An Online Banking system

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1 Assessment Brief

Design and implement the business layer for an **Online Banking system database project**. To complete this assessment, you will need to achieve the following objectives:

- Develop a conceptual understanding of the solution by reading the background information provided in Section 3
- Create a data model that describes all relevant entities, attributes, and relationships. Make sure you create and submit Entity Relationship Diagram (ERD).
- Implement the data model in PostgreSQL.
- Develop the business logic layer by developing your own SQL views, functions, and procedures.
- Demonstrate the effectiveness of your business logic through several test scripts that align with the user journeys that you would expect for the application.
- Implement controls so that your solution aligns with best practice General Data Protection Regulation (GDPR) requirements.

2 Requirement

You need to submit the following:

1. You will provide a description of the implementation of the back-end business logic layer that will include the following sections:
    - Summary of the main user journeys and the names of any associated PostgreSQL view, function or procedure (including any parameters and return values) that support the service layer features described in the assessment scenario in Section 3.

- A description of your data model that includes an entity relationship diagram using Internet Engineering ("Crow's Foot") notation.
- A description of security best practices such as how your solution meets GDPR and other relevant security practices for the task in hand. You are NOT required to provide descriptions of security controls governing user, application, operating system, or network security unless such controls can be implemented in PostgreSQL either through appropriate settings in configuration files or through the configuration of your database, schema, tables etc.
- Your code including queries, functions, procedures must have descriptive comments.

Important Notes :

- **The report should not contain your name. The only identifier should be your student ID.**
- **The word count must not exceed 2000 words (excluding cover sheet, tables, diagrams, and references).**
- Do not just copy your commands and tables etc. on the report, provide description of each commands.
- Description of your assumption should be written clearly.

2. SQL Database Export:

   Your back-end business logic (comprising database roles, schemas, tables, views, functions and other database objects and configuration settings that make up the secure service layer) will be exported to a single file.

   To assess your database, the examiner will import your solution into a freshly installed instance of PostgreSQL running with default installation options. Assume the import process will be performed using an account that has full PostgreSQL privileges.

3. Configuration folder:

   A folder named "config" will contain any PostgreSQL-related configuration files. Any configuration files need to support a secure configuration of your solution should be placed in a configuration folder. You may also include a short README file that describes the purpose and installation of these files.

4. Test Script Scripts used to test the user journey.

3 Assessment Background Information

An online banking system is in high demand and needs to be secure and flexible to expand the facilities. There are several tasks to start such a high demanding service, this assessment tackles the database side of the service.

There are multiple folds to work with the database task in this system, they are listed below:

- Introduce an online banking system that allows potential customers to open an account and register themselves.
- Once a customer is registered they can apply for another account. With the same online account there is a provision of having multiple accounts.
- Customer can view balance, apply loans, pay online, transfer balance from one account to another but it has to be their own account in the same bank.
- Employee serves the customers such as by checking the customers' balance.
- Managers can approve the transactions that needs further checking and approving such as loan, credit limit increase/decrease etc.
- The bank gives loan to the customer.
- Loan payment facility where loans can be paid through a 'payment' entity.
- List the different types of roles and their importance with the key features to function your online banking system.
- Future expansion :
  - Transferring balance to other accounts outside of the customer's bank.

With following objectives in hand, you are asked to design and build a prototype of back-end database of an online banking system. Identify the possible entities, their attributes, build the relationships and finally develop Entity-Relationship diagram for the above mentioned activities. You are in-charge of back-end system only and are not expected to do the following:

- Checking the registration of new customers if they are valid,
- Application session management handling
- You may safely assume that all calls and parameters are passed to the database via appropriately authorised connections.
- You are not required to create a website (front-end) and are not expected to provide description of website.

4 Notes

Your approach should be GDPR compliant and should show the skills of using the learned techniques such as **normalisation, relational database that comprises of logic, well-formed entities, and keys relations (private, foreign etc.)**. You should demonstrate to write a clear, and concisely explained report. You are also **required to demonstrate the thorough testing** of the correct operations of your back-end solution and submit the test scripts. Refer to the submission section above for further details about the tests. Please make sure you submit all the configuration along with your scripts.

5 Deliverable

The deliverable is comprised of four parts, namely, a report, a PostgreSQL Database export (can be plain text backup file), a folder named 'config' containing any relevant configurations files for PostgreSQL script execution, an executable script containing all working tests. Your report should contain rational behind all the scenarios that customer goes through Your test scripts should have comments documented properly.

- PostgreSQL Database export
  Your back-end business logic (comprising database roles, schemas, tables, views, functions and other database objects and configuration settings that make up the secure service layer) will be exported to a single file. The database carries 30% of the total mark.

- Config folder
  A folder named "config" will contain any PostgreSQL-related configuration files (including but not limited to "postgresql.conf"). You may also include a short README file that describes the purpose and installation of these files. It carries 20% of the total.

- Submission
  Test script - A single executable file should be provided containing SQL queries (e.g., statements, functions, procedures). All the documents should be submitted as a single file zip file. It carries 15% of the total.

- Report
  The report carries 35% of the total mark and you will provide a clear description of the implementation of the back-end business logic layer. Make sure descriptions are linked with the testing SQL statements as well. The report should be in the Portable Document Format (PDF) format and should not contain your details (e.g., your name). The only identifier should be your studentID.

Note: Assignment should be uploaded in a SINGLE zip file.

The deadline is before 12:00 on 30/01/2023