# Introduction to Database

Group Name: Up to Data

Project Name: Diagnostic Center Management System

Course Instructor: Kawser Irom Rushee

Section: C

# Group Members Details:

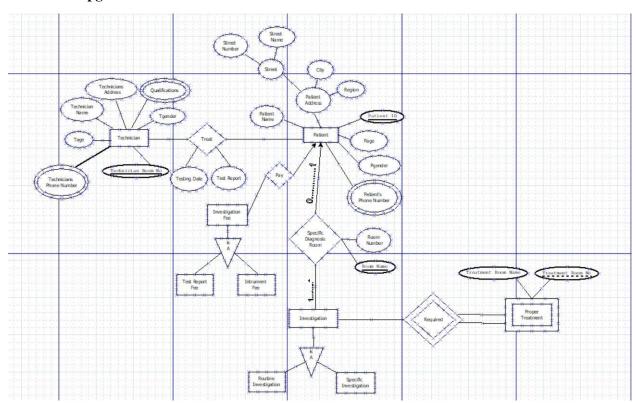
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## **Case Study**

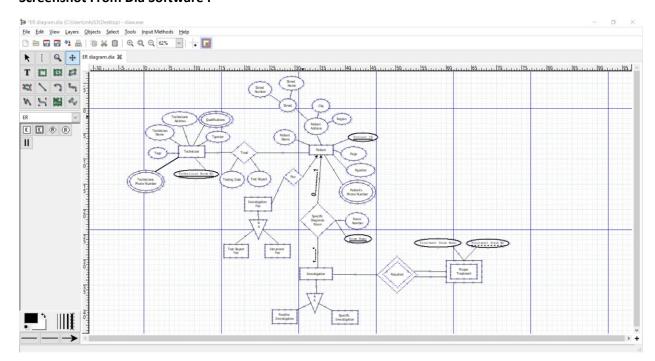
In a diagnostic center management system, a patient is treated by many technician. One technician can treat many patient. Here, a patient is identified by a patient id. Patient name, Patient's address, Pgender, patient's phone number, Page are also stored in computer. There may be multiple phone number of a patient. A patient address is composed of street, city and region. Street is composed of street- number and street- name. A technician is also identified by technician's room no. The computer also stores technician name, technician's address, Tgender, technician's phone- number, Tage and qualification. There may be multiple qualification and phone number of a technician. While technician treat patients, the Ptest report and testing date is given to patient. A patient may also pay many investigation fee. A investigation fee may be payed by exactly one patient. Test report fee and instrument fee can be generalized as investigation fee. A patient goes to specific diagnosis room for at least one investigation. One investigation is performed into the specific diagnosis room for at most one patient. Specific Diagnosis room is identified by room name. At the time of going to specific diagnosis room, patient check room number. Investigation can be specialized into routine investigation and specific investigation. Investigation is required for proper treatment. The existence of proper treatment is totally dependent on investigation. Here, proper treatment is identified by a treatment room no. Hospital's Treatment room name is also stored in diagnosis room's computer. Now draw an ER diagram according to the mentioned scenario.

## **ER Diagram**

#### **Screenshot Jpg Format:**



#### **Screenshot From Dia Software:**



## **Normalization**

#### Treat:

**UNF:1<sup>st</sup>:** technician name, technician address, qualification, Tgender, technician's phone number, Tage, technician's room no, patient name, street- number, street- name, city, region, Page, Pgender, patient's phone number, patient id, Ptesting date, test report

**1NF:1**<sup>st</sup>:. technician's room no, technician's phone number, qualification, patient id, patient's phone number, technician name, technician address, Tgender, Tage, patient name, street-name, street-name, city, region, Page, Pgender, Ptesting date, test report

**2NF:1**<sup>st</sup>: <u>technician's room no</u>, <u>technician's phone number</u>, <u>qualification</u>, technician name, Tgender, Tage

- 2<sup>nd</sup>: technician's room no, technician's phone number, technician address
- **3<sup>rd</sup>:** <u>patient id</u>, <u>patient's phone number</u>, patient name, street- number, street- name, city, region, Page, Pgender
  - 4<sup>th</sup>: patient id, test report, Ptesting date

**3NF: 1**<sup>st</sup>: <u>technician's room no, technician's phone number</u>, <u>qualification</u>, technician name, Tgender, Tage

2<sup>nd</sup>: <u>technician's room no</u>, <u>technician's phone number</u>, technician address

3<sup>rd</sup>: patient id, patient's phone number, patient name, city, Page, Pgender

4th: City, street- number, street- name, region

5<sup>th</sup>: patient id, test report, Ptesting date

#### Pay:

**UNF:** 1<sup>st</sup>: patient id, patient's phone number, patient name, street- number, street- name, city, region, Page, Pgender, test report fee, instrument fee

**1NF:1**<sup>st</sup>: patient id, patient's phone number, patient name, street- number, street- name, city, region, Page, Pgender, test report fee, instrument fee

**2NF:1**<sup>st</sup>: <u>patient id, \_patient's phone number</u>, patient name, street- number, street- name, city, region, Page, Pgender, test report fee, instrument fee

**3NF:1**<sup>st</sup>: <u>patient id</u>, <u>patient's phone number</u>, patient name, city, Page, Pgender, test report fee

2<sup>nd</sup>: City, street- number, street- name, region

3<sup>rd</sup>: test report fee, instrument fee

#### Specific diagnosis room:

**UNF:1**<sup>st</sup>: <u>patient id</u>, patient's phone number, patient name, street- number, street- name, city, region, Page, Pgender, routine investigation, specific investigation, room name, room number

**1NF:1**<sup>st</sup>: patient id, patient's phone number, room name, patient name, street- number, street- name, city, region, Page, Pgender, routine investigation, specific investigation, room number

**2NF:1**<sup>st</sup>: patient id, patient's phone number, patient name, street- number, street- name, city, region, Page, Pgender

2<sup>nd</sup>: room name, routine investigation, specific investigation, room number

3NF:1st: patient id, patient's phone number, patient name, city, Page, Pgender,

- 2<sup>nd</sup>: City, street- number, street- name, region
- 3<sup>rd</sup>: room name, routine investigation, specific investigation, room number

#### Required:

UNF:1<sup>st</sup>: routine investigation, specific investigation, treatment room name, treatment room no
1NF:1<sup>st</sup>: treatment room no, routine investigation, specific investigation, treatment room name
2NF:2<sup>nd</sup>:treatment room no, routine investigation, specific investigation, treatment room name
3NF:1<sup>st</sup>: treatment room no, treatment room name, routine investigation, specific investigation

#### **Final Table:**

- $\mathbf{1}^{\text{st}}$ :  $\underline{\text{technician's room no}}$ ,  $\underline{\text{technician's phone number, qualification}}$ ,  $\underline{\text{technician name, Tgender,}}$ 
  - 2<sup>nd</sup>: <u>technician's room no</u>, <u>technician's phone number</u>, technician address
  - 3<sup>rd</sup>: patient id, patient phone number, patient name, city, Page, Pgender
  - 4th: City, street-number, street-name, region
  - 5<sup>th</sup>: patient id, test report, Ptesting date
  - 6<sup>th</sup>: patient id, patient's phone number, patient name, city, Page, Pgender, test report fee
  - 7<sup>th</sup>: test report fee, instrument fee
  - 8<sup>th</sup>: room name, routine investigation, specific investigation, room number
  - 9<sup>th</sup>: treatment room no, treatment room name, routine investigation, specific investigation

## **Table Creation**

## 1. Technician

```
CREATE TABLE Technician_Info1 (
```

Technician\_Room\_No number(20),

Technician\_Name varchar2(50),

Technician\_Phone\_No number(14),

Qualification varchar2(40),

Tage number(2),

Tgender varchar2(10),

primary key(Technician\_Room\_No,Technician\_Phone\_No,Qualification));

#### Table Screenshot:

Results Explain [	Describe Saved SQL His	story							
Object Type TABLE	Object TECHNICIAN_II	NFO1							
Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
TECHNICIAN INFO1	TECHNICIAN ROOM NO	Number		20	0				
	TECHNICIAN NAME	Varchar2	50				<b></b> ✓		
	TECHNICIAN PHONE NO	Number		14	0	2			
	QUALIFICATION	Varchar2	40			3			
	<u>TAGE</u>	Number		2	0		s/		
	<u>TGENDER</u>	Varchar2	10				<b></b> ✓		
									1 - 6

## 2. Technician Info

```
CREATE TABLE Technician_Info2(
```

Technician\_Room\_No number(20),

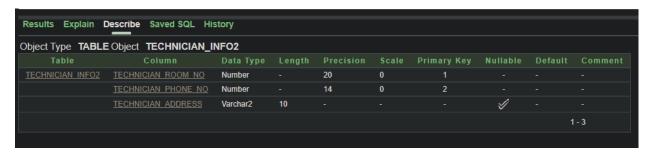
Technician\_Phone\_No number(14),

Technician\_Address varchar2(10),

primary key(Technician\_Room\_No,Technician\_Phone\_No)

);

#### **Table Screenshot:**



## 3.Patient

CREATE TABLE Patient (

Patient\_id number(20),

Patient\_Name varchar2(50),

Patient\_Phone\_No number(14),

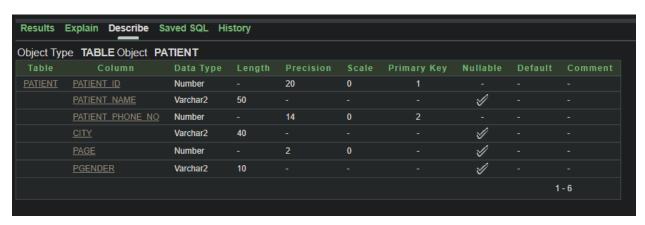
City varchar2(40),

Page number(2),

Pgender varchar2(10),

primary key(Patient\_id,Patient\_Phone\_No));

#### Table Screenshot:



## 4. City

CREATE TABLE City (

City varchar2(50) primary key,

Street\_Number number(14),

Street\_Name varchar2(40),

Region varchar2(10)

);

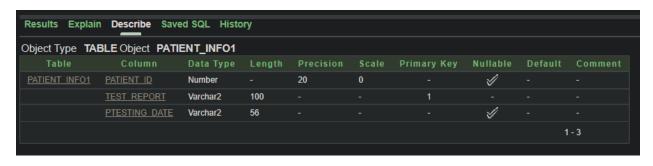
#### Table Screenshot:

Results	Explain Describe	Saved SQL	History						
Object Ty	pe TABLE Object	CITY							
Table	Column	Data Type	Length	Precision	Scale	Primary Key	Nullable	Default	Comment
CITY	<u>CITY</u>	Varchar2	50			1			
	STREET NUMBER	Number		14	0		<b></b>		
	STREET NAME	Varchar2	40				<b></b>		
	REGION	Varchar2	10				<b></b>		
									1 - 4

## **5.Patient Info1**

CREATE TABLE Patient\_Info1(
Patient\_id number(20),
Test\_Report varchar2(100),
Ptesting\_date date not null,
primary key(Test\_Report)
);

Table Screenshot:



## 6.Patient Info2

```
CREATE TABLE Patient_Info2(

Patient_id number(20),

Patient_Name varchar2(50),

Patient_Phone_No number(14),

City varchar2(40),

Page number(2),

Pgender varchar2(10),

Test_Report_Fee number(10),

primary key(Patient_id,Patient_Phone_No))
```

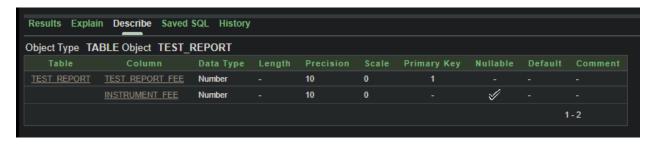
#### Table Screenshot:



## 7.Test Report

```
CREATE TABLE Test_Report (
Test_Report_Fee number(10) primary key,
Instrument_Fee number(10)
);
```

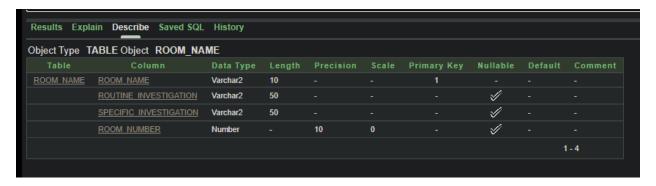
#### Table Screenshot:



## 8. Room Name

```
CREATE TABLE Room_Name (
Room_Name varchar2(10) primary key,
Routine_Investigation varchar2(50),
Specific_Investigation varchar2(50),
Room_Number number(10)
);
```

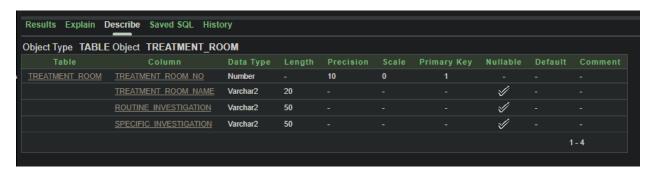
#### Table Screenshot:



#### 9. Treatment Room

```
CREATE TABLE Treatment_Room (
Treatment_room_no number(10) primary key,
Treatment_room_Name varchar2(20),
Routine_Investigation varchar2(50),
Specific_Investigation varchar2(50)
);
```

#### **Table Screenshot**



## **Data Insertion**

#### 1. Technician

INSERT INTO Technician\_Info1

VALUES (304, 'Mr. koushik', +8801819471121, 'B.Sc in medical laboratory technology', 28, 'Male');

INSERT INTO Technician\_Info1

VALUES (103, 'Mrs. Asma', +8801745216636, 'B.Sc in Dialysis', 26, 'Female');

INSERT INTO Technician\_Info1

VALUES (247, 'Mr. Ahmed', +8801929298982, 'M.Sc in Medicine', 30, 'Male');

#### **Screenshot:**



#### 2. Technician Info

INSERT INTO Technician\_Info2

VALUES (304,+8801819471121,'Comilla');

INSERT INTO Technician\_Info2

VALUES (103,+8801745216636,'Basundhara');

INSERT INTO Technician\_Info2

VALUES (247,+8801929298982,'Uttara');

Results	Explain D	escribe	Saved SQL	History		
TECHNI	CIAN_ROOI	M_NO	TECHNICIAN	_PHONE_NO	TECHNICIAN_ADDRESS	
304			8801819471121		Comilla	
103			8801745216636		Basundhara	
247			8801929298982		Uttara	
3 rows ref	turned in 0.0	0 second	is <u>csv</u>	<u>Export</u>		

## 3.Patient

**INSERT INTO Patient** 

VALUES (202110, 'Soumik Roy', +8801780363359, 'Bandar', 35, 'Male');

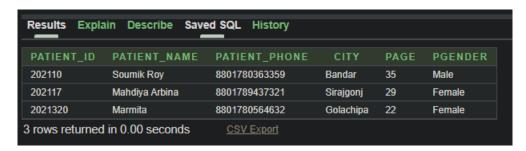
**INSERT INTO Patient** 

VALUES (202117, 'Mahdiya Arbina', +8801789437321, 'Sirajgonj', 29, 'Female');

**INSERT INTO Patient** 

VALUES (2021320, 'Marmita', +8801780564632, 'Golachipa', 22, 'Female');

#### **Screenshot:**



# 4. City

**INSERT INTO City** 

VALUES ('Bandar',175,'College Road','Bangladesh');

**INSERT INTO City** 

VALUES ('Sirajgonj',112,'K.c Dhor road', 'Bangladesh');

**INSERT INTO City** 

VALUES ('Golachipa', 286, 'Amlapara', 'Bangladesh');



#### 5.Patient Info1

INSERT INTO Patient\_Info1

VALUES (202110, 'Surgical Pathology Report', '20-JUN-21');

INSERT INTO Patient\_Info1

VALUES (202117, 'Psychological Report', '03-APRIL-20');

INSERT INTO Patient\_Info1

VALUES (2021320, 'Heart Dignosis Report', '04-DEC-21');

#### **Screenshot:**



## 6.Patient Info2

INSERT INTO Patient\_Info2

VALUES (202110, 'Soumik Roy', +8801780363359, 'Bandar', 35, 'Male', 950);

INSERT INTO Patient\_Info2

VALUES (202117, 'Mahdiya Arbina', +8801789437321, 'Sirajgonj', 29, 'Female', 1000);

INSERT INTO Patient\_Info2

VALUES (2021320, 'Marmita', +8801780564632, 'Golachipa', 22, 'Female', 880);



## 7.Test Report

INSERT INTO Test\_Report

VALUES (950,1000);

INSERT INTO Test\_Report

VALUES (1000,1200);

INSERT INTO Test\_Report

VALUES (880,2900);

#### **Screenshot:**



#### 8. Room Name

INSERT INTO Room\_Name

VALUES ('Medi Lab', 'Saturday, Tuesday, Thursday', 'Sunday', 101);

INSERT INTO Room\_Name

VALUES ('Consultant', 'Friday, Tuesday, Thursday', 'Monday', 307);

INSERT INTO Room\_Name

VALUES ('ECG Lab', 'Saturday, Wednesday', 'Friday', 10);



## 9. Treatment Room

INSERT INTO Treatment\_Room

VALUES (09, 'Surgery Lab', 'Saturday', 'Wednesday');

INSERT INTO Treatment\_Room

VALUES (101, 'Discussion Room', 'Friday', 'Monday');

INSERT INTO Treatment\_Room

VALUES (309, 'Heart Dignosis Lab', 'Wednesday', 'Friday');

#### **Screenshot:**

Results Explain Describe	Saved SQL History		
TREATMENT_ROOM_NO	TREATMENT_ROOM_NAME	ROUTINE_INVESTIGATION	SPECIFIC_INVESTIGATION
101	ECG	Normal	Found Some Substance
9	Surgery Lab	Saturday	Wednesday
309	Heart Dignosis Lab	Wednesday	Friday
3 rows returned in 0.00 secon	nds <u>CSV Export</u>		

## **Joining**

## Equijoin 01:

select

Technician\_Info1.Technician\_Room\_No,Technician\_Info1.Technician\_Name,Technician\_Info2.Technician\_Phone\_No,Technician\_Info2.Technician\_Address

from Technician\_Info1,Technician\_Info2

where Technician\_Info1.Technician\_Phone\_no=Technician\_Info2.Technician\_Phone\_No;

Results Explain Describe	Saved SQL History		
TECHNICIAN_ROOM_NO	TECHNICIAN_NAME	TECHNICIAN_PHONE_NO	TECHNICIAN_ADDRESS
304	Mr. koushik	8801819471121	Comilla
103	Mrs. Asma	8801745216636	Basundhara
247	Mr. Ahmed	8801929298982	Uttara

<sup>3</sup> rows returned in 0.00 seconds

CSV Export

## Equijoin 02:

select Patient\_Patient\_Id,Patient\_Name,Patient\_Info1.Test\_Report,Patient\_Info1.Ptesting\_Date from Patient,Patient\_Info1

where Patient\_Patient\_Id=Patient\_Info1.Patient\_Id;

## **Screenshot:**

Results Explai	in Describe Save	ed SQL History	
PATIENT_ID	PATIENT_NAME	TEST_REPORT	PTESTING_DATE
202110	Soumik Roy	Surgical Pathology Report	20-JUN-21
2021320	Marmita	Heart Dignosis Report	04-DEC-21
202117	Mahdiya Arbina	Psychological Report	03-APR-20
3 rows returned	in 0.01 seconds	CSV Export	

#### **Outer Join:**

select Technician\_Info1.Technician\_Room\_No,Technician\_Info2.Technician\_Phone\_No from Technician\_Info1

full outer join Technician\_Info2 on Technician\_Info1.Technician\_Phone\_No=Technician\_Info2.Technician\_Phone\_No order by Technician\_Info1.Technician\_Room\_No;

Results	Explain	Describe	Saved SQL	History
TECHNI	CIAN_RO	OM_NO	TECHNICIAN	_PHONE_NO
103			8801745216636	6
247			8801929298982	2
304			8801819471121	I

3 rows returned in 0.01 seconds

CSV Export

#### **Self Join:**

select Patient\_Name as Patient\_Name1,Patient\_Info2.Patient\_Name as Patient\_Name2,Patient.City

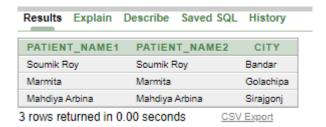
from Patient, Patient\_Info2

where Patient\_Id=Patient\_Info2.Patient\_Id

And Patient.City=Patient\_Info2.City

Order by Patient.City;

#### **Screenshot:**



## **Subquery**

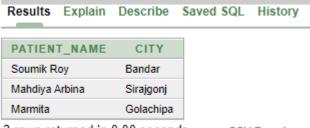
## 1. Find the patientname, city who lives in Bangladesh

SELECT patient\_name, city

FROM patient

WHERE city IN (SELECT city FROM city where region='Bangladesh');

#### **Screenshot:**



3 rows returned in 0.00 seconds

CSV Export

# 2.Display the street\_name along their street\_number which is belong same region.

select street\_name,street\_number
from city
where street\_number=(select max(street\_number)
from city
where street\_number<(select max(street\_number)
from city ))</pre>

#### **Screenshot:**



## 3. Display the test\_report\_fee according highest fee of instrument

```
select test_report_fee,instrument_fee
from test_report
where test_report_fee=(select max(test_report_fee)
from test_report
where test_report_fee<(select max(test_report_fee)
from test_report_))</pre>
```



## 4. Find the patient\_name tested date in 2021.

```
SELECT patient_id,patient_name, pgender

FROM patient

WHERE patient_id IN (

SELECT patient_id FROM patient_info1

WHERE ptesting_date > to_date('1-1-2021', 'dd-mm-yy')
);
```

#### **Screenshot:**

Results E	xplain	Describe	Saved SO	QL Histor
PATIENT_	ID P	ATIENT_N	AME PG	ENDER
202110	Sc	oumik Roy	Ma	le
2021320	M	armita	Fer	male
2 rows retu	rned in (	0.03 secon	nds ⊆	SV Export

## **View**

## **Complex View 01:**

Create View Technician\_Info

As Select

Technician\_Info1.Technician\_Room\_No,Technician\_Info1.Technician\_Name,Technician\_Info2.Technician\_Phone\_No,Technician\_Info2.Technician\_Address

from Technician\_Info1,Technician\_Info2

where Technician\_Info1.Technician\_Phone\_no=Technician\_Info2.Technician\_Phone\_No;

Results Explain Describe	Saved SQL History		
TECHNICIAN_ROOM_NO	TECHNICIAN_NAME	TECHNICIAN_PHONE_NO	TECHNICIAN_ADDRESS
304	Mr. koushik	8801819471121	Comilla
103	Mrs. Asma	8801745216636	Basundhara
247	Mr. Ahmed	8801929298982	Uttara

<sup>3</sup> rows returned in 0.00 seconds

CSV Export

# **Complex View 02:**

Create View Patient\_info as select
Patient\_Patient\_Id,Patient\_Patient\_Name,Patient\_Info1.Test\_Report,Patient\_Info1.Ptesting\_Date
from Patient,Patient\_Info1

where Patient\_Id=Patient\_Info1.Patient\_Id;

## **Screenshot:**

Results Exp	lain Describe Save	ed SQL History	
PATIENT_ID	PATIENT_NAME	TEST_REPORT	PTESTING_DATE
202110	Soumik Roy	Surgical Pathology Report	20-JUN-21
2021320	Marmita	Heart Dignosis Report	04-DEC-21
202117	Mahdiya Arbina	Psychological Report	03-APR-20
rows returne	d in 0.03 seconds	CSV Export	

# **Constraint Adding**

alter table Patient add constraint pk31 foreign key(City) references City(City);

## **Screenshot:**

