

@Backend:Phase1

Task 5

/DBMS-MySQL



This is the final task of MySQL, and next is the project of the 1st phase.

/Feedback

\$ Task_4_Feedback

/Resources

\$ Attend the online session(there is a warning if you don't attend it).

\$ from Baraa Course, watch these videos:

- > Window Functions Basics

Indexes

- > SQL Indexes

- > SQL Unique & Filtered Indexes

- > How to choose the right index

Transactions

- > Database Transactions

\$ Other Useful resources along this phase:

- > Baraa Course

- > Eng-Ramy ITI Course

- > DR-Amr Internal DBs Course

/TODO

\$ Part A: LeetCode Problems

Create a file named `Task_5_Solutions.sql` and paste your SQL code for each problem there.

- > [Duplicate Emails](#)
- > [Delete Duplicate Emails](#)
- > [Nth Highest Salary](#)
- > [Rank Scores](#)
- > [Department Highest Salary](#)



\$ Part B: Research Questions

Answer the following questions in the file named `research.md`.

Window Functions vs GROUP BY:



- Both `GROUP BY` and window functions perform aggregations. What is the fundamental difference regarding the "granularity" (level of detail) in the output?

Clustered vs Non-Clustered Indexes:



- Based on the "Clustered vs Nonclustered" video, explain the difference between the **Leaf Nodes** of a Clustered Index's B-Tree versus a Non-Clustered Index.





- Why are you only allowed to have exactly **one clustered index** per table?

Filtered & Unique Indexes:



- What is a "Filtered Index" and why is it useful? (Mention the impact on storage and query performance).



- If you put a "Unique Index" on an Email column, how does it physically slow down **INSERT** statements while speeding up **SELECT** statements?

Choosing the Right Index:



- You have a temporary "Staging Table" where you insert millions of rows very quickly, read them once, and then delete them. According to the "How to Choose" video,



should you use a Clustered Index, a Non-Clustered Index, or a Heap Structure? Why?



Database Transactions (ACID):

- Explain the "All or Nothing" concept (Atomicity). What disastrous scenario happens if a partial failure occurs without using a Transaction?



/Submission Guidelines

> Inside your **IEEE-ZSB-Backend-26** repository, inside the **MySQL** folder, create a new folder named **Task_5** and put your files there:

MySQL\

Task_5\

Task_5_Solutions.sql



research.md

HTML\

. . .

/How-To-Submit

\$ After you finish all of that, push your files to the repo as explained.

\$ Submit the GitHub repository link on the task chat on **Discord**.

/Deadline

\$ Saturday, February 28 at 11:59 PM

Wish you the best.❤️

