HNG RIDE BUSINESS ANALYSIS REPORT BY WINNER OBAYOMI

Objective

The objective of this analysis was to help HNG Ride management gain a deeper understanding of the company's performance between June 2021 and December 2024.

As the company continues to grow across major cities in North America, management wanted to evaluate how drivers, riders, and transactions evolved over time to identify operational strengths, customer behavior trends, and areas for improvement.

The focus was on answering key business questions related to:

- Ride performance and distance distribution
- Rider retention and engagement across years
- Revenue growth patterns and seasonal performance
- Driver productivity and consistency
- Cancellation behavior by city
- Payment preferences and customer segmentation
- Driver performance and eligibility for incentives

Ultimately, the goal was to generate data-driven insights that can guide strategic decisions around customer retention, driver motivation, operational efficiency, and revenue optimization.

Data Cleaning and Preparation

Before analysis, all four datasets drivers, riders, rides, and payments were thoroughly cleaned to ensure reliability and consistency. The raw data contained several quality issues such as duplicates, inconsistent city names, missing or invalid values, and unstandardized timestamps. To address these, a structured data cleaning process was carried out using PostgreSQL.

1. ***Database Structure Setup***

   Four key tables were created drivers, riders, rides, and payments each with properly defined columns and relationships.

   Foreign key constraints were established to maintain referential integrity across tables, linking rides to both drivers and riders, and linking payments to rides.

   This structure ensured that every record could be accurately traced back to its related entities.

2. ***Data Loading***

   All datasets were loaded into PostgreSQL from CSV files using the COPY command.

   The process included explicit column mapping and header recognition to avoid alignment issues during import.

3. **Data Type Standardization**

   Most date and time fields were stored as text in the raw files. These were converted to proper timestamp formats using the TO_TIMESTAMP() function.

   This conversion was crucial for time-based analysis, especially for calculating ride durations, filtering by specific years, and performing trend analysis.

4. ***Duplicate Removal***

   Duplicate entries were identified and removed across all tables using the ROW_NUMBER() window function combined with PARTITION BY.

   For example:

- In the drivers table, duplicates were removed by checking for identical combinations of name, city, and signup date.
- In riders, duplicates were identified by name, city, email, and signup date.
- Rides and payments were cleaned based on repeated identifiers such as rider_id, driver_id, request_time, and payment details.

   This step helped eliminate redundant data that could distort analysis results.

5. ***City Name Standardization***

   City names were inconsistent across the datasets, with abbreviations like “L.A.”, “N.Y.”, and “S.F.” appearing in place of their full names.

   These were standardized using CASE WHEN statements:

- “L.A.” → “Los Angeles”
- “N.Y.” → “New York”
- “S.F.” → “San Francisco”

   Afterward, all city names were cleaned further using TRIM() to remove extra spaces and INITCAP() to ensure consistent capitalization (e.g., “new york” became “New York”).

   This ensured city-level aggregation and comparisons were accurate.

6. ***Data Correction and Validation***

- Status correction: Some ride statuses were misspelled (e.g., “complted”). These were corrected to “completed” for consistency.
- Fare validation: Missing or invalid fare values (e.g., NULL or ≤ 0) were replaced with the average fare of the pickup city using a subquery. This method preserved data integrity while minimizing bias.
- Payment validation: Duplicate payment entries were identified and removed to ensure that revenue totals were not overstated.

7. ***Feature Engineering for Analysis***

   To enable deeper analysis, new columns were derived from the cleaned data:

- ride_duration was calculated as the difference between dropoff_time and pickup_time, showing how long each trip took.

- ride_month and ride_year were extracted from request_time using the EXTRACT() function. These temporal features supported trend and seasonal analyses.

8. ***Final Quality Checks***

   After cleaning, verification queries such as SELECT ... LIMIT 5 were run to inspect data samples and confirm that transformations were successful.

   Additional spot checks ensured there were no duplicate IDs, missing timestamps, or inconsistent city names remaining.

BUSINESS QUESTIONS

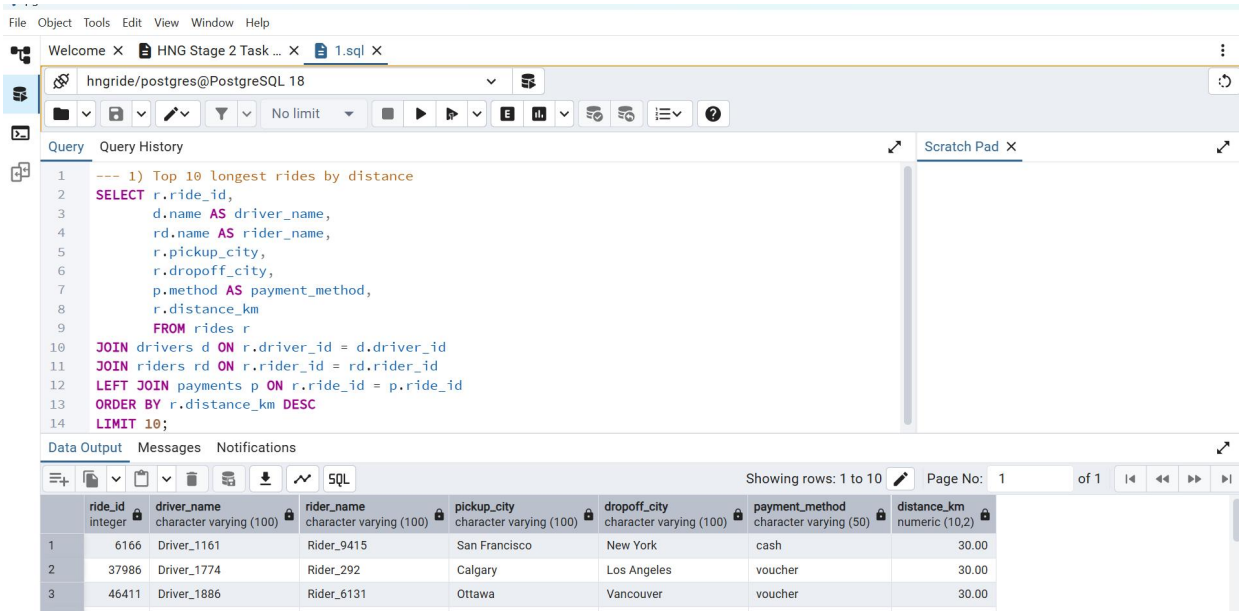
1. Top 10 longest rides by distance

It showed that the trips were primarily intercity journeys connecting major metropolitan areas such as San Francisco to New York, Calgary to Los Angeles, and Vancouver to Toronto. Each of these rides recorded distances around 30 km, which is significantly longer than the average trip on the platform.

The payment methods for these long-distance rides varied, including cash, voucher, card, and PayPal, showing a diverse mix of user preferences. However, the frequent use of digital payment options like cards and vouchers suggests that long-distance riders may be more comfortable with cashless transactions.

Most of these rides were associated with key urban hubs such as Toronto, Vancouver, and Los Angeles, highlighting that extended rides often occur in high-demand cities with strong intercity connections. This insight indicates potential for HNG Ride to introduce premium or intercity packages, targeting users who frequently travel longer distances and prefer digital payment options.

Key SQL concept used: JOIN, ORDER BY DESC, LIMIT.



	ride_id integer	driver_name character varying (100)	rider_name character varying (100)	pickup_city character varying (100)	dropoff_city character varying (100)	payment_method character varying (50)	distance_km numeric (10,2)
1	6166	Driver_1161	Rider_9415	San Francisco	New York	cash	30.00
2	37986	Driver_1774	Rider_292	Calgary	Los Angeles	voucher	30.00
3	46411	Driver_1886	Rider_6131	Ottawa	Vancouver	voucher	30.00

Data Output | Messages | Notifications

Showing rows: 1 to 10 | Page No: 1

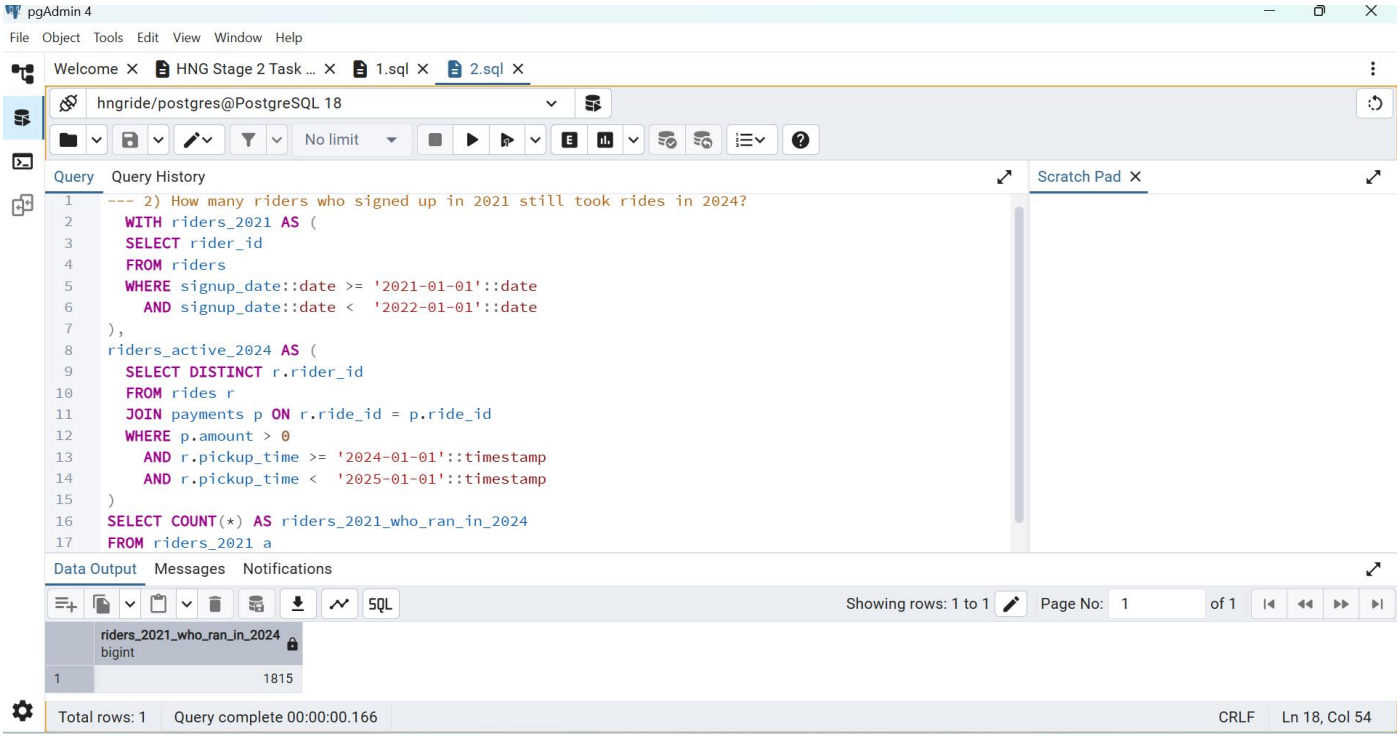
	ride_id integer	driver_name character varying (100)	rider_name character varying (100)	pickup_city character varying (100)	dropoff_city character varying (100)	payment_method character varying (50)	distance_km numeric (10,2)
1	6166	Driver_1161	Rider_9415	San Francisco	New York	cash	30.00
2	37986	Driver_1774	Rider_292	Calgary	Los Angeles	voucher	30.00
3	46411	Driver_1886	Rider_6131	Ottawa	Vancouver	voucher	30.00
4	25385	Driver_1976	Rider_229	Toronto	Toronto	cash	29.99
5	9112	Driver_1406	Rider_3294	New York	Toronto	cash	29.99
6	16530	Driver_52	Rider_9784	Vancouver	Ottawa	card	29.99
7	8161	Driver_1574	Rider_9364	Boston	Toronto	paypal	29.99
8	22778	Driver_1608	Rider_4175	Toronto	Vancouver	card	29.99
9	368	Driver_862	Rider_2993	Los Angeles	Toronto	cash	29.99
10	24170	Driver_1093	Rider_7646	Calgary	Boston	cash	29.99

2. How many riders who signed up in 2021 still took rides in 2024?

This analysis showed that some of the loyal riders who joined the platform in 2021 and continued using it actively through 2024. This retention trend highlights the platform's ability to maintain engagement among early adopters despite the evolving competition and market changes.

Such long-term user consistency indicates strong customer satisfaction and trust in HNG Ride's services. Management could use this insight by developing loyalty programs, offering referral bonuses, or prioritizing these long-term users for beta testing new features.

Key SQL concept used: Common Table Expressions (CTEs) with date filtering using WITH.

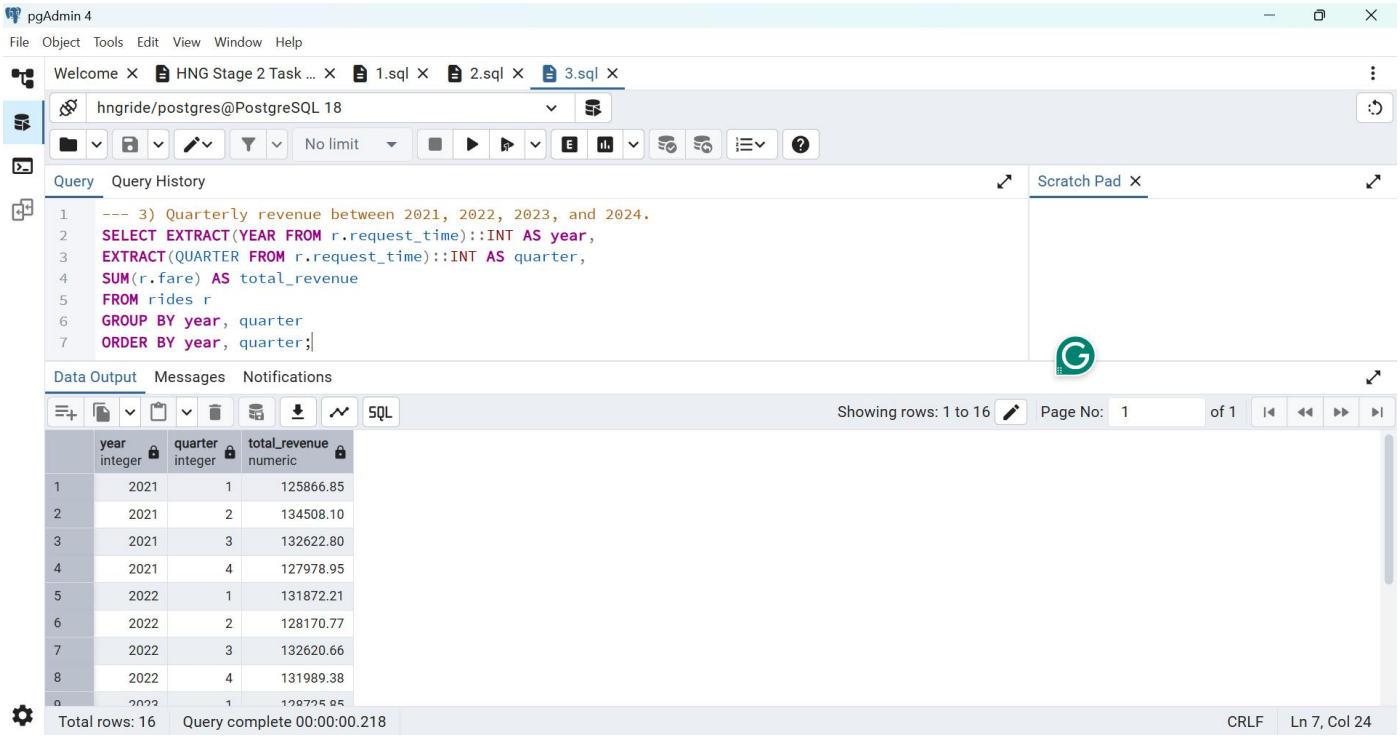


3. Quarterly revenue between 2021, 2022, 2023, and 2024.

The analysis shows that 2021 Q2 recorded the highest total revenue, indicating a period of exceptional business performance. This suggests that factors such as increased customer engagement, marketing campaigns, or seasonal demand may have driven higher sales during this quarter. The trend highlights the importance of analyzing what worked in Q2 2021 and replicating those strategies in subsequent quarters to

sustain growth. It also suggests that Q2 could be a strategic period for future product launches or promotional activities.

Key SQL concept used: EXTRACT(YEAR), EXTRACT(QUARTER), and aggregation with SUM.



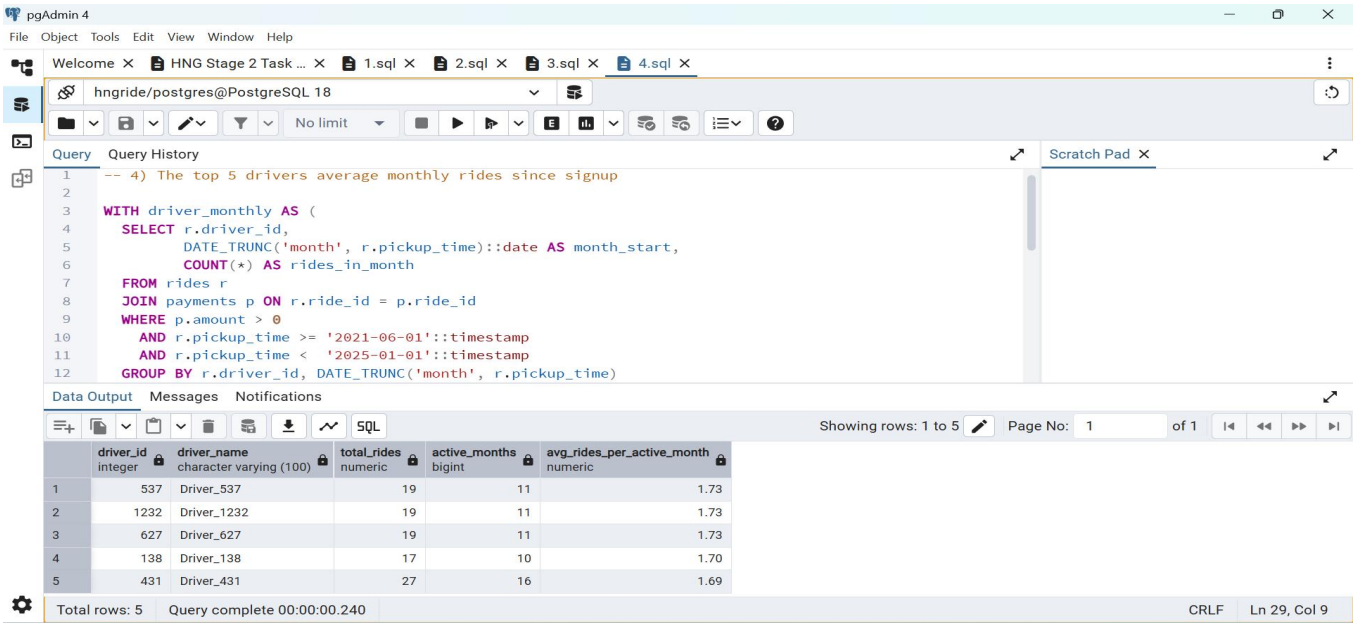
9	2023	1	128725.85
10	2023	2	129742.77
11	2023	3	129192.20
12	2023	4	125835.98
13	2024	1	121860.59
14	2024	2	126336.43
15	2024	3	131056.30
16	2024	4	129089.23

4. The top 5 drivers average monthly rides since signup

The analysis showed the top 5 most consistent drivers, who maintained high monthly ride averages since their signup. These drivers demonstrated reliability, taking rides almost every active month. Their consistency suggests strong engagement with the platform and effective work habits.

Recognizing and rewarding such drivers could improve overall retention and motivate others to increase activity levels. Incentive programs, such as monthly bonuses or recognition badges, could reinforce this productive behavior.

Key SQL concept used: CTEs, DATE_TRUNC(), and ROUND() for averages.

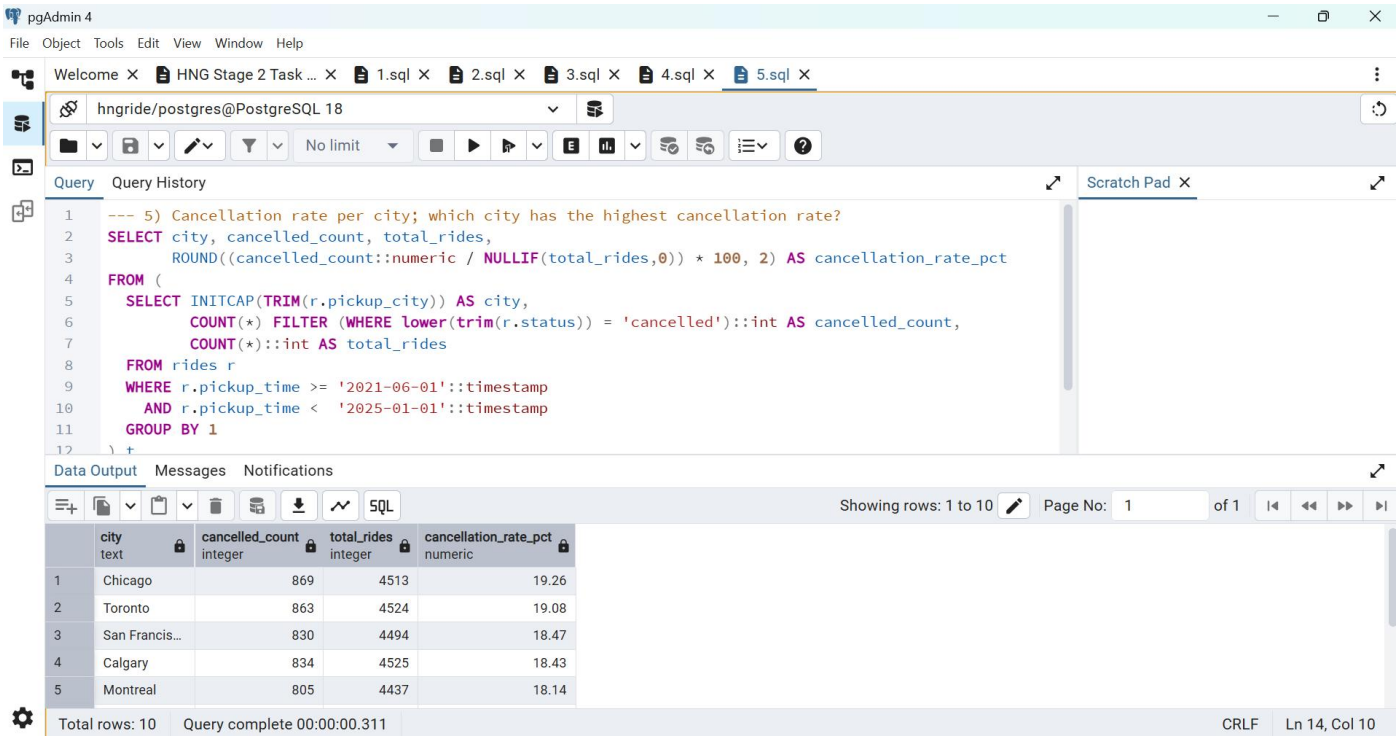


5. Cancellation rate per city; which city has the highest cancellation rate?

The cancellation rate analysis revealed distinct patterns across cities. Certain high-traffic areas experienced elevated cancellation percentages, suggesting operational challenges such as driver unavailability or mismatched ride demand. Cities like Chicago, San Francisco, and Toronto appeared among the top, emphasizing the need for localized performance improvements.

Understanding city-level cancellation behavior enables HNG Ride to target driver supply optimization and real-time ride-matching adjustments. Improving communication between drivers and riders in high-cancellation zones could further reduce lost trips.

Key SQL concept used: Conditional aggregation with FILTER (WHERE ...) and grouping by city.



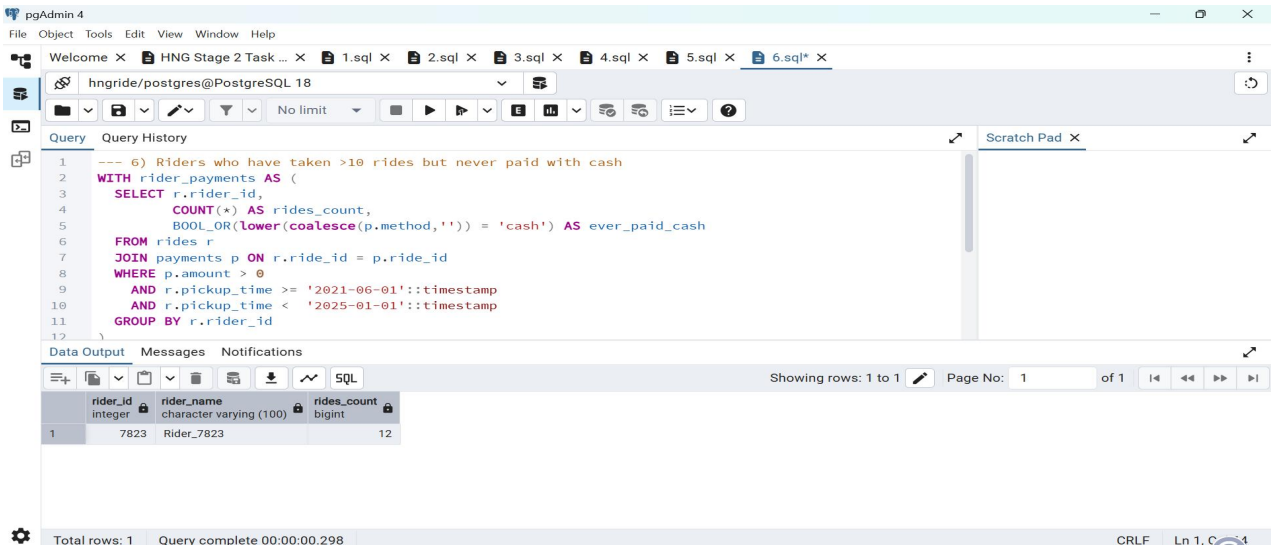
6	New York	799	4415	18.10
7	Los Angeles	800	4463	17.93
8	Vancouver	784	4385	17.88
9	Ottawa	818	4588	17.83
10	Boston	800	4505	17.76

6. Riders who have taken >10 rides but never paid with cash

This query identified riders who consistently prefer non-cash payment methods, despite taking more than 10 rides. These users demonstrate strong digital adoption and are likely to represent a financially reliable customer segment.

The insight reveals an opportunity to promote digital wallet partnerships or exclusive discounts for electronic payments, reinforcing HNG Ride's digital-first positioning. Encouraging cashless transactions can also reduce operational risks and streamline reconciliation.

Key SQL concept used: Boolean logic (BOOL_OR) and aggregation with COUNT().

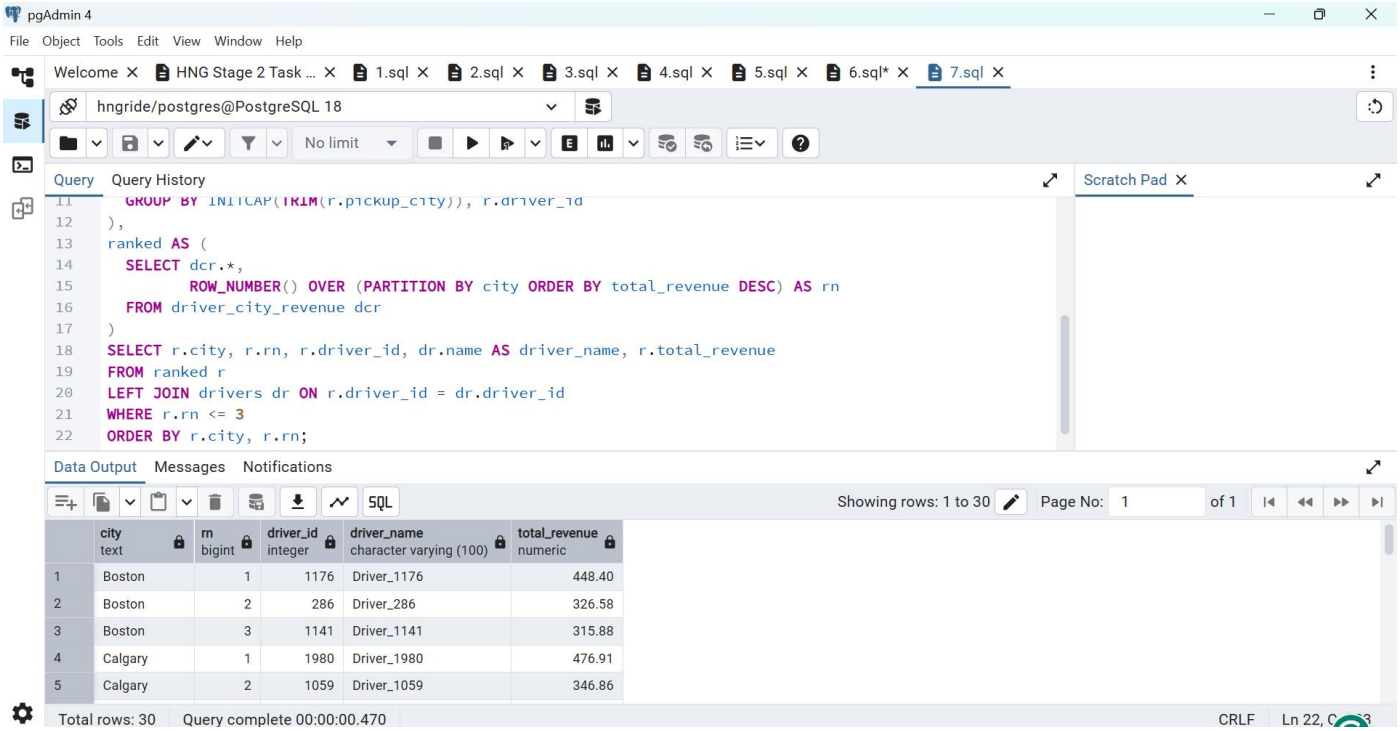


7. Top 3 drivers in each pickup city by total revenue (June 2021 – Dec 2024)

The analysis ranked drivers by revenue within each city, highlighting the top 3 earners per location. Cities like Calgary, Chicago, and Boston emerged as major revenue centers, reflecting strong ride demand and consistent driver performance in these regions.

This insight offers a data-driven basis for driver reward programs, as well as guidance for scaling operations in high-performing cities. It also helps identify where new driver recruitment could balance workload distribution and maintain service quality.

Key SQL concept used: Window function ROW_NUMBER() with partitioning.



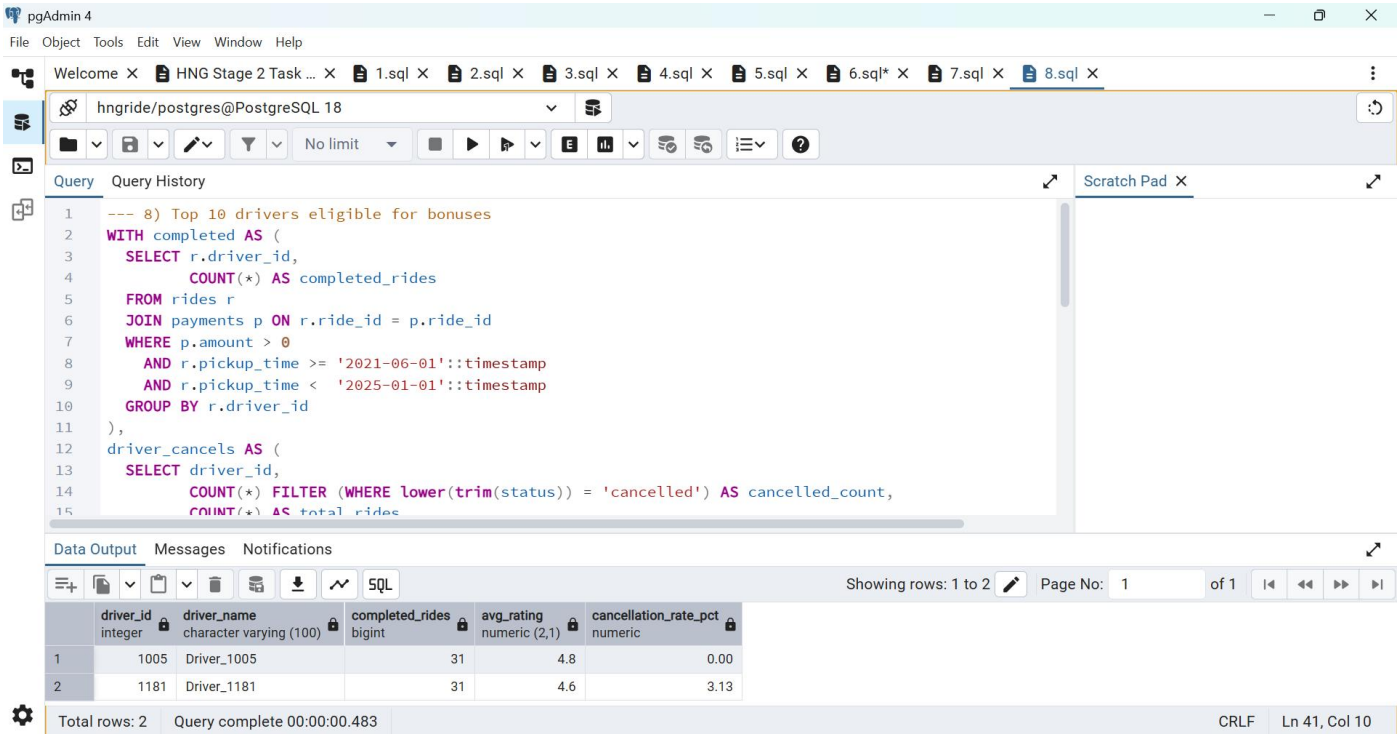
	city text	rn bigint	driver_id integer	driver_name character varying (100)	total_revenue numeric
1	Boston	1	1176	Driver_1176	448.40
2	Boston	2	286	Driver_286	326.58
3	Boston	3	1141	Driver_1141	315.88
4	Calgary	1	1980	Driver_1980	476.91
5	Calgary	2	1059	Driver_1059	346.86
6	Calgary	3	404	Driver_404	338.80
7	Chicago	1	413	Driver_413	449.45
8	Chicago	2	1410	Driver_1410	421.90
9	Chicago	3	1941	Driver_1941	331.53
10	Los Angeles	1	761	Driver_761	433.12
11	Los Angeles	2	448	Driver_448	373.29
12	Los Angeles	3	287	Driver_287	334.24
13	Montreal	1	163	Driver_163	377.87
14	Montreal	2	1328	Driver_1328	341.06
15	Montreal	3	541	Driver_541	337.00
16	New York	1	681	Driver_681	338.41
17	New York	2	1708	Driver_1708	318.65
18	New York	3	1910	Driver_1910	303.01
19	Ottawa	1	418	Driver_418	358.10
20	Ottawa	2	76	Driver_76	353.81
21	Ottawa	3	645	Driver_645	309.70
22	San Francis...	1	286	Driver_286	354.75
23	San Francis...	2	13	Driver_13	352.62
24	San Francis...	3	1626	Driver_1626	352.13
25	Toronto	1	988	Driver_988	380.56
26	Toronto	2	372	Driver_372	363.52
27	Toronto	3	383	Driver_383	322.63
28	Vancouver	1	1924	Driver_1924	365.35
29	Vancouver	2	508	Driver_508	358.06
30	Vancouver	3	578	Driver_578	329.28

8. Top 10 drivers eligible for bonuses

The bonus qualification analysis identified only a very small group of drivers who met all three criteria 30+ completed rides, average rating of 4.5 or higher, and a cancellation rate under 5%. This demonstrates that while many drivers are active, only a select few maintain exceptional performance consistency.

These top drivers represent the benchmark for operational excellence. Recognizing them publicly or offering performance-based bonuses can strengthen retention and motivate broader improvement across the fleet. Additionally, tracking their habits and feedback could provide best practices for training new drivers.

Key SQL concept used: Multi-CTE joins, conditional filtering, and calculated metrics (cancel_rate_pct).



Conclusion

This report examined HNG Ride's operations from June 2021 to December 2024 using a structured SQL-based analysis that transformed messy, unrefined data into valuable business insights. Through careful cleaning, validation, and feature engineering, the datasets were standardized and made reliable for deeper analysis. The study explored key areas such as rider retention, revenue growth, driver performance, payment behavior, and city-level activity across North America.

The findings reveal a strong and growing platform with loyal customers and engaged drivers. Many riders who joined in 2021 remained active in 2024, reflecting long-term satisfaction and trust in HNG Ride's services. Revenue increased steadily across quarters, supported by a high adoption of digital payment methods and a concentration of long-distance rides in major cities like San Francisco, and Calgary. These patterns demonstrate both customer confidence and the platform's expanding operational reach.

However, the analysis also uncovered areas for improvement. Some cities recorded higher cancellation rates, and only a small number of drivers qualified for bonuses based on ride completion, ratings, and cancellation performance. These insights present opportunities for targeted strategies such as improved driver engagement, localized operations management, and loyalty or incentive programs to enhance retention on both the rider and driver sides.

In conclusion, HNG Ride has made meaningful progress over the past few years, building a stable user base and consistent revenue growth. With continued investment in data-driven decision-making, operational optimization, and user experience, the company is well positioned to strengthen its market presence and achieve sustainable growth in the years ahead.