ATAL BIHARI VAJPAYEE INDIAN INSTITUTE OF INFORMATION TECHNOLOGY AND MANAGEMENT, GWALIOR

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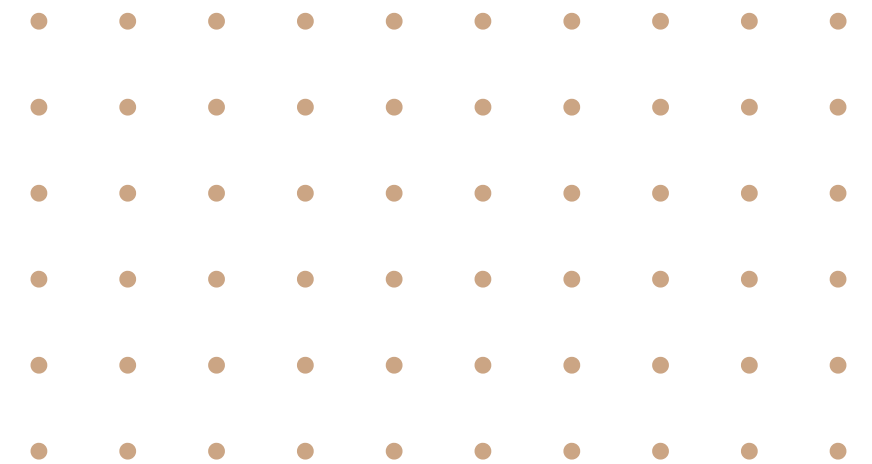
DBMS PROJECT

SUBMITTED TO :-
Dr. DEBANJAN SADHYA

We as a team are very thankful to our mentor Dr.DEBANJAN SADHYA for giving us this brainstorming project on COVID-19 to enhance our skills and solve real-life problems.
While doing this project we have gained lot of experience in data base management system.

TEAM MEMBERS

Abhinav Gupta	(2021BCS-003)
Abhishek Chaudhary	(2021BCS-004)
Aditya Rai	(2021BCS-008)
Ajay Singh	(2021BCS-010)
Darshan Arkhade	(2021BCS-020)
Mohit Saini	(2021BCS-044)

CONTENT
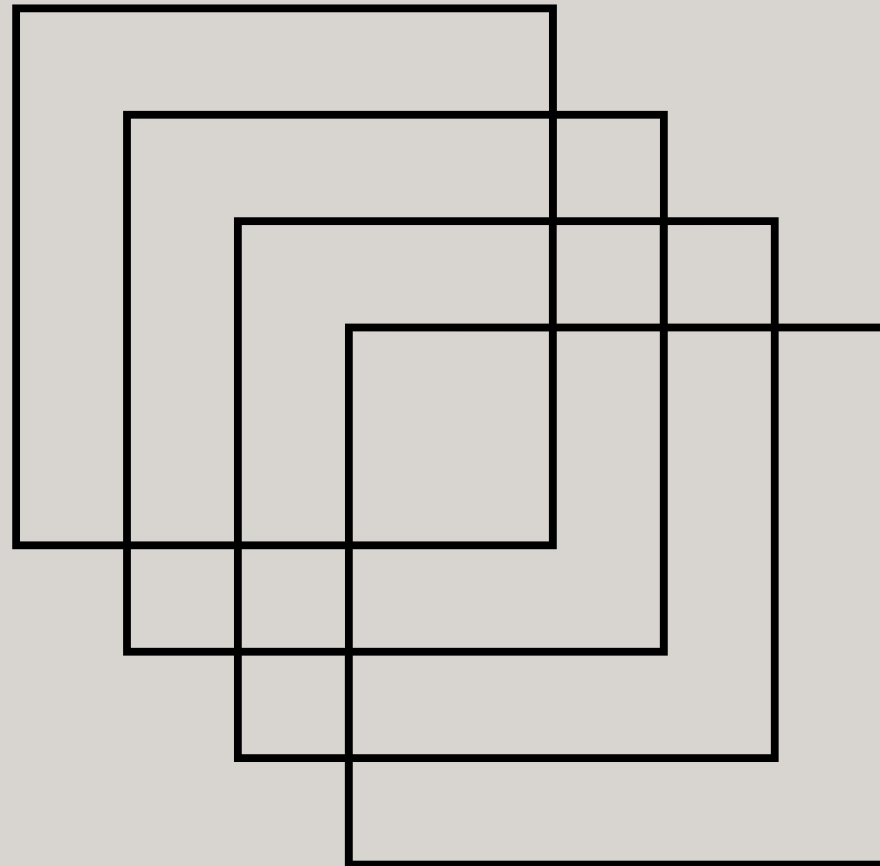
EFFORTS TO RESOLVE THE COVID-19 PANDEMIC

OBJECTIVE

In the mid **2020** we witnessed one of the major global pandemic across the globe i.e. covid-19. It is a very new kind of virus (sars-cov-2 virus). Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. So, here we are solving the same issue by helping the patient in finding the appropriate hospital suitable for him/her along with the availability of the doctors/medical /ventilators/oxygen cylinders/beds etc.
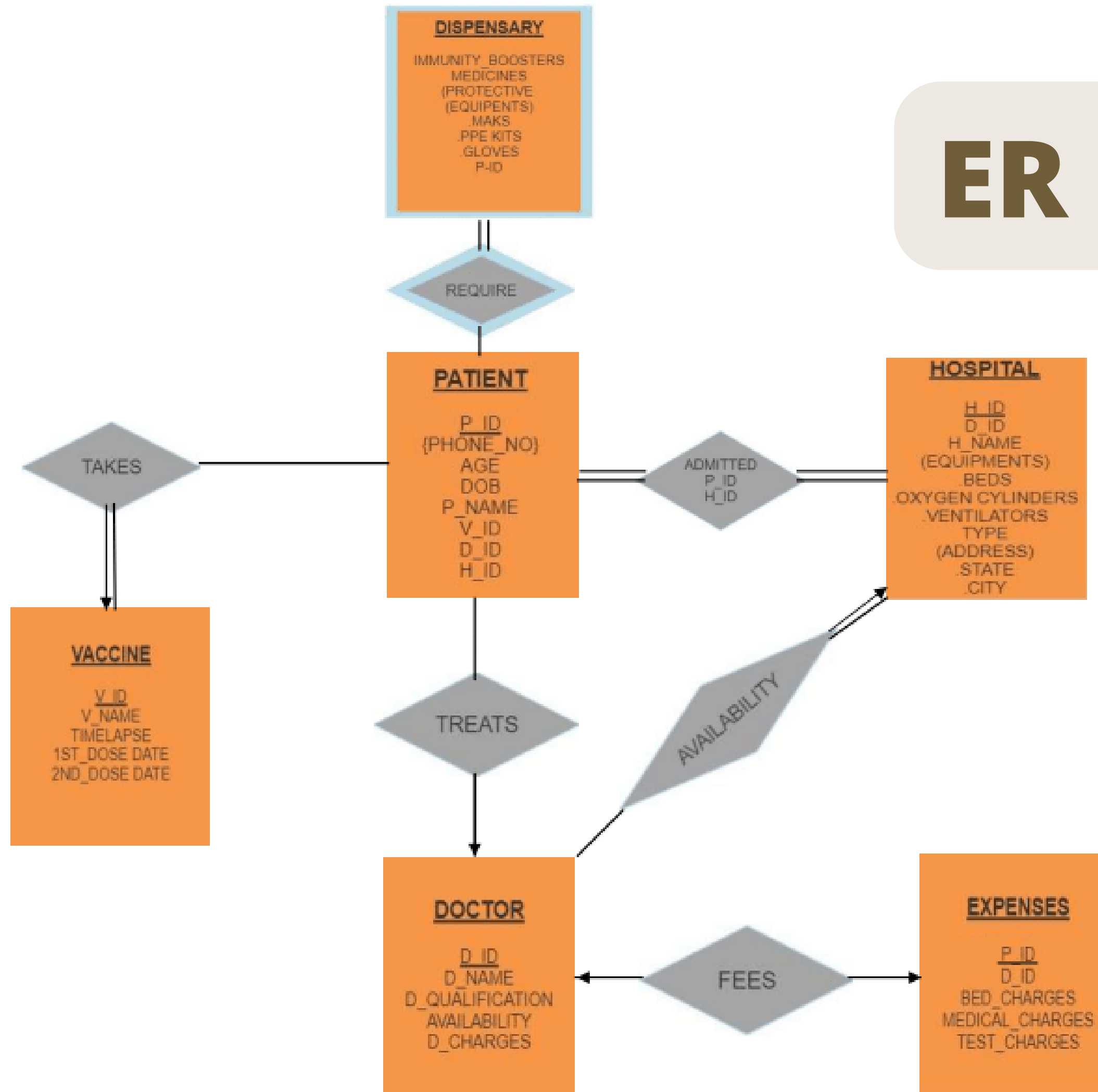
STRATEGY
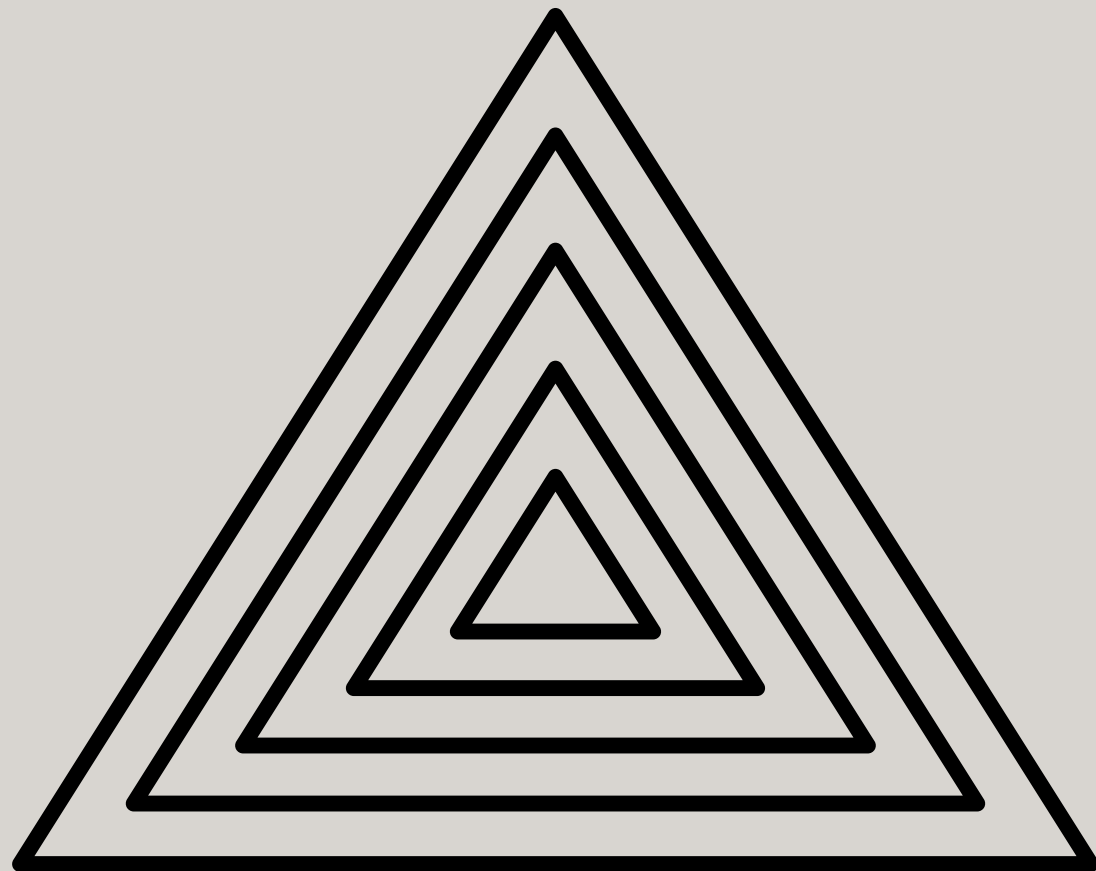
- **Identified a real-life problem.**

- **Created schemas and decided the candidate keys, primary key, and foreign key.**

- **Entered tuples in the relation.**

- **Created an E-R diagram.**

- **Normalized the whole project**

- **Given both SQL & RELATIONAL queries.**

- **Got the result.**

ER DIAGRAM

ENTITY- PATIENT

PATIENT=

{ P_ID	**PRIMARY**	INT,
DOB		VARCHAR(20),
Age		INT,
P_Name		VARCHAR(20),
P_No		VARCHAR(20)
V_ID		INT
D_ID		INT
H_ID		INT **};**

Functional Dependencies

P_ID -> P_Name , P_No , DOB , V_ID , D_ID , H_ID

DOB -> Age

Candidate Key - { P_ID }

Prime Attribute - { P_ID }

Non-prime Attribute - { P_Name , P_No , DOB , Age , V_ID , H_ID , D_ID }

- For 1NF all attributes should be atomic but P_NO is a multivalued attribute thus we need to beak it into further tables.

>>>>> **NORMALIZATION** >>>>>

PATIENT :

```
{ P_ID          PRIMARY KEY          int(4),
  P_Name                             varchar(20),
  P_DOB                              date,
  P_Age                             int(3)
V_ID                                int(4)
H_ID                                int(4)
D_ID                                  int(4)  }
```

PATIENT_P_No :

```
{ P_ID     PRIMARY KEY          int(4)
  P_No1                         int(10)
  P_No2                         int(10) }
```

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is P_ID.
- Not In 3NF, as non-prime attribute depends upon non_prime attribute.

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is P_ID.
- In 3NF, as no non-prime attribute depends upon anynon_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

NORMALIZATION

PATIENT :

{ P_ID   **PRIMARY KEY**   int(4),
  P_Name   varchar(20),
  DOB   date,
  V_ID   int(4)
  H_ID   int(4)
  D_ID   int(3) }

PATIENT_DOB :

{ **DOB**   **PRIMARY KEY**   date,
  AGE   int(10) **}**

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is P_ID.
- In 3NF, as no non-prime attribute depends upon anynon_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is P_ID.
- In 3NF, as no non-prime attribute depends upon anynon_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

ENTITY- DOCTOR

DOCTOR =
{ D_ID **PRIMARY** INT,
D_NAME VARCHAR(20),
D_QUALIFICATION VARCHAR(20),
AVAILIBILTY VARCHAR(50)
D_CHARGES INT(5) **};**

Functional Dependencies

D_ID -> D_NAME, D_QUALIFICATION, AVAILABILITY , D_CHARGES

Candidate Key - { D_ID }
Prime Attribute - { D_ID }
Non-prime Attribute - { D_NAME , D_QUALIFICATION , AVAILABILITY , D_CHARGES }

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is D_ID.
- In 3NF, as no non-prime attribute depends upon anynon_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

SCHEMAS

ENTITY- HOSPITAL

HOSPITAL= {

H_ID	**PRIMARY**	INT,
H_Type		VARCHAR(20),
H_Name		VARCHAR(20),
City		VARCHAR(50)
State		VARCHAR(20),
Ventilators		INT,
Beds		INT,
Oxygen_Cylinders		INT
D_ID		INT(4) };

Functional Dependencies

H_ID -> H_NAME , H_EQUIPMENTS , TYPE , D_ID

H_ID , H_NAME -> ADDRESS

Candidate Key - { H_ID }

Prime Attribute - { H_ID }

Non-prime Attribute - { H_NAME , H_EQUIPMENTS , ADDRESS , TYPE , D_ID }

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is H_ID.
- In 3NF, as in both functional dependency LHS is a superkey.
- In BCNF as LHS is a super key.

ENTITY- VACCINE

VACCINE=

{ V_ID   **PRIMARY**   INT,
V_NAME   Varchar(20),
TIME_LAPSE   Varchar(20),
FIRST_DOSE_DATE   Varchar(20),
SECOND_DOSE_DATE   Varchar(20)   };

Functional Dependencies

V_ID , 1ST_DOSE_DATE -> TIMELAPSE , 2ND_DOSE_DATE

V_ID -> V_NAME

Candidate Key - { V_ID , 1ST_DOSE_DATE }

Prime Attribute - { V_ID , 1ST_DOSE_DATE }

Non-prime Attribute - { V_NAME , TIMELAPSE , 2ND_DOSE_DATE }

- In 1NF, as all the attributes assumed are atomic.
- Not In 2NF, as part of candidate key(V_ID) is determining a non prime attribute(V_NAME).

VACCINE

```
{ V_ID              PRIMARY KEY        int(4),
  1ST_DOSE_DATE                        varchar(20),
  2ND_DOSE_DATE                        varchar(20),
  TIME_LAPSE                           varchar(20)  }
```
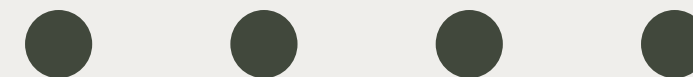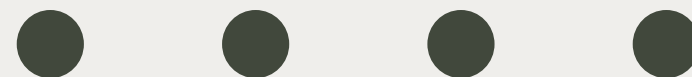
VACCINE_NAME

```
{ V_ID              PRIMARY KEY        int(4),
  V_NAME                               varchar(20)  }
```

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is V_ID.
- In 3NF, as no non-prime attribute depends upon any non_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is V_ID.
- In 3NF, as no non-prime attribute depends upon any non_prime attribute.
- In BCNF , as all attributes depend only upon the candidate key.

ENTITY- DISPENSARY

```
DISPENSARY =
                    {  Immunity_Boosters          VARCHAR(30),
                       Medicines                  VARCHAR(40),
                       Masks                       INT,
                       PPE_Kit                     INT,
                       Gloves                      INT,
                        P_ID  PRIMARY FOREIGN      INT              };
```

Functional Dependencies

P_ID -> MEDICINE , IMMUNITY_BOOSTERS , P_EQUIPMENTS

Candidate Key - { P_ID }
Prime Attribute - { P_ID }
Non-prime Attribute - { MEDICINE , IMMUNITY_BOOSTERS , P_EQUIPMENTS }

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is H_ID.
- In 3NF, as in functional dependency P_ID -> MEDICINE , IMMUNITY_BOOSTERS , P_EQUIPMENTS prime attribute determines non-prime attributes.
- In BCNF , as LHS is a candidate key.

SchEMAS

ENTITY- EXPENSES

```
EXPENSES =
            { P_ID            PRIMARY        VARCHAR(20),
              Medical_Charges                INT,
              Bed_Charges                    INT,
              Test_Charges                   INT,
              D_ID                           INT            };
```

Functional Dependencies

P_ID -> D_ID , BED_CHARGES , MEDICAL_CHARGES , TEST_CHARGES

Candidate Key - { P_ID }
Prime Attribute - { P_ID}
Non-prime Attribute - { D_ID , BED_CHARGES , MEDICAL_CHARGES , TEST_CHARGES }

- In 1NF, as all the attributes assumed are atomic.
- In 2NF, as candidate key is made up of single attribute which is H_ID.
- In 3NF, as in functional dependency P_ID -> D_CHARGES , BED_CHARGES , MEDICAL_CHARGES , TEST_CHARGES no non-prime attribute depends on other non-prime attribute,
- In BCNF , as all attributes depend only upon candidate key.

SchEMAS

ENTITY- ADMITTED

ADMITTED =
{ P_ID **PRIMARY** INT,
H_ID **PRIMARY** INT };

Functional Dependencies
NO FUNCTIONAL DEPENDENCIES

Candidate Key - { P_ID, H_ID}
Prime Attribute - {P_ID,H_ID }
Non-prime Attribute - { φ }

- It is a Relationship.
- Already in 1NF as attributes are assumed to be atomic.
- In 2NF as no partial dependency exists.
- No non prime attribute depends on any other non prime attribute and hence in 3NF.
- In BCNF as each attribute is only identified by the candidate key.

DATA OF PATIENT

	P_ID	PHONE_NO	DOB	AGE	P_NAME	V_ID	H_ID	D_ID
✎	1	9857642587,9574862457	1978-01-01	44	Abhinav Gupta	1201	1001	101
	2	9587684987,6854987534	1978-01-30	44	Abhinav Arvind	1202	1002	201
	3	8956875987,6985985698	1981-02-23	41	Abhishek Chaudhary	1203	1003	301
	4	6847521324,8695854751	1989-01-30	33	Anmol Patnaik	1204	1004	401
	5	9585965895,9512435784	1987-06-30	35	Mohit Saini	1301	1005	501
	6	9565421777,7845842351	1966-08-24	66	Devansh Sengar	1302	1006	601
	7	8585231678,6542315789	1964-09-29	58	Aditya Rai	1303	1007	701
	8	8232147589,9512473211	2000-10-29	22	Mithali Raj	1401	1008	801
	9	9114876821,9512444455	2002-11-15	20	Aman Gupta	1402	1009	901
	10	8542316578,8652324571	1945-05-03	77	Chinmay Gupta	1403	1010	1001

DATA OF DOCTOR

D_ID	D_NAME	D_QUALIFICATION	AVALIBILITY	D_CHARGES
101	Mohit Saini	MBBS	MoTuWeThSaSu	1000
201	Nandini Ramawanth	BAMS	MoTuWeThFrSaSu	2000
301	Dilreet Thakur	MS	MoTuFrSaSu	3000
401	Aditya Jain	BAMS	MoWeFrSaSu	5000
501	Aaroh Shrivasata	MD	MoTuWeThFrSaSu	2000
601	Aneeka Mangal	BAMS	MoThFrSaSu	3000
701	Aleesha Aleesha	BUMS	MoTuThFrSu	4000
801	Vikrant Toppo	MBBS	MoTuWeFrSu	2000
901	Tanmay Maheshwari	BAMS	MoTuWeFrSa	1500
1001	Abhishek Chaudhary	MD	MoWeThFrSaSu	2500

DATA OF VACCINE

V_ID	V_NAME	TIME_LAPSE	FIRST_DOSE_DATE	SECOND_DOSE_DATE
1201	Covishield1	3 Months	2022-04-03	2022-07-03
1202	Covishield2	3 Months	2022-04-04	2022-07-04
1203	Covishield3	3 Months	2022-04-05	2022-07-05
1204	Covishield4	3 Months	2022-04-06	2022-07-06
1301	Covaxin1	4 Months	2022-02-05	2022-06-05
1302	Covaxin2	4 Months	2022-02-06	2022-06-06
1303	Covaxin3	4 Months	2022-02-07	2022-06-07
1401	Pfizer1	2 Months	2022-05-04	2022-07-04
1402	Pfizer2	2 Months	2022-05-05	2022-07-05
1403	Pfizer3	2 Months	2022-05-06	2022-07-06

DATA OF HOSPITAL

H_ID	D_ID	H_Type	H_Name	City	State	Ventilators	Beds	Oxygen_Cylinders
1001	101	Private	Kasturba Hospital	Mumbai	Maharashtra	15	20	18
1002	201	Private	Apollo Hospital	Nashik	Maharashtra	20	22	27
1003	301	Government	Lilavati Hospital	Surat	Gujarat	20	24	19
1004	401	Private	A.J Hospital	SambhajiNagar	Maharashtra	23	29	19
1005	501	Government	Tejpal Hospital	Pune	Maharashtra	16	20	14
1006	601	Private	Welcare Hospital	Vadodara	Gujarat	29	23	20
1007	701	Government	J.J Hospital	Thane	Maharashtra	17	26	19
1008	801	Government	Raje Hospital	Raigad	Maharashtra	19	17	14
1009	901	Government	Jupiter Hospital	Jalgaon	Maharashtra	24	28	20
1010	1001	Private	Phoenix Hospital	Dhule	Maharashtra	30	40	20

DATA OF DISPENSARY

Immunity_Boosters	Medicines	Masks	PPE_Kit	Gloves	P_ID
PATANJALI GILOY	NAMCOLD	100	0	200	1
DABUR ALOVERA	PARACETAMOL	150	1	300	2
DABUR ASHWAGANDHA	B-12COMPLEX	300	2	210	3
PATANJALI GILOY	QUININE	500	0	600	4
TULSI	NAMCOLD	600	0	300	5
AMLA JUICE	CROCIN	300	1	250	6
DABUR ALOVERA	QUININE	180	1	250	7
PATANJALI GILOY	B-12 COMPLEX	560	2	280	8
AMLA JUICE	NAMCOLD	100	2	200	9
DABUR ASWAGANDHA	HONITUS	400	0	120	10

DATA OF EXPENSES

P_ID	D_ID	Medical_Charges	Bed_Charges	Test_Charges
1	101	10000	7600	1200
2	201	15000	6000	1500
3	301	20000	7000	2000
4	401	6000	8000	1000
5	501	8000	9000	1800
6	601	12000	5000	1000
7	701	15000	10000	1500
8	801	89000	7800	2000
9	901	5000	7690	3000
10	1001	10000	8900	1000

DATA OF ADMITTED
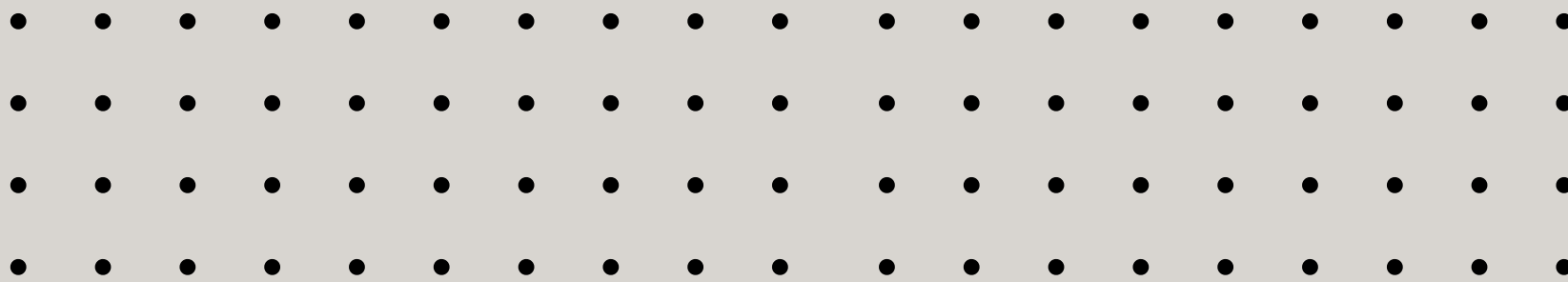
P_ID	H_ID
1	1001
2	1001
3	1001
4	1001
5	1001
6	1001
7	1001
8	1001
9	1001
10	1001

1	1002
2	1002
3	1002
4	1002
5	1002
6	1002
7	1002
8	1002
9	1002
10	1002

1	1003
2	1003
3	1003
4	1003
5	1003
6	1003
7	1003
8	1003
9	1003
10	1003

1	1004
2	1004
3	1004
4	1004
5	1004
6	1004
7	1004
8	1004
9	1004
10	1004

1	1005
2	1005
3	1005
4	1005
5	1005
6	1005
7	1005
8	1005
9	1005
10	1005
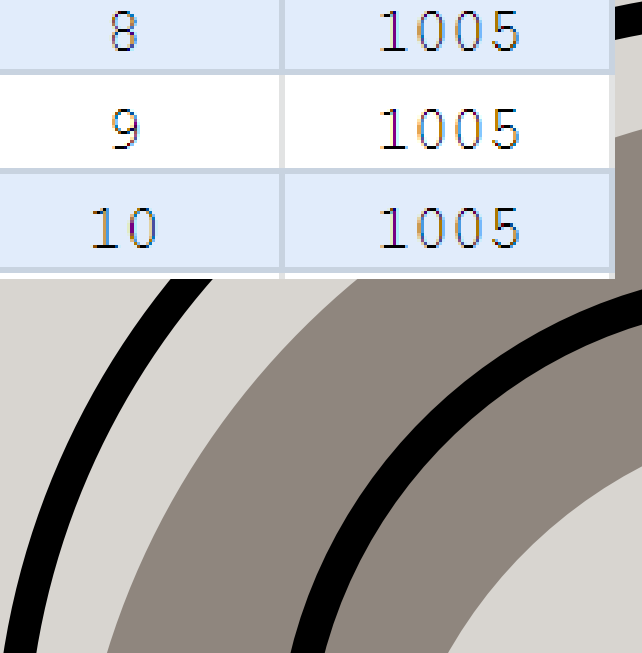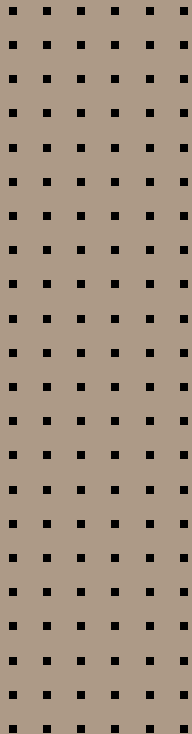
DATA OF ADMITTED
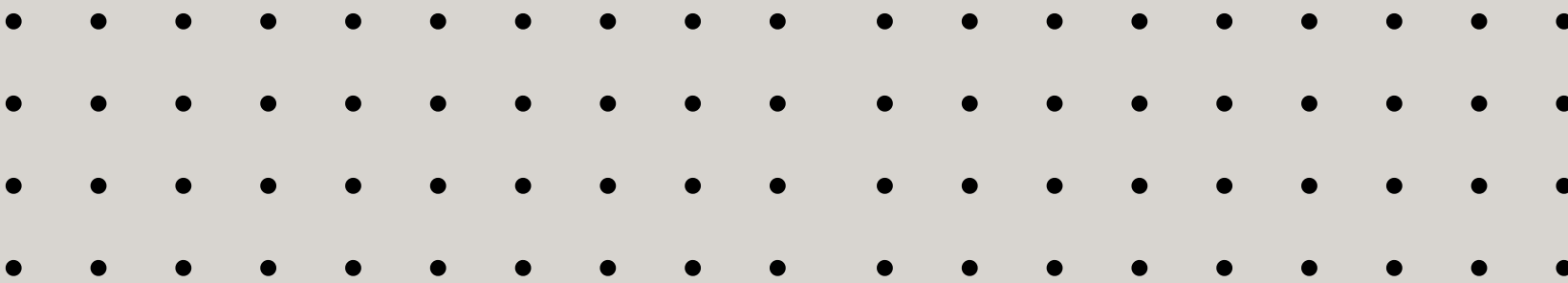
1	1006	1	1007	1	1008	1	1009	1	1010
2	1006	2	1007	2	1008	2	1009	2	1010
3	1006	3	1007	3	1008	3	1009	3	1010
4	1006	4	1007	4	1008	4	1009	4	1010
5	1006	5	1007	5	1008	5	1009	5	1010
6	1006	6	1007	6	1008	6	1009	6	1010
7	1006	7	1007	7	1008	7	1009	7	1010
8	1006	8	1007	8	1008	8	1009	8	1010
9	1006	9	1007	9	1008	9	1009	9	1010
10	1006	10	1007	10	1008	10	1009	10	1010
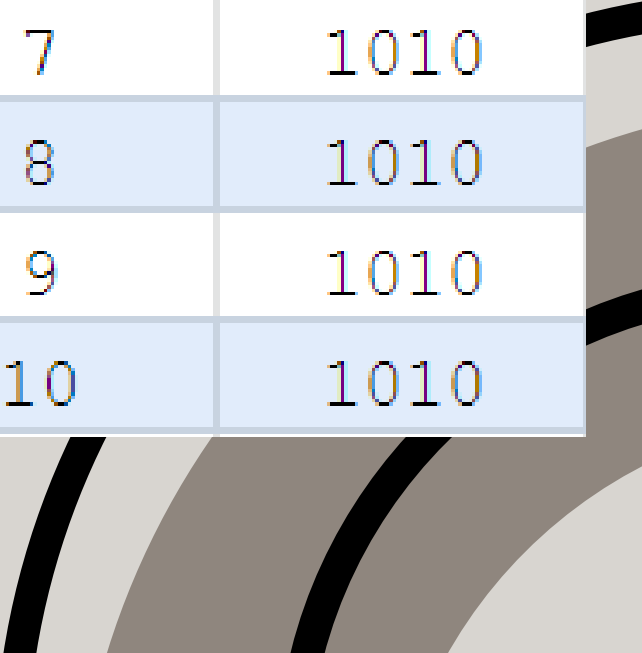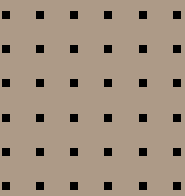
SQL QUERIES

OUTPUT

D_NAME
Aaroh Shrivasata
Abhishek Chaudhary
Aditya Jain
Aleesha Aleesha
Aneeka Mangal
Dilreet Thakur
Mohit Saini
Nandini Ramawanth
Vikrant Toppo

Q1.

Find the name of doctors who are available on Sunday .

● ● ●

```
select D_NAME
from doctor
where AVALIBILITY like '%Su';
```

OUTPUT

Q2.

Find the number of ventilators in hospitals of Maharashtra.

● ● ●

	sum(Ventilators)
▶	68

```
select sum(Ventilators)
from hospital
where State like 'Maharashtra'
;
```

OUTPUT

Q3.

Find the bed charge for Abhinav Arvind (patient).

●●●

	BED_CHARGES
▶	6000

```sql
select expenses.BED_CHARGES
from expenses,patient
where expenses.P_ID=patient.P_ID and
patient.P_Name='Abhinav Arvind';
```

OUTPUT

P_Name
► Anmol Patnaik
Mohit Sairi
Aditya Rai
Chinmay Gupta

Q4.

Find the patients whose Bed_charge>7600 and Test_ charges <2000

● ● ●

```
select patient.P_Name
from patient,expenses
where expenses.P_ID=patient.P_ID and Bed_charges>7600
and patient.P_Name in(
                        select patient.P_Name
                        from patient,expenses
                        where expenses.P_ID=patient.P_ID and Test_Charges<2000 );
```

OUTPUT

	P_Name	Total_Expenses
▶	Abhinav Gupta	18800
	Abhinav Arvind	22500
	Abhishek Chaudhary	29000
	Anmol Patnaik	15000
	Mohit Sairi	18800
	Devansh Senger	18000
	Aditya Rai	26500
	Mithali Raj	98800
	Aman Gupta	15690
	Chinmay Gupta	19900

Q5.

Find the total expenses of all patients.

● ● ●

```
select patient.P_Name,expenses.Bed_Charges+expenses.Test_Charges+expenses.Medical_Charges
as Total_Expenses
from expenses,patient
where patient.P_ID=expenses.P_ID;
```

RA
QUERIES

OUTPUT

π H_NAME σ BEDS ≥ 24 and VENTILATORS ≥ 20 and O_CYLINDERS ≥ 19
(HOSPITAL)

Execution time: 2 ms

HOSPITAL.H_NAME
'Lilavati Hospital'
'A.J. Hospital'
'Jupiter Hospital'
'Phoenix Hospital'

Act
Go t

Q1.

Find the name of hospitals where-
Beds > 24 and Ventilators > 20 and
O_Cylinders > 19

● ● ●

```
1  π H_NAME
2  σ BEDS≥24∧ VENTILATORS≥20∧ O_CYLINDERS≥19 (HOSPITAL)
```

OUTPUT

π D_NAME σ STATE = 'Gujrat' and D_QUALIFICATION = 'MS' (
HOSPITAL ⋈ DOCTOR)

Execution time: 2 ms

DOCTOR.D_NAME

'Dilreet Thakur'

Q2.

Find the Doctors who hold MS degree in state of Gujrat.

● ● ●

```
1 π D_NAME
2 σ STATE= 'Gujrat'∧ D_QUALIFICATION= 'MS' (HOSPITAL⋈DOCTOR)
```

OUTPUT

π D_NAME σ AVAILABILITY = 'MoTuWeThFrSaSu' and D_CHARGES ≤ 3000
(DOCTOR)

Execution time: 0 ms

DOCTOR.D_NAME
'Nandini Ramavath'
'Aaroh Shrivastav'

Q3.

Find the name of doctors available on everyday whose charges are less than 3,000 .

● ● ●

```
1  π D_NAME
2  σ AVAILABILITY='MoTuWeThFrSaSu'∧ D_CHARGES≤3000 (DOCTOR)
```

OUTPUT

$\pi_{P\_NAME} \sigma_{TIMELAPSE = '2\ MONTHS'} (PATIENT \bowtie VACCINE)$

Execution time: 3 ms

PATIENT.P_NAME
'MITHALI RAJ'
'AMAN GUPTA'
'CHINMAY GUPTA'

Q4.

Find the name of patient whose vaccine has timelapse of 2 months.

● ● ●

```
1 π P_NAME
2 σ TIMELAPSE='2 MONTHS' (PATIENT⋈VACCINE)
```

OUTPUT

π P_NAME σ AGE ≥ 20 and AGE ≤ 50 and TIMELAPSE = '3 MONTHS' (
PATIENT ⋈ VACCINE)

Execution time: 2 ms

PATIENT.P_NAME
'ABHINAV GUPTA'
'ABHINAV ARVIND'
'ABHISHEK CHAUDHARY'
'ANMOL PATNAIK'

Q5.

Find the name of patients aged between 20 to 50 who took vaccine having timelapse 3 months..

● ● ●

```
1 π P_NAME
2 σ  AGE≥20∧ AGE≤50∧ TIMELAPSE='3 MONTHS' (PATIENT⋈VACCINE)
```

THANK YOU