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

QUERY:

```
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:

```
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:

```
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:

```
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)
```

ER diagram:

