

Aviation Industry Queries

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40+ SQL PROJECTS FOR AIRLINES

(WITH SOLUTIONS)

2025



40+

SQL PROJECTS

FOR

AIRLINES

(WITH SOLUTIONS)

2025

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Database Diagram

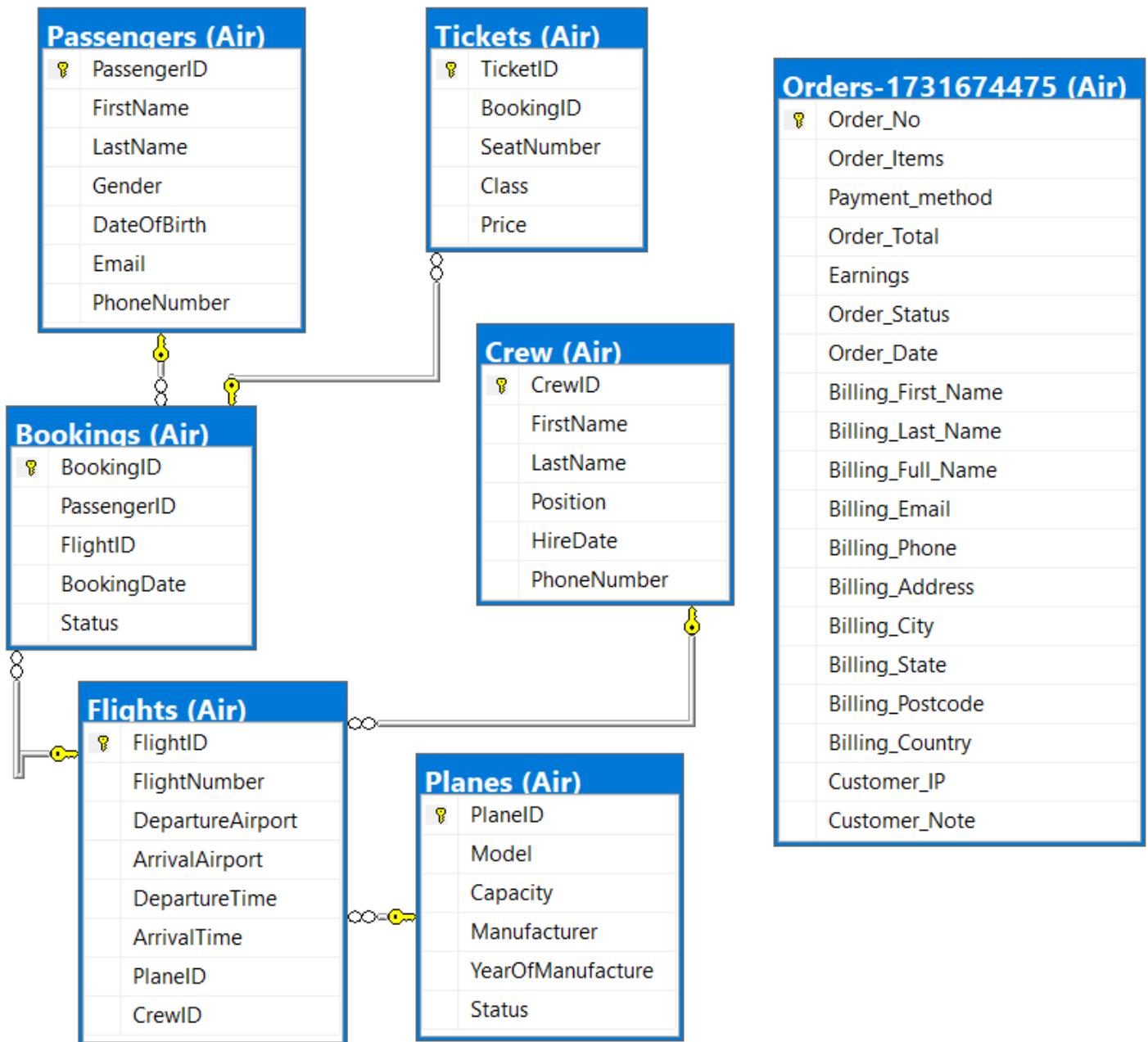


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AfriqIQ.com

About Afriq IQ

AfriqIQ.com is the pioneering platform dedicated to unearthing and amplifying the AI revolution driven by African and diaspora innovators.

AfriqIQ serves as a dynamic directory and hub for over 2000+ startups, prototypes, and beta tools, bridging continental creators Africa and beyond.

Born from a mission to democratise visibility in the AI world, AfriqIQ aggregates public insights, fosters community connections, and spotlights pan-African and Diaspora solutions that tackle real-world challenges like healthcare equity, sustainable agritech, and financial inclusion.

Through partnerships with accelerators, hubs and features such as VC matching, job boards, and ecosystem analytics, the platform empowers users to claim profiles, unlock premium tools, and collaborate across borders.

This ebook is AfriqIQ's invitation to the tech movement. Whether you're a founder seeking exposure, an investor hunting trends, or a researcher mapping the landscape, AfriqIQ equips you to navigate and shape Africa's AI odyssey.

Dive in at AfriqIQ.com and submit your startup for free, explore the directory, and join the network. Africa's AI story is global, collaborative, and unstoppable. Together, we're building it.

Important information

Welcome to "**SQL Projects on Aviation**". This book is designed to be your comprehensive guide to mastering the art of SQL using practical business scenarios. Whether you're a beginner looking to build a strong foundation or an experienced practitioner aiming to sharpen your skills.

SQL (Structured Query Language) is the backbone of managing and manipulating data in modern databases, making it an essential skill for anyone working with data-driven applications.

This book covers the commands used in Data Query language (DQL) in most parts. Other categories of SQL commands namely, Data Manipulation Language (DML), Data Definition Language (DDL) and Data Control Language (DCL) will be covered in a separate book.

Solutions to the problems in this book are given at the end of this book (before the Appendix).

***NOTE:** The commands employed in the "sample" solutions primarily align with Microsoft's SQL Server conventions, although suggestions are provided on how the syntax might be adapted to suit other frequently used SQL platforms such as MySQL, Oracle, PostgreSQL, etc.*

Database used in this book.

The database used in this book is based solely on the aviation business as the title suggests. Access to the database should have already been acquired when the book was downloaded. The Database Diagram given above (after the copyright page) can help in understanding the relationships between the tables.

SQL Server installation and database restoration

In the Appendix, you'll find comprehensive instructions for installing SQL Server 2019 (or later) on Windows 10 and later versions, as well as the step-by-step process on how to restore a database using the Microsoft AdventureWorks database as an example.

Who This Book Is For

This "**SQL Projects on Aviation**" assumes some fundamental knowledge of SQL's basic commands at the least. Nevertheless, it is intended for a wide audience, including beginners, students, educators and database professionals and anyone who uses SQL in their everyday lives and business.

Feedback

We value your feedback and suggestions. If you have any comments, questions, or ideas for improvement, please don't hesitate to reach out on any of the following platforms:

- Website: AfriqlQ.com
- Twitter:
- LinkedIn

Your input will help us enhance future editions of this book.

Thank you for choosing " SQL Projects on Aviation". We hope this book serves as a valuable resource in your journey to become a proficient SQL practitioner.

Happy querying!

Business Scenarios

1. Business Scenario Q1

Passenger Flight Details Lookup

An airline company wants to implement a simple query to allow their customer service agents to quickly retrieve information about all flights for Michelle Taylor. The agents need to know which flight a passenger is booked on, including the flight date, departure time, and the plane they will be flying on. This information helps the agents provide accurate assistance to passengers regarding their travel details.

2. Business Scenario Q2

Booking Confirmation Details

An airline company wants to provide a system where passengers can look up their booking confirmation details, including their seat number, class, flight information, and the price paid. This allows passengers to verify their booking and ensure all details are correct. Get these information for Booking ID B0019.

3. Business Scenario Q3

Crew Schedule Overview

An airline company needs a system for their crew members to quickly check their work schedules. This includes the flights they are assigned to, the departure and arrival times, and the plane they will be operating. This information is crucial for crew members to manage their work shifts efficiently. Get this information for a crew with ID C0123

4. Business Scenario Q4

Flight Occupancy Check

An airline company needs a system to check the occupancy of their flights. This includes knowing how many seats are booked and how many are still available for a particular flight (ID F0897). This information helps the airline manage overbooking, seat allocation, and plan for future demand.

5. Business Scenario Q5

Passenger Contact Information for Upcoming Flights

An airline company needs a system to quickly retrieve the contact information of passengers for upcoming flights. Focus on retrieving the contact information of passengers booked on a specific flight, identified by its flight number, 778. This is crucial for sending notifications about flight changes, delays, or other important information.

6. Business Scenario Q6

Passenger List for a Specific Flight

An airline company needs to retrieve a list of all passengers on a flight 505. This is useful for check-in procedures, boarding, and ensuring all passengers are accounted for.

7. Business Scenario Q7

List of All Planes and Their Assigned Flights

An airline company wants to generate a list of all planes along with the details of their assigned flights. This includes the flight number, departure and arrival times, and the

plane model. This information helps in managing the fleet and scheduling maintenance.

8. Business Scenario Q8

Passenger List for Specific Flight Date

An airline company wants to retrieve a list of all passengers booked on flights departing on 14th May 2022. This is useful for operational planning and ensuring that all passengers are accounted for.

9. Business Scenario Q9

Passenger Information for All Booked Flights

An airline company wants to retrieve a list of all passengers along with their booked flights. This is useful for operational planning and ensuring that all passengers are accounted for.

10. Business Scenario Q10

Monthly Flight Revenue Analysis

An airline company wants to analyse the revenue generated from flights on a monthly basis. This includes calculating the total revenue from ticket sales for each flight, grouping the results by month, and identifying the top-performing flights in terms of revenue. This information is useful for financial analysis, planning, and decision-making.

11. Business Scenario Q11

Crew Utilisation and Assignment Analysis

An airline company wants to analyse the utilisation of their crew members. This includes identifying the number of flights each crew member has been assigned to for the year 2022, the total flight hours logged by each crew member, and ranking the crew members based on their utilisation. This information helps in workforce planning, identifying overworked crew members, and ensuring balanced crew assignments.

12. Business Scenario Q12

Passenger Loyalty Program Analysis

An airline company wants to analyse the loyalty of their passengers by tracking the number of flights taken by each passenger for the year 2021 and calculating the total amount spent on tickets. This helps in identifying the most frequent flyers and rewarding them with loyalty points or other benefits.

13. Business Scenario Q13

Revenue Analysis by Flight Class

An airline company wants to analyse the revenue generated from ticket sales for each flight class (e.g., Economy, Business, First Class). This includes calculating the total revenue per class, the number of tickets sold per class, and identifying the most profitable class. This information helps in pricing strategy and capacity planning.

14. Business Scenario Q14

Passenger Demographic Analysis for Marketing

An airline company wants to analyse the demographics of their passengers to tailor marketing campaigns and improve customer service. This includes understanding the gender distribution, age distribution, and contact information of passengers who have travelled in the year 2021. This information helps in targeting specific passenger segments with personalized offers and services.

15. Business Scenario Q15

Revenue and Seat Utilisation Analysis for Each Flight

An airline company wants to analyse the revenue and seat utilization for each flight. This includes calculating the total revenue generated from ticket sales, the number of seats booked, and the percentage of seat utilization for each flight. This information helps in understanding the financial performance and occupancy rate of different flights, informing decisions on pricing, scheduling, and capacity planning.

16. Business Scenario Q16

Frequent Flyer Program Analysis (Simplified)

An airline company wants to analyse the activity of their frequent flyer program. This includes identifying passengers who have taken the most flights and determining their eligibility for different tiers (Platinum for total flights of 10 and above; Gold for total flights of 5 and above, Silver for total flights of 2 and above and Bronze for anything else) of the frequent flyer program based on the number of flights taken in the year 2021. This information helps in rewarding loyal customers and promoting the frequent flyer program.

17. Business Scenario Q17

Monthly Revenue and Flight Count per Airport

An airline company wants to analyse the monthly revenue and number of flights for each airport. This includes calculating the total revenue generated from ticket sales for flights departing from each airport and the number of flights departing each month. This information helps in understanding the performance of different airports and informs decisions on resource allocation and scheduling.

18. Business Scenario Q18

Passenger Booking Trends Analysis

An airline company wants to analyse passenger booking trends to understand the peak booking periods and the average booking lead time. This includes calculating the number of bookings made each month, the average time between booking and flight departure, and identifying patterns in booking behaviour. This information helps in optimising marketing strategies and managing operational efficiency.

Additional Queries for Comprehensive Analysis:

- **Daily Booking Trends:**
- Booking Trends by Passenger Segment (e.g., Business vs. Economy Class)

19. Business Scenario Q19

Analysis of Flight Delays and Their Impact on Revenue

An airline company wants to analyse the impact of flight delays on revenue. This includes identifying the average delay time for each flight, the total revenue lost due to

delays, and the number of delayed flights. This information helps in understanding the financial impact of delays and improving operational efficiency.

Additional Queries for Comprehensive Analysis:

- **Monthly Impact of Delays:**
- Impact of Delays by Airport:

20. Business Scenario Q20

Top Revenue-Generating Flights

An airline company wants to identify the top revenue-generating flights. This includes calculating the total revenue generated from ticket sales for each flight and ranking the flights based on their revenue. This information helps in identifying the most profitable routes and optimising flight schedules.

Additional Queries for Comprehensive Analysis:

- **Top Revenue-Generating Flights by Month:**
- Top Revenue-Generating Flights by Airport:

21. Business Scenario Q21

Frequent Flyer Analysis by Total Flights and Total Spend

An airline company wants to identify their most frequent flyers by analysing both the number of flights taken and the total amount spent on tickets. This information is useful for designing loyalty programs and targeting top customers with special offers and benefits.

22. Business Scenario Q22

Analysis of Plane Utilisation and Efficiency

An airline company wants to analyse the utilisation and efficiency of their planes. This includes calculating the total number of flights each plane has completed, the total hours flown, and identifying the planes with the highest and lowest utilisation rates (i.e. if the number of flights is less than zero then that is considered underutilised and when greater than 3 then that is overutilised and anything else is well-utilised). This information helps in optimising the fleet management and scheduling.

Additional Queries for Comprehensive Analysis:

- **Plane Utilisation by Month:**
- Top 5 Most Utilised Planes:
- Under-utilised Planes:

23. Business Scenario Q23

Passenger Demographics and Travel Patterns

An airline company wants to analyse the demographics and travel patterns of their passengers. This includes identifying the gender distribution, age distribution, and the most popular travel routes. This information helps in tailoring marketing campaigns and improving customer service by understanding the passenger base better.

24. Business Scenario Q24

Age Distribution of Passengers

You are a data analyst for an airline company. The business wants to understand the age distribution of passengers who have confirmed bookings to tailor marketing campaigns by age group. Age should be calculated based on the current date and grouped into these bands: 0-17, 18-24, 25-34, 35-44, 45-54, 55-64, and 65+. Retrieve the age group and the count of confirmed passengers in each group

25. Business Scenario Q25

Most Popular Travel Routes

You are a data analyst for an airline company. The business wants to identify the most popular travel routes based on confirmed bookings to optimise flight scheduling. Write a query to retrieve the departure airport, arrival airport, and the count of confirmed flights for each route.

26. Business Scenario Q26

Booking Status Analysis

An airline company wants to analyse the booking statuses over a specific period to understand trends and identify potential issues with booking confirmations and cancellations. This includes calculating the total number of bookings, confirmed bookings, pending and cancelled bookings for each month. This information helps in improving booking management and customer service.

27. Business Scenario Q27

Daily Booking Status Analysis

You are a data analyst for an airline company. The business wants to analyse daily booking status to monitor performance and identify trends. Write a query to retrieve the booking day, total bookings, confirmed bookings, cancelled bookings, and pending bookings for each day, ordered by booking day.

28. Business Scenario Q28

Booking Status Breakdown by Status Type

You are a data analyst for an airline company. The business wants to analyse the breakdown of booking statuses to assess overall booking health. Write a query to retrieve each status type and the total number of bookings for that status, ordered by the total bookings.

29. Business Scenario Q29

Weekly Booking Status Analysis

You are a data analyst for an airline company. The business wants to analyse weekly booking status to monitor performance and identify trends. Write a query to retrieve the year, week, total bookings, confirmed bookings, cancelled bookings, and pending bookings for each week.

30. Business Scenario Q30

Booking Volume Trends Analysis

An airline company wants to analyse the volume of bookings over time to understand trends in passenger demand. This includes identifying peak booking periods, monthly booking trends, and the overall growth or decline in booking volume. This information helps in planning marketing campaigns, adjusting flight schedules, and optimising resource allocation.

31. Business Scenario Q31

Daily Booking Volume Analysis

You are a data analyst for an airline company. The business wants to analyse daily booking volume to monitor performance and identify trends. Write a query to retrieve the booking day and total bookings for each day.

32. Business Scenario Q32

Weekly Booking Volume Analysis

You are a data analyst for an airline company. The business wants to analyse weekly booking volume to monitor performance and identify trends. Write a query to retrieve the year, week, and total bookings for each week.

33. Business Scenario Q33

Annual Booking Volume Analysis

The You are a data analyst for an airline company. The business wants to analyse annual booking volume to monitor performance and identify trends. Write a query to retrieve the year and total bookings for each year.

34. Business Scenario Q34

Fleet Composition and Status Analysis

An airline company wants to analyse the composition and status of their fleet. This includes identifying the distribution of planes by manufacturer, the age of the planes, and the current operational status of each plane. This information helps in making decisions about fleet upgrades, maintenance schedules, and retirement of older planes.

35. Business Scenario Q35

Current Operational Status of Planes

You are a data analyst for an airline company. The business wants to analyse the current operational status of planes to monitor fleet availability. Write a query to retrieve each status and the total number of planes for that status.

36. Business Scenario Q36

Details of Planes Manufactured by a Specific Manufacturer

You are a data analyst for an airline company. The business wants to retrieve details of planes manufactured by a specific manufacturer, such as 'Boeing', to assess the fleet composition. Write a query to select the plane ID, model, capacity, year of manufacture, and status for planes made by Boeing.

37. Business Scenario Q37

Capacity Distribution of Planes

You are a data analyst for an airline company. The business wants to analyse the capacity distribution of planes to assess fleet efficiency. Write a query to retrieve the capacity group (i.e. Capacity less than or equal to 100, between 101 and 200, between 201 and 300 and greater than 300) and total planes for each group.

38. Business Scenario Q38

Age distribution of Planes

You are a data analyst for an airline company. The business wants to analyse the age distribution of planes to assess fleet maintenance needs. Age should be calculated based on the current date and grouped into these bands: 0-5 years, 6-10 years, 11-20 years, and 20+. Write a query to retrieve the age group and total planes for each group.

39. Business Scenario Q39

Revenue Analysis by Ticket Class

An airline company wants to analyse the revenue generated from ticket sales by different classes (e.g., Economy, Business, First Class). This includes calculating the total revenue for each class, the average price per ticket, and the number of tickets sold per class. This information helps in understanding the financial performance of different classes and optimising pricing strategies.

40. Business Scenario Q40

Revenue Analysis by Ticket Class and Month

You are a data analyst for an airline company. The business wants to analyse revenue by ticket class and month to optimise pricing strategies and identify seasonal trends. Write a query to retrieve the class, year, month, total tickets sold, total revenue, and average ticket price for each combination.

41. Business Scenario Q41

Top 5 Most Expensive Tickets Sold

You are a data analyst for an airline company. The business wants to identify the top 5 most expensive tickets sold to review premium offerings. Write a query to retrieve the ticket ID, class, and price for the 5 most expensive tickets.

42. Business Scenario Q42

Revenue Distribution by Price Range

You As the data analyst for an Airline, you're reviewing ticket sales data to understand how revenue is performing across different price segments. This will help identify high-performing price ranges and guide future dynamic pricing adjustments. Craft a SQL query that categorises tickets into price ranges (0-100, 101-200, 201-300, 301-400, and 400+) and calculates the total tickets sold and total revenue for each range.