**2814ICT – DATA MANAGEMENT**
**7003ICT – DATABASE DESIGN**
**School of Information & Communication Technology**
**Trimester 1, 2021**

# Assignment Part 1:
## Designing a Database for BigM

**ASSIGNMENT TITLE:** Designing a Database for BigM

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| **Course Code:** 2814ICT | | **Workshop/Lab day & time:** Fri 12:00 pm | |
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# List of Illustrations

# Statement of Completion

All tasks have been completed.

# Acknowledgements

N/A

## Case Example

BigM operates stores in many cities in Australia. We have developed an aggregate that organically combines and stores the data required for various tasks of BigM. This was developed to process data efficiently, and it has the advantage that it is possible to eliminate the problem of overlapping the same data and that there is no need to prepare a new file even if the business is expanded.

Library DB consists of the following tables:

**Product**
> For each product, it stores the product number, product description, product size, and price. It also records the date the product arrived and the date it was received by the customer. (This date may vary from product to product.)

**Supervised Store**
> Supervisory stores with all training, salaries, server applications, and help desks can be assigned.
>
> **Store**
>> Record each store name, phone, fax, and email. The store has several departments such as finance, accounts, sales, customer service, and more.
>>
>> **Store Manager**
>>> Each store is managed by an employee as a store manager.

**Department**
> Each department has a department ID, department name, phone and email address. Each department has several employees.
>
> **Department Supervisor**
>> Each department is supervised by employees. The department supervisor is also the supervisor of all employees in the department.

**Employees**
> Record the employee ID, first name, last name, phone number, date of birth, start date of work, hourly wage, salary, and tax file number.

**Customer**
> Customers can order from the store. Customer details are always taken from each order. Customers are referred to by customer number, customer first and last name, and phone number if possible.
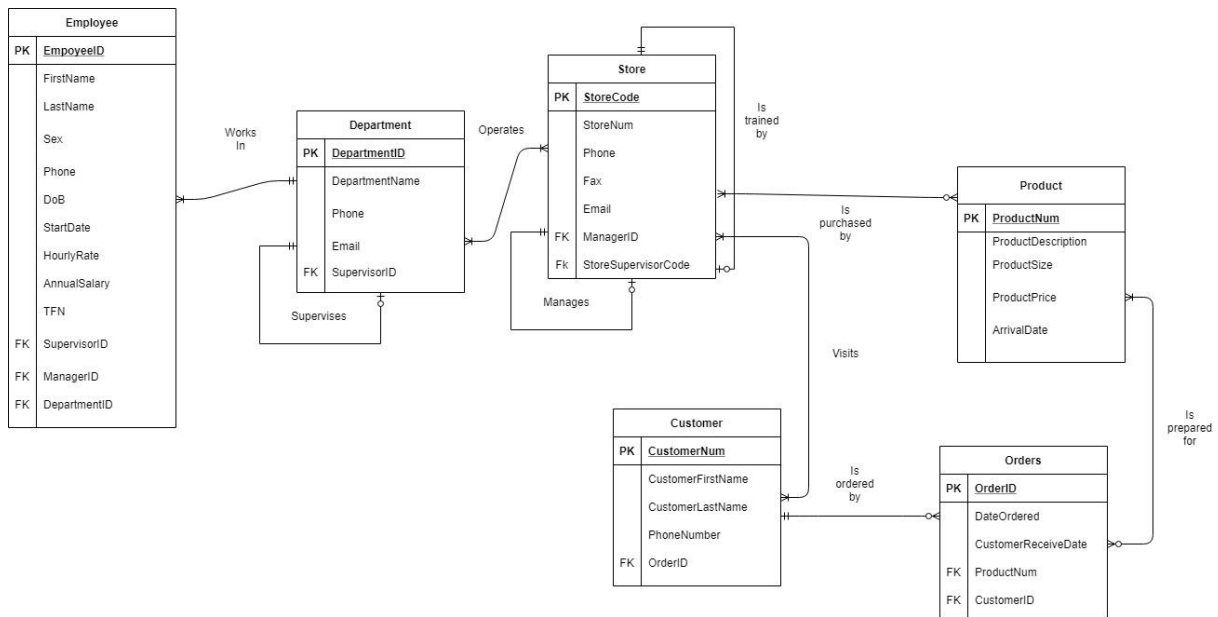
# Entity Relationship Diagram



*Figure 1: Entity Relationship Diagram*

# Assumptions

- There is one supervisor per department
- Many employees can work in one department and a department needs an employee to work in the department
- Many customers can go to many stores
- Many BigM stores can purchase many products and purchasing products is optional

# Normalisation

## a) Relation Schema

**Product**
(<u>ProductNum</u>, ProductDesc, ProductSize, ProductPrice, ArrivalDate)

**Store**
(<u>StoreCode</u>, ManagerID, StoreSupervisorCode, StoreNum, Phone, Fax, Email)

**Department**
(<u>DepartmentID</u>, SupervisorID, DepartmentName, Phone, Email)

**Employee**
(<u>EmployeeID</u>, SupervisorID, ManagerID, FirstName, LastName, Sex, Phone, DoB, StartDate, HourlyRate, AnnualSalay, TFN, DepartmentID)

**Customer**
(<u>CustomerNum</u>, ProductDesc, ProductSize, ProductPrice, OrderID)

**Order**
(OrderID, DateOrdered, CustomerReceiveDate, ProductNum, CustomerID)

## b) Normalisation

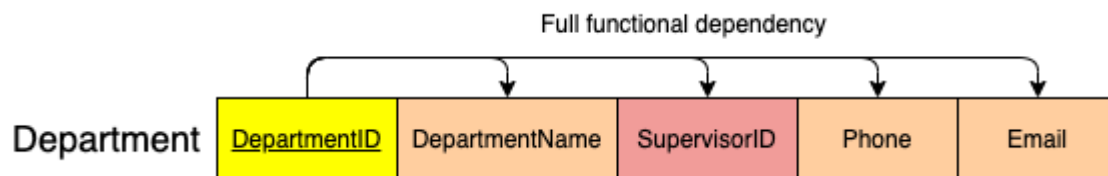**For department table the dependency diagram is:**



*Figure 2: Department Dependency Diagram*

The table is in 3NF because it has no partial dependency and no transitive dependency
Full dependency: DepartmentID → DepartmentName, SupervisorID, Phone, Email
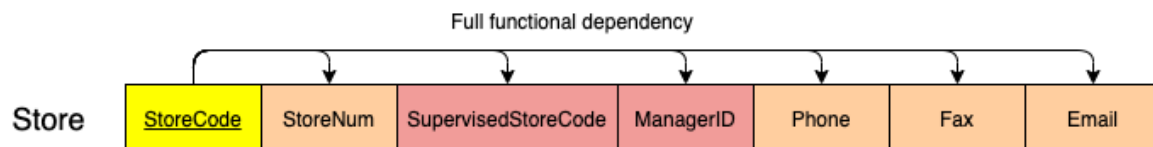
**For store table the dependency diagram is:**



*Figure 3: Store Dependency diagram*

The table is in 3NF because it has no partial dependency and no transitive dependency
Full dependency: StoreCode→StoreNum, SupervisedStoreCode, ManagerID, Phone, Fax, Email

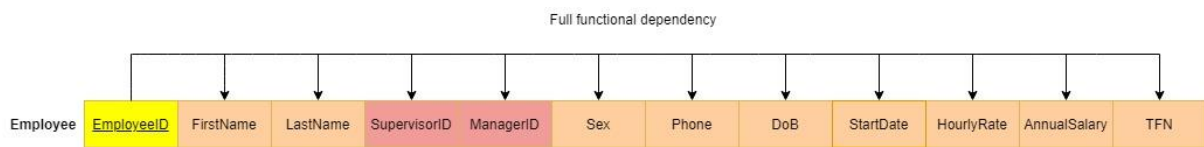**For Employee table the dependency diagram is:**



*Figure 4: Employee Dependency Diagram*

The table is in a 3NF because it has no transitive dependency and does not have partial dependency.
Full dependency: EmployeeID→ FirstName, LastName, SupervisorID,ManagerID,Sex, Phone, DoB, StartDate, HourlyRate, AnnualSalay, TFN, DepartmentID
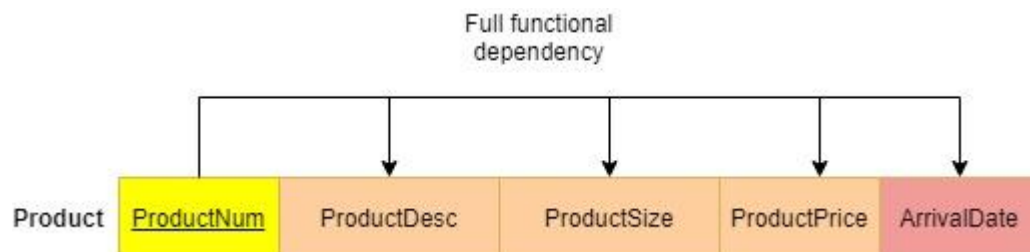
**For product the dependency diagram is:**



*Figure 5: Product Dependency Diagram*

The table is in 3NF because it has a transitive dependency
Full dependency: ProductNum→ProductDesc,ProductSize,ProductPrice,ArrivalDate
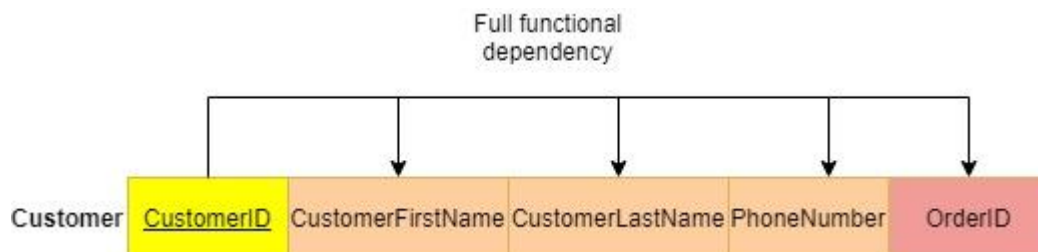
**For Customer the dependency diagram is:**



*Figure 6: Customer Dependency Diagram*

The table is in 3NF because it has no partial dependency and no transitive dependency
Full dependency: CustomerID→CustomerFirstName,CustomerLastName,PhoneNumber,OrderID
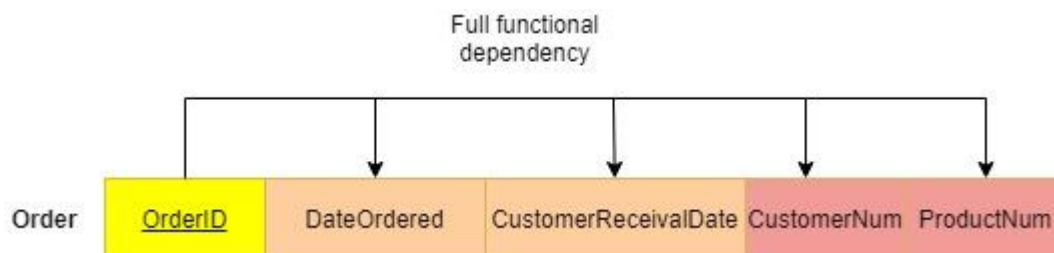
**For Order the dependency diagram is:**



*Figure 7: Order Dependency Diagram*

The table is in 3NF because it has no partial dependency and no transitive dependency
Full dependency: OrderID→DateOrdered,CustomerReceivalDate,CustomerNum,ProductNum