Birla Institute of Technology & Science, Pilani, K. K. BIRLA Goa campus
Database Systems (CS F212)
Second Semester 2019-2020
Lab-4 Exercise: To study Group by and Having clause and Nested queries

Instructions:

● Download the 'database.sql' file to your home directory and import it in your database by the following command in your mysql terminal: source database.sql
(If the above command shows error, make sure you are in the correct directory.)

● Use the Customer, OrderBook and Book tables and write SQl queries to solve the following questions.

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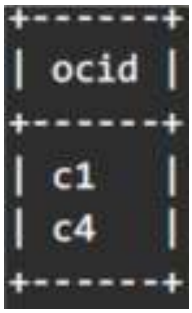
1. List the book isbn ordered by more than 2 customers.

Expected output:

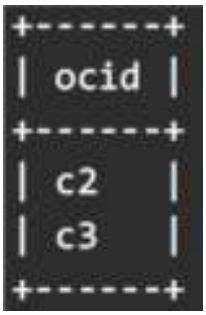
2. List the customer ids who have ordered more than total 4 copies.

Expected output:



3. List the customer ids whose latest order was placed before 7 years.

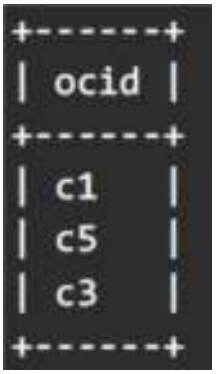
Expected output:



ocid
c2
c3

4. List the customer ids who have ordered book Operating Systems without using join on isbn & in predicate. (Hint: use EXISTS/NOT EXISTS)

Expected output:

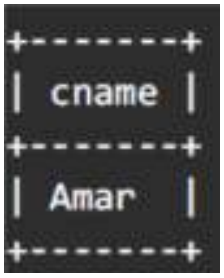


ocid
c1
c5
c3

5. Find the names of the customers who have ordered book Operating Systems and Data Structures and Algorithms without using join on customer name & in predicate. (Hint: use EXISTS/NOT EXISTS)

```
Approach:
select cname from Customer
where exists (query 4 for DSA)
    and cid matches
and exists (query 4 for OS)
    and cid matches;
```

Expected output:



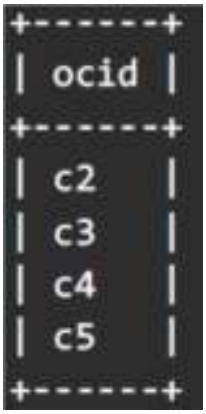
cname
Amar

Note : Do NOT use 'OR Predicate' anywhere in questions 6,7, and 8.

6. List the customer ids who have not ordered both Operating Systems and Data Structures and Algorithms.

```
Approach:
Q1: A ←set of ocid who have ordered OS
Q2: B ←set of ocid who have ordered DSA
Q3: A ∩ B ← set of ocid who have ordered both OS and DSA
     i.e. Q3 ← Q1 and Q2
Q4: Result ← (A ∩ B)' : set of ocid who have not ordered both OS and
DSA
i.e. Q4 ← set of ocid not in (Q3)
```

Expected output:

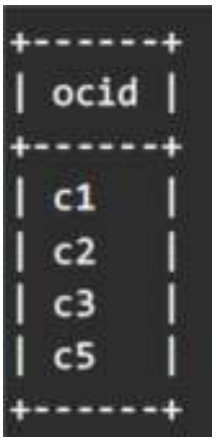


ocid
c2
c3
c4
c5

7. List the customer ids who have either ordered Operating Systems or Data Structures and Algorithms.

```
Approach:
Q5: A' ←set of ocid who have not ordered OS
i.e. Q5 ←set of ocid not in Q1
Q6: B' ←set of ocid who have not ordered DSA
i.e. Q6 ←set of ocid not in Q2
Q7: A' ∩ B' ← set of ocid who have not ordered both OS and DSA
     i.e. Q7 ← Q5 and Q6
Q8: Result ← (A' ∩ B')' : set of ocid who have either ordered OS or
DSA
i.e. Q8 ← set of ocid not in (Q7)
```

Expected output:

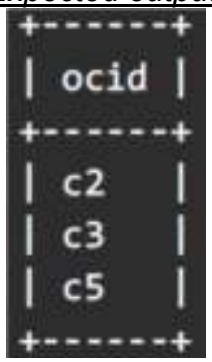


ocid
c1
c2
c3
c5

8. List the customer ids who have ordered a book Operating Systems or Data Structures and Algorithms but not both.

```
Approach: (A' ∩ B')' ∩ (A ∩ B)'
i.e Result ← set of ocid in (Q8 and Q4)
```

Expected output:



ocid
c2
c3
c5

9. List the customer names who have ordered less than total 4 copies. Write the query without any join operation.

Expected output:

```
+--------+
| cname  |
+--------+
| Akbar  |
| Pooja  |
+--------+
```

Note:
- 'in' and 'not in' predicates are to equality condition.
- 'all' and 'any' predicates are to check inequality condition.
- 'all' is equivalent to multiple AND conditions.
- 'any' is equivalent to multiple OR conditions.

10. Find the books with the second highest Qty_in_stock. Write the query without any aggregate function, in/not in predicate, order by and limit;

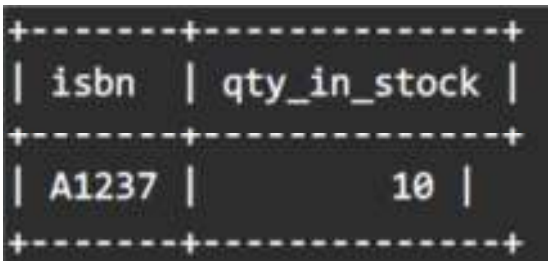
Approach:

Following query finds the books with highest Qty_in_stock without using any aggregate function.

mysql> **select isbn,qty_in_stock from Book where qty_in_stock >=all(select qty_in_stock from Book);**

```
+ -------+--------------+
| isbn | qty_in_stock |
+ -------+--------------+
| A1238 | 20 |
+ -------+--------------+
1 row in set ( 0.00 sec)
```

Expected output:



```
+-------+--------------+
| isbn  | qty_in_stock |
+-------+--------------+
| A1237 |           10 |
+-------+--------------+
```