

**Module:** Information Systems, 2nd Year Bachelor's Degree in computer science

## **Solution for Tutorial 5**

### **Exercise 1**

For "Client," the client number "Client ID" uniquely identifies each client.

For "Company," the company name uniquely identifies each company.

For "Depot," none of the properties uniquely identifies each depot. Therefore, we need to add a "Depot ID," which will fulfill this role.

### **Functional Dependencies**

Client ID → Name

Company Name → Activity, Capital

Depot ID → Depot Name, Address, Area

Invoice ID → Client ID, Date

Product ID → Description, Unit Sale Price

Invoice ID, Product ID → Quantity

### **Interpretation of Business Rules**

**Rule 1:** There is no functional dependency between Company Name and Depot ID.

Company Name  $\nrightarrow$  Depot ID

**Rule 2:** There is no functional dependency between Depot ID and Product ID.

Depot ID  $\nrightarrow$  Product ID

**Rule 3:** There is no functional dependency between Product ID and Depot ID.

Product ID  $\nrightarrow$  Depot ID

### **Exercise 2**

#### **Business Rules**

- A Department is managed by a Director.

- A Teacher can teach multiple Modules.
- A Teacher only teaches within their Department.
- A Module can be taught by multiple Teachers.
- Each Teacher must belong to a Team.
- A Team can handle at least one Project.

## 2. Data Dictionary (DD)

We will only provide the first two columns of the DD.

Symbol	Meaning
Dpt_ID	Department Number
Dpt_Name	Department Name
Teach_Num	Number of Teachers
Dir_Name	Director Name
Teach_ID	Teacher Number
Teach_LName	Teacher Last Name
Teach_FName	Teacher First Name
Teach_Rank	Teacher Rank
Mod_Cod	Module Code
Mod_Des	Module Description
Team_ID	Team Number
Team_Theme	Team Theme
Prj_ID	Project Number
Prj_Des	Project Description

## 3. Functional Dependency Graph (FDG)

**Rule 1:** Dpt\_Num  $\rightarrow$  Dir\_Name

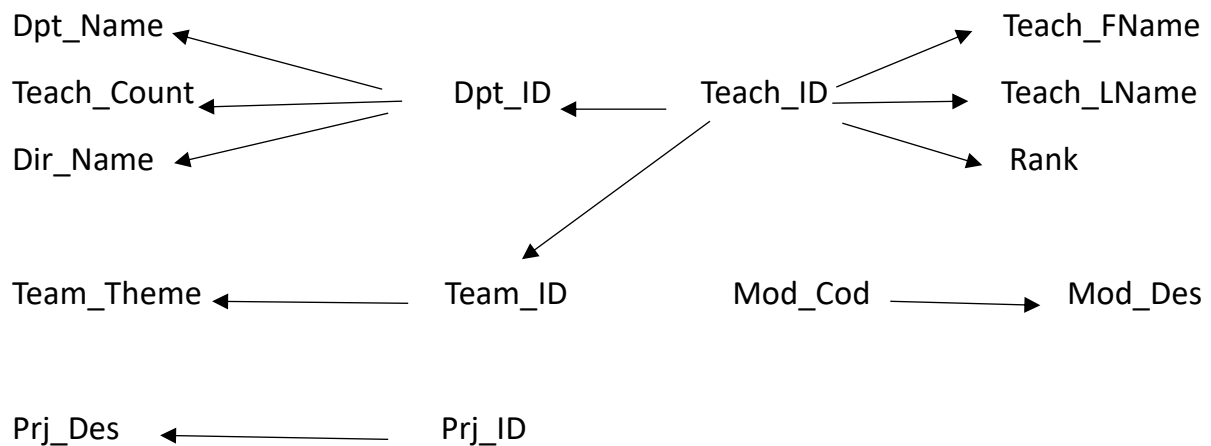
**Rule 2:** Teach\_ID  $\times\rightarrow$  Mod\_Cod

**Rule 3:** Teach\_ID  $\rightarrow$  Dpt\_ID

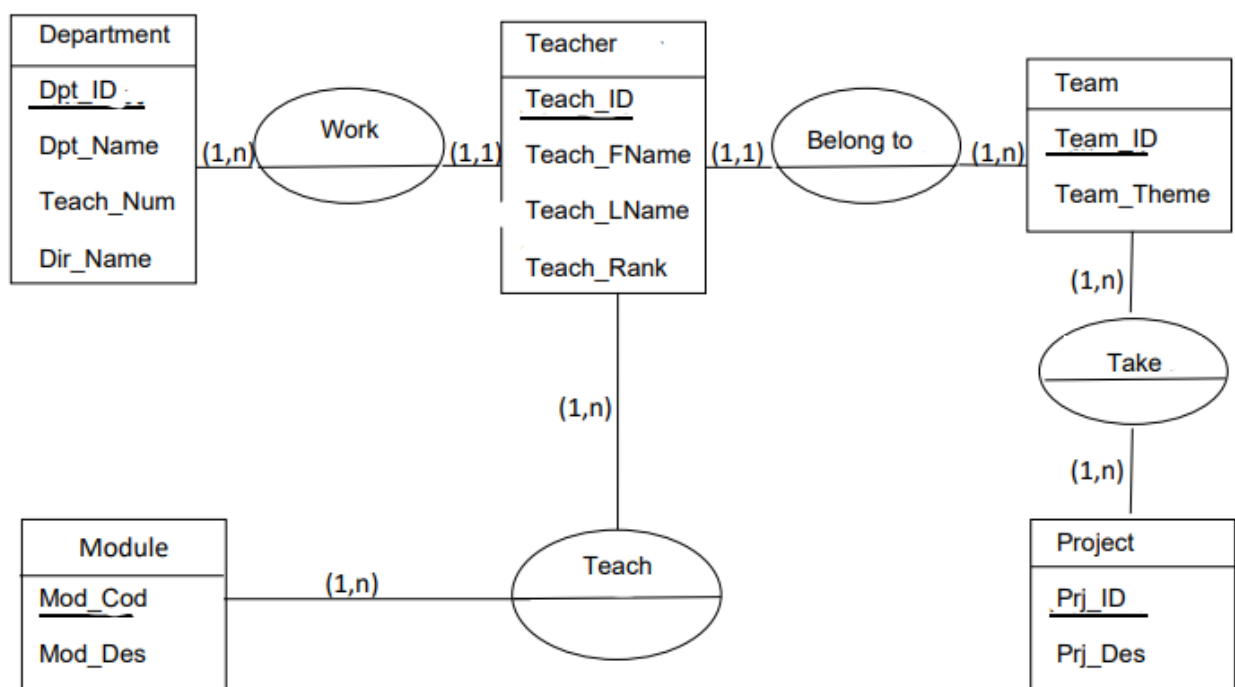
**Rule 4:** Mod\_Cod  $\times\rightarrow$  Teach\_ID

**Rule 5:** Teach\_ID  $\rightarrow$  Team\_ID

**Rule 6:** Team\_ID  $\nrightarrow$  Prj\_ID



#### 4. Conceptual Data Model (CDM)



**Note:** It is assumed that a project can be handled by one or more teams.

#### Exercise 3

##### 1. Business Rules

- A product can be in stock in several stores.
- An order is placed with suppliers.

- A product is sold by several suppliers.

## 2. Data Dictionary (DD)

Only the first two columns of the DD will be used:

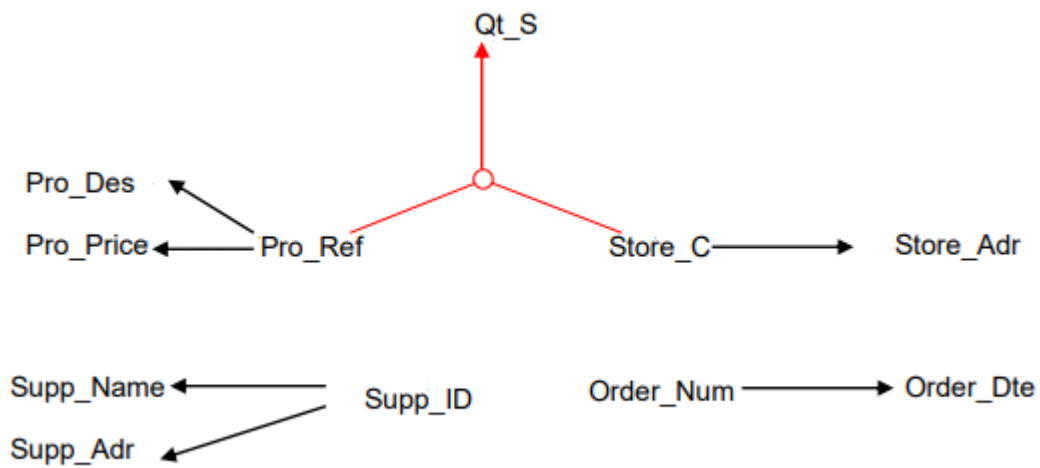
Symbols	Meaning
<b>Pro_Ref</b>	Product Reference
<b>Pro_Des</b>	Product Description
<b>Pro_Price</b>	Product Unit Price
<b>Qt_S</b>	Quantity in Stock
<b>Store_C</b>	Internal Store Code
<b>Store_Adr</b>	Store Address
<b>Order_Num</b>	Order Number
<b>Order_Dte</b>	Order Date
<b>Supp_ID</b>	Supplier Number
<b>Supp_Name</b>	Supplier Name
<b>Supp_Adr</b>	Supplier Address

## 3. Functional Dependency Graph (FDG)

**Rule 1:** Pr\_Ref  $\twoheadrightarrow$  Store\_C

**Rule 2:** Order\_Num  $\twoheadrightarrow$  Supp\_ID

**Rule 3:** Pr\_Ref  $\twoheadrightarrow$  Supp\_ID



#### 4. Conceptual Data Model (CDM)

