**HOSTEL MANAGEMENT SYSTEM**

1. Draw the relational model before and after Normalization. Anomalies and Dependencies 1NF to 5 NF

**TEAM DETAILS:**

1. **MOHAMMED QUASIM D A 21C053**
2. **SHABARI PRAKASH S V 21C085**
3. **SHAYE SREE NIVASHINI S R 21C088**

**1.HOSTEL**

|  |  |  |  |
| --- | --- | --- | --- |
| **HOSTELID** | **HOSTELNAME** | **HOSTELADDRESS** | **CONTACTNO** |
| 1 | ABC Hostel | 123 Main Street, Madurai | 555-555-5555 |
| 2 | XYZ Hostel | 456 Kamarajar Street, Trichy | 555-555-5556 |
| 3 | PQR Hostel | 789 Gandhi Street, Chennai | 555-555-5557 |
| 4 | Sun Hostel | 101 Mint street, Madurai | 555-555-5558 |
| 5 | Moon Hostel | 555 Nehru Road, Coimbatore | 555-555-5559 |

**FUNCTIONAL DEPENDENCIES:**

HostelID → HostelName

HostelID → HostelAddress

HostelID →ContactNo

**1NF**

The Hostel relation is already in 1NF as it does not contain any repeating groups or multivalued attributes.

**2NF**

We can see that there is a partial dependency of the ContactNo attribute on the HostelID attribute. To remove this dependency, we can create a separate table for the Hostel Contact information.

**HOSTEL**

|  |  |  |
| --- | --- | --- |
| **HOSTELID** | **HOSTELNAME** | **HOSTELADDRESS** |
| 1 | ABC Hostel | 123 Main Street, Madurai |
| 2 | XYZ Hostel | 456 Kamarajar Street, Trichy |
| 3 | PQR Hostel | 789 Gandhi Street, Chennai |
| 4 | Sun Hostel | 101 Mint street, Madurai |
| 5 | Moon Hostel | 555 Nehru Road, Coimbatore |

**HOSTEL CONTACT**

|  |  |
| --- | --- |
| **HOSTELID** | **CONTACTNO** |
| 1 | 555-555-5555 |
| 2 | 555-555-5556 |
| 3 | 555-555-5557 |
| 4 | 555-555-5558 |
| 5 | 555-555-5559 |

**3NF**

There are no transitive dependencies in the current Hostel and Hostel Contact tables, so the Hostel relation is already in 3NF.

**2.STUDENT**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **STUDENTID** | **STUDENTNAME** | **YEAROFSTUDY** | **CONTACTNO** | **DEPARTMENT** |
| 1 | Virat | 2 | 555-123-4567 | Computer Science |
| 2 | Shaye | 1 | 555-234-5678 | Mathematics |
| 3 | Sakthi | 3 | 555-345-6789 | English |
| 4 | Shabari | 2 | 555-456-7890 | Physics |

**FUNCTIONAL DEPENDENCIES:**

StudentID → StudentName

StudentID → YearOfStudy

StudentID → ContactNo

StudentID → Department

**1NF**

The Student table in its original form is already in 1NF (First Normal Form) since it has a primary key (StudentID) and each attribute is atomic

**2NF**

The Student table has only one candidate key, which is the StudentID attribute. There are no partial dependencies, so the table is already in 2NF.

**3NF**

There is a transitive dependency between the StudentID and Department attributes, since the Department attribute depends on the YearOfStudy attribute, which in turn depends on the StudentID attribute. To remove this transitive dependency, we can create a new table for the Department attribute.

**STUDENT**

|  |  |  |  |
| --- | --- | --- | --- |
| **STUDENTID** | **STUDENTNAME** | **YEAROFSTUDY** | **CONTACTNO** |
| 1 | Virat | 2 | 555-123-4567 |
| 2 | Shaye | 1 | 555-234-5678 |
| 3 | Sakthi | 3 | 555-345-6789 |
| 4 | Shabari | 2 | 555-456-7890 |

**DEPARTMENT**

|  |  |
| --- | --- |
| **STUDENTID** | **DEPARTMENT** |
| 1 | Computer Science |
| 2 | Mathematics |
| 3 | English |
| 4 | Physics |

**3.MESS**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **MESSID** | **HOSTELID** | **MENU** | **NO\_OF\_EMPLOYEES** | **MONTHLY\_EXPENSE** |
| 1 | 1 | Veg | 5 | 20000 |
| 2 | 2 | Non-veg | 7 | 30000 |
| 3 | 3 | Veg | 3 | 15000 |
| 4 | 4 | Non-veg | 5 | 25000 |
| 5 | 5 | Veg | 4 | 18000 |

**FUNCTIONAL DEPENDENCIES:**

Messid → Hostelid, Menu, No\_of\_employees, Monthly\_expense

Hostelid → Monthly\_expense

Menu, No\_of\_employees → Monthly\_expense

**1NF**

The "mess" table is already in 1NF, as each cell in the table contains only one value.

**2NF**

All non-key attributes are functionally dependent on the entire primary key, messid. Therefore, the "mess" table is already in 2NF.

**3NF**

There is a transitive dependency between hostelid and monthly\_expense, as monthly\_expense is functionally dependent on hostelid. To remove this transitive dependency, we can split the "mess" table into two tables

**MESS**

|  |  |  |  |
| --- | --- | --- | --- |
| **MESSID** | **HOSTELID** | **MENU** | **NO\_OF\_EMPLOYEES** |
| 1 | 1 | Veg | 5 |
| 2 | 2 | Non-veg | 7 |
| 3 | 3 | Veg | 3 |
| 4 | 4 | Non-veg | 5 |
| 5 | 5 | Veg | 4 |

**MESS\_EXPENSE**

|  |  |
| --- | --- |
| **MESSID** | **MONTHLY\_EXPENSE** |
| 1 | 20000 |
| 2 | 30000 |
| 3 | 15000 |
| 4 | 25000 |
| 5 | 18000 |

**4.MESS EMPLOYEE**

| **EMPLOYEE\_ID** | **EMPLOYEE\_NAME** | **SALARY** |
| --- | --- | --- |
| 1 | Joseph | 25000 |
| 2 | Kumar | 30000 |
| 3 | Ajith | 20000 |
| 4 | Raja | 28000 |
| 5 | Vijay | 32000 |

**FUNCTIONAL DEPENDENCIES:**

Employee\_Id → Employee\_Name, Salary

Employee\_Name → Salary

**1NF**

The "mess\_employee" table is already in 1NF, as each cell in the table contains only one value.

**2NF**

In our "mess\_employee" table, the primary key is employee\_id. The non-key attributes are employee\_name and salary.

All non-key attributes are functionally dependent on the entire primary key, employee\_id. Therefore, the "mess\_employee" table is already in 2NF.

**3NF**

In our "mess\_employee" table, there are no transitive dependencies. Therefore, the "mess\_employee" table is already in 3NF.

**5.VISITORS**

| **VISITOR\_ID** | **VISITOR\_NAME** | **IN\_TIME** | **OUT\_TIME** | **DATE** |
| --- | --- | --- | --- | --- |
| 1 | John | 10:00 | 12:00 | 2022-01-01 |
| 2 | Jane | 14:00 | 18:00 | 2022-02-14 |
| 3 | Alex | 09:30 | 11:30 | 2022-03-05 |
| 4 | Mark | 13:45 | 15:45 | 2022-04-20 |
| 5 | Sarah | 11:00 | 12:30 | 2022-05-10 |

**FUNCTIONAL DEPENDENCIES:**

Visitor\_Id → Visitor\_Name, In\_Time, Out\_Time, Date

**1NF**

The "visitor" table is already in 1NF, as each cell in the table contains only one value.

**2NF**

In our "visitor" table, the primary key is visitor\_id. The non-key attributes are visitor\_name, in\_time, out\_time, and date.

Note that all non-key attributes are functionally dependent on the entire primary key, visitor\_id. Therefore, the "visitor" table is already in 2NF.

**3NF**

In our "visitor" table, there are no transitive dependencies. Therefore, the "visitor" table is already in 3NF.

**6.ROOM**

| **ROOM\_NO** | **PRICE** | **NO\_OF\_BEDS** |
| --- | --- | --- |
| 101 | 5000 | 2 |
| 102 | 6000 | 3 |
| 103 | 4000 | 2 |
| 104 | 5500 | 2 |
| 105 | 7000 | 4 |

**FUNCTONAL DEPENDENCIES:**

Room\_No → Price, No\_Of\_Beds

**1NF**

The "room" table is already in 1NF, as each cell in the table contains only one value.

**2NF**

In our "room" table, the primary key is room\_no. The non-key attributes are price and no\_of\_beds.

Note that all non-key attributes are functionally dependent on the entire primary key, room\_no. Therefore, the "room" table is already in 2NF.

**3NF**

In our "room" table, there are no transitive dependencies. Therefore, the "room" table is already in 3NF.

**7.FEE**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **STUDENT\_ID** | **TRANSA\_ID** | **AMOUNT** | **PAYMENT\_MODE** | **TRANS\_DATE** |
| 1001 | 101 | 5000 | Cash | 2022-03-01 |
| 1002 | 102 | 6000 | Card | 2022-03-02 |
| 1003 | 103 | 4000 | Cheque | 2022-03-03 |
| 1004 | 104 | 5500 | Cash | 2022-03-04 |
| 1005 | 105 | 7000 | Card | 2022-03-05 |

**FUNCTIONAL DEPENDENCIES:**

Student\_Id, Transaction\_Id → Amount, Payment\_Mode, Transaction\_Date

**1NF**

The "fee" table is already in 1NF, as each cell in the table contains only one value.

**2NF**

In our "fee" table, the primary key is the composite of student\_id and transaction\_id. The non-key attributes are amount, payment\_mode, and transaction\_date.

Note that all non-key attributes are functionally dependent on the entire primary key consisting of student\_id and transaction\_id.Therefore, the "fee" table is already in 2NF.

**3NF**

In our "fee" table, there are no transitive dependencies. Therefore, the "fee" table is already in 3NF.