Instructions for Data Science Apprenticeship Challenge

Objective: This challenge aims to assess your SQL proficiency, data analysis skills, and ability to draw insights from data. The challenge is divided into three sections: Initialization, Query Building, and Exploratory Data Analysis.

Please go through `Data Science Apprenticeship CHALLENGE [Pathao Nepal 2024 Fall] - Assignment.pdf` for the detailed task descriptions and expected output of each task.

Section A: Initialization

1. **Sample Data -> Restore (10 Marks)**
    - **Task:** Load the provided `queue_system_sqlite3.db` database file into SQLite Online.
    - **Instructions:**
        - After loading the database, execute the query: `SELECT name FROM sqlite_master WHERE type='table'`.
        - Save the result as an image or screenshot.
    - **Submission:** Provide the screenshot image.
2. **Tables Definition and Their Relation (20 Marks)**
    - **Task:** Explore the database schema and provide the definitions and relationships between the tables.
    - **Instructions:**
        - Describe each table, its columns, data types, and any primary or foreign key relationships.
        - Explain the relationships between tables.
    - **Submission:** Document your findings in a separate file, along with any SQL queries used.

Section B: Query Building

3. **Counter Summary (10 Marks)**
    - **Task:** Write an SQL query to get a summary of counters for any given date, including the total queue called, serving, served, and no-show.
    - **Note:** Use data from "2024-02-14" for the output.
    - **Submission:** Provide the SQL query and the output as an image or screenshot.
4. **Service Summary (10 Marks)**
    - **Task:** Write an SQL query to get a summary of services for any given date, including the total visitors, queued, called, serving, served, and no-show.
    - **Submission:** Provide the SQL query and the output as an image or screenshot.
5. **Service x Counter Summary (10 Marks)**

- **Task:** Write an SQL query to get a detailed summary of counters and services for any given date.
- **Submission:** Provide the SQL query and the output as an image or screenshot.

6. **Agent Summary (15 Marks)**
   - **Task:** Write an SQL query to get a summary of agents for any given date, including the total visitors, queued, called, serving, served, and no-show.
   - **Submission:** Provide the SQL query and the output as an image or screenshot.

Section C: Exploratory Data Analysis (EDA)

7. **Service Efficiency Analysis (25 Marks)**
   - **Objective:** Analyze the efficiency of services provided at different counters using the available data. The analysis should identify patterns and insights related to waiting times, service times, and the volume of customers served.
   - **Task Details:**
     1. **Data Preparation (5 Marks)**
        - Clean and preprocess the data, handling missing values, inconsistencies, or outliers.
     2. **Descriptive Statistics (5 Marks)**
        - Calculate and interpret statistics like mean, median, and standard deviation for key metrics.
     3. **Visualizations (5 Marks)**
        - Create visualizations to show the distribution and trends of key metrics over time.
     4. **Correlation and Insights (10 Marks)**
        - Analyze correlations between variables and provide insights and recommendations based on the findings.
   - **Submission:** Provide the analysis in a Jupyter Notebook or Google Colab file, including the code, visualizations, and interpretations.

General Guidelines:

- **No Use of ChatGPT:** You are expected to complete the challenge independently without using AI-based assistance tools like ChatGPT.
- **Collaboration:** This challenge must be completed individually. Any form of collaboration is strictly prohibited. If any submissions are found to be similar or matching, all parties involved will be disqualified from the selection process.
- **File Submissions:**
  - SQL Queries: Submit all SQL files used for the queries.
  - EDA: Submit the Jupyter Notebook or Google Colab file containing the analysis.
  - Images/Screenshots: Provide clear images or screenshots of the outputs where required.

Note: Your performance in this challenge may lead to further interview rounds. During the interviews, you may be asked to explain your solutions and approach in detail.