SDE - 1 (Data Science and Data Analytics) Task 1, Ref. 22A

Task Description:

This assessment evaluates your problem-solving abilities, logical thinking, and quantitative aptitude. At Vodafone, we prioritize providing equal opportunities for individuals regardless of their background or experience. For this task, you may utilize AI tools or internet resources. However, ensure to document your solution process, acknowledging and citing any external research used.

Problem Statement:
There are 193 countries worldwide, each comprising various states, and each state has its capital city. Your objective is to construct a database encompassing all countries, their capital cities, and the states within each country along with their corresponding capital cities.

User Input Options:

1. **A: Countries with Identical First and Last Letters:** List all countries whose names start and end with the same alphabet.

- *Example*: India, Indonesia, Australia, Argentina. Note: India and Indonesia start with 'I' and end with 'a'.

2. **W: States with Identical First and Last Letters:** Display all countries and their states where the state names begin and end with the same alphabet.
    - *Example*: In the USA, "Alabama" and "Alaska" are two states where the state names meet the criteria.
3. **D: Cities with Prime-Length Names:** Provide a list of cities from countries whose city names have a prime number of characters.
    - *Example*: "Paris" (France), "Rome" (Italy), and "Berlin" (Germany) have prime-length city names.
4. **X: Random Operation:** Perform any of the operations A, W, or D randomly.

Output Format:
Deliver your solution in a Notion document with thorough documentation outlining your thought process and accompanying code files.

Evaluation Criteria:

- Database modeling proficiency.
- Data collection, scraping, and ELT (Extract, Load, Transform) skills.
- Algorithmic reasoning and problem-solving prowess.

Memory Limit: 1024 MB

Time Limit for Code Execution: 2 seconds

This assessment aims to gauge your ability to devise effective database models, gather and process data efficiently, and employ algorithmic strategies to solve complex problems. Ensure your solution is structured, well-documented, and meticulously explained in your output files.

PS: Feel free to use a programming language of your choice.