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Inventory Optimization Through SQL: A

Data Driven Retail Solution

Urban Retail Co. | Summer Projects 2025

**1.Project Overview**

Urban Retail Co., a mid-sized retail chain with 5,000+ SKUs across multiple cities, faces

key inventory challenges—frequent stockouts of fast-moving products, overstocking of

slow movers, poor real-time visibility, and inconsistent supplier performance. This

summer project aimed to build a SQL-driven inventory management system to convert

raw data into actionable insights for smarter, data-informed decisions.more informed

decision-making.

**2.Project Goals**

The project focused on structuring raw inventory data into relational models,

developing advanced SQL queries for key insights, identifying inefficiencies through

analytics, and forecasting demand to optimize inventory and reorder strategies.

**3.Data Handling & Schema Design**

A cleaned and structured dataset was developed using SQL:

● Duplicate records and missing values were identified and handled

A new table inventory\_analysis was created with appropriate data types

● Composite primary keys and indexes were implemented for performance

● Data was normalized to allow easier querying and scalability

Key columns included: store\_id, product\_id, category, inventory\_level,

units\_sold, units\_ordered, region, price, and demand\_forecast.

**4.Analytical Queries and Insights**

Stock Overview: Tracked inventory by region and category using total, average, min, and

max stock levels.

Reorder Point Estimation: Identified products needing restock using:

Reorder Point = Avg\_Units\_Sold × 7 + 1.5 × Std\_Dev

Inventory Turnover: Measured sales efficiency by category with:

Turnover = Total Units Sold / Avg Inventory

Stockout Rate: Flagged frequent stock shortages by region using:

Stockout Rate = (Stockouts / Total Entries) × 100

Inventory Aging: Detected outdated SKUs via:

Inventory Age = DATEDIFF(CURRENT\_DATE, MAX(Date))

**5. Tableau Dashboard Summary**

Visualized:

● Fast vs. slow-moving SKUs

● Heatmaps for stock adjustment (Units Sold > Units Ordered)

● Demand trends and reorder needs

● Aged inventory and supplier delays

Filters by region/category enhanced clarity.

**5.Findings & Recommendations**

● Understocked SKUs (15%) → Set up auto restock alerts

● Overstocked items → Discount or shift to other stores

● Supplier delays → Track and benchmark vendor performance

● Old stock (90+ days) → Clear through promotions or markdowns

**6.Conclusion**

The project delivered a scalable SQL-based solution for Urban Retail Co. to monitor and

optimize inventory, enabling faster and more informed decision-making.