NAME: Sree Vaishnavi Alugunuri
INTERN ID: I0333

1. All appointments booked in last 7 days for a doctor

QUERY:

```sql
SELECT *
FROM appointments
WHERE doctor_id = 1
  AND created_at >= NOW() - INTERVAL 7 DAY;
```

```
mysql> SELECT *
    -> FROM appointments
    -> WHERE doctor_id = 1
[   ->    AND created_at >= NOW() - INTERVAL 7 DAY;
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
| id | user_id | doctor_id | clinic_id | appointment_time    | status    | created_at          |
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
|  1 |       1 |         1 |         1 | 2024-06-28 09:00:00 | booked    | 2024-06-28 20:16:57 |
|  6 |       6 |         1 |         1 | 2024-07-03 16:00:00 | booked    | 2024-06-28 20:16:57 |
|  9 |       4 |         1 |         4 | 2024-06-28 14:00:00 | cancelled | 2024-06-28 20:16:57 |
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
3 rows in set (0.01 sec)
```

EXPLAIN ON QUERY:

```
mysql> EXPLAIN SELECT *
    -> FROM appointments
    -> WHERE doctor_id = 1
[   ->    AND created_at >= NOW() - INTERVAL 7 DAY;
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
| id | select_type | table        | partitions | type | possible_keys | key       | key_len | ref   | rows | filtered | Extra       |
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
|  1 | SIMPLE      | appointments | NULL       | ref  | doctor_id     | doctor_id | 4       | const |    3 |    33.33 | Using where |
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
1 row in set, 1 warning (0.00 sec)
```

2. All appointments booked in last 2 days and scheduled within next 5 hours for a doctor

QUERY:

```sql
SELECT *
FROM appointments
WHERE doctor_id = 1
  AND created_at >= NOW() - INTERVAL 2 DAY
  AND appointment_time <= NOW() + INTERVAL 5 HOUR;
```

```
mysql> SELECT *
    -> FROM appointments
    -> WHERE doctor_id = 1
    ->   AND created_at >= NOW() - INTERVAL 2 DAY
    ->   AND appointment_time <= NOW() + INTERVAL 5 HOUR;
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
| id | user_id | doctor_id | clinic_id | appointment_time    | status    | created_at          |
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
|  1 |       1 |         1 |         1 | 2024-06-28 09:00:00 | booked    | 2024-06-28 20:16:57 |
|  9 |       4 |         1 |         4 | 2024-06-28 14:00:00 | cancelled | 2024-06-28 20:16:57 |
+----+---------+-----------+-----------+---------------------+-----------+---------------------+
2 rows in set (0.01 sec)
```

EXPLAIN ON QUERY:

```
mysql> EXPLAIN SELECT *
    -> FROM appointments
    -> WHERE doctor_id = 1
    ->   AND created_at >= NOW() - INTERVAL 2 DAY
    ->   AND appointment_time <= NOW() + INTERVAL 5 HOUR;
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
| id | select_type | table        | partitions | type | possible_keys | key       | key_len | ref   | rows | filtered | Extra       |
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
|  1 | SIMPLE      | appointments | NULL       | ref  | doctor_id     | doctor_id | 4       | const |    3 |    11.11 | Using where |
+----+-------------+--------------+------------+------+---------------+-----------+---------+-------+------+----------+-------------+
1 row in set, 1 warning (0.02 sec)
```

3. Users who have at least 1 appointment and have their birthday coming in next 5 days
QUERY:
SELECT DISTINCT u.*
FROM users u
JOIN appointments a ON u.id = a.user_id
WHERE DATE_FORMAT(u.birthdate, '%m-%d') BETWEEN DATE_FORMAT(CURDATE(),
'%m-%d') AND DATE_FORMAT(CURDATE() + INTERVAL 5 DAY, '%m-%d');

QUERY and EXPLAIN ON QUERY:

```
mysql> SELECT DISTINCT u.*
    -> FROM users u
    -> JOIN appointments a ON u.id = a.user_id
    -> WHERE DATE_FORMAT(u.birthdate, '%m-%d') BETWEEN DATE_FORMAT(CURDATE(), '%m-%d') AND DATE_FORMAT(CURDATE() + INTERVAL 5 DAY, '%m-%d');
+----+----------------+------------+
| id | name           | birthdate  |
+----+----------------+------------+
|  1 | Jane Doe       | 1990-06-28 |
|  2 | Bob Smith      | 1985-06-29 |
|  3 | Samuel Johnson | 1978-06-30 |
|  4 | Linda Brown    | 1995-07-01 |
|  5 | George Wilson  | 1980-07-02 |
|  6 | Anna Lee       | 1992-07-03 |
+----+----------------+------------+
6 rows in set (0.00 sec)

mysql> EXPLAIN SELECT DISTINCT u.*
    -> FROM users u
    -> JOIN appointments a ON u.id = a.user_id
    -> WHERE DATE_FORMAT(u.birthdate, '%m-%d') BETWEEN DATE_FORMAT(CURDATE(), '%m-%d') AND DATE_FORMAT(CURDATE() + INTERVAL 5 DAY, '%m-%d');
+----+-------------+-------+------------+------+---------------+---------+---------+------------------------+------+----------+------------------------------+
| id | select_type | table | partitions | type | possible_keys | key     | key_len | ref                    | rows | filtered | Extra                        |
+----+-------------+-------+------------+------+---------------+---------+---------+------------------------+------+----------+------------------------------+
|  1 | SIMPLE      | u     | NULL       | ALL  | PRIMARY       | NULL    | NULL    | NULL                   |    6 |   100.00 | Using where; Using temporary |
|  1 | SIMPLE      | a     | NULL       | ref  | user_id       | user_id | 4       | appointment_system.u.id |    1 |   100.00 | Using index; Distinct        |
+----+-------------+-------+------------+------+---------------+---------+---------+------------------------+------+----------+------------------------------+
2 rows in set, 1 warning (0.00 sec)
```

4. Appointments for a particular patient in the last 7 days

QUERY:

```sql
SELECT *
FROM appointments
WHERE user_id = 1
  AND created_at >= NOW() - INTERVAL 7 DAY;
```

QUERY and EXPLAIN ON QUERY:

```
mysql> SELECT *
    -> FROM appointments
    -> WHERE user_id = 1
    ->   AND created_at >= NOW() - INTERVAL 7 DAY;
+----+---------+-----------+-----------+---------------------+--------+---------------------+
| id | user_id | doctor_id | clinic_id | appointment_time    | status | created_at          |
+----+---------+-----------+-----------+---------------------+--------+---------------------+
|  1 |       1 |         1 |         1 | 2024-06-28 09:00:00 | booked | 2024-06-28 20:16:57 |
| 12 |       1 |         4 |         2 | 2024-07-01 16:00:00 | booked | 2024-06-28 20:16:57 |
+----+---------+-----------+-----------+---------------------+--------+---------------------+
2 rows in set (0.02 sec)

mysql> EXPLAIN SELECT *
    -> FROM appointments
    -> WHERE user_id = 1
    ->   AND created_at >= NOW() - INTERVAL 7 DAY;
+----+-------------+--------------+------------+------+---------------+---------+---------+-------+------+----------+-------------+
| id | select_type | table        | partitions | type | possible_keys | key     | key_len | ref   | rows | filtered | Extra       |
+----+-------------+--------------+------------+------+---------------+---------+---------+-------+------+----------+-------------+
|  1 | SIMPLE      | appointments | NULL       | ref  | user_id       | user_id | 4       | const |    2 |    33.33 | Using where |
+----+-------------+--------------+------------+------+---------------+---------+---------+-------+------+----------+-------------+
1 row in set, 1 warning (0.00 sec)
```

5. Appointment cancellation percentage for a doctor by clinic

QUERY:

```sql
SELECT c.name AS clinic_name,
       d.name AS doctor_name,
       (SUM(a.status = 'cancelled') / COUNT(*)) * 100 AS
cancellation_percentage
FROM appointments a
JOIN clinics c ON a.clinic_id = c.id
JOIN doctors d ON a.doctor_id = d.id
WHERE a.doctor_id = 3
GROUP BY c.id, d.id;
```

QUERY and EXPLAIN ON QUERY:

```
mysql> SELECT c.name AS clinic_name,
    ->        d.name AS doctor_name,
    ->        (SUM(a.status = 'cancelled') / COUNT(*)) * 100 AS cancellation_percentage
    -> FROM appointments a
    -> JOIN clinics c ON a.clinic_id = c.id
    -> JOIN doctors d ON a.doctor_id = d.id
    -> WHERE a.doctor_id = 3
    -> GROUP BY c.id, d.id;
+-------------+-------------+-------------------------+
| clinic_name | doctor_name | cancellation_percentage |
+-------------+-------------+-------------------------+
| Clinic C    | Dr. Charlie |                  0.0000 |
| Clinic B    | Dr. Charlie |                100.0000 |
| Clinic E    | Dr. Charlie |                100.0000 |
+-------------+-------------+-------------------------+
3 rows in set (0.01 sec)
```

```
mysql> EXPLAIN SELECT c.name AS clinic_name,
    ->        d.name AS doctor_name,
    ->        (SUM(a.status = 'cancelled') / COUNT(*)) * 100 AS cancellation_percentage
    -> FROM appointments a
    -> JOIN clinics c ON a.clinic_id = c.id
    -> JOIN doctors d ON a.doctor_id = d.id
    -> WHERE a.doctor_id = 3
    -> GROUP BY c.id, d.id;
+----+-------------+-------+------------+--------+-------------------+-----------+---------+------------------------------+------+----------+----------------+
| id | select_type | table | partitions | type   | possible_keys     | key       | key_len | ref                          | rows | filtered | Extra          |
+----+-------------+-------+------------+--------+-------------------+-----------+---------+------------------------------+------+----------+----------------+
| 1  | SIMPLE      | d     | NULL       | const  | PRIMARY           | PRIMARY   | 4       | const                        | 1    | 100.00   | Using temporary |
| 1  | SIMPLE      | a     | NULL       | ref    | doctor_id,clinic_id | doctor_id | 4     | const                        | 3    | 100.00   | NULL           |
| 1  | SIMPLE      | c     | NULL       | eq_ref | PRIMARY           | PRIMARY   | 4       | appointment_system.a.clinic_id | 1  | 100.00   | NULL           |
+----+-------------+-------+------------+--------+-------------------+-----------+---------+------------------------------+------+----------+----------------+
3 rows in set, 1 warning (0.01 sec)
```

users

PK	id int NOT NULL
	name varchar(255) NOT NULL
	birthdate NOT NULL

clinics

PK	id int NOT NULL
	name varchar(255) NOT NULL

doctors

PK	id int NOT NULL
	name varchar(255) NOT NULL

appointments

PK	id int NOT NULL

user_id INT NOT NULL (FK),
doctor_id INT NOT NULL (FK),
 clinic_id INT NOT NULL (FK),
 appointment_time DATETIME NOT NULL,
 status ENUM('booked', 'cancelled') NOT NULL,
 created_at TIMESTAMP DEFAULT