data collection and improve data searching and filtering. As the data is currently presented, it is overly long and difficult to search. Using the entity relationship model, we can separate the data as necessary based on the information Pharmlabs has provided classifying each attribute into separate tables, or entities.

Furthermore, we can implement Structured Query Language (SQL) to allow easy location of certain pieces of data through the use of SELECT statements. With all of the aforementioned information in mind, we have identified the following as our goals for this project:

● Create and maintain a database that contains detailed information about each customer, including purchases and other pertinent customer information, calculates the final receipt for each order.

● Keep track of order information to keep track of business transactions for the company.

● Keep records of employee information, sales made by an employee, salary information such as pay slips and additional benefits. Additionally, provide incentives to employees like pay raises to improve business.

● Find the Net Pay received by each employee.