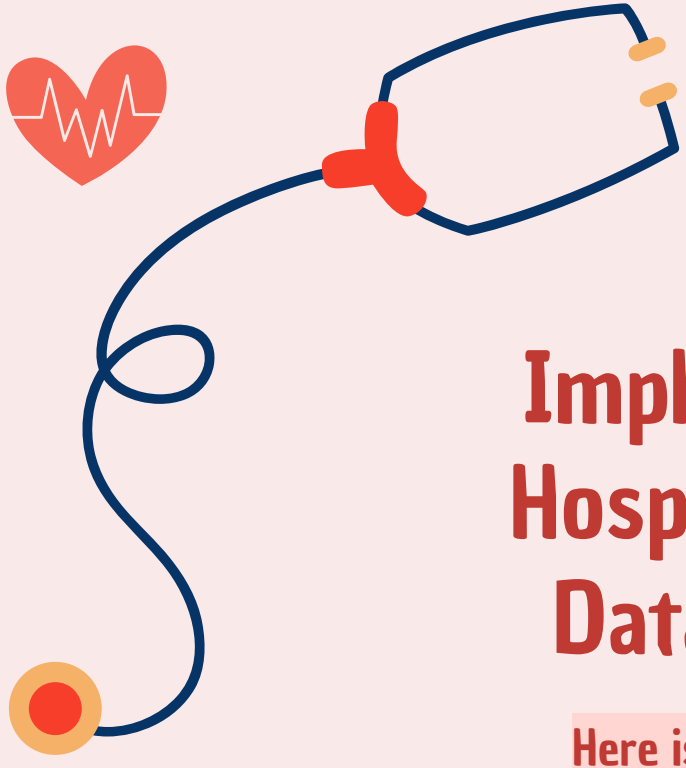
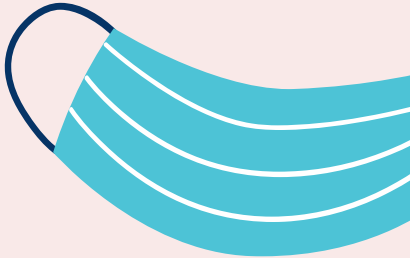
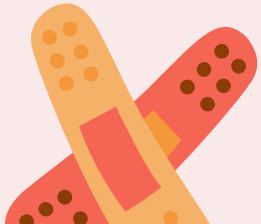
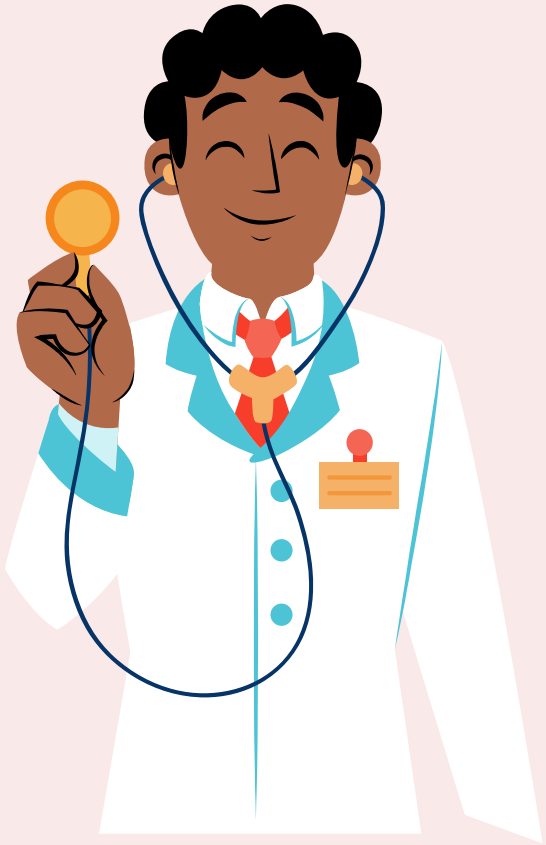
Design and Implementation of a Hospital Management Database in MySQL

Here is where presentation begins



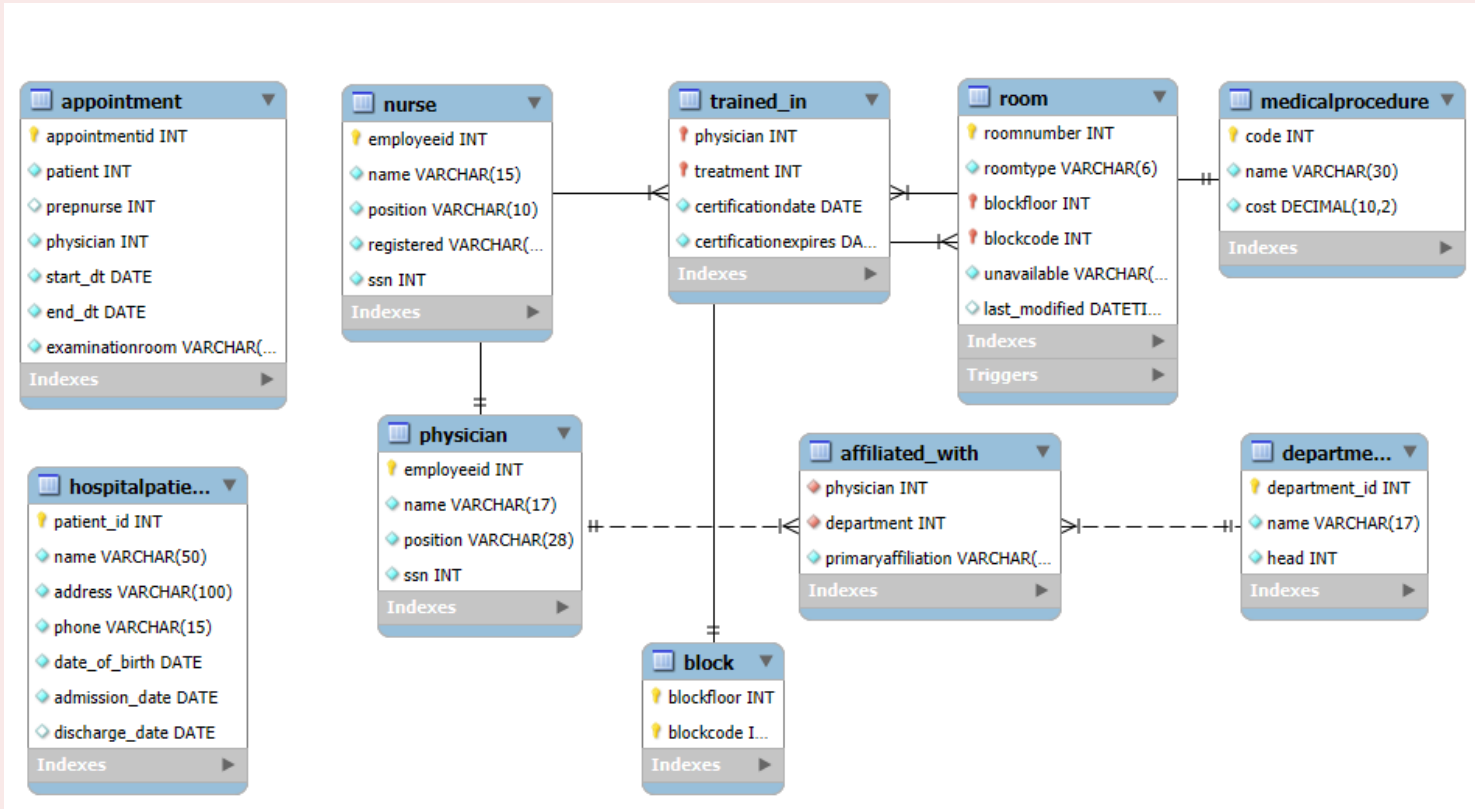
Introduction



Overview: This project focuses on creating a Hospital Management System using MySQL. The system helps manage essential hospital data, including information about patients, doctors, and medical procedures.

Purpose: The goal is to show how a MySQL database can organize and handle hospital data efficiently, making it easier to retrieve and manage important information.

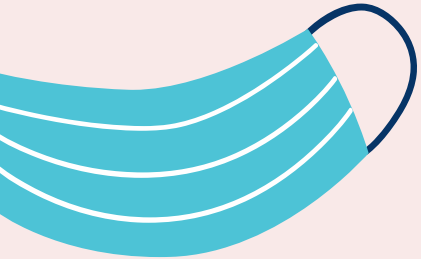
ER Diagram Overview: Hospital Database

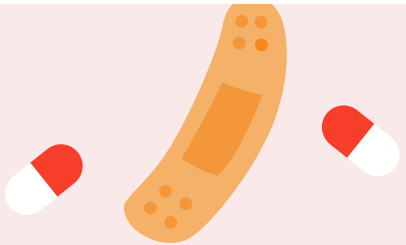


How can you find all nurses who are registered?

```
SELECT *
FROM Nurse
WHERE registered = 't';
```

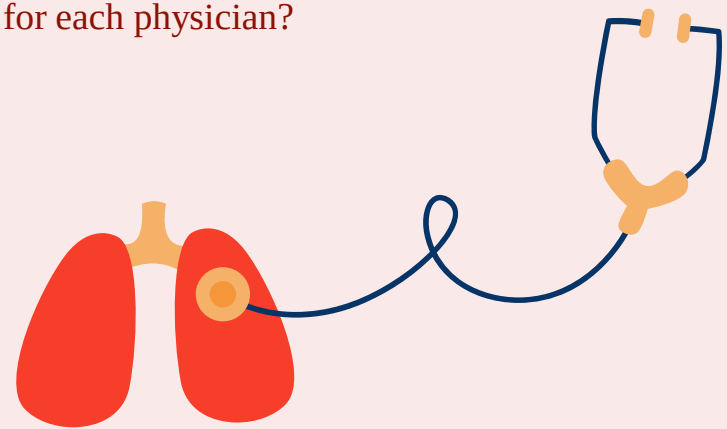
employeeid	name	position	registered	ssn
101	Carla Espinosa	Head Nurse	t	111111110
102	Laverne Roberts	Nurse	t	222222220
NULL	NULL	NULL	NULL	NULL





How can you find the total number of appointments for each physician?

```
SELECT Physician, COUNT(*) AS
total_appointments
FROM appointment
GROUP BY Physician;
```

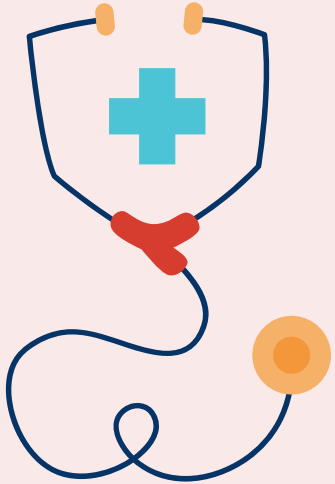


	Physician	total_appointments
▶	1	6
	2	9
	4	6
	3	3
	9	3

How can you list the names of patients who have been discharged?

```
SELECT name
FROM HospitalPatient
WHERE discharge_date IS NOT NULL;
```

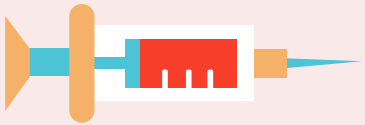
name
John Doe
Jane Smith
Bob Brown
John Doe
Jane Smith
Bob Brown
John Doe
Jane Smith
Bob Brown



How can you list the names of physicians who are department heads?

```
SELECT name
FROM Physician
WHERE employeeid IN
(SELECT head FROM department);
```

name
Percival Cox
John Wen
Molly Clock



How can you list departments that have more than two physicians?

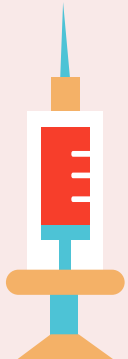
```
SELECT d.name AS Department, COUNT(p.employeeid) AS PhysicianCount
FROM department d
JOIN affiliated_with aw ON d.department_id = aw.department
JOIN Physician p ON aw.physician = p.employeeid
GROUP BY d.name
HAVING PhysicianCount > 2;
```

Department	PhysicianCount
General Medicine	5
Surgery	3

How can you find patients who were admitted in the last month?

```
SELECT name, admission_date
FROM HospitalPatient
WHERE admission_date >=
DATE_SUB(CURDATE(), INTERVAL 1 MONTH);
```

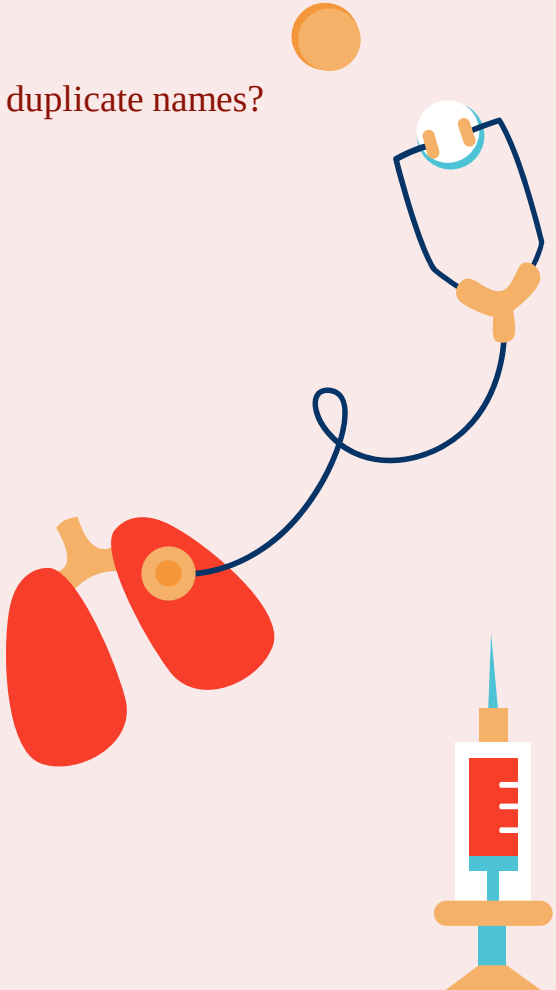
name	admission_date
Tom Hanks	2024-09-01
Tom Hanks	2024-09-01



How can you list the names of all physicians and hospital patients, including duplicate names?

```
SELECT name
FROM Physician
UNION ALL
SELECT name
 FROM HospitalPatient;
```

name
Bob Kelso
Christopher Turk
Elliot Reid
John Dorian
John Wen
Keith Dudemeister
Molly Clock
Percival Cox
Todd Quinlan
John Doe
Jane Smith
Alice Johnson
Bob Brown
Tom Hanks
John Doe
Jane Smith
Alice Johnson
Bob Brown
John Doe
Jane Smith
Alice Johnson
Bob Brown
Tom Hanks



How can you calculate and display the age of each patient based on their date of birth?

```
SELECT name,
DATE_FORMAT(FROM_DAYS(DATEDIFF(NOW(), date_of_birth)), '%Y')+0 AS
age
FROM HospitalPatient;
```

name	age
John Doe	39
Jane Smith	33
Alice Johnson	46
Bob Brown	41
Tom Hanks	58
John Doe	0
Jane Smith	0
Alice Johnson	0
Bob Brown	0
John Doe	0
Jane Smith	0
Alice Johnson	0
Bob Brown	0
Tom Hanks	58

How can you list the names of physicians affiliated with the Surgery department?

```
SELECT Physician.name
FROM Physician
JOIN affiliated_with ON Physician.employeeid = affiliated_with.physician
JOIN department ON affiliated_with.department = department.department_id
WHERE department.name = 'Surgery';
```

	name
▶	Christopher Turk
	Todd Quinlan
	John Wen

How can you find the number of physicians in each department?

```
SELECT d.name AS Department, COUNT(p.employeeid) AS PhysicianCount
FROM department d
JOIN affiliated_with aw ON d.department_id = aw.department
JOIN Physician p ON aw.physician = p.employeeid
GROUP BY d.name;
```

Department	PhysicianCount
General Medicine	5
Surgery	3
Psychiatry	1

How can you find the names of patients treated by a specific physician, such as John Dorian?

```
SELECT *
FROM appointment a
JOIN Physician p ON a.physician = p.employeeid
WHERE p.name = 'John Dorian';
```

appointmentid	patient	prepnurse	physician	start_dt	end_dt	examinationroom	employeeid	name	position	ssn
13216581	100000001	101	1	2024-04-24	2024-08-24	A	1	John Dorian	Staff Internist	111111111
13216584	100000001	101	1	2008-04-24	2008-04-24	A	1	John Dorian	Staff Internist	111111111
1321658	13216587	101	1	2024-04-24	2024-08-24	A	1	John Dorian	Staff Internist	111111111
36549873	100000001	102	1	2024-04-25	2024-08-25	A	1	John Dorian	Staff Internist	111111111
36549878	100000001	102	1	2024-04-25	2024-08-25	A	1	John Dorian	Staff Internist	111111111
36549879	100000001	102	1	2008-04-25	2008-04-25	A	1	John Dorian	Staff Internist	111111111

How can you find the name of the nurse who has been a prep nurse the most times?

```
SELECT name
FROM Nurse
WHERE employeeid =
 ( SELECT prepnurse
FROM appointment
GROUP BY prepnurse
ORDER BY COUNT(*) DESC
 LIMIT 1);
```

	name
▶	Carla Espinosa

How can you find the most expensive medical procedure that each physician is trained in?

```
SELECT p.name AS physician_name, mp.name AS procedure_name, mp.cost
FROM MedicalProcedure mp
JOIN trained_in ti ON mp.code = ti.treatment
JOIN Physician p ON ti.physician = p.employeeid
WHERE mp.cost =
(  SELECT MAX(mp2.cost)
FROM MedicalProcedure mp2
JOIN trained_in ti2 ON mp2.code = ti2.treatment
WHERE ti2.physician = ti.physician);
```

physician_name	procedure_name	cost
John Wen	Reverse Rhinopodoplasty	1500.00
John Dorian	Obtuse Pyloric Recombobulation	
Elliot Reid	Obtuse Pyloric Recombobulation	3750.00
Christopher Turk	Complete Walletectomy	10000.00
Bob Kelso	Complete Walletectomy	10000.00
Percival Cox	Reversible Pancreomyoplasty	5600.00
Molly Clock	Reversible Pancreomyoplasty	5600.00
Keith Dudemeister	Follicular Demiectomy	25.00

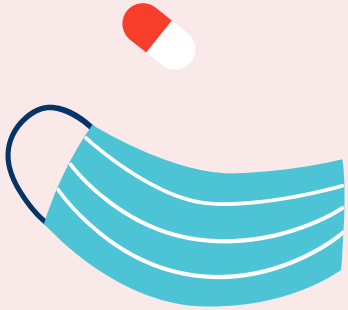
How can you find the count of nurses who have worked as prep nurses in each block and floor of a hospital?

```
SELECT b.blockcode, b.blockfloor, (SELECT COUNT(*)
FROM Nurse n
JOIN appointment a ON n.employeeid = a.prepnurse
JOIN room r ON a.examinationroom = r.roomnumber
WHERE r.blockfloor = b.blockfloor AND r.blockcode = b.blockcode) AS
nurse_count FROM block b;
```

blockcode	blockfloor	nurse_count
1	1	0
2	1	0
3	1	0
1	2	0
2	2	0
3	2	0
1	3	0
2	3	0
3	3	0
1	4	0
2	4	0
3	4	0

How can you create a view that shows the association between physicians and their departments ?

```
CREATE VIEW PhysicianDepartment ASSELECT p.name AS Physician,
d.name AS Department
FROM Physician p
JOIN affiliated_with aw ON p.employeeid = aw.physicianJOIN department d
ON aw.department = d.department_id;
```



```
SHOW INDEX FROM block;
```

Table	Non_unique	Key_name	Seq_in_index	Column_name	Collation	Cardinality	Sub_part	Packed	Null	Index_type	Comment	Index_comment	Visible	Expression
block	0	PRIMARY	1	blockfloor	A	4	NULL	NULL		BTREE			YES	NULL
block	0	PRIMARY	2	blockcode	A	12	NULL	NULL		BTREE			YES	NULL
block	1	idx1_block	1	blockfloor	A	4	NULL	NULL		BTREE			YES	NULL
block	1	idx1_block	2	blockcode	A	12	NULL	NULL		BTREE			YES	NULL
block	1	idx_blockfloor_blockcode	1	blockfloor	A	4	NULL	NULL		BTREE			YES	NULL
block	1	idx_blockfloor_blockcode	2	blockcode	A	12	NULL	NULL		BTREE			YES	NULL

Key Findings

Organized Data:
The MySQL database neatly organizes hospital data, making it easy to access and manage.

Fast Data Retrieval:
Queries are optimized for quick access to important information like patient records and procedures.

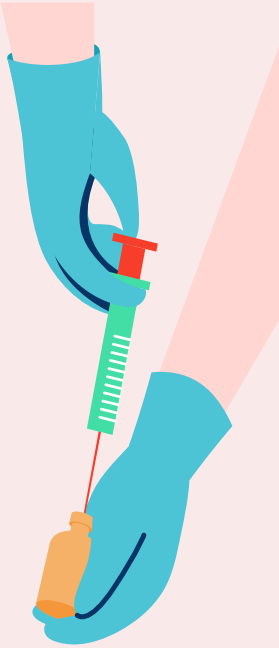
Clear Relationships:
The ER diagram shows how different parts of the database are connected, making the data structure easy to understand.

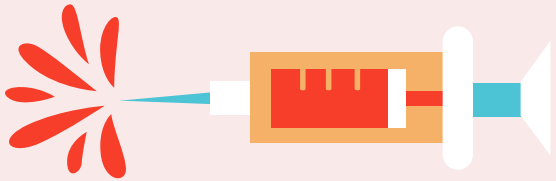
Room for Growth:
The database design can be expanded in the future to include more features or data.

Strong Data Integrity:
The use of primary and foreign keys keeps the data accurate and consistent.

Conclusion

This project showed how MySQL can be used to manage hospital data effectively. By organizing information about patients, doctors, and procedures, the database helps make hospital operations smoother.
Through this project, I learned how to design and use a database, which is an important step in my journey toward a career in software development





Thank you