fetch

REWARDS

TAKE HOME ASSESSMENT

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About Myself

A Data Analyst who loves to **SELECT** insights, **JOIN** ideas, and **GROUP BY** logic!

- I specialize in SQL, Python, and data visualization, turning raw data into actionable insights.
- I believe in clean queries and clean data—no NULL insights here!
- My approach? Ask the right questions, optimize for efficiency, and always keep learning.
- Today, I'll walk you through my take-home challenge—the logic, the insights, and my decision-making process.

Let's 'EXECUTE' this presentation!

Challenge Overview

Goal: Analyze transaction, user, and product data to derive insights.

Dataset: Provided datasets included:

- Users (demographics)
- Transactions (purchase data)
- Products (categories & brands)

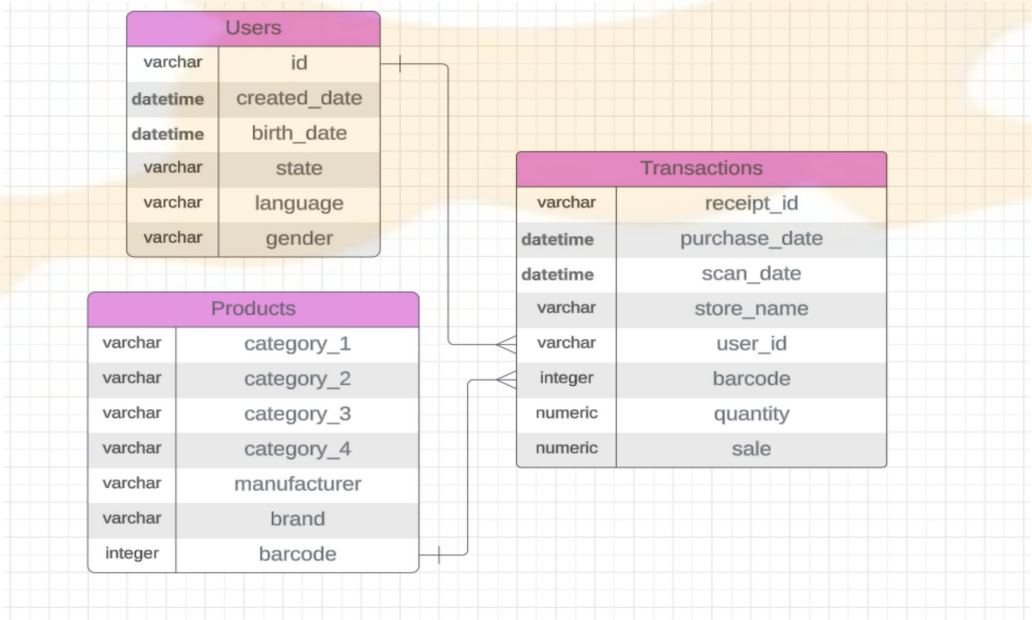
Key Objectives:

- Identify data trends and anomalies.
- Perform exploratory analysis and generate actionable insights.
- Address data quality issues and make business recommendations.

🗂️ Data Overview

Users Data → Contains customer demographics (age, state, gender, language, etc.)
Transactions Data → Records purchase details (receipt ID, store, barcode, quantity, sale amount, etc.)
Products Data → Links barcodes to product categories, brands, and manufacturers.

ERD:



Understanding Fetch’s Business Context

Fetch’s Data Model: Uses receipt transactions to analyze brand performance & user behavior.

Key Business Considerations:

- How do users interact with Fetch? (Purchases, receipt scans)
- Which brands and categories perform best?
- What anomalies or gaps exist in the data?

My Approach:

- Understand business questions before diving into the data.
- Identify missing and inconsistent data.
- Extract meaningful insights for decision-making.

Data Exploration & Cleaning

Data Issues Identified:

- 🚨 **Users Data:** Missing values in birthdate, state, language, gender.
- 🚨 **Transactions Data:** 11.5% missing barcodes, 25% missing final sales.
- 🚨 **Products Data:** 226K records missing brand or manufacturer info.

Cleaning Approach:

- Standardized data types (dates, categories).
- Removed duplicates.
- Retained missing values rather than making assumptions.

Key Assumptions in Data Cleaning & Analysis

📌 Retained missing data unless necessary to remove

📌 Did not impute categorical data (state, gender) due to lack of strong correlations

📌 Removed duplicate transactions based on `receipt_id`

📌`Handled missing sales values by keeping them rather than assuming a value`

📌Defined power users based on transaction activity, not Fetch points

📌 Used **`created_date`** as a proxy for Fetch's user growth

📌 Assumed that decimal values in **`quantity`** were valid

ER Diagram – Data Relationships

Content:

- **Diagram Explanation:**
  - Users linked to transactions via `user_id`.
  - Transactions linked to products via `barcode`.

- **Key Considerations:**
  - How missing barcodes impact product analysis.
  - How user demographics tie into transaction behavior.

Key Insights from Analysis

Top 5 Brands by Receipts Scanned (21+ Users)

- 🍬 **Nerds Candy, Dove, Hershey's, Coca-Cola, Great Value.**
- **Business Impact:** Frequent everyday purchases → Ideal for **loyalty campaigns.**

Top 5 Brands by Sales (Users with Older Accounts)

- 🏪 **CVS, Trident, Dove, Coors Light, Quaker.**
- **Business Impact:** Strong potential for **retail-specific incentives.**

Sales by Generation (Health & Wellness Category)

- 💪 **Generation X dominates this category** → Ideal for **personalized wellness offers.**
- **Gen Z & Silent Generation have minimal engagement** → Check for **missing data or market opportunity.**

Business Trends & Open Questions

User Growth Trend:

- 📈 **Growth peaked in 2020 (+138%) but declined in 2023 (-42%).**
- 🔍 Potential causes: **Market saturation, reduced marketing efforts, increased competition.**

Unresolved Questions:

- Should we **manually fill missing barcodes** or exclude transactions?
- If `quantity = 0` but `sale > 0`, is it a refund or a system issue?
- Should each product have **one barcode per brand**, or is duplication valid?

SQL Approach & Techniques Used

Key SQL Techniques Used

Common Table Expressions (CTEs) – Used for modular queries and better readability.
I**NNER JOIN** – Combined `users`, `transactions`, and `products` to analyze brand purchases.
Aggregation Functions – Used `GROUP BY`, `COUNT(*)`, and `SUM(FINAL_SALE)` for insights.

Why?

- Improved query structure and readability.
- Ensured data consistency and accurate insights

Advanced SQL & Handling Edge Cases

Window Functions – Used `RANK()`, `DENSE_RANK()` for brand ranking, `LAG()` for YoY growth.
CASE WHEN Handling – Managed missing barcodes and inconsistent sales data.
Query Optimization – Can use indexed columns to improve performance and CTEs instead of subqueries.

🎯 Why?

- Optimized for large datasets.
- Improved performance and trend analysis.

Recommendations & Next Steps

Business Recommendations:

- **Leverage top brands** (Nerds, Dove) for targeted campaigns.
- **Create loyalty incentives** for **power users & frequent buyers.**
- **Investigate missing sales data** before making pricing decisions.
- **Address growth slowdown** by exploring new user acquisition strategies.

Next Steps:

- Validate barcode data inconsistencies.
- Test different marketing strategies for engagement.
- Reassess Fetch’s **user acquisition model post-2022.**

Questions?

Should I ‘COMMIT’ and call it a day,

or

‘ROLLBACK’ and try again?