Take-Home Coding Exercise – Data Engineering & Analysis

Overview

Thank you for participating in our interview process. This exercise is designed to evaluate your skills in data processing, pipeline design, and basic analytical reasoning.

You are expected to **return your work within 24 hours** from the time the test begins. After submission, a **restitution session** will be scheduled where you will present and discuss your solution.

Files Provided

Attached to this document, you will find the following CSV files:

1. `locations.csv`
2. `products.csv`
3. `sales.csv`
4. `stocks_history.csv`

These files contain data from a fictional client. Your task is to process, transform, and prepare this data for ingestion into a structured SQL database.

Part 1 – Data Pipeline Preparation

Objective

Construct a data pipeline to prepare the data for ingestion in an SQL database with the following schema:

Table 1: `locations`

Column	Type
id	UUID
name	string
latitude	float
longitude	float

Table 2: `products`

Column	Type
id	UUID
category	string
is_perishable	bool

Table 3: `product_attributes`

Column	Type
id	int
product_id	UUID
attribute_name	string
attribute_value	string

Table 4: `sales`

Column	Type
id	int
datetime	datetime
product_id	UUID

location_id	UUID
quantity	int

Table 5: `historical_stocks`

Column	Type
date	date
product_id	UUID
location_id	UUID
quantity	int

Requirements

- Clean and transform the data as needed to fit the database schema.
- Generate UUIDs where applicable.
- No need to actually create a SQL database; you may provide **CSV files representing the tables** ready for ingestion.
- Maintain referential integrity (e.g., `product_id` in `sales` must exist in `products`).

Part 2 – Weather Data Integration & Analysis

Objective

1. Fetch historical weather data for the relevant locations using Open-Meteo API.
2. Draft a basic analysis connecting **sales patterns to weather conditions**. Examples could include:
    - Impact of temperature on product sales
    - Rainy vs. sunny day sales trends
    - Other correlations you find relevant

Requirements

- Show the steps taken to fetch and integrate weather data.
- Provide a short written summary of your observations and potential insights.
- Visualizations are encouraged but optional.

Submission Instructions

- Submit a compressed file (ZIP) containing:
    - Transformed CSV files representing the database tables
    - Any code used to process the data and fetch weather information
    - A short report or notebook summarizing your weather-sales analysis

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Evaluation Criteria

- Correctness and completeness of the data transformation
- Code quality and readability
- For the weather analysis part, focus on fetching data from the API. Correlation or other analyses are considered bonus points, not a core requirement
- Ability to communicate findings clearly during the presentation session