

CMPE353/CMSE354

Database Management Systems

Fall 2021 Semester

Labs 2-6

Design of a Store

**Task**: You are asked to design a relational database according to the given schema diagram below using Oracle Live SQL software. The task has several subtasks and each of them are described below. Each task will be carried out during weekly lab hours (Labs 2-6). Therefore, each subtask must be completed weekly in accordance with the set lab dates (see dates below).

**Problem:** The aim is to develop a database scheme which represents an example of a used dataset in a store system.

The schema diagram below is designed to keep the data of the store system.

In a store system, customers have factors. In this system each customer is known with a unique ID and non-unique personal information such as address ID, first name, last name and phone number. In each factor the customer and the goods are determined uniquely with their IDs. Similarly, goods have their own dataset table including their information and unique IDs. Information regarding goods group is saved in another table. Each good has a unique ID in addition to non-unique information such as name, code, etc.

Following criteria are considered in the database design.

1. Each customer can have different factors, while each factor belongs only to one customer.
2. Each good belongs only to a good group. However, each good group can have many goods.
3. Each customer has a single specific address. However, many customers can have similar address.
4. For the payment of factors, different payment methods with unique IDs are available. Each factor can be paid with only one method.
5. There can be different goods in the factor of a customer.
6. Although each good has a specific ID in the stock, it can belong to many factors.

|  |
| --- |
| ***Addresses*** |
| address\_id | PK |
| city |  |
| state |  |
| country |  |
| note |  |

|  |
| --- |
| ***Customers*** |
| customer\_id | PK |
| address\_id | FK |
| first\_name |  |
| last\_name |  |
| phone |  |
| note |  |

|  |
| --- |
| ***Factors*** |
| ***Factor***\_id | PK |
| customer\_id | FK |
| payment\_method\_id | FK |
| date |  |
| note |  |

|  |
| --- |
| ***Factor\_items*** |
| factor\_id | FK |
| good\_id | FK |
| quantity |  |
| Price |  |
| note |  |

|  |
| --- |
| ***Good\_groups*** |
| good\_group\_id | PK |
| name |  |
| taxrate |  |
| note |  |

|  |
| --- |
| **goods** |
| **good**\_id | PK |
| **good**\_code |  |
| **good**\_name |  |
| **good**\_cost |  |
| note |  |

|  |
| --- |
| ***Payment*** |
| peyment\_method\_id | PK |
| payment\_name |  |
| note |  |

|  |
| --- |
| **LAB 2:*** SUBTASK 1: Fill in the following tables: as preliminary lab work (some are filled for your guidance)
* SUBTASK 2: Build the tables in Oracle Live SQL with your account according to the tables above.
* SUBTASK 3: Build the relations among the tables.

**Addresses** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
| address\_id | √ | - |  | NO | - | 1234567890 |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| **Customers** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
| customer\_id | √ | - | number | NO | - |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| ***Good\_groups*** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
| good\_group\_id | √ | number | varchar2(10) | NO | - |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

|  |
| --- |
| **Payment** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ***Factors*** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| **goods** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
| ***Factor\_items*** |
| **Column Name** | **Primary Key** | **Foreign Key** | **Data Type** | **Nullable** | **Default** | **Sample Entry** |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |

**LAB 3:**

* Insert sample data into the tables. (At least 15 records for each table)

**LAB 4:**

* Write an SQL query for the following questions:
1. How many factors are recorded in the database? (output : a number)
2. Which good\_group (name) does have the most number of customers? (output : group name)
3. What is the most common method name of payment? (output : method name)
4. List the goods have been sold more than 2 times. (output : good ID, good name)
5. List the name of good\_groups with the number of factors. (output : good name, number of foactors)
6. List the customers and the number of factors each has. (output : customer name, number of foactors)
7. List the most sold goods in the ascending order. (output : good name, number of foactors)
8. What is the average number of goods in each factor? (output : a number)
9. What is the average cost of each factor? (output : a number)
10. What is the code of the most expensive factor? (output : a number)
11. Which city has the most number of good\_groups? (output : city name)
12. List and rank preferred methods of payment. (output : method name)

**LAB 5:**

* Write a trigger to save all modification on table Goods. (Update and Delete).

**LAB 6:**

* Finalization and show of all work done throughout the semester.