

View: **D** (Date Information)

- **Purpose:** Encapsulates time-based metadata like Date, Seasonality, and Holiday/Promotion.
 - **Columns:**
 - `sr_no`: Row number for ordering.
 - `Date`: Date of inventory entry.
 - `Seasonality`: Season category (e.g., Summer, Winter).
 - `Holiday/Promotion`: Whether a date had a special event.
 - **Usage:** Useful for trend and time-series analysis.
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2. View: **S** (Store Information)

- **Purpose:** Extracts distinct store-level information.
 - **Columns:**
 - `sr_no`: Row number.
 - `store_id`: Unique identifier for each store.
 - `region`: Geographical region of the store.
 - **Usage:** Helps in regional and store-wise performance evaluation.
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3. View: **P** (Product Information)

- **Purpose:** Extracts product-specific metadata.
 - **Columns:**
 - `sr_no`: Row number.
 - `product_id`: Unique identifier for each product.
 - `Category`: Product category.
 - `price`: Unit price.
 - **Usage:** Needed for product segmentation and pricing analysis.
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4. View: **I** (Inventory View)

- **Purpose:** Combines all relevant fields from `inventory_forecasting` for operational and analytical reporting.
- **Columns:** Includes store/product IDs, date, region, seasonality, pricing, inventory, sales, demand, etc.
- **Usage:** Central dataset for all downstream analysis.



ANALYTICAL QUERIES



1. Reorder Point & Stock Level Calculation

- **Goal:** Estimate optimal inventory levels using historical data.
 - **Key Metrics:**
 - `avg_daily_sales`: Mean of `units_sold`.
 - `reorder_point`: Assuming lead time = 2 days.
 - `max_stock_level`: Buffer stock based on demand.
 - `min_stock_level`: Minimum stock to avoid stockout.
 - **Usage:** Inventory planning, auto-replenishment.
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2. Low Inventory Detection

- **Logic:** Flags when current `inv_level` is less than `units_sold` — likely to go out of stock.
 - **Usage:** Alert system for urgent stock replenishment.
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3. Inventory Turnover Ratio

- **Formula:** $\text{COGS} / \text{Avg Inventory}$ → Here: $\text{SUM}(\text{units_sold} * \text{avg_price}) / \text{SUM}(\text{inv_level} * \text{avg_price})$
 - **Purpose:** Measures how efficiently inventory is sold and replaced.
 - **Higher ratio** = better performance.
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4. Stockout Rate

- **Definition:** % of days where `demand > inventory`.
 - **Formula:** $(\text{stockout_days} / \text{total_days}) * 100$
 - **Usage:** Identifying frequent understock scenarios.
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5. Inventory Age

- **Metric:** Average time (in days) a product stays in inventory.
- **Formula:** $\text{inv_level} / \text{units_sold}$
- **Higher values** = slow-moving inventory.



6. Fast vs. Slow Selling Products

- **Purpose:** Ranks products by total sales.
 - **Top products:** Fast-sellers.
 - **Usage:** Marketing, procurement, promotions.
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7. Stock Adjustment Insights

- **Tracks:**
 - `overstock_days`: Inventory far exceeds demand.
 - `stockout_days`: Inventory below sales.
 - `avg_inventory`, `avg_forecast`: For calibration.
 - **Usage:** Fine-tuning procurement strategy.
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8. Seasonal Demand Trends

- **Purpose:** Analyzes sales pattern across different seasons for each category.
 - **Metrics:**
 - `total_units_sold`: Seasonal sales volume.
 - `avg_forecast`: Average predicted demand.
 - **Usage:** Planning seasonal promotions, marketing.
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Assumptions and Constants

- **Lead Time:** Manually assumed as **2 days** for reorder point calculation.
- **Data Source:** All views derive from the base table `inventory_forecasting`.
- **Price Normalization:** Average price is calculated per product using window functions.