

# DBMS Practical Assignments

Paper: CSM105(P) Module 2: Database Management System

## **Group – A**

*M.Sc. in Computer Science, Semester I*

Group Members:

Class Roll No.	Exam Roll No.	Name
12	C91/CSC/201012	Mijanur Molla
20	C91/CSC/201014	Rahul Chatterjee
4	C91/CSC/201015	Rahul Das

# **DBMS Assignment - 1**

## **ART BASE GALLERY**

### **Software Requirement Specification (SRS)**

#### **1> ARTIST :**

- According to the given question of the assignment, the data for each artist will be stored in a entity named "ARTIST" which will include Artist\_name , Date of Birth , Birthplace, Age, Style of Art. Here "age" will be a derived attribute from "date of birth".
- The above five parameters will represent the four different attributes of the entity "ARTIST".
- Since it is also mentioned that the Artist\_name must be unique, so we can consider the attribute "Artist\_name" to be the minimum possible candidate key (primary key) of the entity "ARTIST".
- The other attribute : Birthplace will contain the place of birth of the corresponding artists, Date of Birth will contain the birth date of the artists, Age will contain the ages of the artists and Style of Art will include different styles followed by an artist e.g - Modern Art, Pop Art, Renaissance Art etc.
- Two or more artists can have the same age or the same style of art.

#### **2> ARTWORK :**

- Next it is mentioned in the question that artist paint artworks. Thus, we can have a separate entity by the name "ARTWORK". Thus we will have a relation between the entity "ARTIST" and this entity "ARTWORK".
- This entity will constitute of eight different attributes namely Artist\_name(name of the artist who made the artwork), the year in which it was made, Title of the artwork ,the type of art it depicts, for e.g. it can be a painting, lithograph, sculpture, photograph etc, the group to which an

artwork belongs, the image of the artwork drawn by the artists, the no. of pieces of the artwork present in the gallery and finally the last attribute will be the Price of the artwork.

- Now every artwork that is made by an artist would have a unique Title, hence, the attribute "Title" can be considered to be the minimum possible candidate key(primary key) of the entity "ARTWORK".
- In the entity "ARTWORK" the attribute "Artist\_name" will serve as the foreign key.
- Now the relationship between the entity "ARTIST" and the entity "ARTWORK" may be considered to be a "one-to-many" relationship because one artist can make more than one artwork but on the other hand one particular artwork might not be made by more than one artist.

### **3> GROUPS:**

- Now different artworks can be classified into different groups. Thus, we can consider another entity named "GROUPS" and there will be a relation between this entity and the entity "ARTWORK".
- Now this entity can constitute of three different attributes namely the Group\_name, Description and Status.
- Now the Group\_name can be classified as portraits, still lifes, landscapes, works by Picasso ,works of the 19th Century etc. Thus it has to be a unique name. Hence, we can consider "Group\_name" as the minimum possible candidate key (primary key) for the entity "GROUPS".
- As for the next two attribute of this entity i.e. Description, will contain a brief insight into the different group names and the attribute Status will depict whether a particular group is shown in the sidebar of the Views section.

### **4> CUSTOMER:**

- Now, according to the question, the given database will also store information about the different customers associated with the Art Base

Gallery. Thus, we can create another entity with the name "CUSTOMER".

- This entity will comprise of the following attributes namely the customer's name, password entered by the customer for login, addresses of the different customers and amount of money spent by each customer (in Rupees) for an artwork.
- Here the passwords that would be entered by the customers for registering will only be used for the implementation of user login at the back end and will be stored in the database and will not be displayed in the Customers page of the gallery.
- Here the customer name is considered to be unique and thus it is alone enough to identify all the attributes of the "CUSTOMER" entity so it can be treated as a part of the candidate key. Thus, the primary key for the "CUSTOMER" entity will be customer name.

Now it is also the case that each customer has liking or preference for different artists and groups of art. Thus, for this situation we can consider two more relational schemas namely "LIKE\_ARTIST" and "LIKE\_GROUP".

### 5> **LIKE ARTIST:**

- "LIKE\_ARTIST" will be a relation between the entity "CUSTOMER" and the entity "ARTIST".
- Thus, in the database, we can have two attributes for this table i.e. "customer\_name" and the "artist\_name".
- Here both of the attributes together are required to uniquely identify the each of the customers' liking for the artists. Thus both of them form a part of the candidate key(primary key).
- The relationship between "CUSTOMER" and "ARTIST" through "LIKE\_ARTIST" is many-to-many because one customer can like many artists and every artist can be liked by more than one customer.

## 6> **LIKE GROUP** :

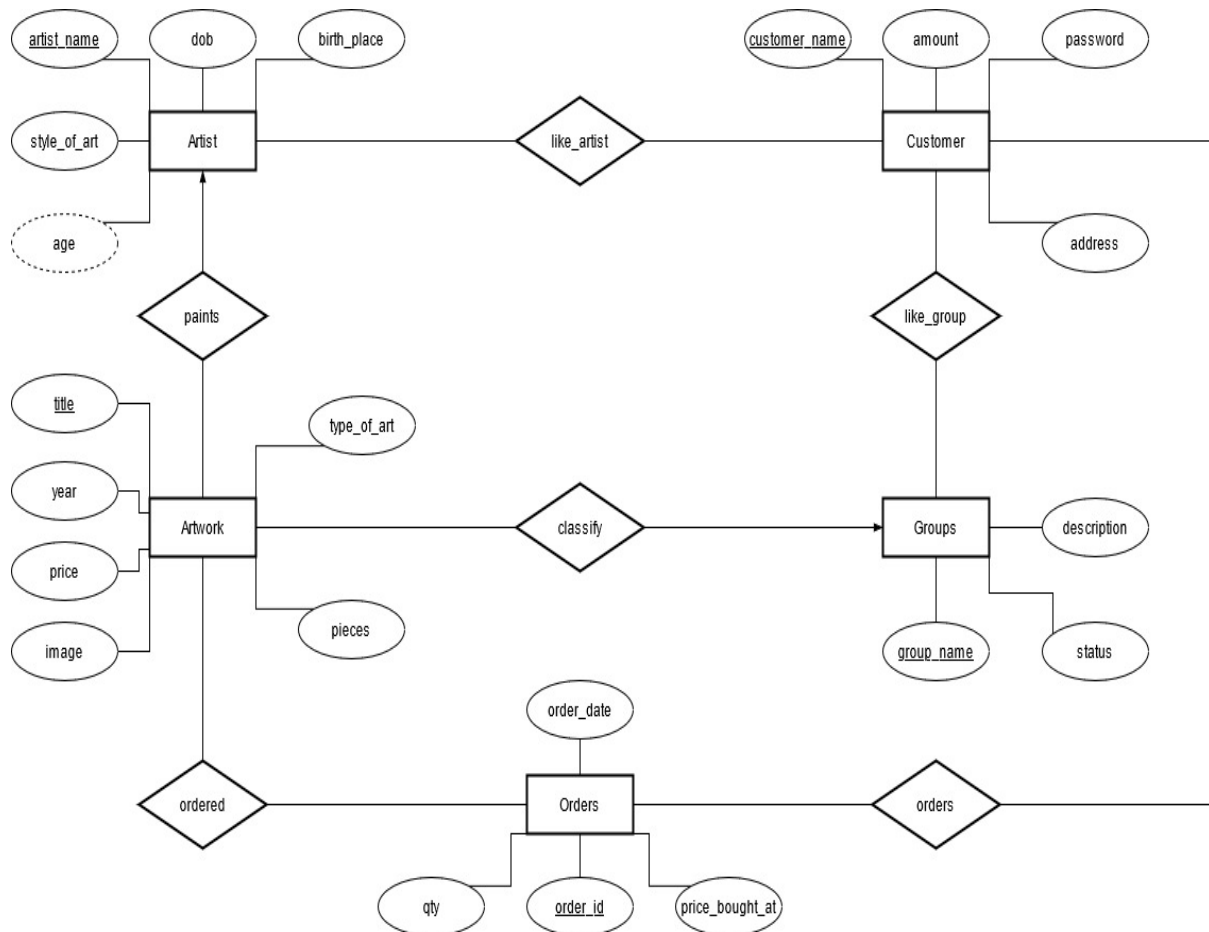
- Similarly, "LIKE\_GROUP" will be a relation between the entity "CUSTOMER" and the entity "GROUPS".
- Thus, we can have two attributes for this table i.e. is "customer\_name" and the "Group\_name".
- Here both of the attributes together are required to uniquely identify each of the customers' liking for each of the groups. Thus, both of them form a part of the candidate key (primary key).
- The relationship between "CUSTOMER" and "GROUPS" through "LIKE\_GROUP" is many-to-many because one customer can like many groups and each group can be liked by more than one customer.

## 7> **ORDERS**:

- Now the given database also has to store the various transaction details of the customers, thus another entity "ORDERS" is required for storing that information.
- This entity will consist of six different attributes namely : order\_id which will sequentially record the order no. for every transaction that has occurred for purchasing an artwork, next attribute is the customer names those who have placed orders, then the next attribute is the title of the artwork purchased, then the quantity i.e. the no. of pieces that is bought against a particular artwork, then there is order\_date which will store the date of purchase and finally the last attribute will be price\_brought\_at that stores the price at which the customer will purchase an artwork/artworks.
- Here the "order\_id" is considered to be unique and thus it is alone enough to identify all the attributes of the "ORDERS" entity so it can be treated as a part of the candidate key. Thus, the primary key for the "ORDERS" entity will be "order\_id".
- The two attributes "customer\_name", and "title" serve as foreign keys to the "CUSTOMER" entity and the "ARTWORK" entity respectively.

## Entity - Relationship Diagram (E-R Diagram)

The E-R diagram for the Art Base Gallery design would be:



**E-R Diagram**

## **Relational Schema**

The Art Base Gallery comprises of seven relations namely: ARTIST, ARTWORK, GROUPS, CUSTOMER, LIKE\_ARTIST, LIKE\_GROUP and ORDERS.

Thus, the relational schemas for these seven relations are as follows:

### **1> For ARTIST:**

ARTIST(Artist\_name , DOB , Age , Birth\_place , Style\_of\_Art)

The corresponding Functional Dependency (FD) is :

**Artist\_name** -> DOB , Age , Birth\_place , Style\_of\_Art

### **2> For ARTWORK :**

ARTWORK(Title , Artist\_name , Year , Type\_of\_Art , Group\_name , Image, Pieces, Price)

The corresponding Functional Dependency (FD) is :

**Title** -> Artist\_name , Year , Type\_of\_Art , Group\_name , Image , Pieces, Price

### **3> For GROUPS :**

GROUPS(Group\_name , Description, Status)

The corresponding Functional Dependency (FD) is :

**Group\_name** -> Description, Status

### **4> For CUSTOMER :**

CUSTOMER(Customer\_name , Password, Address , Amount)

The corresponding Functional Dependency (FD) is :

**Customer\_name** -> Password, Address , Amount

5> For **LIKE\_ARTIST** :

**LIKE\_ARTIST**(**Customer\_name** , **Artist\_name**)

Now both the attributes in this relation are prime hence together forming the primary key, thus there is no dependency in this table.

6> For **LIKE\_GROUP** :

**LIKE\_GROUP**(**Customer\_name** , **Group\_name**)

Now both the attributes in this relation are prime hence together forming the primary key, thus there is no dependency in this table.

7> For **ORDERS** :

**ORDERS**(**Order\_id**, Customer\_name, Title, Quantity, Order\_date, Price\_bought\_at)

The corresponding Functional Dependency (FD) is :

**Order\_id** -> Customer\_name, Title, Quantity, Order\_date, Price\_bought\_at

Thus, we can say that the final relational schemas have been checked and all of them are normalized up to **BCNF** with respect to the functional dependencies stated above.



## Sample Queries

Some of the sample queries that can be designed based on The Art Base Gallery are :

1>Show a report on the purchased art-pieces for a specific time-period by a specific artist, sorted in terms of kind like "Portrait".

2>Show all art pieces ordered by a given customer along with the details of the artwork, sorted on descending order of date on which the artwork was purchased by the given customer. Also show the total of each order.

3>Find the details of the artist(s) whose artwork price ranges from Rs 100000 to Rs 200000.

4>Find the name and birthplace of the artist(s) preferred by the customer whose name is "Rahul Das".

5>Find the type and the price of the artwork(s) made by artist(s) whose age is more than 35 years and style of art is "Abstract Art".

6>Find the details of the customer(s) who prefer the artists whose style of art is "Modern Art" and "Pop Art".

7>Find the titles of the artworks for which a customer is paying amount greater than Rs 5000.

8>Find the name and age of the artist who is preferred by the customer paying the 2nd highest amount.

9>Find the group details preferred by the customer paying the 3rd lowest amount.

10>Find the details of the customer whose preferred artist has made his artwork in the year between 2000 and 2020.