

@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. ❤️

