## Executive Summary

Project Title: Solving Inventory Inefficiencies Using SQL

Company: Urban Retail Co.

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## Objective

Urban Retail Co. is a mid-sized retail chain operating across multiple cities with a wide range of over 5,000 SKUs. Despite having access to substantial sales and inventory data, the company has been facing operational inefficiencies such as frequent stockouts, overstocking, and poor visibility into inventory performance.  
  
This project aimed to build a robust SQL-based inventory analysis system using historical inventory and sales data. The goal was to identify inefficiencies and generate actionable insights to improve stock management, reduce waste, and boost product availability.

## Approach & Methodology

1. Data Setup  
- Imported a flat .csv dataset with 109,501 rows containing fields such as date, store, product, inventory level, demand forecast, and more.  
- Used MySQL to build a suite of efficient and scalable SQL queries for inventory analytics.  
  
2. Key SQL Processes  
- Calculated total inventory across stores, products, categories, and regions.  
- Analyzed weekly inventory turnover to classify products as Fast, Medium, or Slow-Moving.  
- Estimated reorder points using 5-day moving averages of past sales and category-based lead times (e.g., 3 days for groceries, 5 for electronics).  
- Flagged SKUs that pose a low inventory risk based on comparison with dynamic reorder points.

## Key Insights

1. Inventory Turnover Analysis  
- Weekly turnover values ranged from 0.77 to 6.56.  
- Products were categorized into:  
 - Slow-Moving: Turnover ≤ 4.30  
 - Medium-Moving: 4.31 – 4.95  
 - Fast-Moving: > 4.95  
- Fast-moving items were mostly found in groceries and personal care categories.  
  
2. Reorder Point Evaluation  
- Using moving averages and tailored lead times, reorder points were dynamically calculated per product-store combination.  
- Products falling below their reorder points were flagged as "Needs Reorder".  
- Helped identify SKUs at immediate risk of stockout.  
  
3. Stock Distribution  
- Certain categories like Furniture and Electronics showed uneven distribution across regions.  
- Opportunities exist to redistribute stock more evenly to balance demand and reduce overstock.

## Recommendations

- Automate Low Inventory Detection  
 Integrate the reorder point logic into the replenishment system to automatically flag SKUs needing attention.  
  
- Push Slow-Moving Products  
 Run clearance campaigns or targeted promotions to move stagnant stock and reduce carrying costs.  
  
- Optimize Regional Stock  
 Monitor category-wise stock distribution across regions and rebalance where necessary.  
  
- Continue SQL-Based Monitoring  
 Extend this SQL framework to cover additional KPIs like inventory aging, supplier delays, and seasonal demand.

## Expected Impact

- Minimized stockouts, improving customer retention.  
- Lowered warehousing costs through better inventory turnover.  
- Enabled data-driven, proactive inventory decisions using just SQL-based analysis.