



CASE STUDY/ Data Engineer Intern

ABOUT TIMO

Everybody dreams of being rich(er) and fears being poor. Timo supports you in achieving this dream. Financially, we support across the 5 functions of money: **moving, managing, accessing, growing, and protecting your money.**

Being rich however means more than just having a lot of money. Enjoying a rich life includes making money more fun and emotional by embedding banking services into your lifestyle and within your social circle to unlock a truly rich life.

CASE STUDY

This intern assessment evaluates your ability to design and implement a secure, compliant data platform for a simplified banking system. The project is guided by regulatory requirements from **2345/QĐ-NHNN 2023**, focusing on banking operations such as online/card-based payments, identity verification, device tracking, and fraud risk monitoring.

You are expected to:

- Understand compliance requirements and translate them into a relational data model
- Implement secure schema design, data generation, and quality checks
- Automate and monitor workflows using orchestration tools
- (Optionally) Visualize risk and data quality insights

Your solution will be submitted as a structured GitHub repository, with working scripts and clear documentation.

Key Questions

Part 1: Research & Database Design

- * List relevant use cases, entities, and relationships
- * Design an Entity-Relationship Diagram (ERD)
- * Deliver SQL schema creation script ('schema.sql')
- * Your model should cover:
 - * Customer identity (CCCD/passport)
 - * Bank accounts
 - * Payment transactions
 - * Authentication logs (OTP, biometrics)



- * Devices used
- * Risk tagging or fraud detection fields

Part 2: Generate example data

Create a Python script (`generate_data.py`) that:

- * Populates tables with sample data
- * Reflects real-world structure and dependencies (e.g., customers own accounts)
- * Includes edge cases (e.g., high-value transactions)

Part 3: Data quality checks

Write Python/SQL scripts:

- * Data quality checks:
 - * Null/missing values
 - * Uniqueness (e.g., National ID)
 - * Format/length validation (e.g., CCCD regex)
 - * Foreign key integrity (e.g., customer/account, transaction/account)
- * Risk-based checks:
 - * Transactions more than 10M VND must use strong auth (biometric or OTP)
 - * Device must be verified if new or untrusted.
 - * Total transaction amount per customer more than 20M VND in a day must have at least one strong auth method.
- * Scripts to submit:
 - * `data_quality_standards.py`
 - * `monitoring_audit.py`
- * Output should be logs or summary tables

Part 4: Scheduling & Orchestration

Use Airflow, Dagster, or Cron to schedule daily checks

DAG or shell job must:

- * Run data generation (optional)
- * Run data quality checks



- * Log pass/fail outcomes

- * Alert via print/log on failure

Submit the DAG/job script (`banking_dq_dag.py` or equivalent)

Part 5: (Optional) Visualization

Build a lightweight dashboard (Streamlit, Metabase, Superset...) to display:

- * Top failed checks

- * Risky transaction count

- * Unverified devices by customer

Include access/launch instructions in README

Submission instructions

Organize your GitHub repo as follows:

...

/banking-data-assignment

/sql

- schema.sql

- reporting_queries.sql (optional)

/src

- generate_data.py

- data_quality_standards.py

- monitoring_audit.py

/dags_or_jobs

- banking_dq_dag.py

/visualization (optional)

- dashboard.py or dashboard_app/*

README.md

...

Your README must include:

- * Project overview



- * Setup instructions (Python version, libraries, how to run scripts)
- * How to run DAG or job scheduler
- * Description of any assumptions made

Submission Format & Deadline

- **Deadline:** You will have **14 days** to complete your proposal upon receiving the case study. However, we encourage you to submit it as early as possible to allow for timely feedback.
- **Format:** PDF or PowerPoint.
- **Method:** Please submit your file via email to **thuy.mai@timo.vn** using the following file naming convention **(25CDEI_ Full Name)**

REFERENCE

If you have any questions or need clarification, feel free to contact us.

We would be happy to review your submission before the direct interview, during which we will discuss your proposal and evaluate how well you align with Timo's goals and vision.