|  |
| --- |
| **Member** |
| Name |
| Address |
| Membership Level |
| Membership Standing |
| Home Gym Location |
| Balance |
| Billing Date |
| Monthly Billing Amount |
| Age |
| Birthdate |
| Last Visit Time |
| Last Visit Location |
|  |

|  |
| --- |
| Membership Levels |
| Pro |
| Amateur |
| Beginner |

|  |
| --- |
| **Equipment** |
| Type |
| Purchase Date |
| Manufacturer |
| Manufacturer Support Number |
| Warranty Status |
| Warranty Date |
| Location |

|  |
| --- |
| **Service** |
| Name |
| Location |
| Membership Level |
| Room Number |
| Covered in Membership(Y/N) |
| Fee |

|  |
| --- |
| **Location** |
| Rolla Location 1 |
| Rolla Location 2 |

Membership

Type

N

1

Membership Level

Member

1

N

Equipment is Located at

Location

Equipment

Is available at

1

N

Location

Service

Registered at

1

N

Location

Member

Level of service

M

N

Service

Membership Level

Last visited

1

N

Location

Member

Service Based on Membership

Service

Member

N

M

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Name | Address | Membership Level | Membership Standing | Home Gym Location | Balance | Billing Date | Monthly Billing Amount | Age | Birthdate | Last Visit Time | Last Visit Location |
| Chandu | 1301 | Pro | Good | Rolla1 | 300 | 31-05-2022 | 60 | 24 | 14-12-1997 | 3:00 PM | Rolla2 |

**4th Question:**

3 Insert Queries:

A. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Chandu','1301','Pro','Good','Rolla1',300,'2022-05-14',60,24,'1997-12-14','2022-09-18','Rolla2');

B. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

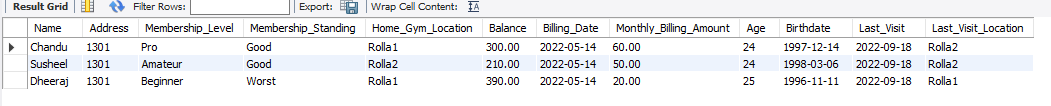
('Susheel','1301','Amateur','Good','Rolla2',210,'2022-05-14',50,24,'1998-03-06','2022-09-18','Rolla2');

C. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Dheeraj','1301','Beginner','Worst','Rolla1',390,'2022-05-14',20,25,'1996-11-11','2022-09-18','Rolla1');



1 Insert Anomaly Query:

#insertion anomalies NULL Values

insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Chandu','1301','Pro','Good',300,'2022-05-14',60,24,'1997-12-14','2022-09-18','Rolla2');



**5th Question:**

3 Insert Queries:

A. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Chandu','1301','Pro','Good','Rolla1',300,'2022-05-14',60,24,'1997-12-14','2022-09-18','Rolla2');

B. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

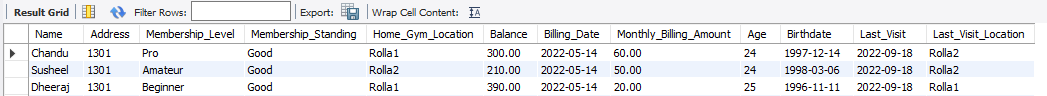
('Susheel','1301','Amateur','Good','Rolla2',210,'2022-05-14',50,24,'1998-03-06','2022-09-18','Rolla2');

C. insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Dheeraj','1301','Beginner','Good','Rolla1',390,'2022-05-14',20,25,'1996-11-11','2022-09-18','Rolla1');



1 Insert Anomaly Query:

#insert Anomaly Duplicate Value

insert into members(Name, Address ,Membership\_Level ,Membership\_Standing ,

Home\_Gym\_Location ,Balance ,Billing\_Date ,Monthly\_Billing\_Amount ,

Age ,Birthdate ,Last\_Visit,Last\_Visit\_Location )values

('Dheeraj','1301','Beginner','Worst','Rolla1',390,'2022-05-14',20,25,'1996-11-11','2022-09-18','Rolla1'); Graphical user interface, application

Description automatically generated

**6th Question:**

3 Insert Queries:

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

Warranty\_Status ,Warranty\_Date ,Location ) values

('Barbell set','2022-09-20','SCHWINN',5736473529,'5','2027-09-20','Rolla1');

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

Warranty\_Status ,Warranty\_Date ,Location ) values

('Rowing Machine','2022-09-21','NordicTrack',5736473579,'5','2027-09-21','Rolla2');

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

Warranty\_Status ,Warranty\_Date ,Location ) values

('Ellipticals','2022-09-22','Nautilus',5736473519,'5','2027-09-22','Rolla1');

Graphical user interface, text, application

Description automatically generated

#deletion Anamoly

delete from equipment where Type='Rowing Machine';

Graphical user interface, application, Word

Description automatically generated

There are null

**7th Question:**

3 Insert Queries:

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

Warranty\_Status ,Warranty\_Date ,Location ) values

('Rowing Machine','2022-09-21','NordicTrack',5736473579,'5','2027-09-21','Rolla2');

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

Warranty\_Status ,Warranty\_Date ,Location ) values

('Ellipticals','2022-09-22','Nautilus',5736473519,'6','2027-09-22','Rolla1');

insert into equipment(Type,Purchase\_Date ,Manufacturer ,Manufacturer\_Support\_Number,

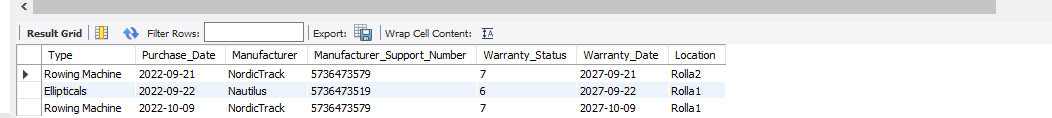
Warranty\_Status ,Warranty\_Date ,Location ) values

('Rowing Machine','2022-10-09','NordicTrack',5736473579,'5','2027-10-09','Rolla1');

Graphical user interface, application, Word

Description automatically generated

update equipment set Warranty\_Status='7' where Type='Rowing Machine';



There are two Rowing Machines which are present, but the warranty is extended two years only for the Rowing Machine is purchased most recently. While updating, both the older and newer purchased equipment’s warranty\_status is increased to 2 years, which should not happen.

**8th Question:**

|  |  |  |  |
| --- | --- | --- | --- |
| EmpName | Phone | Department | Location |
| Chandu | 23488,25338,39584 | Electrical | California |
| Dheeraj | 29949,33447,87779 | Aerospace | Rolla |

If a relation contain composite or multi-valued attribute, it violates first normal form or a relation is in first normal form if it does not contain any composite or multi-valued attribute. A relation is in first normal form if every attribute in that relation is singled valued attribute. Here the multi-valued attribute is the Phone number so creating a separate record each one.

Conversion to first Normal Form.

|  |  |  |  |
| --- | --- | --- | --- |
| EmpName | Phone | Department | Location |
| Chandu | 23488 | Electrical | California |
| Chandu | 25338 | Electrical | California |
| Chandu | 39584 | Electrical | California |
| Dheeraj | 29949 | Aerospace | Rolla |
| Dheeraj | 33447 | Aerospace | Rolla |
| Dheeraj | 87779 | Aerospace | Rolla |

**9th Question:**

**Note:** For this question we are using only table 2 not table 1 or table 3.

Table1:

The below table is not in second normal form and not in third normal form too. Now we will convert this to second normal form and use that table.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TeacherID | TeacherName | Subject | PhoneNumber | State |
| 101 | John | Mathematics | 573-1962 | Missouri |
| 102 | Chandu | Biology | 776-1985 | Texas |
| 103 | Pavan | Physics | 678-1978 | Arkansas |
| 104 | Karan | Chemistry | 543-1981 | Nebraska |
| 105 | Xuo Ti | Computer | 891-1967 | Iowa |

This is a table of faculty attending for a conference, the first column is the TeacherID which is unique ,we have name of the teacher, subject taught by the teacher and phone number of the teacher. The Place is decided by the area code of the phone number given by the teacher.

This table is not in 2nd normal form and we need to convert it to 2nd normal form

Candidate Key - TeacherID

All attributes except TeacherID is the non-prime attribute.

Here TeacherName cannot decide the TeacherID or other attributes and similarly teacher subject also cannot decide the other attributes. But the proper subset of candidate key is {TeacherID,TeacherName} can decide other attributes and similarly we also have {TeacherID, Subject}which can also decide other attributes.

Hence the conversion would be

Table2:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| TeacherID | TeacherName | Subject | PhoneNumber | State |
| 101 | John | Mathematics | 573-1962 | Missouri |
| 102 | Chandu | Biology | 776-1985 | Texas |
| 103 | Pavan | Physics | 678-1978 | Arkansas |
| 104 | Karan | Chemistry | 543-1981 | Nebraska |
| 105 | Xuo Ti | Computer | 891-1967 | Iowa |

Table 3:

|  |  |
| --- | --- |
| TeacherID | Subject |
| 101 | Mathematics |
| 102 | Biology |
| 103 | Physics |
| 104 | Chemistry |
| 105 | Computer |

Note: We are using only table 2 for this question.

Now we have the table 2 which is properly in 2nd Normal form but not in third normal form because

Because TeacherID and PhoneNumber are dependent on each other and PhoneNumber and Place(which is derived from the areacode present in phone number give that is 573 is Missouri ) are dependent on each other. So in order to convert to third normal form we have {TeacherID, TeacherName, Subject, PhoneNumber} and {PhoneNumber, State}

Table 4:

|  |  |  |  |
| --- | --- | --- | --- |
| TeacherID | TeacherName | Subject | PhoneNumber |
| 101 | John | Mathematics | 573-1962 |
| 102 | Chandu | Biology | 776-1985 |
| 103 | Pavan | Physics | 678-1978 |
| 104 | Karan | Chemistry | 543-1981 |
| 105 | Xuo Ti | Computer | 891-1967 |

Table 5:

|  |  |
| --- | --- |
| PhoneNumber | State |
| 573-1962 | Missouri |
| 776-1985 | Texas |
| 678-1978 | Arkansas |
| 543-1981 | Nebraska |
| 891-1967 | Iowa |

**Question1:**

1. 1st Question
2. The representation of a object in our Miniworld is…    Ans)  An Entity
3. The representation of an association between two or more Entities is…   Ans) Relationship
4. A minimal collection of Attributes that satisfied the definition of Super Key of a Relationship is…  Ans) A key
5. A property that describes an Entity is …    Ans) An Attribute
6. Any one Key of a Relationship which has more than one Key is …   Ans) A Candidate Key
7. Any Candidate Key of a Relationship that has not been designated as a Primary Key is…  Ans) Unique Key
8. The designated Candidate Key used to uniquely identify Tuples is …  Ans) A Primary Key
9. A subset of Attributes with the property that no two Tuples in any Relationship has the same combination of values is…   Ans) A super key
10. A collection of related value of the Attributes in a Relationship is …   Ans) Tuple
11. A representation of a Real World object we are trying to represent in our Database is …  Ans) A miniworld
12. It looks like the person teaching this class likes to start each slide deck with… Ans) Meme

**Question 2:**

1. For the first Normal form…define a primary key
2. For Second Normal Form… remove Partial Dependencies
3. For Third Normal Form….    Remove Transitive Dependencies
4. For the Fourth Normal Form..  remove Multivalued Dependencies