HOSPITAL MANAGEMENT SYSTEM

Abstract

Effective hospital management integrates administrative, financial, and clinical functions to enhance patient care, improve operational efficiency, and adapt to evolving healthcare demands through strategic planning and innovative technologies.

HOSPITAL
MANAGEMENT SYSTEM

MARCH 12

SUNIL KUMAR PRUSTY
Sunilprusty16@gmail.com

HOSPITAL MANAGEMENT SYSTEM

1. Description:

Hospitals are the most important part of our lives, trying to provide the best medical facilities to people suffering from various type of illness, which may be due to change in climate conditions, increased workload, emotional trauma stress etc. It is very much difficult for the hospital to maintain its day-to-day activities and records manually. That is why a database is required to keep records of all type of activities of a hospital.

Hospitals interact with a lot of people in a day and there are various activities involved in day-to-day operations of hospitals, for example managing doctor schedules, managing patient diagnoses, managing medical histories of patients, etc. The aim of this project is to show how data related to these tasks can be made easier to manage using databases.

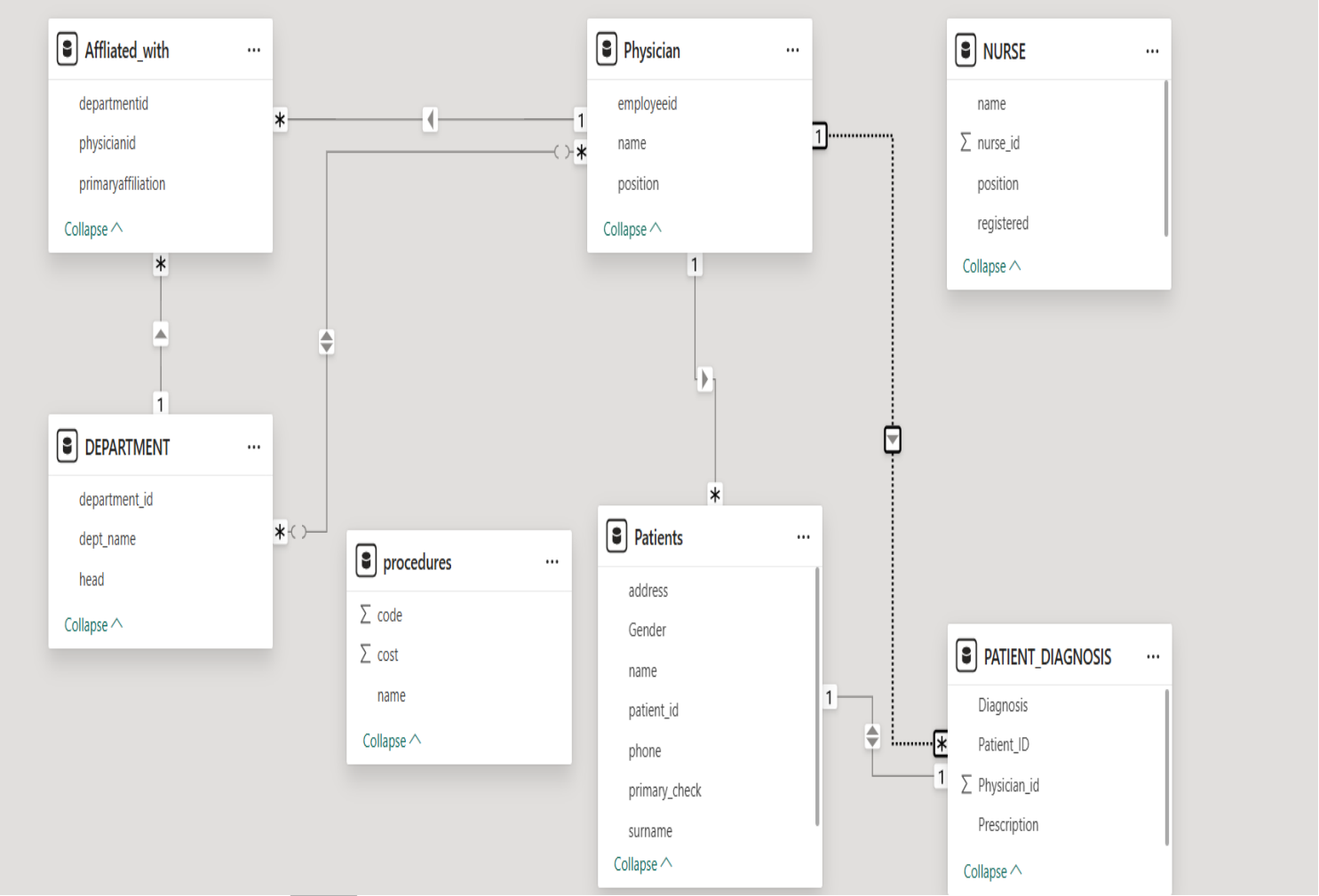
By storing information in a relational database, all the tasks relate to daily functioning of the hospital can be performed easily and much more efficiently. Hospital Database Management System (DBMS) is a comprehensive SQL project designed to streamline and optimize the management of hospital operations. This project aims to provide an efficient and user-friendly solution for storing, retrieving, and manipulating various types of healthcare-related data.

This database contains 7 tables:

1. Physician
2. Affiliated with
3. Department
4. Nurse
5. Patient
6. Patient Diagnosis
7. Procedures

How these tables/entities are related to each other is shown on next page through ER diagram, i.e., Entity Relationship Diagram.

2.ER-Diagram (Entity Relationship Diagram) For Hospital Management System.



3.TABLE DESCRIPTION:

1. **Physician:**

Field	Type	Null	Key	Default	Extra
Employeeid	Int	NO	PRI	NULL	
Name	Varchar (150)	NO		NULL	
Position	Varchar (150)	NO		NULL	

2.**Affiliated with:**

Field	Type	Null	Key	Default	Extra
physicianid	Int	NO	MUL	NULL	
departmentid	Int	NO	MUL	NULL	
primaryaffiliation	varchar(1)	NO		NULL	

3.**Department:**

Field	Type	Null	Key	Default	Extra
department_id	Int	NO	PRI	NULL	
dept_name	varchar(150)	NO		NULL	
Head	Int	NO	MUL	NULL	

4. Nurse:

Field	Type	Null	Key	Default	Extra
nurse_id	Int	NO		NULL	
Name	varchar(150)	NO		NULL	
Position	varchar(150)	NO		NULL	
registered	varchar(10)	NO		NULL	

5. Patient

Field	Type	Null	Key	Default	Extra
patient_id	Int	NO	PRI	NULL	Auto increment
Name	varchar(100)	NO		NULL	
Surname	varchar(100)	NO		NULL	
Address	varchar(100)	NO		NULL	
Gender	varchar(150)	NO		NULL	
Phone	varchar(150)	NO		NULL	
primary_check	Int	NO	MUL	NULL	

6. Patient Diagnosis:

Field	Type	Null	Key	Default	Extra
Diagnosis	varchar(150)	NO		NULL	
Prescription	varchar(150)	NO		NULL	
Patient_ID	Int	NO	MUL	NULL	
Physician_id	Int	NO	MUL	NULL	

7.Procedures:

Field	Type	Null	Key	Default	Extra
Code	int	NO	PRI	NULL	
Name	varchar(150)	NO		NULL	
Cost	Int	NO		NULL	

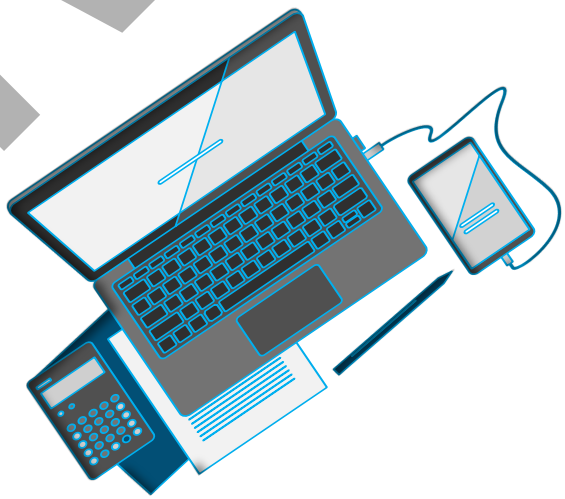
4.SQL PROJECT – HOSPITAL MANAGEMENT SYSTEM BASIC QUERY.

1.Write a query in SQL to obtain the name of the physician in alphabetical order.

```
SELECT NAME FROM PHYSICIAN
ORDER BY NAME ASC;
```

TABLE OUTPUT:

NAME
Dr.Aaliyah Craig
Dr.Alexis Estes
Dr.Ariya Bradley
Dr.Berkley McKenzie
Dr.Bob Kelso
Dr.Brynn Harrison
Dr.Cali Vazquez
Dr.Cedric Kelley
Dr.Christopher Turk
Dr.Dallas Gutierrez
Dr.Elliot Reid
Dr.Estella Keller
Dr.Gavin Curtis
Dr.Imani Harper
Dr.Jamison Clayton
Dr.Jaxson Khan
Dr.Jesse Craig
Dr.John Dorian
Dr.John Wen
Dr.Keith Dudemeister
Dr.Luca Flowers
Dr.Mabel Leal
Dr.Molly Clock
Dr.Nancy James
Dr.Nico Galvan



2.Write a query in SQL to obtain the full name of the patients whose gender is male.

```
SELECT NAME, SURNAME, CONCAT (NAME," ", SURNAME) AS FULL_NAME, GENDER
FROM PATIENT
WHERE GENDER = "MALE";
```

TABLE OUTPUT:

```
333
334  SELECT NAME,SURNAME,CONCAT(NAME," ",SURNAME) AS FULL_NAME,GENDER
335  FROM PATIENT
336  WHERE GENDER = "MALE";
```

Result Grid | Filter Rows: | Export: | Wrap Cell Content:

NAME	SURNAME	FULL_NAME	GENDER
John	Smith	John Smith	Male
Remo	Xavier	Remo Xavier	Male
Dennis	Doe	Dennis Doe	Male
John	Smith	John Smith	Male
Michael	Williams	Michael Williams	Male
David	Jones	David Jones	Male

3.Write a query in SQL to find the name of the nurse who are the head of their department and are registered.

```
SELECT NAME,POSITION,REGISTERED
FROM NURSE
WHERE POSITION = "Head Nurse" AND REGISTERED =
"YES";
```

TABLE OUTPUT:

Result Grid | Filter Rows:

NAME	POSITION	REGISTERED
Carla Espinosa	Head Nurse	Yes
Rose Hughes	Head Nurse	Yes
Olive Peterson	Head Nurse	Yes
Jamiya Villarreal	Head Nurse	Yes
Liliana Pace	Head Nurse	Yes

4.Write a query in SQL to find the name of the nurse who are Team Leader or not registered.

```
SELECT NAME,POSITION,REGISTERED
FROM NURSE
WHERE POSITION = "Head Nurse" AND REGISTERED = "No";
```

TABLE OUTPUT:

Result Grid | Filter Rows:

NAME	POSITION	REGISTERED
Nia Knox	Head Nurse	No

5.Write a query to obtain the average cost of all the medical procedures.

```
SELECT AVG(COST) AS AVG_COST
FROM PROCEDURES;
```

TABLE OUTPUT:

Result Grid | Filter Row

AVG_COST
2552.5000

6.Write a query to obtain name and cost of the procedure whose cost is greater than 2000.

```
SELECT NAME,COST
FROM PROCEDURES
WHERE COST >2000;
```

TABLE OUTPUT:

Result Grid | Filter Rows:

NAME	COST
MRI-Brain	5000
MRI-Spine	6000
CT Scan-Abdomen	3000
CT Scan-Pelvis	3500
Ultrasound-Obstetric	2500
PET-CT Scan	5000
Fluoroscopy - Upper GI Series	7000
Fluoroscopy - Barium Enema	4500
MRI-Knee	4000

7.Write a query to update the name of the patient to Robert Fernandez having patient id as 5.

```
UPDATE PATIENT
SET NAME = "Robert",SURNAME = "Fernandez"
WHERE PATIENT_ID = 5;

SELECT * FROM PATIENT WHERE PATIENT_ID = 5;
```

TABLE OUTPUT:

Result Grid | Filter Rows: | Edit: | Export/Import:

patient_id	name	surname	address	Gender	phone	primary_chec
5	Robert	Fernandez	123 Main St	Male	555-123-4567	24

8.Write a query to drop phone column from patient table.

```
ALTER TABLE PATIENT
DROP COLUMN PHONE;

SELECT * FROM PATIENT;
```

TABLE OUTPUT:

Result Grid | Filter Rows: | Edit: | Export/Import:

patient_id	name	surname	address	Gender	primary_check
1	John	Smith	42 Foobar Lane	Male	2
2	Grace	Ritchie	37 Snafu Drive	Female	2
3	Remo	Xavier	101 Omgbbq Street	Male	9
4	Dennis	Doe	1100 Foobaz Avenue	Male	17
5	Robert	Fernandez	123 Main St	Male	24
6	Emily	Johnson	56 Elm St	Female	7
7	Michael	Williams	789 Oak St	Male	13
8	Sarah	Brown	101 Pine St	Female	25
9	David	Jones	234 Maple St	Male	28
10	Jessica	Davis	567 Cedar St	Female	19
11	Christ...	Wilson	890 Birch St	Male	5
12	Ashley	Taylor	111 Walnut St	Female	33

9.Write a query to find second maximum cost of medical procedure?

#1ST_WAY

```
WITH SECOND_HIGHEST_COST AS
(SELECT CODE,NAME,COST,
        DENSE_RANK() OVER(ORDER BY COST DESC) AS RANKING
FROM PROCEDURES)
SELECT * FROM SECOND_HIGHEST_COST WHERE RANKING =2;
```

TABLE OUTPUT:

Result Grid | Filter Rows: | Exp

CODE	NAME	COST	RANKING
6	MRI-Spine	6000	2

2ND WAY

```
SELECT MAX(COST) AS SECOND_HIGHEST_COST
FROM PROCEDURES
WHERE COST < (SELECT MAX(COST) FROM PROCEDURES);
```

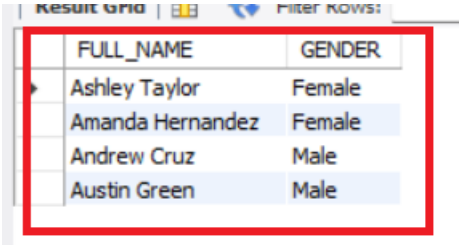
TABLE OUTPUT:

SECOND_HIGHEST_COST
6000

10.Write a query in SQL to obtain the name of the patients starting with letter A.

```
SELECT CONCAT(NAME," ",SURNAME) AS FULL_NAME,GENDER
FROM PATIENT
WHERE CONCAT(NAME," ",SURNAME) LIKE 'A%';
```

TABLE OUTPUT:



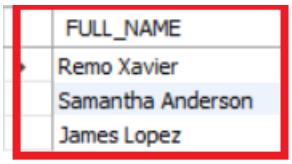
FULL_NAME	GENDER
Ashley Taylor	Female
Amanda Hernandez	Female
Andrew Cruz	Male
Austin Green	Male

11. Write a query in SQL to obtain the name of the patients whose third letter is M.

```
SELECT *
FROM PATIENT
WHERE SUBSTRING(NAME,3,1) = 'M';

SELECT CONCAT(NAME," ",SURNAME) AS FULL_NAME
FROM PATIENT
WHERE CONCAT(NAME," ",SURNAME) LIKE '__M%';
```

TABLE OUTPUT:

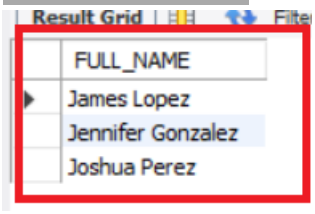


FULL_NAME
Remo Xavier
Samantha Anderson
James Lopez

12.Write a query in SQL to obtain the name of the patients whose name start with letter J and ends with Z.

```
SELECT CONCAT(NAME," ",SURNAME) AS FULL_NAME
FROM PATIENT
WHERE CONCAT(NAME," ",SURNAME) LIKE 'J%Z';
```

TABLE OUTPUT:



FULL_NAME
James Lopez
Jennifer Gonzalez
Joshua Perez

13. Write a query to obtain patient details having patient id 11 to 20.

```
SELECT *
FROM PATIENT
WHERE PATIENT_ID BETWEEN 11 AND 20;
```

TABLE OUTPUT:

patient_id	name	surname	address	Gender	primary_check
11	Christopher	Wilson	890 Birch St	Male	5
12	Ashley	Taylor	111 Walnut St	Female	33
13	Matthew	Martinez	222 Cherry St	Male	3
14	Samantha	Anderson	333 Spruce St	Female	18
15	Daniel	Garcia	444 Sycamore St	Male	6
16	Amanda	Hernandez	555 Pineapple St	Female	19
17	James	Lopez	666 Banana St	Male	15
18	Jennifer	Gonzalez	777 Orange St	Female	26
19	Joshua	Perez	888 Grape St	Male	6
20	Brittany	Torres	999 Lemon St	Female	20

HOSPITAL MANAGEMENT SYSTEM OF ADVANCE QUERY.

14.Write a query in SQL to obtain the name of the physicians who are the head of each department.

```
SELECT P.NAME AS DOCTORS_NAME,D.DEPT_NAME
FROM PHYSICIAN P
INNER JOIN DEPARTMENT D
ON P.EMPLOYEEID = D.HEAD;
```

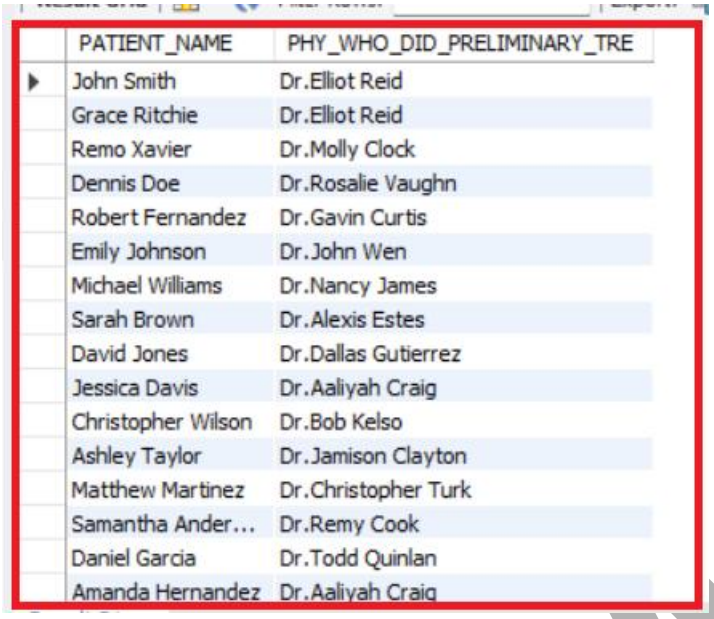
TABLE OUTPUT:

DOCTORS_NAME	DEPT_NAME
Dr.Percival Cox	General Medicine
Dr.John Wen	Surgery
Dr.Molly Clock	Psychiatry
Dr.Nancy James	Cardiology
Dr.Imani Harper	Nephrology
Dr.Robert Suarez	Urology
Dr.Ariya Bradley	Neurology
Dr.Nico Galvan	Physiotherapy
Dr.Mabel Leal	ENT
Dr.Bob Kelso	Pulmonology
Dr.Remy Cook	Gastroenterology
Dr.Scott Vaughan	Gynecology
Dr.Jesse Craig	Neonatal
Dr.Alexis Estes	Critical care
Dr.Cali Vazquez	Orthopedics

15. Write a query in SQL to obtain the name of the patients with their physicians by whom they got their preliminary treatment

```
SELECT CONCAT(P.NAME," ",P.SURNAME) AS PATIENT_NAME,PH.NAME AS
PHY_WHO_DID_PRELIMINARY_TRE
FROM PATIENT P
LEFT JOIN PHYSICIAN PH
ON P.PRIMARY_CHECK = PH.EMPLOYEEID;
```

TABLE OUTPUT:

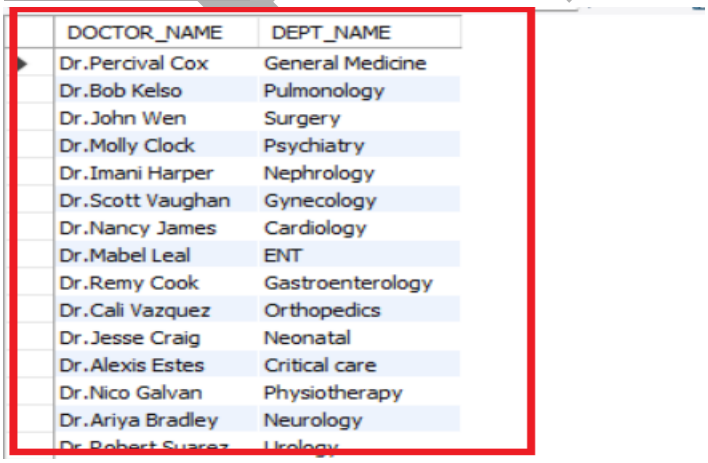


PATIENT_NAME	PHY_WHO_DID_PRELIMINARY_TRE
John Smith	Dr.Elliot Reid
Grace Ritchie	Dr.Elliot Reid
Remo Xavier	Dr.Molly Clock
Dennis Doe	Dr.Rosalie Vaughn
Robert Fernandez	Dr.Gavin Curtis
Emily Johnson	Dr.John Wen
Michael Williams	Dr.Nancy James
Sarah Brown	Dr.Alexis Estes
David Jones	Dr.Dallas Gutierrez
Jessica Davis	Dr.Aaliyah Craig
Christopher Wilson	Dr.Bob Kelso
Ashley Taylor	Dr.Jamison Clayton
Matthew Martinez	Dr.Christopher Turk
Samantha Ander...	Dr.Remy Cook
Daniel Garcia	Dr.Todd Quinlan
Amanda Hernandez	Dr.Aaliyah Craig

16.Write a query in SQL to obtain the name of the physician with the department who are done with affiliation.

```
SELECT
        PH.NAME AS DOCTOR_NAME,
        D.DEPT_NAME
FROM PHYSICIAN PH
INNER JOIN DEPARTMENT D
ON PH.EMPLOYEEID = D.HEAD
INNER JOIN AFFILIATED_WITH A ON PH.EMPLOYEEID = A.PHYSICIANID
WHERE A.PRIMARYAFFILIATION = 'T';
```

TABLE OUTPUT:



DOCTOR_NAME	DEPT_NAME
Dr.Percival Cox	General Medicine
Dr.Bob Kelso	Pulmonology
Dr.John Wen	Surgery
Dr.Molly Clock	Psychiatry
Dr.Imani Harper	Nephrology
Dr.Scott Vaughan	Gynecology
Dr.Nancy James	Cardiology
Dr.Mabel Leal	ENT
Dr.Remy Cook	Gastroenterology
Dr.Cali Vazquez	Orthopedics
Dr.Jesse Craig	Neonatal
Dr.Alexis Estes	Critical care
Dr.Nico Galvan	Physiotherapy
Dr.Ariya Bradley	Neurology
Dr.Robert Suarez	Urology

17.Write a query to obtain physician name, position and department they are affiliated with.

```
SELECT
        PH.NAME AS DOCTOR_NAME,
        PH.POSITION,
        D.DEPT_NAME
FROM PHYSICIAN PH
INNER JOIN AFFILIATED_WITH A
ON PH.EMPLOYEEID = A.PHYSICIANID
INNER JOIN DEPARTMENT D
ON A.DEPARTMENTID = D.DEPARTMENT_ID;
```

TABLE OUTPUT:

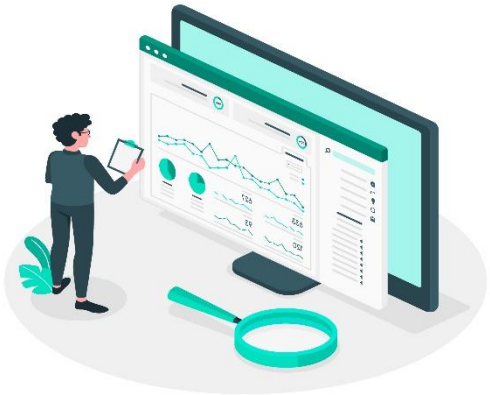
DOCTOR_NAME	POSITION	DEPT_NAME
Dr.John Dorian	Staff Internist	General Medicine
Dr.Elliot Reid	Attending Physician	General Medicine
Dr.Christopher Turk	Surgical Attending Physician	General Medicine
Dr.Percival Cox	Senior Attending Physician	General Medicine
Dr.John Wen	Surgical Attending Physician	General Medicine
Dr.Keith Dudemeister	Resident	General Medicine
Dr.Christopher Turk	Surgical Attending Physician	Surgery
Dr.Todd Quinlan	Surgical Attending Physician	Surgery
Dr.John Wen	Surgical Attending Physician	Surgery
Dr.Molly Clock	Attending Psychiatrist	Psychiatry

18.Write a query in SQL to obtain the patient name from which physician they get primary checkup and also mention the patient diagnosis with prescription.

```
SELECT CONCAT(P.NAME," ",P.SURNAME) AS Patient_Name,
                P.GENDER,
                PH.NAME AS Doctor_Name,
                PH.POSITION,
                PD.DIAGNOSIS AS Patient_Diagnosis,
        PD.PRESCRIPTION AS Patient_Prescription
FROM PATIENT_DIAGNOSIS PD
LEFT JOIN PHYSICIAN PH
ON PD.PHYSICIAN_ID = PH.EMPLOYEEID
LEFT JOIN PATIENT P
ON P.PATIENT_ID = PD.PATIENT_ID;
```

TABLE OUTPUT:

Patient_Name	GENDER	Doctor_Name	POSITION	Patient_Diagnosis	Patient_Prescription
John Smith	Male	Dr.Elliot Reid	Attending Physician	Hypertension	Lisinopril
Dennis Doe	Male	Dr.Rosalie Vaughn	Assistant Orthopedic Surgeon	Arthritis	Naproxen & Aspirin
Remo Xavier	Male	Dr.Molly Clock	Attending Psychiatrist	Anxiety Disorder	Fluoxetine
Robert Fernandez	Male	Dr.Gavin Curtis	Assistant Physiotherapist	Muscular Dystrophy	Corticosteroids
Grace Ritchie	Female	Dr.Elliot Reid	Attending Physician	Asthma	Albuterol
Kayla Adams	Female	Dr.Imani Harper	Senior Attending Nephrologist	IgA Nephropathy	Budesonide
Emily Johnson	Female	Dr.John Wen	Surgical Attending Physician	Chronic Pain	Tramadol
Michael Williams	Male	Dr.Nancy James	Cardiologist	Acoustic neuroma	Radiation therapy
Sarah Brown	Female	Dr.Alexis Estes	Senior Intensivist	Septic Shock	Corticosteroids:Hydrocortisone
David Jones	Male	Dr.Dallas Gutierrez	Senior attending Urologist	Kidney Stones	Ibuprofen, Acetaminophen
Jessica Davis	Female	Dr.Aaliyah Craig	Assistant Neuro Surgeon	Parkinsons Disease...	Ropinirole
Christopher Wilson	Male	Dr.Bob Kelso	Head Chief of pulmonology	Chronic Obstructiv...	Fluticasone,Budesonide
Ashley Taylor	Female	Dr.Jamison Clayton	Assistant neonatologist	Neonatal Jaundice	Phototherapy
Matthew Martinez	Male	Dr.Christopher Turk	Surgical Attending Physician	Chronic Pain	Tramadol



Hospital Management System Advance Query (Subquery)

19. Write a query in SQL to obtain the maximum cost of the medical procedure.

```
SELECT NAME,COST FROM PROCEDURES
WHERE COST = (SELECT MAX(COST) FROM PROCEDURES);
```

TABLE OUTPUT:

NAME	COST
Fluoroscopy - Upper GI Series	7000

20. Write a query in SQL to obtain the details of patient who has diagnosed with chronic pain.

```
SELECT * FROM PATIENT
WHERE PATIENT_ID IN (SELECT PATIENT_ID FROM PATIENT_DIAGNOSIS WHERE
DIAGNOSIS = 'Chronic Pain');
```

TABLE OUTPUT:

patient_id	name	surname	address	Gender	primary_check
6	Emily	Johnson	56 Elm St	Female	7
13	Matthew	Martinez	222 Cherry St	Male	3
NULL	NULL	NULL	NULL	NULL	NULL

21. Write a query in SQL to obtain the procedure name and cost whose cost is greater than the average cost of all the procedure.

```
SELECT NAME,COST
FROM PROCEDURES
WHERE COST > (SELECT AVG(COST) FROM PROCEDURES);
```

TABLE OUTPUT:

NAME	COST
MRI-Brain	5000
MRI-Spine	6000
CT Scan-Abdomen	3000
CT Scan-Pelvis	3500
PET-CT Scan	5000
Fluoroscopy - Upper GI Series	7000
Fluoroscopy - Barium Enema	4500
MRI-Knee	4000

22. Write a query in SQL to obtain the procedure name and cost whose cost is less than the average cost of all the procedure.

```
SELECT NAME,COST
FROM PROCEDURES
WHERE COST < (SELECT AVG(COST) FROM PROCEDURES);
```

TABLE OUTPUT:

NAME	COST
X-ray-Chest	1000
X-ray-Abdomen	1200
X-ray-Skull	900
X-ray-Spine	1500
Ultrasound-Abdomen	700
Ultrasound-Obstetric	2500
Mammogram	1200
Bone Density Scan (DEXA)	1800
Nuclear Medicine - Thyroid Scan	450
Angiography - Cerebral	800

23. Write a query in SQL to obtain the physician name who are either head chief or senior in their respective department.

```
SELECT * FROM PHYSICIAN
WHERE POSITION IN
(SELECT POSITION
        FROM PHYSICIAN
                WHERE POSITION LIKE '%HEAD CHIEF%' OR POSITION LIKE '%SENIOR%');
```

TABLE OUTPUT:

employeeid	name	position
4	Dr.Percival Cox	Senior Attending Physician
5	Dr.Bob Kelso	Head Chief of pulmonology
10	Dr.Imani Harper	Senior Attending Nephrologist
12	Dr.Scott Vaughan	Senior Attending Gynecologist
15	Dr.Mabel Leal	Senior ENT Surgeon
18	Dr.Remy Cook	Head chief of Gastroenterology
21	Dr.Cali Vazquez	Head Chief of Orthopedics
22	Dr.Jesse Craig	Head chief of neonatal
25	Dr.Alexis Estes	Senior Intensivist
27	Dr.Nico Galvan	Head chief of physiotherapy
28	Dr.Dallas Gutierrez	Senior attending Urologist

24. Write a query in SQL to obtain the employee id, physician name and position whose primary affiliation has not been done.

```
SELECT * FROM PHYSICIAN
WHERE EMPLOYEEID IN (SELECT PHYSICIANID FROM AFFILIATED_WITH WHERE
PRIMARYAFFILIATION = 'f');
```

TABLE OUTPUT:

employeeid	name	position
3	Dr.Christopher Turk	Surgical Attending Physician
7	Dr.John Wen	Surgical Attending Physician
11	Dr.Berkley McKenzie	Resident
14	Dr.Jaxson Khan	Assistant Intensivist
16	Dr.Cedric Kelley	Junior Resident
20	Dr.Odin Banks	Junior Intensivist
23	Dr.Brynn Harrison	Staff Internist
26	Dr.Estella Keller	Assistant Gastro Surgeon
31	Dr.Richard Mitchell	Senior Resident
32	Dr.Willow Farmer	Junior Resident

THANK YOU

BY SUNILKUMAR PRUSTY