HOSPITAL MANAGEMENT SYSTEM

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PROBLEM STATEMENT

The problem entails designing and implementing a unified hospital management database system that addresses challenges such as data integration, security, scalability, user-friendliness, real-time access, and interoperability to improve patient care and streamline hospital operations while ensuring regulatory compliance.

PROBLEM DESCRIPTION

In response to the increasing pressure on hospitals to improve efficiency and improve patient care, the aim of this project is to develop a robust database system for monitoring hospital activities. The current landscape often suffers from outdated and fragmented systems, resulting in inefficiencies and errors. The main challenges addressed were:

- **Data Integration**: Integrate disparate databases for patient records, scheduling, inventory, and billing to facilitate informed decision making.
- **Data Security and Privacy:** Ensure compliance with HIPAA and other legal standards to protect patient privacy.

PROBLEM DESCRIPTION

- **User-friendly interfaces:** Designing user-friendly interfaces to increase usability by health professionals.
- **Real-time access and reporting**: Timely delivery of accurate information for clinical decision making and performance management.
- **Interoperability:** Ensure easy data exchange with external systems such as EHRs and billing systems for continuous monitoring.
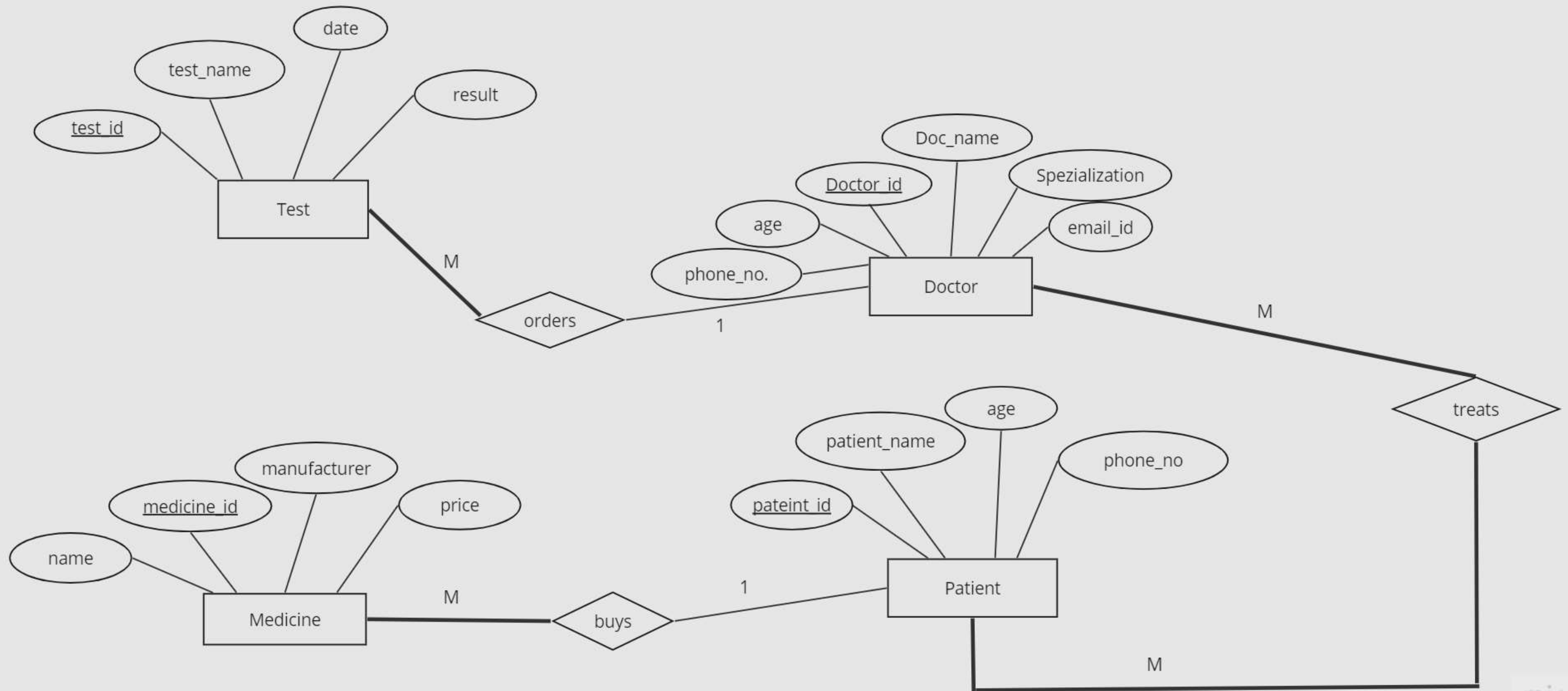
By addressing these challenges, the project aims to provide a comprehensive clinical management database system that improves resource utilization, improves patient care, and improves overall clinical performance.

ALL POSSIBLE ASSUMPTIONS

1. There is a strong entity **patient** which refers to the patient who visits our clinic and it has attributes like patient_id primary key and other attributes as patient_name, age, phone_no.
2. There is a strong entity **doctor** which refers to the doctors working in out clinic and it has primary key doctor_id and other attributes like phone_no, email_id, doc_name, specialization and age.
3. There is a strong entity **Test** which refers to the tests which the doctor orders the patient to take with primary key test_id and other attributes like test_name, date and result
4. There is a strong entity **medicine** which refers to the medicine list as per the test and it has okey attribute medicine_id and other attributes liike name, manufacturer and price.

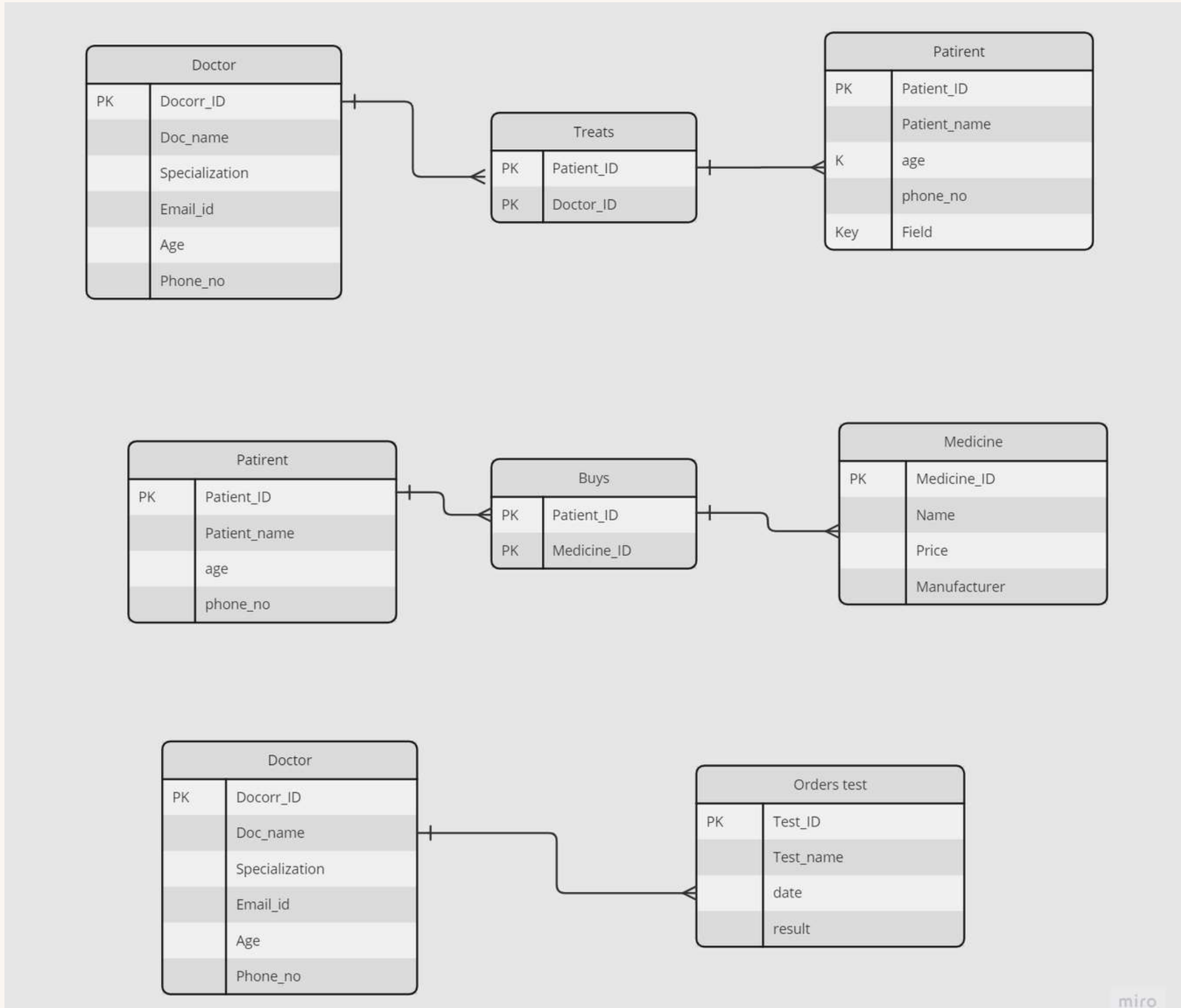# ER DIAGRAM

RELATIONAL MODEL

Doctor

PK	Docorr_ID
	Doc_name
	Specialization
	Email_id
	Age
	Phone_no

Treats

PK	Patient_ID
PK	Doctor_ID

Patirent

PK	Patient_ID
	Patient_name
K	age
	phone_no
Key	Field

Patirent

PK	Patient_ID
	Patient_name
	age
	phone_no

Buys

PK	Patient_ID
PK	Medicine_ID

Medicine

PK	Medicine_ID
	Name
	Price
	Manufacturer

Doctor

PK	Docorr_ID
	Doc_name
	Specialization
	Email_id
	Age
	Phone_no

Orders test

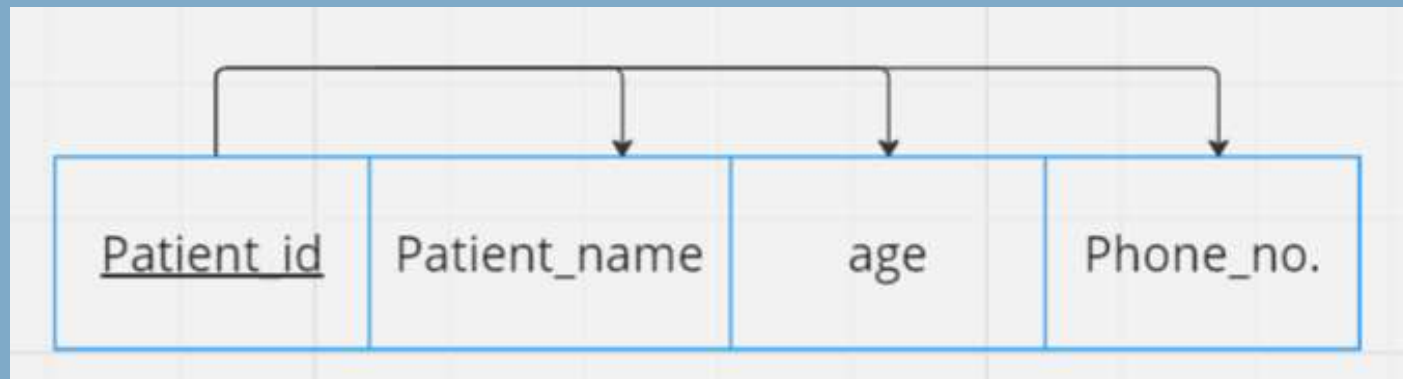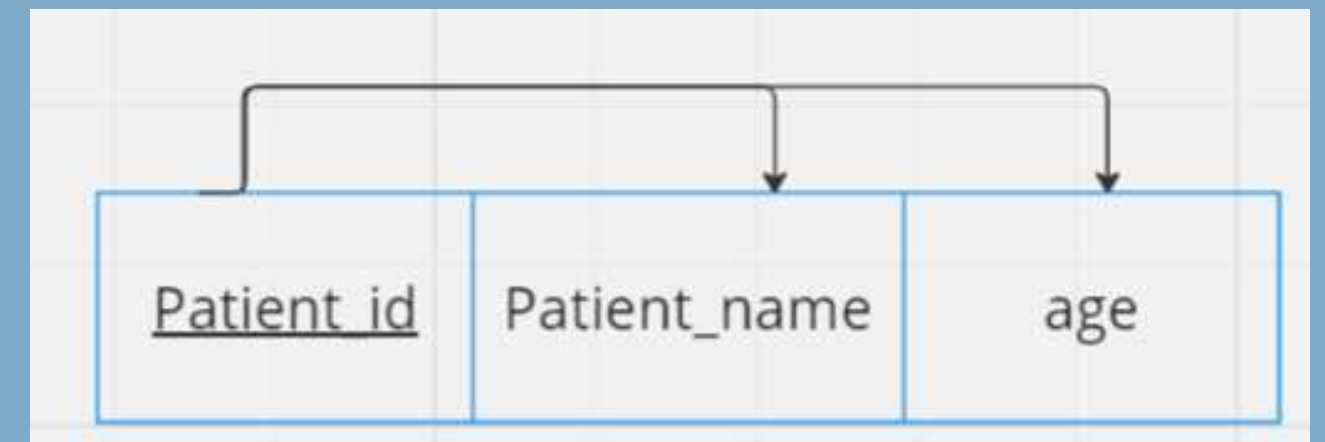| PK	Test_ID
	Test_name
	date
	result

Normalization

PATIENT TABLE

●The patient table has multivalued attribute phone no._ and therefore it is not in 1NF so creating a seperate table for it so that it is in 1NF

● This is normalized form since the patient table is in 1NF as it has no multivalued attribute

● The table is also in 2NF as it has no partial dependencies and non-key attributes fully functionally depend on the candidate key Patient_id

● It also follows 3NF as it has no transitive dependencies.

● Finally the table is in BCNF as the LHS is a super key.
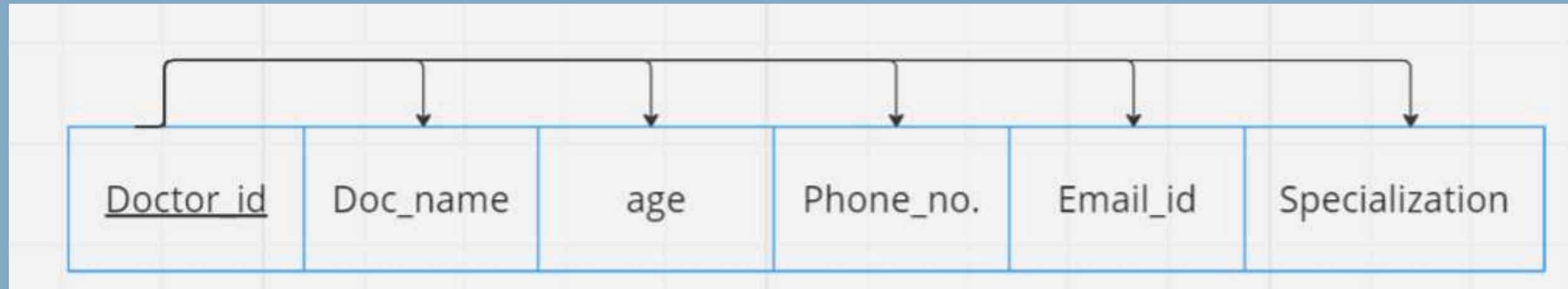
Normalization

PATIENT-PHONENO. TABLE

- This is normalized form since the table is in 1NF as it has no multivalued attribute
- The table is also in 2NF as it has no partial dependencies and non-key attribute fully functionally depends on the candidate key Patient_id
- It also follows 3NF as it has no transitive dependencies.
- Finally the table is in BCNF as the LHS is a super key.

Normalization

DOCTOR TABLE

Doctor_id	Doc_name	age	Phone_no.	Email_id	Specialization

●The doctor table has multivalued attribute phone_no and email_id and therefore it is not in 1NF so creating a seperate table for it so that it is in 1NF

● This is normalized form since the patient table is in 1NF as it has no multivalued attribute
● The table is also in 2NF as it has no partial dependencies and non-key attributes fully functionally depend on the candidate key Doctor_id
● It also follows 3NF as it has no transitive dependencies.
● Finally the table is in BCNF as the LHS is a super key.

Doctor_id	Doc_name	age	Specialization

Normalization

DOCTOR-PHONE_NO. TABLE

- This is normalized form since the table is in 1NF as it has no multivalued attribute
- The table is also in 2NF as it has no partial dependencies and non-key attribute fully functionally depends on the candidate key Doctor_id
- It also follows 3NF as it has no transitive dependencies.
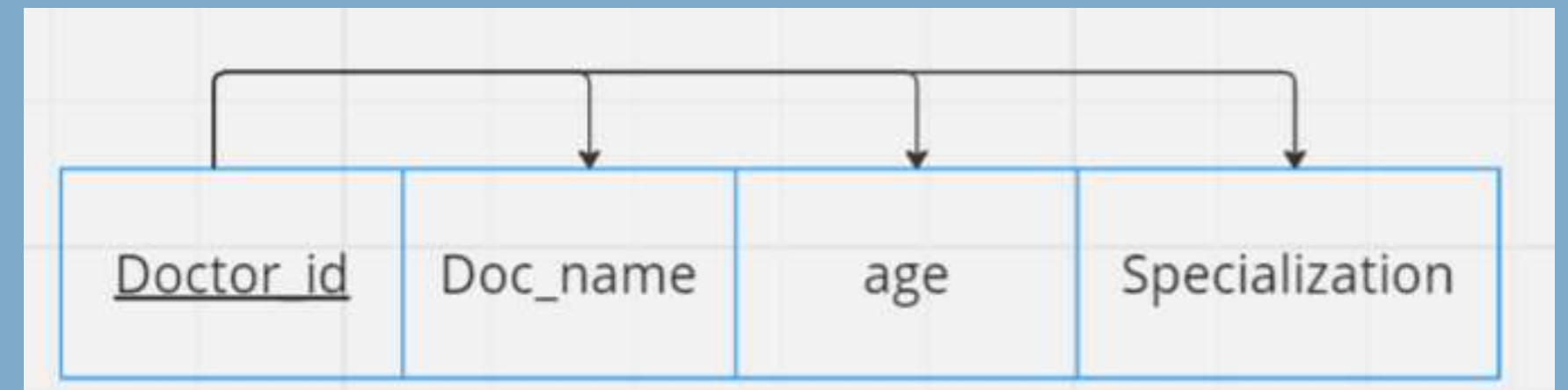- Finally the table is in BCNF as the LHS is a super key.

Normalization

DOCTOR-EMAIL_ID TABLE

Doctor_id | Email_id

- This is normalized form since the table is in 1NF as it has no multivalued attribute
- The doctor_email-id table is also in 2NF as it has no partial dependencies and non-key attribute fully functionally depends on the candidate key Doctor_id
- It also follows 3NF as it has no transitive dependencies.
- Finally the table is in BCNF as the LHS is a super key.

Normalization

MEDICINE TABLE

- This is normalized form since the table is in 1NF as it has no multivalued attribute
- The medicine table is also in 2NF as it has no partial dependencies and non-key attribute fully functionally depends on the candidate key Medicine_id.
- It also follows 3NF as it has no transitive dependencies.
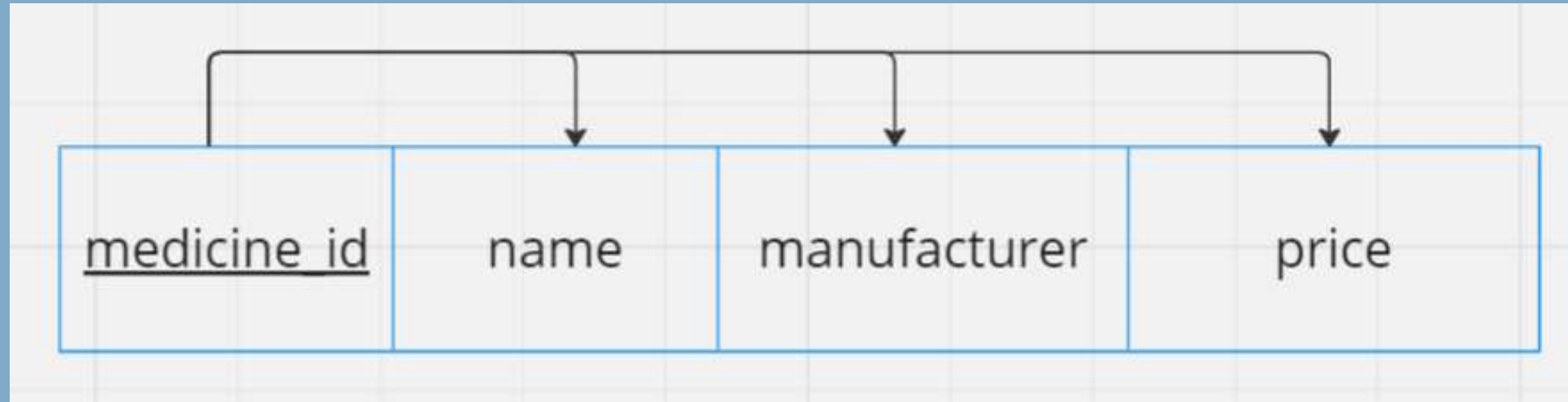- Finally the table is in BCNF as the LHS is a super key.

Normalization

TEST TABLE

- This is normalized form since the table is in 1NF as it has no multivalued attribute
- The test table is also in 2NF as it has no partial dependencies and non-key attribute fully functionally depends on the candidate key test_id.
- It also follows 3NF as it has no transitive dependencies.
- Finally the table is in BCNF as the LHS is a super key.

FINAL TABLES

PATIENT TABLE

Field	Type	Null	Key	Default	Extra
p_id	int	NO	PRI	NULL	
patient_name	varchar(20)	YES		NULL	
age	int	YES		NULL	
phone_number	varchar(20)	YES		NULL	

FINAL TABLES

DOCTOR

TABLE

Field	Type	Null	Key	Default	Extra
pno	int	YES		NULL	
age	int	YES		NULL	
d_id	int	NO	PRI	NULL	
d_name	varchar(20)	YES		NULL	
spcl	varchar(20)	YES		NULL	
email_d	varchar(20)	YES		NULL	

FINAL TABLES

TEST

TABLE

```
+------------+-------------+------+-----+---------+-------+
| Field      | Type        | Null | Key | Default | Extra |
+------------+-------------+------+-----+---------+-------+
| test_id    | int         | NO   | PRI | NULL    |       |
| test_name  | varchar(20) | YES  |     | NULL    |       |
| date       | date        | YES  |     | NULL    |       |
| result     | varchar(20) | YES  |     | NULL    |       |
+------------+-------------+------+-----+---------+-------+
```

FINAL TABLES

MEDICINE
TABLE

Field	Type	Null	Key	Default	Extra
id	int	NO	PRI	NULL	
name	text	NO		NULL	
price	double	NO		NULL	
manufacturer	text	NO		NULL	

IMPLEMENTATION

Patient details being added to the table Patient

after getting input from the user

PROBLEMS   OUTPUT   DEBUG CONSOLE   **TERMINAL**   PORTS

Python Debug Console

```
PS C:\Users\abhin\OneDrive\Desktop>  & 'c:\Users\abhin\anaconda3\python.exe' 'c:\Users\abhin\.vscode\extensions\ms-python.debug
py-2024.4.0-win32-x64\bundled\libs\debugpy\adapter/../..\debugpy\launcher' '50591' '--' 'C:\Users\abhin\OneDrive\Desktop\hg.py'

Enter patient name: Nick
Enter patient age: 26
Enter phone number: 98962
Patient details added successfully!
```

IMPLEMENTATION

List of doctors being printed to be chosen by the user

```
List of Doctors:
1. Dr.Amrutha - Cardiologist
2. Dr.Prabhakaran - Psychologist
3. Dr.Charu - Gynecologist
4. Dr.Sneha - Radiologist
5. Dr.Varsha - Dentist
```

```
Enter the ID of the doctor you want to choose: 4

Doctor 'Dr.Sneha' chosen successfully!
```

IMPLEMENTATION

Prints the available tests and lets the user choose the id of the desired test to be taken

```
Available Tests:
1. Cancer Test
2. Polio Test
3. Pregnancy Test
4. COVID-19 Test
5. STD Test
Enter the ID of the test you want to choose:
```

IMPLEMENTATION

The program lets the doctor input the result of the test and the program throws the medicine with regard to the test id produced by the user and if the result is negative it just prints no medicine prescribed by the doctor.

```
Enter the test result (Positive/Negative): Positive
Test record added successfully!
Doctor prescribes the following medications:
COVID-19 Antiviral
COVID-19 Antibiotic
```

IMPLEMENTATION

All the patient details are added to the patient table and the test details are added to the test table.

Table after running the program

```
mysql> select * from patient;
+------+---------------+------+--------------+
| p_id | patient_name  | age  | phone_number |
+------+---------------+------+--------------+
|    1 | Reka          |   30 | 1234567890   |
|    2 | Ashirvad      |   25 | 23456789O1   |
|    3 | Kamal         |   35 | 3456789012   |
|    4 | Sreeya        |   20 | 4567890123   |
|    5 | Kaavya        |   21 | 5678901234   |
|   13 | sundari       |   65 | 123          |
|   14 | Sahil         |   20 | 98989        |
|   15 | Jiya          |   23 | 1283         |
|   16 | Hrishit       |   19 | 5543         |
|   17 | Navya         |   20 | 3221         |
|   18 | Mritika       |   32 | 2332         |
|   19 | Kritin        |   12 | 5432         |
|   23 | iamclown      |   12 | 123          |
|   24 | Joginde       |   84 | 482          |
|   25 | Varun         |  123 | 212          |
|   26 | Killua        |   12 | 123          |
|   27 | shiva         |   54 | 34           |
|   28 | Hari          |   23 | 543          |
|   29 | gowri         |   98 | 334          |
|   30 | Lucy          |   44 | 32332        |
|   34 | Ashaz         |   21 | 122122       |
|   35 | Nick          |   26 | 98962        |
+------+---------------+------+--------------+
22 rows in set (0.00 sec)
```

```
mysql> select * from test;
+---------+----------------+------------+----------+
| test_id | test_name      | date       | result   |
+---------+----------------+------------+----------+
|       1 | Cancer Test    | 2022-01-01 | Positive |
|       2 | Polio Test     | 2022-02-15 | Negative |
|       3 | Pregnancy Test | 2022-03-20 | Positive |
|       4 | COVID-19 Test  | 2022-04-10 | Negative |
|       5 | STD Test       | 2022-05-05 | Positive |
|       6 | Polio Test     | 2024-04-23 | Negative |
|       7 | Pregnancy Test | 2024-04-23 | Positive |
|       8 | Cancer Test    | 2024-04-23 | Positive |
|       9 | Cancer Test    | 2024-04-23 | Positive |
|      10 | Polio Test     | 2024-04-25 | Positive |
|      11 | COVID-19 Test  | 2024-04-25 | Negative |
|      12 | Cancer Test    | 2024-04-25 | Negative |
|      13 | COVID-19 Test  | 2024-04-25 | Positive |
|      14 | COVID-19 Test  | 2024-04-25 | Positive |
|      15 | Pregnancy Test | 2024-04-25 | Positive |
|      16 | Pregnancy Test | 2024-04-25 | Positive |
|      17 | COVID-19 Test  | 2024-04-25 | Positive |
|      18 | Polio Test     | 2024-04-25 | Positive |
|      19 | Pregnancy Test | 2024-04-25 | Positive |
|      20 | Cancer Test    | 2024-04-25 | Positive |
|      21 | STD Test       | 2024-04-25 | Positive |
|      22 | STD Test       | 2024-04-25 | Positive |
|      23 | Polio Test     | 2024-04-25 | Positive |
|      24 | Polio Test     | 2024-04-25 | Positive |
|      25 | Polio Test     | 2024-04-25 | Positive |
|      26 | COVID-19 Test  | 2024-04-25 | Positive |
+---------+----------------+------------+----------+
26 rows in set (0.00 sec)
```

CONCLUSION

In conclusion, this hospital management system addresses challenges in healthcare by integrating databases, ensuring security, and scalability and usability. It promises to transform business, delivering timely information for meaningful decisions, and prompt applications. Communication allows for seamless data exchange, increasing oversight and continuous collaboration. This program, in line with industry standards, demonstrates a commitment to excellence, improving and improving the overall efficiency and effectiveness of clinical operations for the benefit of patients and healthcare professionals