Lab Project (10 points)

Each team of students in this LAB project should plan and implement one of the following projects:

- An online DB backup solution,

- DB transactional replication,

- Masking technique for sensitive data in DB,

- Or secure hashing for users' passwords in DB.

Note: For the first and the second projects, the online backup or replica servers can be hosted in the Azure public cloud (each student will receive access information for his online server).

Instructions:

- A maximum of three students is allowed for each work team on this Lab project.
- Each team is required to implement one of the following projects:

    - **Online DB Backup:**
        - Justified plan and sufficient implementation for the online DB backup, including the ability to restore the DB backup at any time.
        - The DB backup scheduling should include (at least) full backup and incremental backup.
        - You can utilize the available MySQL tools or Vembu services for implementing this project. Check the following links:
            - MySQL Backup
            - MySQL tool
            - Vembu services

    - **DB Replication:**
        - Justified plan and sufficient implementation for the full, transactional DB replication.
        - Any changes to data in the DB server should be synchronously reflected on the replica server.
        - You can utilize the available MySQL tools or Syniti services for implementing this project. Check the following links:
            - MySQL Replication
            - MySQL Replication Demo
            - Syniti services

- **Data Masking:**
  - Justified plan and sufficient implementation for masking sensitive data in DB such as credit card number (i.e., hiding all numbers of the credit card except the last four digits).
  - The original data should not be affected, and can be retrieved (i.e., you can use masking with views).
  - You can utilize the available MySQL tools for implementing this project. Check the following links:
    - https://www.sqlshack.com/enterprise-data-masking-in-mysql/
    - https://dev.mysql.com/doc/refman/8.0/en/data-masking-usage.html
    - https://dev.mysql.com/doc/refman/8.0/en/data-masking.html

- **Secure Hashing:**
  - Justified plan and sufficient implementation for securely hashing confidential data in DB such as passwords with salt (i.e., to know more about salt for hashed passwords, see this online article)
  - The DB should only save the hashed (password + salt) with a separate column for the random salts.
  - You can utilize the available MySQL or XAMPP tools for implementing this project. Check the following links:
    - https://dev.mysql.com/doc/refman/5.6/en/passwordhashing.html
    - https://www.geeksforgeeks.org/php-md5-sha1-hash-functions/
    - https://www.php.net/manual/en/function.password-hash.php

- After implementing the project, you should write up a technical report describing the details and steps of your implementation (for one of the projects above).
- Each team of students will present the implementation of their project (online), including the strategies and techniques they have adopted in implementation of the project.