Introduction:

In this assignment, both of you will explore advanced concepts and applications in database systems. You will delve into topics such as data modeling, query optimization, transaction management, and data security & privacy. The assignment is designed to challenge your understanding of theoretical concepts and their practical implementations in real-world scenarios.

Assignment Tasks:

Task 1: Data Modeling (10 points)

Create an ER diagram for a university database system that related with the program taken (ISM). Specify relationships and cardinalities. Convert this ER diagram into a relational schema.

1. Each DB consist at min 5 tables
2. It MUST include 1: M and M: N relationships.
3. The attributes must consist a combination of number, text and image
4. Each table must consist of at least 5 data related with the DB
5. Based on relational schema create a database using available tools.
6. Tools:
    - Wamp/Xamp
    - Php myadmin

Task 2: Query Optimization (10 points)

Write at least **5(Five)** complex SQL query involving multiple tables. Analyze the query execution plan and identify potential performance bottlenecks. Propose at least two optimization techniques to improve the query performance.

Task 3: Transaction Management (5 points)

Explain the concepts of ACID (Atomicity, Consistency, Isolation, Durability) properties in transaction management. Provide an example scenario where maintaining these properties is crucial.

Task 4: Data Security and Privacy (5 points)

Discuss the importance of data security and privacy in modern database systems. Explain the role of encryption, authentication, and authorization in ensuring data security.

Submission Guidelines:

- Prepare a well-organized report including introduction, methodology (if any), findings, and conclusion for each task.
- Include relevant diagrams, SQL code snippets, and references where necessary.
- Submit your assignment in a PDF format via the U-future portal/gdrive(https://drive.google.com/drive/folders/1FVpz_YRnPP4THX6MfbNPFhKZQRba-U-Y?usp=sharing) before the deadline
- All must be documented properly as follow:
    - Task 1
        - Introduction
        - Database Objective
        - ERD
        - Data Dictionaries
        - List of tables
        - List of attributes
        - List of PK and FK
        - List of relationship
    - Task 2:
        - List of SQL queries
    - Task 3:
        - Short Essay on ACID
    - Task 4:
        - Short Essay on data security & privacy

Provided by:

MOHD RIDWAN KAMARULZAMAN

UiTM Puncak Perdana

mridwan@uitm.edu.my

0193400730