APPLICATION\_FORM(MEMBER\_ID, DATE\_APPROVED, SIGNATURE,MEMBERSHIP\_ID)

MEMBER:

MEMBER (MEMBER\_ID, DATE-APPROVED, MEMBER-NAME, MEMBER-ADDRESS, (MEMBER-PHONE-HOME, MEMBER-PHONE-WORK, MEMBER-CELL), MEMBER-EMAIL, MEMBER-DATE-OF-BIRTH, MEMBER-EMPLOYER, MEMBER-EMPLOYER-ADDRESS)

PARTNER:

PARTNER (MEMBER\_ID, PARTNER-NAME, PARTNER-ADDRESS, (PARTNER-PHONE-HOME, PARTNER-PHONE-WORK, PARTNER-CELL), PARTNER-EMAIL, PARTNER-DATE-OF-BIRTH, PARTNER-EMPLOYER, PARTNER-EMPLOYER-ADDRESS)

MEMBER\_CATERGORY( CATEGORY\_ID, CATEGORY\_NAME, INITIATION\_FEE, DUE\_FEE)

BILLINGPLAN ( PLAN\_ID, PLAN\_NAME,BILLING\_PREF)

MEMBER\_PAYMENT(PAYMENET\_ID, MEMBER\_ID, CATEGORY\_ID, PLAN\_ID, AMOUNT\_PAID, AMOUNT\_DUE, PAYMNENT\_DATE, CARD\_NUMBER, CARD\_EXP)

MEMBERSHIP:

* MEMBERSHIP (MEMBER-NO, MEMBERSHIP-CATEGORY, BILLING-PREFERENCE, AMOUNT-DUE, PAYMENT-METHOD, CREDIT-CARD-NUMBER, CREDIT-CARD-EXPIRY-DATE)

SIGNATURES:

SIGNATURES (MEMBER-NO, MEMBER-SIGNATURE, PARTNER-SIGNATURE, DATE-SIGNED).

2a.Functional Dependencies:

 MEMBER-NO → DATE-APPROVED

 MEMBER-NO → MEMBER-NAME

 MEMBER-NO → MEMBER-ADDRESS

 MEMBER-NO → MEMBER-PHONE-HOME

 MEMBER-NO → MEMBER-PHONE-WORK

 MEMBER-NO → MEMBER-CELL

 MEMBER-NO → MEMBER-EMAIL

 MEMBER-NO → MEMBER-DATE-OF-BIRTH

 MEMBER-NO → MEMBER-EMPLOYER

 MEMBER-NO → MEMBER-EMPLOYER-ADDRESS

 MEMBER-NO → PARTNER-NAME

 MEMBER-NO → PARTNER-ADDRESS

 MEMBER-NO → PARTNER-PHONE-HOME

 MEMBER-NO → PARTNER-PHONE-WORK

 MEMBER-NO → PARTNER-CELL

 MEMBER-NO → PARTNER-EMAIL

 MEMBER-NO → PARTNER-DATE-OF-BIRTH

 MEMBER-NO → PARTNER-EMPLOYER

 MEMBER-NO → PARTNER-EMPLOYER-ADDRESS

 MEMBER-NO → MEMBERSHIP-CATEGORY

 MEMBER-NO → BILLING-PREFERENCE

 MEMBER-NO → AMOUNT-DUE

 CREDIT-CARD-NUMBER → CREDIT-CARD-EXPIRY-DATE

 MEMBER-NO → MEMBER-SIGNATURE

 MEMBER-NO → PARTNER-SIGNATURE

 MEMBER-NO → DATE-SIGNED

2b.Identifying Repeating Groups:

MEMBER-PHONE-HOME, MEMBER-PHONE-WORK, MEMBER-CELL

PARTNER-PHONE-HOME, PARTNER-PHONE-WORK, PARTNER-CELL

3. Splitting Relations and Moving to Higher Normal Forms:

3a.we will remove repeating groups by:

MEMBER-PHONE (MEMBER-NO, PHONE-TYPE, PHONE-NUMBER)

MEMBER-NO, PHONE-TYPE → PHONE-NUMBER

PARTNER-PHONE (MEMBER-NO, PHONE-TYPE, PHONE-NUMBER)

MEMBER-NO, PHONE-TYPE → PHONE-NUMBER

3b. Split the relation MEMBERSHIP to remove partial dependencies:

MEMBERSHIP (MEMBER-NO, MEMBERSHIP-CATEGORY, BILLING-PREFERENCE, AMOUNT-DUE)

MEMBER-NO → MEMBERSHIP-CATEGORY, BILLING-PREFERENCE, AMOUNT-DUE

CREDIT-CARD (CREDIT-CARD-NUMBER, CREDIT-CARD-TYPE, CREDIT-CARD-EXPIRY-DATE)

CREDIT-CARD-NUMBER → CREDIT-CARD-TYPE, CREDIT-CARD-EXPIRY-DATE

3c. Removing Transitive Dependencies for Member and Partner Data:

Member (MEMBER-NO, MEMBERSHIP-CATEGORY, BILLING-PREFERENCE, AMOUNT-DUE)

MEMBER-NO → MEMBER-NAME, MEMBER-ADDRESS, MEMBER-EMAIL, MEMBER-DATE-OF-BIRTH, MEMBER-EMPLOYER, MEMBER-EMPLOYER-ADDRESS

Partner (MEMBER-NO, PARTNER-NAME, PARTNER-ADDRESS, PARTNER-EMAIL, PARTNER-DATE-OF-BIRTH, PARTNER-EMPLOYER, PARTNER-EMPLOYER-ADDRESS)

MEMBER-NO → PARTNER-NAME, PARTNER-ADDRESS, PARTNER-EMAIL, PARTNER-DATE-OF-BIRTH, PARTNER-EMPLOYER, PARTNER-EMPLOYER-ADDRESS

**The relations from member view are**:

1. **MEMBER** (MEMBER-NO, DATE-APPROVED, MEMBER-NAME, MEMBER-ADDRESS, MEMBER-EMAIL, MEMBER-DATE-OF-BIRTH, MEMBER-EMPLOYER, MEMBER-EMPLOYER-ADDRESS)

2.**MEMBER-PHONE** (MEMBER-NO, PHONE-TYPE, PHONE-NUMBER)

3.**PARTNER** (MEMBER-NO, PARTNER-NAME, PARTNER-ADDRESS, PARTNER-EMAIL, PARTNER-DATE-OF-BIRTH, PARTNER-EMPLOYER, PARTNER-EMPLOYER-ADDRESS)

4.**PARTNER-PHONE** (MEMBER-NO, PHONE-TYPE, PHONE-NUMBER)

5.**MEMBERSHIP** (MEMBER-NO, MEMBERSHIP-CATEGORY, BILLING-PREFERENCE, AMOUNT-DUE)

6.**CREDIT-CARD** (CREDIT-CARD-NUMBER, CREDIT-CARD-TYPE, CREDIT-CARD-EXPIRY-DATE)

SIGNATURES (MEMBER-NO, MEMBER-SIGNATURE, PARTNER-SIGNATURE, DATE-SIGNED).

2.Member Card:

Data Element Identification:

**Member Card**

Member Name

Member Address

Member Number (MEMBER-NO)

Membership Category

Join Date

Member Signature

**Putting views in Standard Form with Functional Dependencies**:

Since we are working with a **Member Card** view, most of the data is completely dependent on the unique **MEMBER-NO**.

**MEMBER-NO** → Member Name

**Member-No**→ Member Address

**MEMBER-NO** → Membership Category

**MEMBER-NO** → Join Date

**MEMBER-NO** → Member Signature

**Identifying Repeating Groups**:

In this view there are no repeating groups. Each member has only one address, one name, one membership category, one join date, and one signature.

Normalization:

1nf: In this case, the data is already in 1nf since all are related to MEMBER NO. primary key.

2nf: Since **MEMBER-NO** is the primary key and there are **no partial dependencies** in this view. Therefore, the data is in **2NF**

3nf**:** There are no transitive dependencies in this view. Every non-key attribute (name, address, category, join date, signature) is dependent only on the **MEMBER-NO(Primary Key)**. Therefore, the data is in 3NF.

The relations from Member Card view are:

Member Card(MEMBER-NO, Member Name, Member Address, Membership Category, Join Date, Member Signature).

DATA ELEMENT IDENTIFICATION:

Charge Slip:

• Member Name

• Member Number (MEMBER-NO)

• Date

• Description of Charges:

•Dues

•Guest Fees

•Total

• Subtotal

• Gratuity

• Tax: Not specified

• Total

• Payment Method

Signature

2. **Putting views in Standard Form with Functional Dependencies**:

MEMBER-NO → Member Name, Date

MEMBER-NO → Description of Charges

MEMBER-NO → Subtotal

MEMBER-NO → Gratuity

MEMBER-NO → Total

MEMBER-NO → Signature

MEMBER-NO → Payment Method

This shows that all the non-key attributes dependent on primary key MEMBER-NO.

NORMALIZATION:

**Charges** (like **Dues** and **Guest Fees**) are a repeating group since multiple items can appear in a single charge slip.

Remove repeating groups and their dependencies:

For this we need to separate Description Of Charges into a new table,

Charges (MEMBER-NO, Date, Charge Description (e.g., Dues, Guest Fees), Amount)

Identifying Current normal form:

Since we have removed all the repeating groups Charges table is in 2NF(has no repeating groups)and also every non key attributes are fully dependent on MEMBER -NO.

Final relations after normalization are:

**1. MEMBER (**MEMBER-NO, Member Name, Signature, Payment Method**)**

**2. CHARGES (**MEMBER-NO, Date, Charge Description, Amount**)**

**3. TOTALS (**MEMBER-NO, Date, Subtotal, Gratuity, Total**)**

**Group Exercise Schedule:**

Identifying data elements:

Class Name

Day

Time Slot

Location/Room

Duration

2. Putting Views in Standard Form with Functional Dependencies: