

ITEC212 – Lecture Session (14-May-2020)

Tutorial 1

5. List all regions of earth—list each name only once

```
select upper(region) from country; //the result of this query contains repeated values
select distinct upper(region) from country; //correct query
```

3. List population of Iran, China, and Turkey.

```
Select population, name from country
where upper(name)='IRAN' or upper(name)= 'TURKEY' or upper(name)= 'CHINA';
```

```
Select population, name from country
where upper(name) in ('IRAN','TURKEY','CHINA');
```

10. List name and population of countries which are located in Middle East, Asia. Sort the data in ascending order according to the population.

```
Select name, population from country where lower(region)='middle east' and lower(area)='asia'
Order by 2 asc;
```

Tutorial 2

- d) List tutorid and specialty of all tutors who were hired in September, 2006 (Remember that date data type contains DAY-MONTH-YEAR)

```
Select tutored, specialty from tutor
where to_char(hire_date,'fmMONTH YYYY')='September 2006'
```

DAY and MONTH formats of dates are kept as characters. By default 11 characters are allocated for DAY and MONTH fields in Oracle.

```
MONTH='SEPTEMBER__' →fmMonth= 'SEPTEMBER' or rtrim(month)= 'SEPTEMBER'
```

- j) Display first name and last name of students who are younger than 20 years old.

```
Select fname, lname from student where birthdate<20 ?
```

```
Select fname, lname from student where round(sysdate – birthdate)/365) <20;
```

Or

```
Select fname, lname from student
where to_char(sysdate,'YYYY') – to_char(birthdate,'YYYY') <20;
```

NORMALIZATION

Example 3:

R(Patient, Disease, Doctor, Diagnosis, Treatment, Diet)

Functional Dependencies:

1. Patient, Disease, Doctor \rightarrow Diagnosis
2. Patient, Disease \rightarrow Treatment
3. Treatment \rightarrow Diet

Is Table R in BCNF? If not, normalize it.

Step 1: Compute the closures of all Functional Dependencies (F.D.) and determine whether the DETERMINANTS of all FDs are Super Key or not!

Determinant: Left hand-side of the FD is called a DETERMINANT!!!!

FD 1-

{Patient, Disease, Doctor}⁺ = {Patient, Disease, Doctor, Diagnosis, Treatment, Diet} \checkmark Super Key

FD 2-

{Patient, Disease}⁺ = {Patient, Disease, Treatment, Diet} X Super Key

FD3 –

{Treatment}⁺ = {Treatment, Diet} X Super Key

Table R is not in BCNF!!!

Normalize R

Step 2: Take one of the FDs that violates BCNF. Create a new relation/table from its closure. List down all valid FDs on new relation/table.

Let's take FD2.

R1(Patient, Disease, Treatment, Diet)

FD:

2. Patient, Disease \rightarrow Treatment \checkmark Super Key (SHOW PK)
3. **Treatment \rightarrow Diet X Super Key**

R1 is not in BCNF!!! We need to normalize it!!!

Step3:

Our main table is

R(Patient, Disease, Doctor, Diagnosis, Treatment, Diet)

Functional Dependencies:

1. Patient, Disease, Doctor \rightarrow Diagnosis
2. ~~Patient, Disease \rightarrow Treatment~~
3. ~~Treatment \rightarrow Diet~~

New table that we have formed:

R1(Patient, Disease, Treatment, Diet)

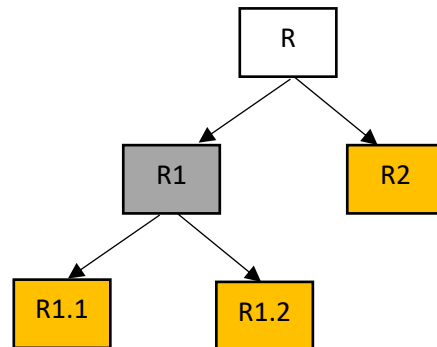
Remove non-key attributes of the new table formed in STEP2 from the main table. Form a new table from the remainders of the main table.

R2(Patient, Disease, Doctor, Diagnosis)

Functional Dependencies:

1. Patient, Disease, Doctor \rightarrow Diagnosis \checkmark Super Key

R2 is in BCNF.



Let's Normalize R1 (means we need to repeat step 2 and step 3)

R1(Patient, Disease, Treatment, Diet)

FD:

2. Patient, Disease \rightarrow Treatment \checkmark Super Key (SHOW PK)
3. **Treatment \rightarrow Diet X Super Key**

Step2:

Take FD 3

R1.1(Treatment, Diet)

FD:

3. **Treatment \rightarrow Diet \checkmark Super Key (SHOW PK)**

R1.1 is in BCNF.

Step3:

Main table

R1(Patient, Disease, Treatment, ~~Diet~~)

New table formed in Step2

R1.1(Treatment, Diet)

R1.2 (Patient, Disease, Treatment)

FD:

2. Patient, Disease \rightarrow Treatment \checkmark Super Key (If no violation SHOW PK)

R1.2 is in BCNF.

List of Normalized Tables:

R2(Patient, Disease, Doctor, Diagnosis)

R1.1(Treatment, Diet)

R1.2 (Patient, Disease, Treatment)

Homework:

R (AppNo, AppDate, PatNo, PatName, PatCity, GPNo, GPSpec, Diagnosis)

Functional Dependencies:

1. PatNo → PatName, PatCity
2. GPNo → GPSpec
3. AppNo → AppDate, PatNo
4. AppNo, GPNo → Diagnosis

Is table R in BCNF? If not, normalize it.

There is another approach that we can use to normalize tables. NORMAL FORMS

Unnormalized Form

First Normal Form

Second Normal Form

Third Normal Form

Boyce-Codd Normal Form

Forth Normal Form

Fifth Normal Form

You may see lecture notes for more details.