1.

```
mysql> SELECT username FROM `user` WHERE password_hash = "hash";
+----------------+
| username       |
+----------------+
| fluffybunny91  |
| greatbigpurple |
| iamthedude     |
| justice4all    |
| nothingspecial |
| iloveyou2      |
+----------------+
6 rows in set (0.00 sec)

mysql>
```

2.

```
mysql>  SELECT r.room_id, r.name
    -> FROM room_user ru
    -> JOIN room r ON ru.room_id = r.room_id
    -> JOIN `user` u ON ru.user_id = u.user_id
    -> WHERE u.username = "fluffybunny91";
+---------+--------------+
| room_id | name         |
+---------+--------------+
|       1 | Besties      |
|       3 | Fav Foods    |
|       7 | School Notes |
|       8 | Jokes        |
+---------+--------------+
4 rows in set (0.00 sec)

mysql>
```

3.

```
mysql> SELECT u.user_id, u.username
    -> FROM room_user AS ru
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> WHERE ru.room_id = (SELECT room_id FROM room_user WHERE user_id = (SELECT user_id FROM user WHERE username = 'fluffybunny91') LIMIT 1)
    -> AND u.username <> 'fluffybunny91';
+---------+----------------+
| user_id | username       |
+---------+----------------+
|       4 | justice4all    |
|       5 | nothingspecial |
|       6 | iloveyou2      |
+---------+----------------+
3 rows in set (0.00 sec)
```

4.

```
mysql> SELECT m.text, m.sent_datetime, u.username
    -> FROM message AS m
    -> INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> WHERE ru.room_id = 1  -- Replace with the actual room_id
    -> ORDER BY m.sent_datetime DESC
    -> LIMIT 10;
+-----------------------------------------+---------------------+-------------+
| text                                    | sent_datetime       | username    |
+-----------------------------------------+---------------------+-------------+
| What about 5PM?                         | 2023-01-20 19:07:17 | justice4all |
| I will!                                 | 2023-01-20 19:05:52 | iloveyou2   |
| Who wants to go to the Mall on Saturday? | 2023-01-20 19:02:14 | fluffybunny91 |
+-----------------------------------------+---------------------+-------------+
3 rows in set (0.00 sec)

mysql>
```

5.

```
mysql> SELECT m.text, m.sent_datetime, u.username
    -> FROM message AS m
    -> INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> WHERE ru.room_id = 1;
+-----------------------------------------+---------------------+---------------+
| text                                    | sent_datetime       | username      |
+-----------------------------------------+---------------------+---------------+
| Who wants to go to the Mall on Saturday? | 2023-01-20 19:02:14 | fluffybunny91 |
| What about 5PM?                         | 2023-01-20 19:07:17 | justice4all   |
| I will!                                 | 2023-01-20 19:05:52 | iloveyou2     |
+-----------------------------------------+---------------------+---------------+
3 rows in set (0.00 sec)

mysql>
```

6.

```
mysql> SELECT ru.user_id, u.username, COUNT(m.message_id) AS message_count
    -> FROM message AS m
    -> INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> GROUP BY ru.user_id, u.username
    -> HAVING message_count = (
    ->     SELECT MAX(msg_count) FROM (
    ->         SELECT COUNT(m.message_id) AS msg_count
    ->         FROM message AS m
    ->         INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    ->         GROUP BY ru.user_id
    ->     ) AS Subquery
    -> );
+---------+---------------+---------------+
| user_id | username      | message_count |
+---------+---------------+---------------+
|       2 | greatbigpurple |           10 |
+---------+---------------+---------------+
1 row in set (0.01 sec)

mysql>
```

7.

```
1 row in set (0.01 sec)

mysql> SELECT ru.user_id, u.username, COUNT(ru.room_id) AS group_count
    -> FROM room_user AS ru
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> GROUP BY ru.user_id, u.username
    -> HAVING group_count = (
    ->      SELECT MAX(group_count) FROM (
    ->          SELECT COUNT(ru.room_id) AS group_count
    ->          FROM room_user AS ru
    ->          GROUP BY ru.user_id
    ->      ) AS Subquery
    -> );
+---------+----------------+-------------+
| user_id | username       | group_count |
+---------+----------------+-------------+
|       6 | iloveyou2      |           6 |
|       2 | greatbigpurple |           6 |
+---------+----------------+-------------+
2 rows in set (0.00 sec)

mysql>
```

8.

```
mysql> SELECT ru.room_id, r.name AS group_name, COUNT(m.message_id) AS message_count
    -> FROM message AS m
    -> INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    -> INNER JOIN room AS r ON ru.room_id = r.room_id
    -> GROUP BY ru.room_id, r.name
    -> HAVING message_count = (
    ->      SELECT MAX(msg_count) FROM (
    ->          SELECT COUNT(m.message_id) AS msg_count
    ->          FROM message AS m
    ->          INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    ->          GROUP BY ru.room_id
    ->      ) AS Subquery
    -> );
+---------+------------+---------------+
| room_id | group_name | message_count |
+---------+------------+---------------+
|       8 | Jokes      |             8 |
+---------+------------+---------------+
1 row in set (0.00 sec)

mysql>
```

9.

```
mysql> SELECT ru.room_id, r.name AS group_name, COUNT(ru.user_id) AS user_count
    -> FROM room_user AS ru
    -> INNER JOIN room AS r ON ru.room_id = r.room_id
    -> GROUP BY ru.room_id, r.name
    -> HAVING user_count = (
    ->     SELECT MAX(group_size) FROM (
    ->         SELECT COUNT(ru.user_id) AS group_size
    ->         FROM room_user AS ru
    ->         GROUP BY ru.room_id
    ->     ) AS Subquery
    -> );
+---------+-------------+------------+
| room_id | group_name  | user_count |
+---------+-------------+------------+
|       3 | Fav Foods   |          6 |
|       7 | School Notes|          6 |
+---------+-------------+------------+
2 rows in set (0.00 sec)

mysql>
```

10.

```
mysql> SELECT r.room_id, r.name AS group_name, m.sent_datetime AS latest_message_time
    -> FROM message AS m
    -> INNER JOIN room_user AS ru ON m.room_user_id = ru.room_user_id
    -> INNER JOIN room AS r ON ru.room_id = r.room_id
    -> WHERE m.sent_datetime = (SELECT MAX(sent_datetime) FROM message);
+---------+------------+---------------------+
| room_id | group_name | latest_message_time |
+---------+------------+---------------------+
|       1 | Besties    | 2023-01-20 19:07:17 |
+---------+------------+---------------------+
1 row in set (0.00 sec)

mysql>
```

11.

```
mysql> SELECT u.user_id, u.username, r.room_id, r.name AS group_name
    -> FROM room_user AS ru
    -> INNER JOIN user AS u ON ru.user_id = u.user_id
    -> INNER JOIN room AS r ON ru.room_id = r.room_id
    -> WHERE NOT EXISTS (
    ->     SELECT 1 FROM message AS m
    ->     INNER JOIN room_user AS ru2 ON m.room_user_id = ru2.room_user_id
    ->     WHERE ru2.user_id = ru.user_id
    ->     AND ru2.room_id = ru.room_id
    -> );
+---------+----------------+---------+---------------+
| user_id | username       | room_id | group_name    |
+---------+----------------+---------+---------------+
|       5 | nothingspecial |       1 | Besties       |
|       5 | nothingspecial |       2 | Controversies |
|       6 | iloveyou2      |       3 | Fav Foods     |
|       5 | nothingspecial |       3 | Fav Foods     |
|       3 | iamthedude     |       3 | Fav Foods     |
|       2 | greatbigpurple |       3 | Fav Foods     |
|       3 | iamthedude     |       6 | Vacations     |
|       3 | iamthedude     |       7 | School Notes  |
|       2 | greatbigpurple |       7 | School Notes  |
|       6 | iloveyou2      |       7 | School Notes  |
|       4 | justice4all    |       7 | School Notes  |
|       5 | nothingspecial |       7 | School Notes  |
+---------+----------------+---------+---------------+
12 rows in set (0.00 sec)

mysql>
```