Course Code: CSE 2301
Course Title: Database Management Systems

Hospital Management System

Submitted to
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Lecturer

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Abstract:

The Hospital Management System is a database management system designed to efficiently organize and manage information within a healthcare institution. It has several advantages compared to existing system.The HMS helps patients for storing and managing critical healthcare-related data, including doctor details, patient records, nurse information, lab reports, admissions, billing, and medical records.And also helps patients to book appointments,admission and collects reports from online any time. By transitioning these records into a digital format, the system reduces some of the stress of manual paperwork, reducing administrative burden, minimizing errors, and enhancing data accuracy. And also helping patients to do their essential work online rather than wait in a long line in hospital.

1. Introduction:

The Hospital Management System is like a user-friendly online System for patients using DBMS. It helps them check doctor details, book appointments, and even upload previous lab reports and medical records and they can even get doctors to review using this system. This system makes things easy for patients. They can quickly check a doctor's information, book appointments online, share past lab reports, and pay their bills online and they can even get feedback from the doctor from showing lab reports online. If needed, they can also find out if the hospital has space for new patients. Plus, they can see details about nurses and doctors. They can collect lab reports online in their convenient time from home and easily admit in the hospital if needed rather than wait in a long line for admission or collect lab reports. In addition this system makes everything easy for hospital administrators and staff by providing the user-friendly interface . It gives them secure access to relevant patient information, allowing quick retrieval of records and easily providing reports to patients. The system also helps with routine administrative tasks like admissions, scheduling, and billing. Ensure a good interaction between healthcare providers and patients, providing timely updates and feedback.

2. PROPOSED SYSTEM

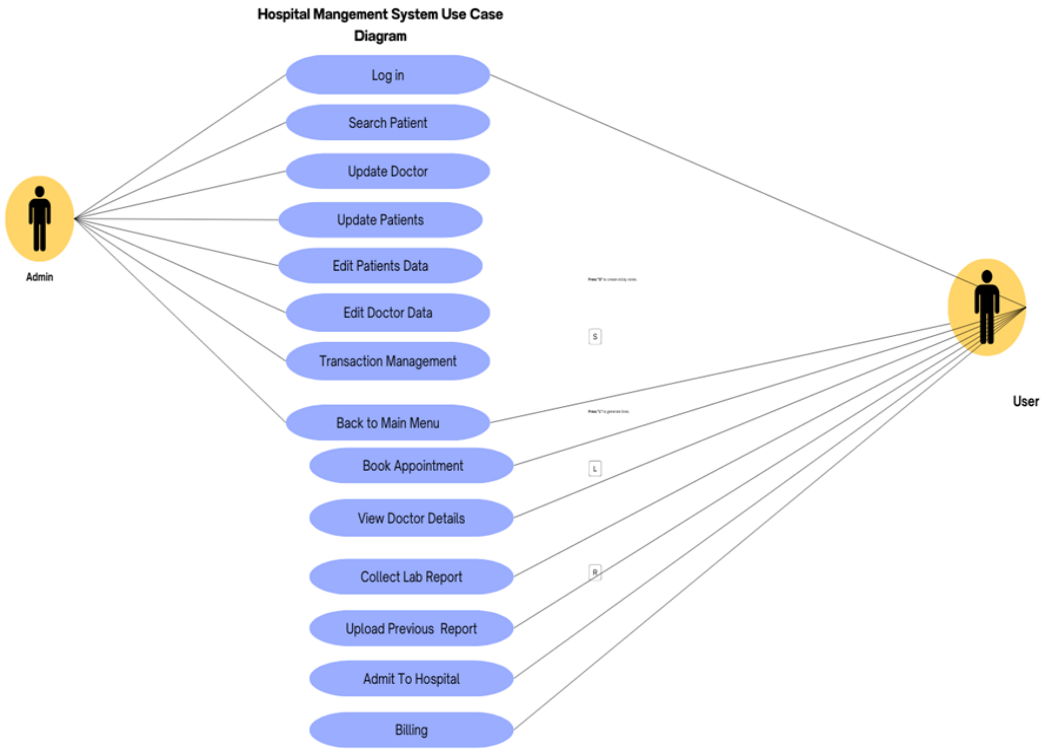
Compared to the existing Hospital management system, it's super helpful for patients and solves many problems of patients. They can effortlessly check out doctor details, book appointments, and even upload previous lab reports, collect reports and get feedback online also at their convenient time from home. It's designed to make things simple and stress-free for patients, offering a user-friendly experience. So, this makes this system more convenient for patients compared to the existing system.So, it has two modes:

- **Admin Mode:** The admin site manages all information coming from patients and doctors, nurses. And work on adding new information and deleting it.
- **Patients Mode:** This site helps patients book appointments, see doctor details, and many other tasks.

This system has several advantages:

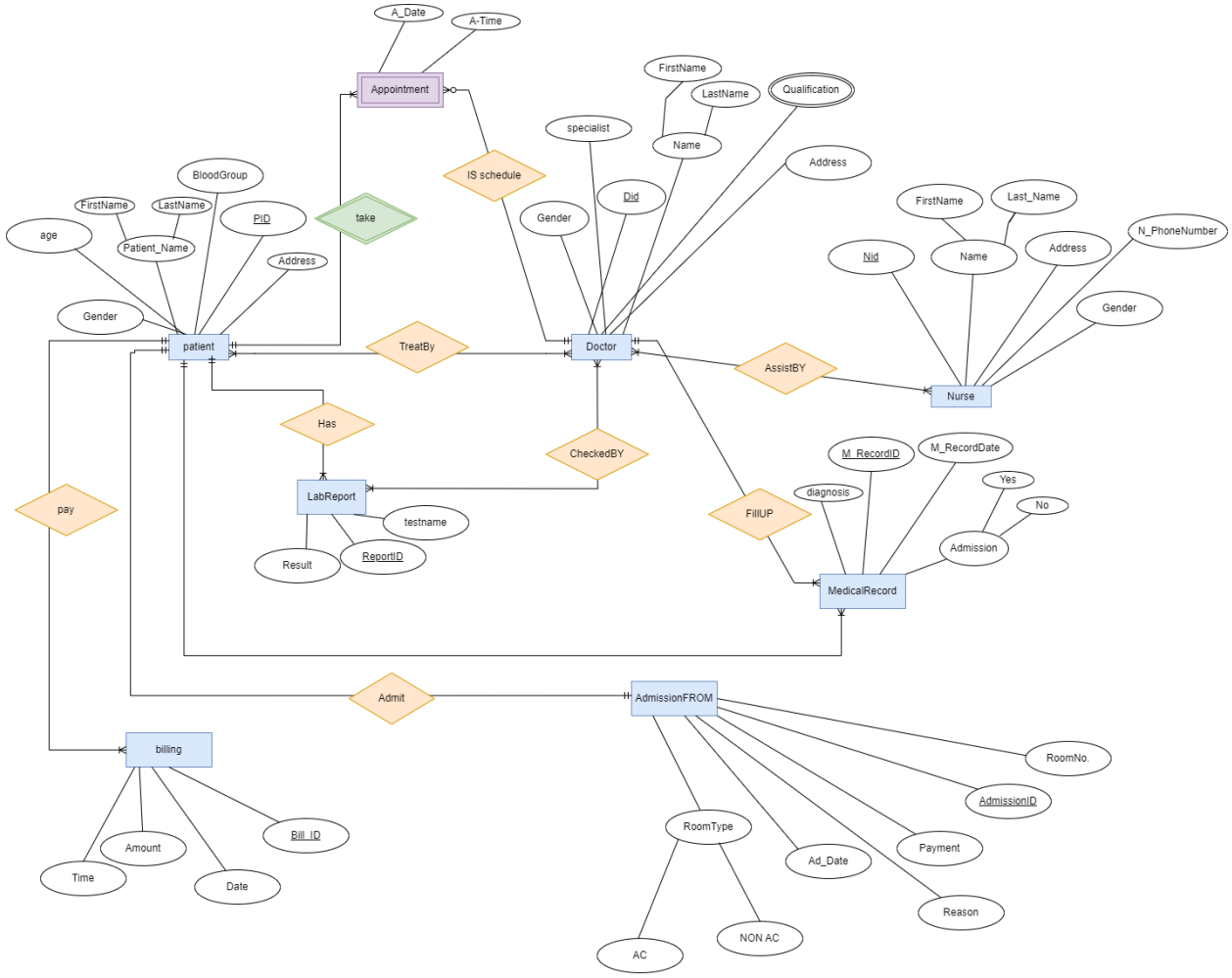
- Fast access to the database
- Less error
- Search facility
- Look and Feel Environment
- Quick transaction

Use Case Diagram of Hospital Management System:



This use case diagram shows what features patients will get as user and admin after logging into this system.As we have discussed, patients can book appointments, view any information , collect lab reports and pay their bills. And admin can update , retrieve and manage transaction

ERD Diagram:



ERD Explanation:

In the above ERD for an online Hospital management system,we have created doctor,doctors qualification, patient, nurse,lab report,appointment, admission form,billing and medical record entity table.

- In the doctor table attributes are:-did(primary key),dfname,dlname,dage,gender,address and specialist.

- As doctors have multiple degrees so the table attributes are:- did(foreign key references doctor table), qualification.

- In the patient table attributes are:-pid(primary key),pfname,plname,page,pgender, paddress, blood group.

- In the nurse table attributes are:- nid(primary key),nfname,nlname,gender,naddress,nphn.

- In the appointment table attributes are:-pid(foreign key references patient table),did(foreign key references doctor table),ap_date,ap_time.

- In the lab report table attributes are:- reportid(primary key),testname, patientid(foreign key references patient table).

- In the admission form table attributes are:- adid(primary key), reason,room type,roomno,ad_date,pid(foreign key references patient table).

- In the billing table attributes are:- billid(primary key), amount,date.time,pid(foreign key references patient table).

- In the medical record table attributes are:- M_RecordID, did(foreign key references doctor table),Diagnosis,M_RecordDate, Admission,pid(foreign key references patient table).

- In the report check table attributes are:- reportid(foreign key references lab report table),did(foreign key references doctor table), result.

Cardinality/Relationship between this table:
Now the relationship between doctor and patient is many to many because one doctor can treat one or more patients the same one patient can treat by one or more doctors.

The relation between patient and appointment is one to many because one patient can take one or more appointments in one day but one appointment is only for one patient.

The relationship between doctor and appointment is one to many because one doctor can have one or more appointments.

The relationship between doctor and nurse is many to many because one nurse can assist one or more doctors and the same one doctor can assist by one or more nurses.

The relationship between patient and lab report is one to many because one patient can have one or more lab tests but one lab test is defined for only one patient.

The relation between doctor and lab report is many to many because one or more lab reports are checked by one or more doctors.

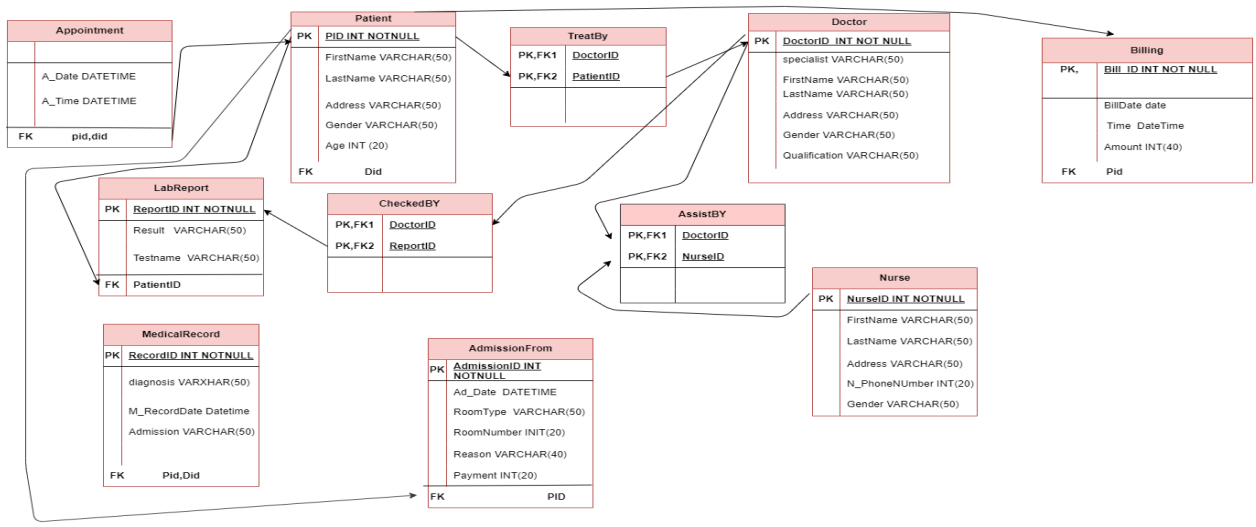
After checking the lab report, the doctor inserts the medical history of the patient into the hospital medical record .So the relationship between doctor and medical record is one to many because one doctor can fill-up medical records for one or more patients.

And the relation between patient and medical record is one to many. Because one patient can have one or multiple medical histories.

The relationship between patient and admission form is one to one because one patient can take one admission at a time.

The relationship between patient and billing is one to many because one patient can have one or multiple billing such as appointment bill,test report bill after admission bill etc.

Relational Model:



Relational Calculus:

- Find the patient name, patient id,patient age from the patient table where age is >than 20?

ANS: {t.pfname,t.pid,t.page ∈patient | patient(t)∧t.page>20}

```
mysql> SELECT pid, pfname, plname, page
    -> FROM patient
    -> WHERE page > 20;
+-----+----------+-----------+------+
| pid | pfname   | plname    | page |
+-----+----------+-----------+------+
|   1 | Asif     | Islam     |   25 |
|   2 | Jannatul | Ferdous   |   30 |
|   3 | Faridul  | Alam      |   40 |
|   4 | Sazia    | Ahmed     |   24 |
|   6 | Sophia   | Khan      |   28 |
|   7 | Rabeya   | Boshri    |   23 |
|   8 | Galib    | Uddin     |   27 |
|   9 | Ajoy     | Roy       |   50 |
|  10 | Moushumi | Chowdhary |   29 |
|  11 | Shakib   | Ahmed     |   36 |
|  12 | Yonna    | Khan      |   22 |
|  17 | Shakib   | Ali       |   36 |
|  18 | Rabeya   | Akter     |   36 |
|  19 | Nila     | Ahmed     |   22 |
|  20 | Yonna    | khan      |   31 |
+-----+----------+-----------+------+
15 rows in set (0.01 sec)

mysql>
```

This query indicates the tuple for the patient table and t.pfname,t.pid,t.page belongs to the patient table where age is greater than 20.

- Find the name of all doctors who have done a BCS degree?

{t| ∃ d ∈ doctor(t[dfname]=d[dfname]∧ ∃ q ∈ doctor_qualification(q[qualification]="BCS"))}

```
mysql> SELECT dfname, dlname
    -> FROM Doctor
    -> WHERE did IN (SELECT did FROM doctor_qualification WHERE qualification = 'BCS');
+--------------------+---------+
| dfname             | dlname  |
+--------------------+---------+
| Prof Dr.Sourav Saha | Mondol  |
| Prof Dr. Nilima     | Afroz   |
| Prof Dr.Prodyut     | Saha    |
| Prof Dr.Ratan       | Kumar   |
| Prof Dr.Susanta     | Sarkar  |
| DR.Ratan            | Kumar   |
| Prof Dr.Rashida     | Akter   |
| Prof Dr.Rubi        | Akter   |
| Prof Dr.Sujon       | Debnath |
| DR.Shakib           | Khan    |
+--------------------+---------+
10 rows in set (0.02 sec)
```

In this query for some tuples d which belongs to doctor table where tupel t.dfname is same as d.dfname and for some tuples q which belongs to doctor qualification table will check the match whether qualification is BCS or not if it matches the condition then we can see the results.

- Find the lab report which belongs to patient 1 and patient 11?

ANS:{t |∃ .l ∈ labreport (t[testname]=l[testname]∧ ∃ p ∈ patient (p[pid]=1 ∧ p[pid]=11))}

```
mysql> SELECT *
    -> FROM labReport
    -> WHERE patientid IN (1, 11);
+----------+----------------------+-----------+
| reportid | testname             | patientid |
+----------+----------------------+-----------+
|    19101 | Complete Blood Count |         1 |
|    19102 | Blood Glucose        |         1 |
|    28999 | Hemoglobin A1c       |         1 |
|    18950 | Cholesterol          |        11 |
|    19632 | Hemoglobin A1c       |        11 |
+----------+----------------------+-----------+
5 rows in set (0.01 sec)
```

In this query, for some tuples l which belong to labreport table, and if t.testname is equal to l.testname and from the patient table if pid is 1 and 11 then it will show the results.

- Find those bills which are paid on both 8th november 2023 and 9 november 2023?

Ans: {t| ∃ b ∈ billing(t[billid]=b[billid] ∧ (b[date]="2023−11−08" ∧ b[date]="2023−11−09"))}

```
mysql> SELECT *
    -> FROM billing
    -> WHERE date IN ('2023-11-08', '2023-11-09');
+--------+----------+------------+----------+------+
| billid | amount   | date       | time     | pid  |
+--------+----------+------------+----------+------+
|      1 |  2550.00 | 2023-11-08 | 10:30:00 |    1 |
|      2 |  3000.00 | 2023-11-08 | 10:35:00 |   10 |
|      3 |  1800.00 | 2023-11-08 | 10:40:00 |    1 |
|      4 |  2000.00 | 2023-11-08 | 11:00:00 |   10 |
|      5 | 45000.00 | 2023-11-08 | 11:30:00 |    5 |
|      6 | 70000.00 | 2023-11-08 | 11:48:50 |    9 |
|      7 |  1380.00 | 2023-11-09 | 09:30:00 |    1 |
|      8 |   800.00 | 2023-11-09 | 10:30:50 |   10 |
|      9 |  3500.00 | 2023-11-09 | 07:30:40 |    2 |
|     11 | 18500.00 | 2023-11-09 | 09:24:12 |    3 |
|     17 |  1100.00 | 2023-11-08 | 10:30:20 |   17 |
|     18 | 28012.00 | 2023-11-08 | 03:12:36 |   18 |
+--------+----------+------------+----------+------+
12 rows in set (0.01 sec)
```

In this query for 8 and 9 th November 2023 we can get the results

Information About Entities And Table:

Doctor Table

```
mysql> select * FROM Doctor;
+-----+--------------------+---------+------+---------+-----------+-----------------------+
| did | dfname             | dlname  | dage | dgender | daddress  | specialist            |
+-----+--------------------+---------+------+---------+-----------+-----------------------+
|   1 | Prof Dr.Sujon      | Debnath |   40 | M       | Dhaka     | Dental                |
|   2 | Dr.Taufiq Hassan   | Reza    |   45 | M       | Dhaka     | Dental                |
|   3 | Prof Dr.Sourav Saha | Mondol  |   55 | M       | Comilla   | ENT                   |
|   4 | Dr.Kaberi          | Guho    |   37 | F       | Dhaka     | Gynacologist          |
|   5 | Prof Dr. Nilima    | Afroz   |   45 | F       | Khulna    | Gynacologist          |
|   6 | Prof Dr.Prodyut    | Saha    |   50 | M       | Dhaka     | Surgery & Urology     |
|   7 | Prof Dr.Ratan      | Kumar   |   49 | M       | Barishal  | Medicine & Cardiology |
|   8 | Dr.Nehal           | Warish  |   55 | M       | Dhaka     | Dermatology           |
|   9 | Prof Dr.Susanta    | Sarkar  |   52 | M       | Joypurhat | Medicine & Pediatrics |
|  10 | Dr.Farzana         | Khanom  |   38 | F       | Khulna    | General Physicians    |
|  11 | DR.Shakib          | Khan    |   36 | M       | Dhaka     | Dermatology           |
|  12 | DR.Ratan           | Kumar   |   41 | M       | Mirpur    | Surgery & Urology     |
|  13 | Prof Dr.Rashida    | Akter   |   39 | F       | Mirpur    | General Physicians    |
|  14 | Prof Dr.Rubi       | Akter   |   33 | F       | Dhanmondi | Gynacologist          |
|  15 | Hassan             | Ahmed   |   35 | M       | Khulna    | Dental                |
+-----+--------------------+---------+------+---------+-----------+-----------------------+
15 rows in set (0.01 sec)
```

Doctors Qualification Table

```
mysql> select * FROM  doctor_qualification;
+------+---------------+
| did  | qualification |
+------+---------------+
|    1 | BDS           |
|    1 | MPH           |
|    2 | BDS           |
|    2 | FCPS          |
|    3 | MBBS          |
|    3 | DLO           |
|    3 | BCS           |
|    4 | MBBS          |
|    4 | MS            |
|    5 | MBBS          |
|    5 | BCS           |
|    5 | FCPS          |
|    6 | MBBS          |
|    6 | MS            |
|    6 | BCS           |
|    6 | FCPS          |
|    7 | MBBS          |
|    7 | BCS           |
|    7 | FCPS          |
|    8 | MBBS          |
|    8 | MD            |
|    9 | MBBS          |
|    9 | BCS           |
|    9 | DCH           |
|   10 | MBBS          |
|   10 | PGT           |
|   11 | PGT           |
|   11 | MBBS          |
|   12 | MBBS          |
|   12 | BCS           |
|   12 | FCPS          |
|   13 | MPH           |
|   13 | MBBS          |
|   13 | BCS           |
```

Patient Table

```
mysql> select * FROM Patient;
+-----+----------+-----------+------+---------+-------------------------+------------+
| pid | pfname   | plname    | page | pgender | paddress                | bloodgroup |
+-----+----------+-----------+------+---------+-------------------------+------------+
|   1 | Asif     | Islam     |   25 | M       | Zatrabari,Dhaka         | A+         |
|   2 | Jannatul | Ferdous   |   30 | F       | 456 Park Ave,Chittagong | B-         |
|   3 | Faridul  | Alam      |   40 | M       | 789 Broad St,Khulna     | B+         |
|   4 | Sazia    | Ahmed     |   24 | F       | Saidabad,Dhaka          | AB+        |
|   5 | Samia    | Ahmed     |   18 | F       | 202 Lake Blvd,Barisal   | A-         |
|   6 | Sophia   | Khan      |   28 | F       | Sylhet                  | B+         |
|   7 | Rabeya   | Boshri    |   23 | F       | Garden St,Rangpur       | O-         |
|   8 | Galib    | Uddin     |   27 | M       | Bou bazar,Comilla       | A+         |
|   9 | Ajoy     | Roy       |   50 | M       | Mohammadpur,Dhaka       | AB-        |
|  10 | Moushumi | Chowdhary |   29 | F       | Banani,Dhaka            | B+         |
|  11 | Shakib   | Ahmed     |   36 | M       | Dhanmondi               | AB+        |
|  12 | Yonna    | Khan      |   22 | F       | Mirpur                  | O-         |
|  13 | Yanna    | Akter     |   18 | F       | Dhanmondi               | AB+        |
|  14 | Sazia    | Ahmed     |   19 | F       | Khulna                  | A+         |
|  15 | Rakib    | Islam     |   15 | M       | mirpur                  | O-         |
|  16 | Hassan   | Ali       |   10 | M       | Banani,Dhaka            | B+         |
|  17 | Shakib   | Ali       |   36 | M       | Uttra                   | A-         |
|  18 | Rabeya   | Akter     |   36 | F       | Dhanmondi               | B+         |
|  19 | Nila     | Ahmed     |   22 | F       | Bonani                  | A+         |
|  20 | Yonna    | khan      |   31 | F       | Dhaka-15                | O-         |
+-----+----------+-----------+------+---------+-------------------------+------------+
20 rows in set (0.01 sec)
```

Nurse Table

```
mysql> select * FROM Nurse;
+-----+---------+--------+---------+-----------+------------+
| nid | nfname  | nlname | ngender | naddress  | nphn       |
+-----+---------+--------+---------+-----------+------------+
|   1 | Nargis  | Akhter | F       | Khulna    | 1956745387 |
|   2 | Romi    | Ahmed  | M       | Dhaka     | 1786893423 |
|   3 | Jotsna  | Ahmed  | F       | Dhaka     | 1875930076 |
|   4 | Tanjila | Akhter | F       | Comilla   | 1911124356 |
|   5 | Habib   | Alam   | M       | Barishal  | 1736659073 |
|   6 | Shakib  | Hassan | M       | Dhaka     | 1728763362 |
|   7 | Leo     | Messi  | M       | Dhanmondi | 1928763342 |
|   8 | shakib  | Hassan | M       | Magura    | 1532763326 |
|   9 | Jotsna  | Ahmed  | F       | Mirpur    | 1452362101 |
|  10 | Nila    | Akter  | F       | Gazipur   | 1368956632 |
+-----+---------+--------+---------+-----------+------------+
10 rows in set (0.00 sec)
```

Doctor and Nurse Relation Table

```
mysql> select * FROM doctor_nurse_relation;
+-----+-----+
| did | nid |
+-----+-----+
|   1 |   1 |
|   2 |   1 |
|   1 |   2 |
|   8 |   2 |
|   2 |   3 |
|   3 |   3 |
|   8 |   3 |
|   9 |   3 |
|   2 |   5 |
|   4 |   5 |
|   5 |   5 |
|   7 |   6 |
|   6 |   9 |
|   7 |  10 |
|  10 |  10 |
+-----+-----+
15 rows in set (0.00 sec)
```

Appointment Table:

```
mysql> select * FROM appointment;
+------+------+------------+----------+
| pid  | did  | ap_date    | ap_time  |
+------+------+------------+----------+
|    1 |    7 | 2023-11-08 | 07:00:00 |
|    2 |    4 | 2023-11-05 | 08:00:00 |
|    3 |    5 | 2023-11-09 | 08:20:35 |
|    4 |   10 | 2023-11-10 | 02:20:35 |
|    5 |    6 | 2023-11-04 | 01:30:00 |
|    6 |    6 | 2023-11-15 | 11:30:00 |
|    7 |   10 | 2023-11-10 | 09:30:00 |
|    8 |    9 | 2023-11-10 | 08:30:00 |
|    9 |    6 | 2023-11-10 | 10:30:00 |
|   10 |    7 | 2023-11-08 | 09:00:00 |
|   11 |   11 | 2023-11-15 | 08:00:00 |
|   12 |   11 | 2023-11-15 | 10:00:00 |
|   13 |    6 | 2023-11-20 | 09:30:00 |
|   14 |    7 | 2023-11-19 | 12:30:00 |
|   15 |    5 | 2023-11-09 | 08:40:00 |
|   16 |   10 | 2023-11-10 | 08:00:00 |
|   17 |    1 | 2023-11-08 | 09:30:00 |
|   18 |    2 | 2023-11-08 | 10:00:00 |
|   19 |    2 | 2023-11-09 | 11:00:00 |
|   20 |   15 | 2023-11-11 | 03:30:00 |
|    1 |   12 | 2023-11-10 | 06:40:00 |
|    3 |   13 | 2023-11-09 | 09:00:00 |
|   12 |   14 | 2023-11-20 | 08:00:00 |
+------+------+------------+----------+
23 rows in set (0.00 sec)
```

Billing Table :

```
mysql> select * FROM billing;
+--------+----------+------------+----------+------+
| billid | amount   | date       | time     | pid  |
+--------+----------+------------+----------+------+
|      1 |  2550.00 | 2023-11-08 | 10:30:00 |    1 |
|      2 |  3000.00 | 2023-11-08 | 10:35:00 |   10 |
|      3 |  1800.00 | 2023-11-08 | 10:40:00 |    1 |
|      4 |  2000.00 | 2023-11-08 | 11:00:00 |   10 |
|      5 | 45000.00 | 2023-11-08 | 11:30:00 |    5 |
|      6 | 70000.00 | 2023-11-08 | 11:48:50 |    9 |
|      7 |  1380.00 | 2023-11-09 | 09:30:00 |    1 |
|      8 |   800.00 | 2023-11-09 | 10:30:50 |   10 |
|      9 |  3500.00 | 2023-11-09 | 07:30:40 |    2 |
|     10 | 30000.00 | 2023-11-05 | 10:12:21 |   12 |
|     11 | 18500.00 | 2023-11-09 | 09:24:12 |    3 |
|     12 |  7000.00 | 2023-11-15 | 04:50:00 |    4 |
|     13 |  5000.00 | 2023-11-20 | 10:12:12 |   13 |
|     14 |  9600.00 | 2023-11-15 | 03:56:32 |   12 |
|     15 | 36000.00 | 2023-11-20 | 07:45:20 |   12 |
|     16 |  4000.00 | 2023-11-15 | 03:00:00 |   15 |
|     17 |  1100.00 | 2023-11-08 | 10:30:20 |   17 |
|     18 | 28012.00 | 2023-11-08 | 03:12:36 |   18 |
|     19 | 35100.00 | 2023-11-12 | 12:47:00 |   19 |
|     20 |  3600.00 | 2023-11-11 | 05:12:21 |   20 |
+--------+----------+------------+----------+------+
20 rows in set (0.01 sec)
```

Medical Record Table:

```
mysql> select * FROM medicalrecord;
+------------+-----+------------------------+-------------+-----------+-----+
| M_RecordID | did | Diagnosis              | M_RecordDate | Admission | pid |
+------------+-----+------------------------+-------------+-----------+-----+
|       1110 |   7 | Heart Attack           | 2023-12-15   | YES       |   3 |
|       1111 |  13 | Broken Arm             | 2023-11-02   | YES       |   1 |
|       1112 |   9 | Flu                    | 2023-11-05   | No        |   4 |
|       1113 |   6 | Kidney Stones          | 2023-11-13   | YES       |   6 |
|       1114 |   7 | Hypertension           | 2023-11-08   | NO        |   8 |
|       1115 |   8 | Allergies              | 2023-11-06   | No        |   9 |
|       1116 |   6 | Stomach Ulcer          | 2023-11-02   | NO        |  10 |
|       1117 |  10 | Cold                   | 2023-11-04   | NO        |   2 |
|       1118 |   6 | Urinary Tract Infection | 2023-11-02   | YES       |   5 |
|       1119 |  10 | Insomnia               | 2023-11-08   | NO        |   7 |
|       1120 |  13 | Diabetes               | 2023-11-12   | NO        |   3 |
|       1121 |   9 | Flu                    | 2023-11-05   | NO        |   4 |
|       1122 |   9 | FLu                    | 2023-11-09   | NO        |   5 |
|       1123 |  10 | Thyroid                | 2023-11-11   | NO        |  10 |
+------------+-----+------------------------+-------------+-----------+-----+
14 rows in set (0.00 sec)
```

Admission Form Table:

```
mysql> select * FROM addmissionform;
+------+----------------------+-------------+--------+---------------------+------+
| adid | reason               | roomtype    | roomno | ad_date             | pid  |
+------+----------------------+-------------+--------+---------------------+------+
|    1 | Emergency face Surgery | Single Ac   |    202 | 2023-11-15 10:30:00 |    9 |
|    2 | Lung infection       | Ward        |    104 | 2023-11-13 09:40:50 |    5 |
|    3 | C-section            | Double Non Ac |    611 | 2023-11-20 11:00:00 |    2 |
|    4 | Brain surgery        | ward        |    105 | 2023-11-25 07:50:54 |    6 |
|    5 | Heart Attack         | Single AC   |    302 | 2023-12-01 10:15:36 |   16 |
+------+----------------------+-------------+--------+---------------------+------+
5 rows in set (0.00 sec)
```

Lab Report Table:

```
mysql> select * FROM labreport;
+----------+----------------------+-----------+
| reportid | testname             | patientid |
+----------+----------------------+-----------+
|    10987 | Electrolytes Panel   |         7 |
|    12345 | MRI Brain            |         6 |
|    17890 | Urinalysis           |         5 |
|    18901 | X-ray Chest          |        10 |
|    18950 | Cholesterol          |        11 |
|    19014 | Hemoglobin A1c       |        14 |
|    19024 | X-ray Chest          |        14 |
|    19101 | Complete Blood Count |         1 |
|    19102 | Blood Glucose        |         1 |
|    19106 | Cholesterol          |         4 |
|    19452 | Complete Blood Count |        13 |
|    19632 | Hemoglobin A1c       |        11 |
|    19642 | MRI Brain            |        16 |
|    19725 | Urinalysis           |        13 |
|    28999 | Hemoglobin A1c       |         1 |
|    32467 | Thyroid Function Test |         3 |
|    45678 | Liver Function Test  |         5 |
+----------+----------------------+-----------+
17 rows in set (0.00 sec)
```

Report Check

```
mysql> select * FROM report_check;
+----------+-----+--------------------------+
| reportid | did | Result                   |
+----------+-----+--------------------------+
|    10987 |  10 | Normal                   |
|    12345 |   7 | Normal                   |
|    17890 |   6 | Within normal range      |
|    17890 |  10 | 5.5%                     |
|    18901 |   7 | No abnormalities detected |
|    19101 |   9 | Normal                   |
|    19101 |  10 | 120 mg/dL                |
|    19106 |  10 | 180 mg/dL                |
|    19452 |   6 | Normal                   |
|    19642 |   7 | Normal                   |
|    19725 |   6 | Not normal               |
|    32467 |   6 | High in range            |
|    45678 |   9 | No abnormalities detected |
+----------+-----+--------------------------+
13 rows in set (0.00 sec)
```

Join Query

- **Write a query for the doctor's name and which sector he/she is a specialist, the lab test name, also the result.**

Ans: SELECT
d.dfname,d.specialist,
lr.testname,
rc.result
FROM
report_check as rc
JOIN doctor as d ON rc.did = d.did
JOIN labreport as lr ON rc.reportid = lr.reportid;

```
mysql> source C:/Users/Lenovo/Downloads/Join query.sql
+-----------------+-----------------------+-----------------------+---------------------------+
| dfname          | specialist            | testname              | result                    |
+-----------------+-----------------------+-----------------------+---------------------------+
| Dr.Farzana      | General Physicians    | Electrolytes Panel    | Normal                    |
| Prof Dr.Ratan   | Medicine & Cardiology | MRI Brain             | Normal                    |
| Prof Dr.Prodyut | Surgery & Urology     | Urinalysis            | Within normal range       |
| Dr.Farzana      | General Physicians    | Urinalysis            | 5.5%                      |
| Prof Dr.Ratan   | Medicine & Cardiology | X-ray Chest           | No abnormalities detected |
| Prof Dr.Susanta | Medicine & Pediatrics | Complete Blood Count  | Normal                    |
| Dr.Farzana      | General Physicians    | Complete Blood Count  | 120 mg/dL                 |
| Dr.Farzana      | General Physicians    | Cholesterol           | 180 mg/dL                 |
| Prof Dr.Prodyut | Surgery & Urology     | Complete Blood Count  | Normal                    |
| Prof Dr.Ratan   | Medicine & Cardiology | MRI Brain             | Normal                    |
| Prof Dr.Prodyut | Surgery & Urology     | Urinalysis            | Not normal                |
| Prof Dr.Prodyut | Surgery & Urology     | Thyroid Function Test | High in range             |
| Prof Dr.Susanta | Medicine & Pediatrics | Liver Function Test   | No abnormalities detected |
+-----------------+-----------------------+-----------------------+---------------------------+
13 rows in set (0.00 sec)
```

- **Write a query for doctor name,her specialism,lab test name,result,and also which patient name,age and blood group?**

Ans: SELECT
d.dfname,d.specialist,
lr.testname,
rc.result,p.pfname,p.page,p.bloodgroup
FROM
report_check as rc
JOIN doctor as d ON rc.did = d.did
JOIN labreport as lr ON rc.reportid = lr.reportid
JOIN patient as p on lr.patientid=p.pid;

dfname	specialist	testname	result	pfname	page	bloodgroup
Dr.Farzana	General Physicians	Electrolytes Panel	Normal	Rabeya	23	O-
Prof Dr.Ratan	Medicine & Cardiology	MRI Brain	Normal	Sophia	28	B+
Prof Dr.Prodyut	Surgery & Urology	Urinalysis	Within normal range	Samia	18	A-
Dr.Farzana	General Physicians	Urinalysis	5.5%	Samia	18	A-
Prof Dr.Ratan	Medicine & Cardiology	X-ray Chest	No abnormalities detected	Moushumi	29	B+
Prof Dr.Susanta	Medicine & Pediatrics	Complete Blood Count	Normal	Asif	25	A+
Dr.Farzana	General Physicians	Complete Blood Count	120 mg/dL	Asif	25	A+
Dr.Farzana	General Physicians	Cholesterol	180 mg/dL	Sazia	24	AB+
Prof Dr.Prodyut	Surgery & Urology	Complete Blood Count	Normal	Yanna	18	AB+
Prof Dr.Ratan	Medicine & Cardiology	MRI Brain	Normal	Hassan	10	B+
Prof Dr.Prodyut	Surgery & Urology	Urinalysis	Not normal	Yanna	18	AB+
Prof Dr.Prodyut	Surgery & Urology	Thyroid Function Test	High in range	Faridul	40	B+
Prof Dr.Susanta	Medicine & Pediatrics	Liver Function Test	No abnormalities detected	Samia	18	A-

- **write a query to find patient name,patient id,admission date,and total amount for that particular patient using a group by?**

Ans:SELECT
p.pid,
p.pfname,
adf.ad_date,
SUM(b.amount) AS total_amount
FROM
patient as p
JOIN addmissionform as adf ON p.pid = adf.pid
JOIN billing as b ON p.pid = b.pid
GROUP BY
p.pid,pfname,adf.ad_date;

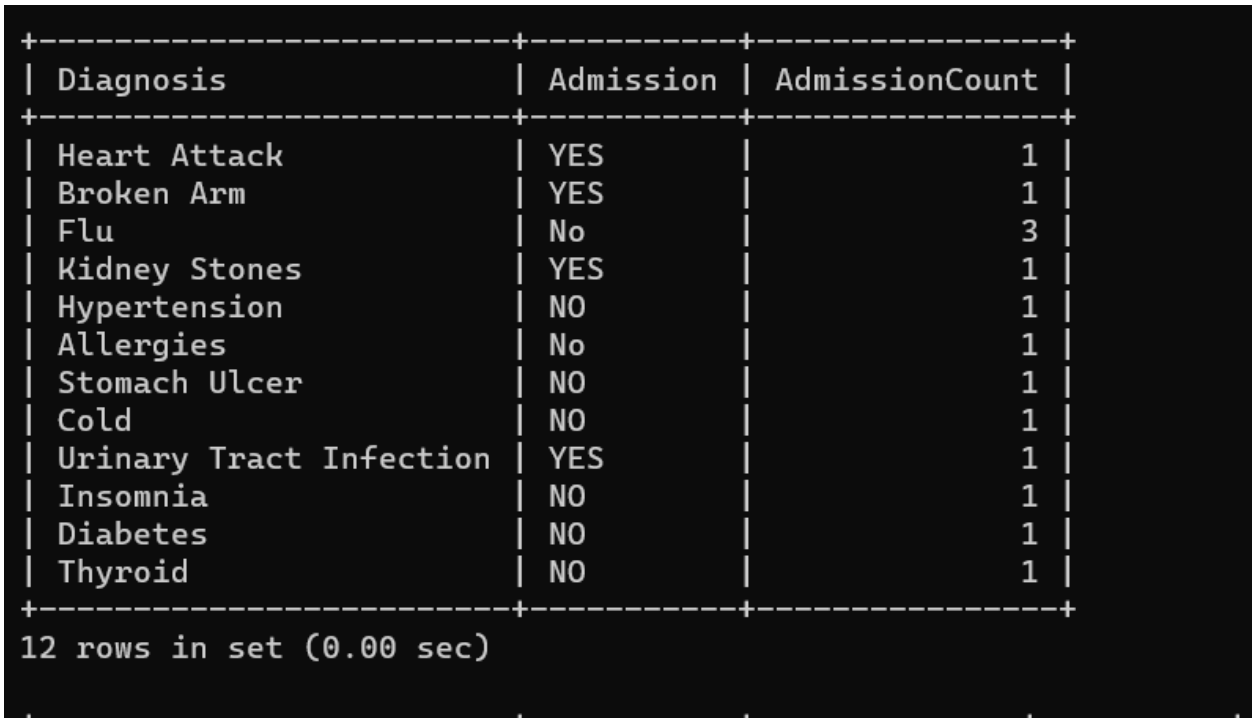
pid	pfname	ad_date	total_amount
9	Ajoy	2023-11-15 10:30:00	70000.00
5	Samia	2023-11-13 09:40:50	45000.00
2	Jannatul	2023-11-20 11:00:00	3500.00

3 rows in set (0.01 sec)

- **Find total count of admissions YES and NO for each diagnosis?**

ANS:

```
SELECT Diagnosis, Admission, COUNT(*) as AdmissionCount
FROM medical record
Group BY Diagnosis,Admission;
```



Diagnosis	Admission	AdmissionCount
Heart Attack	YES	1
Broken Arm	YES	1
Flu	No	3
Kidney Stones	YES	1
Hypertension	NO	1
Allergies	No	1
Stomach Ulcer	NO	1
Cold	NO	1
Urinary Tract Infection	YES	1
Insomnia	NO	1
Diabetes	NO	1
Thyroid	NO	1

12 rows in set (0.00 sec)

- **Find patient name, doctor name and which type of patient he/she is and admission date and whether he/she will admit or not?**

ANS:

SELECT mr.Diagnosis,mr.Admission,mr.M_RecordDate,p.pfname,d.dfname FROM medicalrecord as mr JOIN doctor as d on mr.did=d.did JOIN patient as p on mr.pid=p.pid;

Diagnosis	Admission	M_RecordDate	pfname	dfname
Heart Attack	YES	2023-12-15	Faridul	Prof Dr.Ratan
Broken Arm	YES	2023-11-02	Asif	Prof Dr.Rashida
Flu	No	2023-11-05	Sazia	Prof Dr.Susanta
Kidney Stones	YES	2023-11-13	Sophia	Prof Dr.Prodyut
Hypertension	NO	2023-11-08	Galib	Prof Dr.Ratan
Allergies	No	2023-11-06	Ajoy	Dr.Nehal
Stomach Ulcer	NO	2023-11-02	Moushumi	Prof Dr.Prodyut
Cold	NO	2023-11-04	Jannatul	Dr.Farzana
Urinary Tract Infection	YES	2023-11-02	Samia	Prof Dr.Prodyut
Insomnia	NO	2023-11-08	Rabeya	Dr.Farzana
Diabetes	NO	2023-11-12	Faridul	Prof Dr.Rashida
Flu	NO	2023-11-05	Sazia	Prof Dr.Susanta
FLu	NO	2023-11-09	Samia	Prof Dr.Susanta
Thyroid	NO	2023-11-11	Moushumi	Dr.Farzana

14 rows in set (0.00 sec)

- **Find patient name,doctor name, appointment date and time who took DR farzanas appointment?**

ANS:

SELECT p.pfname,d.dfname,a.ap_date,a.ap_time FROM appointment as a JOIN patient as p ON a.pid=p.pid join doctor as d on d.did=a.did WHERE d.dfname="DR.Farzana";

pfname	dfname	ap_date	ap_time
Sazia	Dr.Farzana	2023-11-10	02:20:35
Rabeya	Dr.Farzana	2023-11-10	09:30:00
Hassan	Dr.Farzana	2023-11-10	08:00:00

3 rows in set (0.00 sec)

- **How many appointments patient "1" took and which doctor appoint he/she take?**

Ans:

SELECT p.pfname,d.dfname,ap.ap_date,ap.ap_time FROM appointment as ap join patient AS p ON ap.pid=p.pid JOIN doctor as d ON ap.did=d.did WHERE p.pid=1;

```
+--------+--------------+------------+----------+
| pfname | dfname       | ap_date    | ap_time  |
+--------+--------------+------------+----------+
| Asif   | Prof Dr.Ratan | 2023-11-08 | 07:00:00 |
| Asif   | DR.Ratan      | 2023-11-10 | 06:40:00 |
+--------+--------------+------------+----------+
2 rows in set (0.00 sec)
```

- **Count the number of patients for each blood group?**

ANS:

SELECT p.bloodgroup, COUNT(*) AS PatientCount
FROM patient as p
GROUP BY bloodgroup;

```
+-------------+---------------+
| bloodgroup | PatientCount |
+-------------+---------------+
| A+          |             4 |
| B-          |             1 |
| B+          |             5 |
| AB+         |             3 |
| A-          |             2 |
| O-          |             4 |
| AB-         |             1 |
+-------------+---------------+
7 rows in set (0.00 sec)
```

- **Find those doctors' names who specialize in a special dignosis?**

ANS:

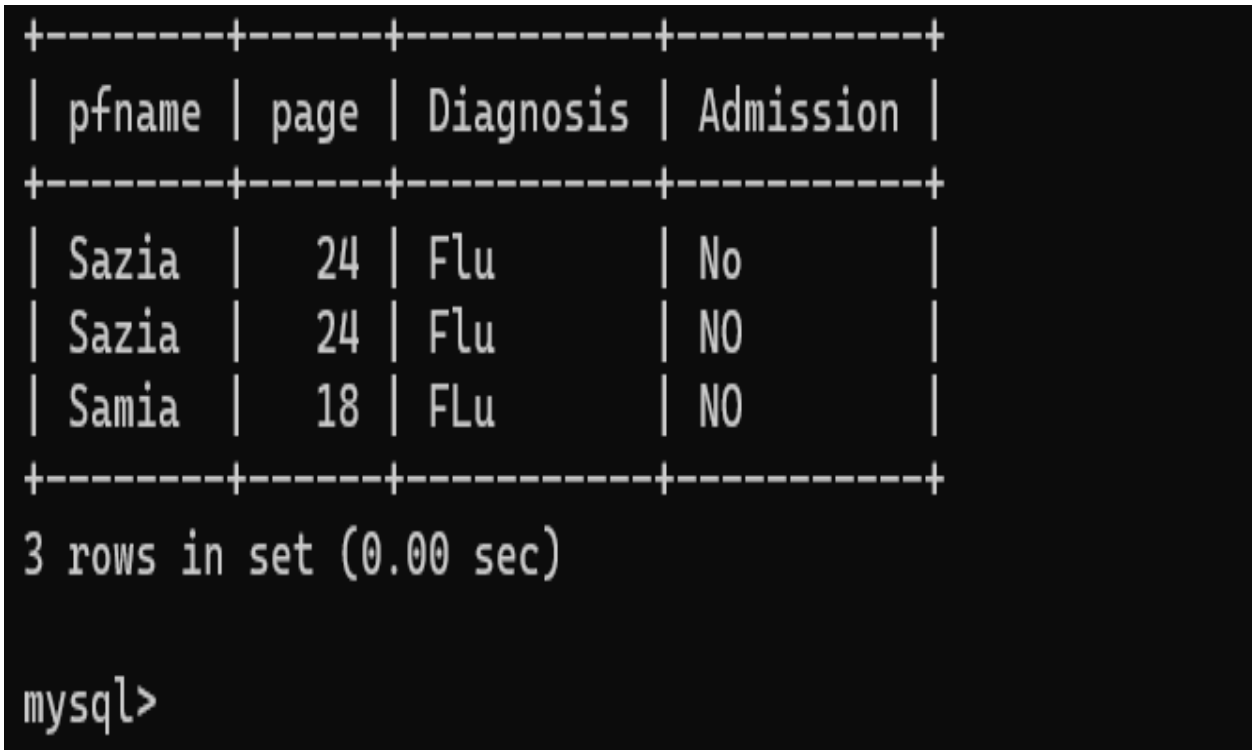
SELECT DISTINCT d.dfname, d.specialist, mr.Diagnosis
FROM medicalrecord AS mr
JOIN doctor AS d ON mr.did = d.did
WHERE mr.Diagnosis = 'Heart attack';

```
+--------------+----------------------+-------------+
| dfname       | specialist           | Diagnosis   |
+--------------+----------------------+-------------+
| Prof Dr.Ratan | Medicine & Cardiology | Heart Attack |
+--------------+----------------------+-------------+
1 row in set (0.00 sec)
```

- **Find a patient's name with a special dignosis and addmission status?**

Ans:

```
  SELECT p.pfname, p.page, mr.Diagnosis, mr.Admission
FROM medicalrecord AS mr
JOIN patient AS p ON mr.pid = p.pid
WHERE mr.Diagnosis = 'Flu' ;
```



```
+--------+------+-----------+-----------+
| pfname | page | Diagnosis | Admission |
+--------+------+-----------+-----------+
| Sazia  |   24 | Flu       | No        |
| Sazia  |   24 | Flu       | NO        |
| Samia  |   18 | FLu       | NO        |
+--------+------+-----------+-----------+
3 rows in set (0.00 sec)

mysql>
```

VIEW CREATE

1)CREATE VIEW patient_treatment_details AS
SELECT mr.Diagnosis,mr.Admission,mr.M_RecordDate,p.pfname,d.dfname FROM medicalrecord as mr JOIN doctor as d on mr.did=d.did JOIN patient as p on mr.pid=p.pid;

```
mysql> select * FROM patient_treatment_details;
+-------------------------+-----------+--------------+----------+-----------------+
| Diagnosis               | Admission | M_RecordDate | pfname   | dfname          |
+-------------------------+-----------+--------------+----------+-----------------+
| Heart Attack            | YES       | 2023-12-15   | Faridul  | Prof Dr.Ratan   |
| Broken Arm              | YES       | 2023-11-02   | Asif     | Prof Dr.Rashida |
| Flu                     | No        | 2023-11-05   | Sazia    | Prof Dr.Susanta |
| Kidney Stones           | YES       | 2023-11-13   | Sophia   | Prof Dr.Prodyut |
| Hypertension            | NO        | 2023-11-08   | Galib    | Prof Dr.Ratan   |
| Allergies               | No        | 2023-11-06   | Ajoy     | Dr.Nehal        |
| Stomach Ulcer           | NO        | 2023-11-02   | Moushumi | Prof Dr.Prodyut |
| Cold                    | NO        | 2023-11-04   | Jannatul | Dr.Farzana      |
| Urinary Tract Infection | YES       | 2023-11-02   | Samia    | Prof Dr.Prodyut |
| Insomnia                | NO        | 2023-11-08   | Rabeya   | Dr.Farzana      |
| Diabetes                | NO        | 2023-11-12   | Faridul  | Prof Dr.Rashida |
| Flu                     | NO        | 2023-11-05   | Sazia    | Prof Dr.Susanta |
| FLu                     | NO        | 2023-11-09   | Samia    | Prof Dr.Susanta |
| Thyroid                 | NO        | 2023-11-11   | Moushumi | Dr.Farzana      |
+-------------------------+-----------+--------------+----------+-----------------+
14 rows in set (0.01 sec)
```

2)CREATE VIEW addmission_info AS SELECT Diagnosis, Admission, COUNT(*) as AdmissionCount
FROM medicalrecord
Group BY Diagnosis,Admission;

```
mysql> select * FROM addmission_info;
+--------------------------+-----------+----------------+
| Diagnosis                | Admission | AdmissionCount |
+--------------------------+-----------+----------------+
| Heart Attack             | YES       |              1 |
| Broken Arm               | YES       |              1 |
| Flu                      | No        |              3 |
| Kidney Stones            | YES       |              1 |
| Hypertension             | NO        |              1 |
| Allergies                | No        |              1 |
| Stomach Ulcer            | NO        |              1 |
| Cold                     | NO        |              1 |
| Urinary Tract Infection  | YES       |              1 |
| Insomnia                 | NO        |              1 |
| Diabetes                 | NO        |              1 |
| Thyroid                  | NO        |              1 |
+--------------------------+-----------+----------------+
12 rows in set (0.01 sec)
```

3)CREATE VIEW report_check_by_doctor AS SELECT
d.dfname,d.specialist,
lr.testname,
rc.result
FROM
report_check as rc
JOIN doctor as d ON rc.did = d.did
JOIN labreport as lr ON rc.reportid = lr.reportid;

```
mysql> select * FROM report_check_by_doctor;
+----------------+----------------------+----------------------+--------------------------+
| dfname         | specialist           | testname             | result                   |
+----------------+----------------------+----------------------+--------------------------+
| Dr.Farzana     | General Physicians   | Electrolytes Panel   | Normal                   |
| Prof Dr.Ratan  | Medicine & Cardiology | MRI Brain           | Normal                   |
| Prof Dr.Prodyut | Surgery & Urology   | Urinalysis           | Within normal range      |
| Dr.Farzana     | General Physicians   | Urinalysis           | 5.5%                     |
| Prof Dr.Ratan  | Medicine & Cardiology | X-ray Chest         | No abnormalities detected |
| Prof Dr.Susanta | Medicine & Pediatrics | Complete Blood Count | Normal                  |
| Dr.Farzana     | General Physicians   | Complete Blood Count | 120 mg/dL                |
| Dr.Farzana     | General Physicians   | Cholesterol          | 180 mg/dL                |
| Prof Dr.Prodyut | Surgery & Urology   | Complete Blood Count | Normal                   |
| Prof Dr.Ratan  | Medicine & Cardiology | MRI Brain           | Normal                   |
| Prof Dr.Prodyut | Surgery & Urology   | Urinalysis           | Not normal               |
| Prof Dr.Prodyut | Surgery & Urology   | Thyroid Function Test | High in range           |
| Prof Dr.Susanta | Medicine & Pediatrics | Liver Function Test | No abnormalities detected |
+----------------+----------------------+----------------------+--------------------------+
13 rows in set (0.00 sec)
```

4) CREATE VIEW patient_report AS SELECT
d.dfname,d.specialist,
lr.testname,
rc.result,p.pfname,p.page,p.bloodgroup
FROM
report_check as rc
JOIN doctor as d ON rc.did = d.did
JOIN labreport as lr ON rc.reportid = lr.reportid
JOIN patient as p on lr.patientid=p.pid;

```
mysql> select * FROM patient_report;
+----------------+---------------------+-----------------------+---------------------------+----------+------+------------+
| dfname         | specialist          | testname              | result                    | pfname   | page | bloodgroup |
+----------------+---------------------+-----------------------+---------------------------+----------+------+------------+
| Dr.Farzana     | General Physicians  | Electrolytes Panel    | Normal                    | Rabeya   |   23 | O-         |
| Prof Dr.Ratan  | Medicine & Cardiology | MRI Brain           | Normal                    | Sophia   |   28 | B+         |
| Prof Dr.Prodyut | Surgery & Urology  | Urinalysis            | Within normal range       | Samia    |   18 | A-         |
| Dr.Farzana     | General Physicians  | Urinalysis            | 5.5%                      | Samia    |   18 | A-         |
| Prof Dr.Ratan  | Medicine & Cardiology | X-ray Chest         | No abnormalities detected | Moushumi |   29 | B+         |
| Prof Dr.Susanta | Medicine & Pediatrics | Complete Blood Count | Normal                  | Asif     |   25 | A+         |
| Dr.Farzana     | General Physicians  | Complete Blood Count  | 120 mg/dL                 | Asif     |   25 | A+         |
| Dr.Farzana     | General Physicians  | Cholesterol           | 180 mg/dL                 | Sazia    |   24 | AB+        |
| Prof Dr.Prodyut | Surgery & Urology  | Complete Blood Count  | Normal                    | Yanna    |   18 | AB+        |
| Prof Dr.Ratan  | Medicine & Cardiology | MRI Brain           | Normal                    | Hassan   |   10 | B+         |
| Prof Dr.Prodyut | Surgery & Urology  | Urinalysis            | Not normal                | Yanna    |   18 | AB+        |
| Prof Dr.Prodyut | Surgery & Urology  | Thyroid Function Test | High in range             | Faridul  |   40 | B+         |
| Prof Dr.Susanta | Medicine & Pediatrics | Liver Function Test | No abnormalities detected | Samia    |   18 | A-         |
+----------------+---------------------+-----------------------+---------------------------+----------+------+------------+
13 rows in set (0.00 sec)
```

5) CREATE VIEW admission_patient SELECT Diagnosis, Admission, COUNT(*) as AdmissionCount
FROM medicalrecord
Group BY Diagnosis,Admission;

```
mysql> select * FROM admission_patient;
+--------------------------+-----------+-----------------+
| Diagnosis                | Admission | AdmissionCount  |
+--------------------------+-----------+-----------------+
| Heart Attack             | YES       |               1 |
| Broken Arm               | YES       |               1 |
| Flu                      | No        |               3 |
| Kidney Stones            | YES       |               1 |
| Hypertension             | NO        |               1 |
| Allergies                | No        |               1 |
| Stomach Ulcer            | NO        |               1 |
| Cold                     | NO        |               1 |
| Urinary Tract Infection  | YES       |               1 |
| Insomnia                 | NO        |               1 |
| Diabetes                 | NO        |               1 |
| Thyroid                  | NO        |               1 |
+--------------------------+-----------+-----------------+
12 rows in set (0.00 sec)
```

Trigger

In this trigger we used before the delete trigger for the doctor table. We know that information can delete any time so by this trigger if any information is deleted any time then the deleted information will store into another table which is named as deleted _doctoe_info. So we can easily get that information after deleting it from the main table.

```
CREATE TABLE deleted_doctor_info (
    did INT not null primary key,
    dfname VARCHAR(50),
    dlname VARCHAR(50),
    daddress VARCHAR(100),
    dage INT,
    dgender VARCHAR(10),
    specialist VARCHAR(50),
    delete_timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);


DELIMITER //

CREATE TRIGGER before_delete_doctor
BEFORE DELETE
ON doctor FOR EACH ROW

BEGIN
    INSERT INTO deleted_doctor_info (did, dfname, dlname, daddress, dage, dgender,
specialist)
    VALUES (OLD.did, OLD.name, OLD.dlname, OLD.daddress, OLD.dage,
OLD.dgender, OLD.specialist);
END;
//

DELIMITER ;
```

In this trigger we used after insertion trigger for patient table.If we add any new information in patient table then it will automatically trigger a new table which we create as inserted_patient_info and the new information for patient will be added into new table by trigger.

```
CREATE TABLE inserted_patient_info (
   pid INT,
   pfname VARCHAR(50),
   plname VARCHAR(50),
   page INT,
   pgender VARCHAR(10),
   paddress VARCHAR(100),
   bloodgroup VARCHAR(5),
   insert_timestamp TIMESTAMP DEFAULT CURRENT_TIMESTAMP
);


DELIMITER //

CREATE TRIGGER after_insert_patient
AFTER INSERT
ON patient FOR EACH ROW

BEGIN
   INSERT INTO inserted_patient_info (pid, pfname, plname, page, pgender, paddress,
bloodgroup)
   VALUES (NEW.pid, NEW.pfname, NEW.plname, NEW.page, NEW.pgender,
NEW.paddress, NEW.bloodgroup);
END;
//

DELIMITER ;
```

Conclusion:

In conclusion, the proposed Hospital Management System offers a user-friendly online platform that makes everything easier for patients and for administrative tasks. Patients can easily access doctor information, book appointments, and collect and upload their healthcare records online, reducing the need for manual paperwork and long waiting times for patients. The system's advantages include fast database access, minimized errors, a search facility, and a user-friendly interface. The Admin Mode allows efficient management of information.