



AEROSPACE



INTRODUCTION



AIRLINE OPERATIONS AND PERFORMANCE ANALYSIS (2023-2025)

This project presents an in-depth analysis of airline operations and performance between the years 2023 and 2025 using structured SQL data. The dataset captures key parameters such as airline names, flight costs, customer ratings, travel time, distance covered, and routes (source to destination).

OBJECTIVE

- The objective of this analysis is to help understand how airlines perform over time, identify the most cost-effective and customer-friendly routes, and support data-driven decisions in airline operations and planning.
- By analyzing flight-level data—including ticket costs, travel duration, customer ratings, and distance covered—the project aims to:-
 - Track performance trends.
 - Identify the most cost-effective routes.
 - Evaluate customer satisfaction by examining rating patterns across different carriers.





QUESTIONS MODE

EASY – QUERIES INCLUDE: WHERE, HAVING, GROUP BY, ORDER BY, LIMIT, DESC.

- . MODERATE – QUERIES INCLUDE: SUBQUERIES, GROUP BY, ORDER BY ETC
- . ADVANCE – QUERIES INCLUDE: WINDOWS, CTE.

AIRLINE_DATABASE

Airlines_Data
Year
Airlines
Cost_in_rupees
Ratings_on_5
Time_in_hours
Distance_in_Kms
Source
Destination



Easy_Level

1) Unique Airline Taken?

> Input

```
SELECT DISTINCT
    airlines
FROM
    AirlinesData;
```

> Output

	airlines
▶	KLM
	Emirates
	United
	Oman Air
	Sri Lankan Airlines
	Malaysian Airlines





EASY_LEVEL

2) Which year did Passenger visit maximum source cities?

> Input

```
SELECT  
    Year, COUNT(source) AS Count_source  
FROM  
    AirlinesData  
GROUP BY Year  
ORDER BY Count_source DESC;
```

> Output

	Year	Count_source
▶	2024	35
	2023	16
	2025	7

Easy_Level

3) WHICH AIRLINES HAVE SPENT MOST MONEY?



> Input

```
SELECT
    Airlines, SUM(Cost_in_rupees) AS Total_Money_spent
FROM
    AirlinesData
GROUP BY Airlines
ORDER BY Total Money spent DESC;
```



> Output

	Airlines	Total_Money_spent
▶	KLM	155000
	Avianca	124000
	Emirates	95000
	Air India	90000
	Air France	84000
	Oman Air	68000

Result 45 ×

Moderate_Level



4) YOY which had higher % increase in number of trips?

> Input

```
with cte1 as
  (select Year, count(*) as Number_of_flights from AirlinesData
   group by Year)
  select year, Number_of_flights, lag(Number_of_flights) over (order by year) as Previous_year_flights,
         round((Number_of_flights - (lag(Number_of_flights) over (order by year))) 
                / (lag(Number_of_flights) over (order by year))),2
         as YOY_change
  from cte1;
```

> Output

	year	Number_of_flights	Previous_year_flights	YOY_change
▶	2023	16	NULL	NULL
	2024	35	16	1.19
	2025	7	35	-0.80

Moderate_Level

5) Maximum distance and trips covered in which airline using rank?

> Input

```
with Cte1 as
(Select Airlines, count(*) as Total_trips, sum(Distance_in_kms)
as Sum_distance from AirlinesData
group by Airlines)
select airlines, Total_trips,
rank() over (order by Total_trips desc)as Airline1 from cte1;
```

> Output

	airlines	Total_trips	Airline1
▶	Ryan Air	8	1
	Oman Air	5	2
	Indigo	5	2
	Malaysian Airlines	4	4
	Etihad	4	4
	British Airways	4	4



Moderate_level

6) Identify the Airline with the Best Average Rating Per Kilometer in 2025?



> Input

```
SELECT Airlines,
       ROUND(AVG(Rating_on_5/ Distance_in_Kms), 2)
     AS Avg_Rating_Per_Km
  FROM AirlinesData
 WHERE Year = 2025
 GROUP BY Airlines
 ORDER BY Avg_Rating_Per_Km DESC
 LIMIT 1;
```

> Output

	Airlines	Avg_Rating_Per_Km
▶	Indigo	0.01



HARD_LEVEL

7) Detect Price Inefficiency by Comparing Cost per Hour?

> Input

```
SELECT Source, Destination,  
       ROUND(AVG(Cost_in_rupees/ Time_in_hours), 2)  
             AS Avg_Cost_Per_Hour  
FROM AirlinesData  
WHERE Time_in_hours > 0  
GROUP BY Source, Destination  
ORDER BY Avg_Cost_Per_Hour DESC  
LIMIT 1;
```

> Output

	Source	Destination	Avg_Cost_Per_Hour
▶	Amsterdam	Dubai	8285.71

Hard_Level

8) FIND THE MOST COST-EFFECTIVE AIRLINE WITH HIGHEST DISTANCE PER RUPEE?



> Input

```
SELECT Airlines,  
       ROUND(AVG(Distance_in_Kms/Cost_in_rupees), 2)  
             AS High_Dis_Per_Hour  
FROM AirlinesData  
GROUP BY Airlines  
ORDER BY High_Dis_Per_Hour DESC  
LIMIT 1;
```



> Output

	Airlines	High_Dis_Per_Hour
▶	British Airways	0.52

Hard_Level

9] Ranking Routes by Popularity and Cost Efficiency?

> Input



```
SELECT Source, Destination,
       COUNT(*) AS Flights_Count,
       ROUND(AVG(Cost_in_rupees / Distance_in_Kms), 2)
             AS Avg_Cost_Per_Km
FROM AirlinesData
GROUP BY Source, Destination
ORDER BY Flights_Count DESC, Avg_Cost_Per_Km ASC
LIMIT 5;
```

> Output

	Source	Destination	Flights_Count	Avg_Cost_Per_Km
▶	Chennai	Paris	3	3.67
	Paris	Chennai	3	3.67
	Muscat	Chennai	2	5.60
	Chennai	Bengaluru	2	8.13
	Mexico City	Houston	2	12.92

Hard_Level

10) For each airline, find the flight with the maximum cost per kilometer in each year.
Return the year, airline, source, destination, cost, distance, and cost per km.



> Input

```
SELECT Year, Airlines, Source, Destination,
       Cost_in_rupees, Distance_in_Kms,
       ROUND(Cost_in_rupees/Distance_in_Kms, 2) AS Cost_Per_Km
FROM (
    SELECT *,
           RANK() OVER (PARTITION BY Year, Airlines
                         ORDER BY Cost_in_rupees/ Distance_in_Kms DESC)
    AS rank_per_airline_year
  FROM AirlinesData
) AS ranked_data
WHERE rank_per_airline_year = 1;
```

> Output

	Year	Airlines	Source	Destination	Cost_in_rupees	Distance_in_Kms	Cost_Per_Km
▶	2023	Air France	Bengaluru	Paris	27000	7800	3.46
	2023	Avianca	Lima	Bogota	15000	1900	7.89
	2023	Easy Jet	Berlin	Mallorca	6000	1600	3.75
	2023	Emirates	Chennai	Dubai	18000	2950	6.10
	2023	KLM	Amsterdam	Dubai	58000	6700	8.66
	2023	Latam	Bogota	Lima	17000	1900	8.95



GET IN TOUCH



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THANK YOU