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Task Decomposition with Abstract Code:

Data Types:**STORE**

Attribute	Data type	Nullable
Store_Number	String	Not Null
Phone_Number	String	Not Null
Street_Address	String	Not Null
Has_Restaurant	Boolean	Not Null
Has_Snack_Bar	Boolean	Not Null

CHILDCARE

Attribute	Data type	Nullable
Limit	Integer	Not Null

CITY

Attribute	Data type	Nullable
City_Name	String	Not Null
State_Location	String	Not Null
Population	Integer	Not Null
Population_Size_Category	String	Not Null

PRODUCT

Attribute	Data type	Nullable
PID	String	Not Null
Product_Name	String	Not Null
Retail_Price	Float	Not Null

CATEGORY

Attribute	Data type	Nullable
Category_Name	String	Not Null

DAY

Attribute	Data type	Nullable
Date	String	Not Null

DISCOUNT

Attribute	Data type	Nullable
Discount_Price	Float	Not Null

SALE

Attribute	Data type	Nullable
Quantity	Integer	Not Null
Total_Amount	Float	Not Null

HOLIDAY

Attribute	Data type	Nullable
Name	List<String>	Not Null

ADVERTISING_CAMPAIGN

Attribute	Data type	Nullable
Description	String	Not Null

Business Logic Constraints:

- No user authentication is needed.

STORE

- Stores offering food should have a restaurant, a snack bar, or both.
- At most of LEOFURN's stores, the restaurant is located before customers enter the main sales floor. Recent psychometric studies show that customers with a full stomach are less interested in purchasing certain kinds of items (such as dining room furniture, kitchen utensils, etc.) but show stronger interest in others (such as beds, couches, sofas, or reclining chairs). This behavior does not apply to snack bars because those are near the exit of the store.

CHILDCARE

- The limit is chosen by each store from predetermined values.
- All limits may need to be updated if it changes (such as from 45 minutes to 60) or a new limit requires manual updating outside of a data load.
- Offering more childcare may allow parents to spend more time browsing and purchase more items, while it's also possible that the cost of providing childcare is not offset by the additional sales it may generate and should be discontinued.
- For "Report 7 – Childcare Sales Volume", it's based on the last 12 months' worth of available sales in the system. Stores that do not offer childcare should be included on this report and grouped as "No childcare".

CITY

- A city's population can be updated by users after data for it has been loaded.
- The categories for city size are: Small (population <3,700,000), Medium (population >=3,700,000 and <6,700,000), Large (population >=6,700,000 and <9,000,000) and Extra Large (population >=9,000,000).

PRODUCT

- All products are available and sold at all stores.
- The retail price is in effect unless there is a discount price.
- If a product is discounted, it is for the same price in all stores—i.e., stores are not allowed to discount items independently or have store-specific discount prices.

CATEGORY

- "Couches and Sofas" should be one of the categories.
- "Outdoor furniture" should be one of the categories.
- "Report 1 – Category Report" should query for all categories including those without products.
- For "Report 5 – State with Highest Volume for each Category", each category will only be listed once unless two or more states tied for selling the highest number of units in that category. Products which do not have a category may be excluded from this report.
- "Report 8 – Restaurant Impact on Category Sales" may exclude any categories that are not assigned products as their information would not be useful here.

DAY

- Assume a year is exactly 365 days.
- Outdoor furniture sales appear to spike on Groundhog Day (which falls on February 2 each year). This is probably because customers begin thinking about the warm spring weather ahead. This report does not imply storing Groundhog Day as a holiday, but to explicitly query for February 2.)
- Day cannot include dates greater than today's date and dates before year 1900.
- If the report requires filter input from user, the system needs to generate the report based on the filter conditions.

DISCOUNT

- Discounts could occur on dates where there are no sales.
- Product discounts introduce on average a 25% increase in volume (quantity sold).
- We assume that if an item that was offered at a discount were instead offered at the retail price, the quantity of items sold would be reduced by 25%.

SALE

- For reporting purposes, sales tax values are ignored.
- The system is not required to store which products were purchased together during a single sales transaction.
- Sales could occur on dates where there are no campaigns.
- The revenue calculation takes into account the items that were sold at a discount.
- For "Report 2 – Actual versus Predicted Revenue for Couches and Sofas", only predicted revenue differences greater than \$5000 (positive or negative) should be displayed.

HOLIDAY

- Holiday information can be added by users after data for it has been loaded.
- User can view and add holiday information but can't delete holiday information.

ADVERTISING_CAMPAIGN

- While there are numerous possibilities to correlate advertising campaigns and sales data, the LEOFURN team would like to start out with a relatively simple analysis: if a product is discounted, does an advertising campaign affect its sales volume?
- For "Report 9 – Advertising Campaign Analysis", all products sold at a discount price are included. The final report output only displays the top 10 and followed by the bottom 10 results when sorting the results by difference in descending order.

