## Table of Contents

## SQL Data Types

Category

| Attribute | Data Type |
|---|---|
| Name | Char(20) |

Product

| Attribute | Data Type |
|---|---|
| Price | Float |
| PID | Int |
| Name | Char(40) |

Manufacturer

| Attribute | Data Type |
|---|---|
| Name | Char(20) |

Special Savings Day

| Attribute | Data Type |
|---|---|
| Date | YYYY-MM-DD (date) |
| Discount | Float |

Sale

| Attribute | Data Type |
|---|---|
| Date | YYYY-MM-DD (date) |

Store

| Attribute | Data Type |
|---|---|
| Phone Number | String |
| Store Number | Integer |
| Street Address | String |

City

| Attribute | Data Type |
|---|---|
| Population | Integer |

| | |
|---|---|
| City Name | Char(20) |
| State | Char(20) |
| Will’s Grand Store | Boolean |

User

| Attribute | Data Type |
|---|---|
| Username | Char(20) |
| Password | Char(20) |

Sale to Product Relationship

| Attribute | Data Type |
|---|---|
| Quantity | Integer |

## Business Logic Constraints

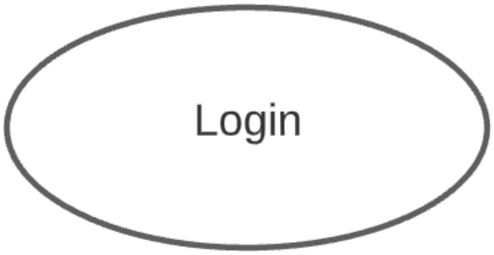
Price cannot be negative.
Population cannot be negative.
All required fields (no NULL).
Every user must be registered.
Special day has calculation priority over discount.

## TD/AC

**Login**

Task Decomposition:

- Read-only
- Order is not critical
- Consistency is not critical
- Mother task not required



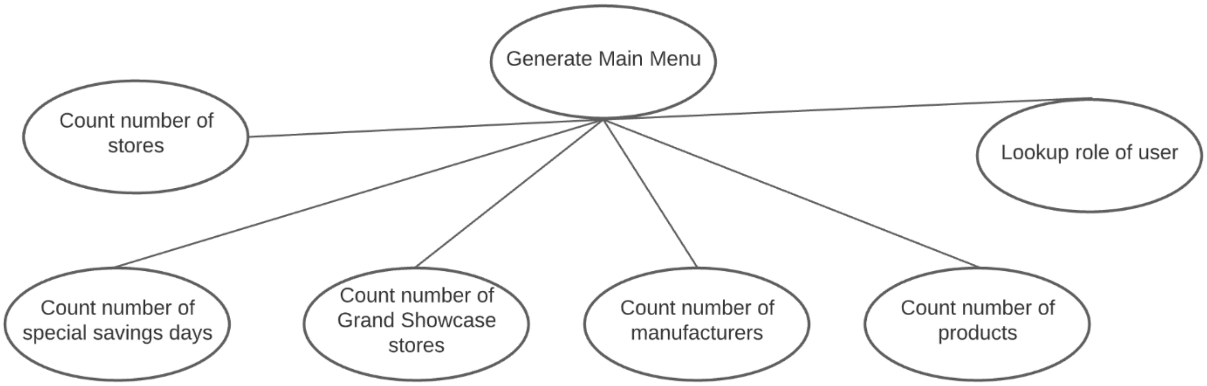
Abstract Code:

- User enters values for username and password
- If username or password field is blank:
  - Display error message
- Else if username and password match:
  - Display success message
  - Go to main menu
- Else:
  - Display error message

**Generate Main Menu**

Task Decomposition:

- Count number of stores
- Count number of Grand Showcase stores
- Count number of stores user can view (store manager only)
- Count number of manufacturers
- Count number of products
- Count number of special savings days
- Link to details of stores (store managers only)
- Lookup role of user
- Read-only
- Order is not critical
- Mother task required
- Task triggered by successful login


Generate Main Menu
Count number of stores
Lookup role of user
Count number of special savings days
Count number of Grand Showcase stores
Count number of manufacturers
Count number of products

Abstract Code:

- Determine role of user using the username
- Display the number of stores
- Display the number of Grand Showcase stores
- If user is store manager
    - Display number of stores managed
    - Add link to page displaying store information
- Display number of manufacturers
- Display number of products
- Display number of special savings days

**Update City Population**

Task Decomposition:

- Verify user role is marketing
- Verify city/state pair entered is valid
- Edit population value
- Mother task not required
- Order is not critical

Abstract Code:

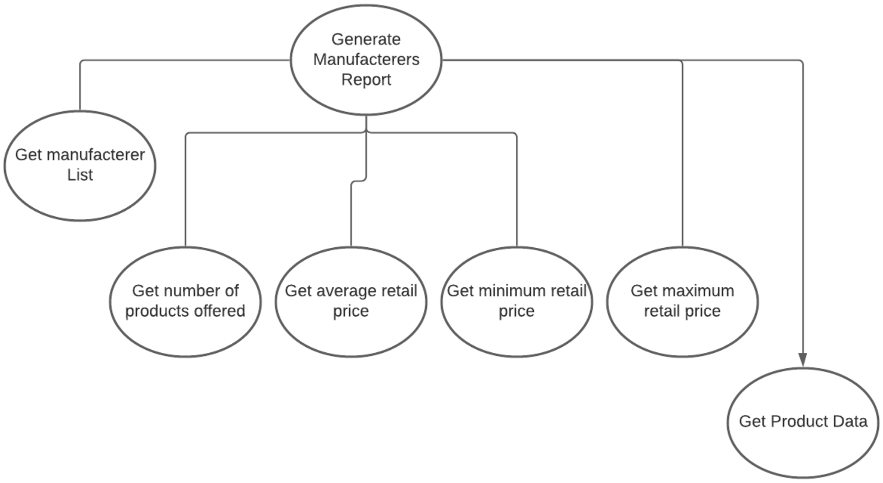
- If user role is not marketing:
    - Display appropriate error message
- Else:

- If city/state pair is invalid:
    - Display appropriate error message
- Else:
    - Allow user to enter new population value
    - User clicks Save button

**Report 1 – Manufacturer's Product Report**

Task Decomposition:

- Query manufacturer's name, number of products offered, average retail price, minimum non-discounted retail price, maximum non-discounted retail price
    - All tasks involve lookup, no database updates
- Sort by average price
- Include separate query for detail of the manufacturer
    - "drill-down" has lower frequency than primary call
- All product data from "drill-down" can be pulled with a single query



Abstract Code:

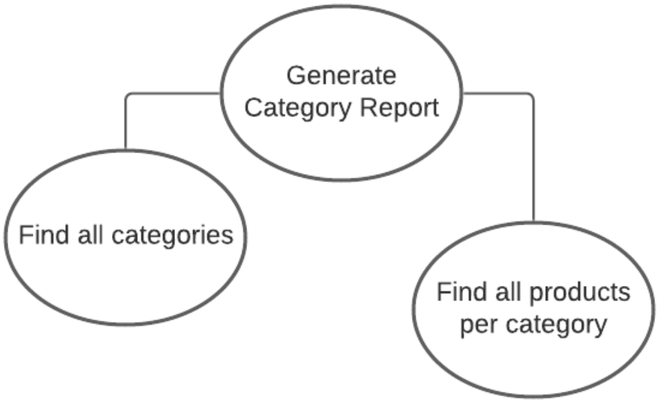
```
Get list of manufacturers
   {Use list of manufacturers to pull list of all products for manufacturer}
      {Use list of all products to pull retail prices of all products}
         Use price data for products to calculate average, min, max of all retail prices
Display summary price data for all manufacturers
{if drill-down:}
```

Get Product Data for manufacturer (product ID, name category, retail price);
display summary data, as well as product data

**Report 2 - Category Report**

Task Decomposition:

- Pull list of categories
- Pull number of products in each category
- Find min/average/max non-discounted retail prices
- Lookup tasks only
- Tasks in sequence (find all categories first, use results to create product query)



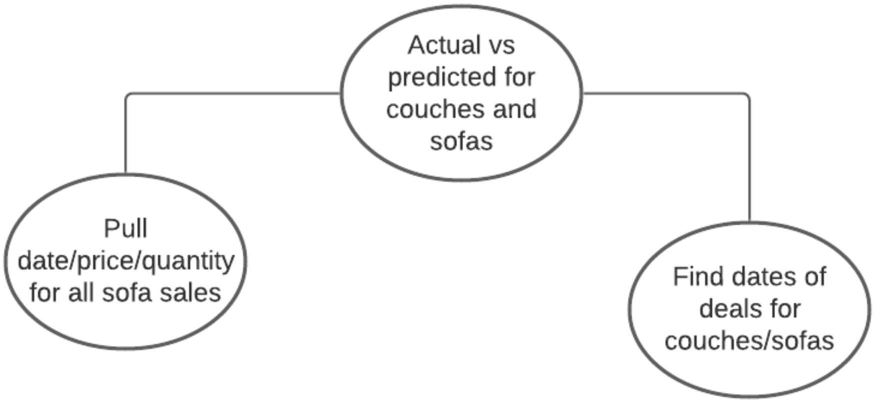
Abstract Code:

```
Get category list
   {for each category: Pull all products and retail prices}
      calculate avg/mins/maxs
fill out display with number of products, min prices, max prices, and avg prices
```

**Report 3 - Actual vs. Predicted Revenue couches/sofas**

Task Decomposition:

- Need to pull Date/price/quantity of all sofa sales
- Need to pull Date of all sofa discount days
- Need to apply some math to our returned data
- Two separate lookup tasks, order executed does not matter


Actual vs predicted for couches and sofas
Pull date/price/quantity for all sofa sales
Find dates of deals for couches/sofas

Abstract Code:

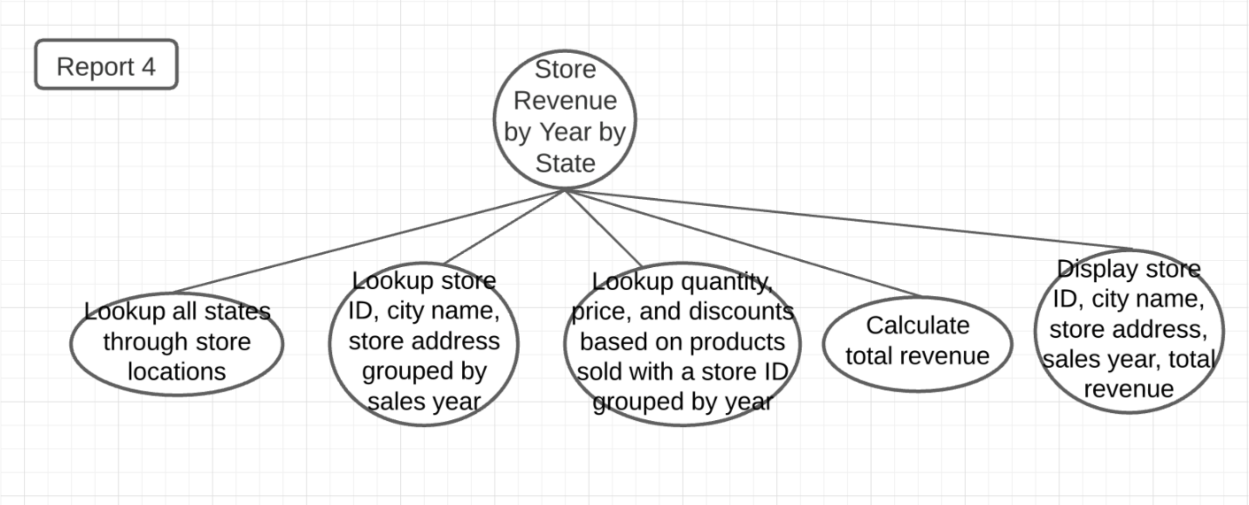
```
Find product ID of all ‘couches and sofas’
{for all products}
   find name, retail price, all sales
   {for each sale}
      determine if sold at discount
      find quantity sold and calculate revenue
   calculate revenue
   apply .75 rule to all discount days, and adjust price to retail price
Display discount data, revenue, and prediction results
```

**Report 4 – Store Revenue by Year by State**

Task Decomposition:

- Lookup all states through store locations
- Lookup store ID, city name, store address grouped by sales year
- Lookup quantity, price, and discounts based on products sold with a store ID grouped by year
- Calculate total revenue
- Display store ID, city name, store address, sales year, total revenue
- Consistency is important

- Read-only
- They must be done in a specific order
- Same frequency
- Multiple schema constructs needed
- Subtasks needed
- Mother task is needed


Report 4
Store Revenue by Year by State
Lookup all states through store locations
Lookup store ID, city name, store address grouped by sales year
Lookup quantity, price, and discounts based on products sold with a store ID grouped by year
Calculate total revenue
Display store ID, city name, store address, sales year, total revenue

Abstract Code:

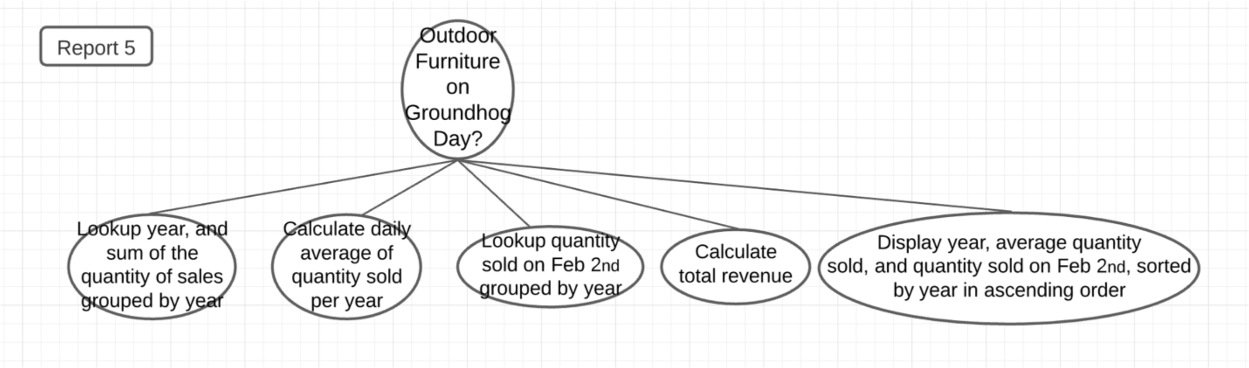
Lookup states using dropdown. *Select State.* (Button)
Lookup store ID, city name, store address, grouped by Sales Year using *state* (Task)
Lookup quantity, price, and discounts based on products sold grouped by year with *store ID*
Calculate total revenue (Task)
Display store ID, city name, store address, sales year, total revenue (Task)
*Back to Dashboard* (Button)

**Report 5 – Outdoor Furniture on Groundhog Day?**

Task Decomposition:

- Lookup year, and sum of the quantity of sales grouped by year
- Calculate daily average of quantity sold per year
- Lookup quantity sold on Feb 2$^{nd}$ grouped by year
- Display year, average quantity sold, and quantity sold on Feb 2$^{nd}$, sorted by year in ascending order
- Consistency is important
- Read-only
- They must be done in a specific order
- Same frequency
- Single schema constructs needed

- Subtasks needed
- Mother task is needed


Report 5
Outdoor Furniture on Groundhog Day?
Lookup year, and sum of the quantity of sales grouped by year
Calculate daily average of quantity sold per year
Lookup quantity sold on Feb 2nd grouped by year
Calculate total revenue
Display year, average quantity sold, and quantity sold on Feb 2nd, sorted by year in ascending order

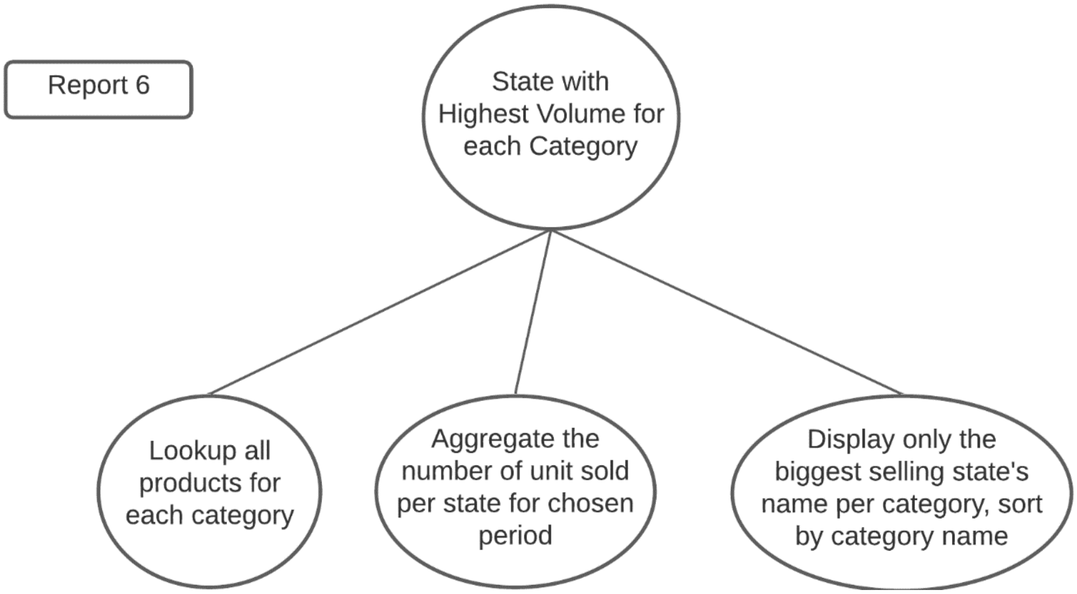
Abstract Code:

Lookup year, and sum of the quantity of sales grouped by year (Task)
Calculate daily average of quantity sold per year (Task)
Lookup quantity sold on Feb 2nd grouped by year (Task)
Display year, average quantity sold, and quantity sold on Feb 2nd, sorted by year in ascending order (Task)
*Back to Dashboard* (Button)

**Report 6 – State with Highest Volume for each Category**

Task decomposition :

- Lookup all products for each category
- Lookup all states, sales based on the selected month and year.
- Calculate the total quantity sold per state
- Display the state that sold the most for each category with an ascending order based on the category name
- Read-only
- Enabled for all corporate users, marketing users and the related store managers who are logged in to read
- Dropdown with passed years and months
- name, state, the number of units that were sold by stores in that state
- Frequency : Monthly report
- Consistency is not critical, this is a lookup task
- Must be decomposed into subtasks


Report 6
State with Highest Volume for each Category
Lookup all products for each category
Aggregate the number of unit sold per state for chosen period
Display only the biggest selling state's name per category, sort by category name

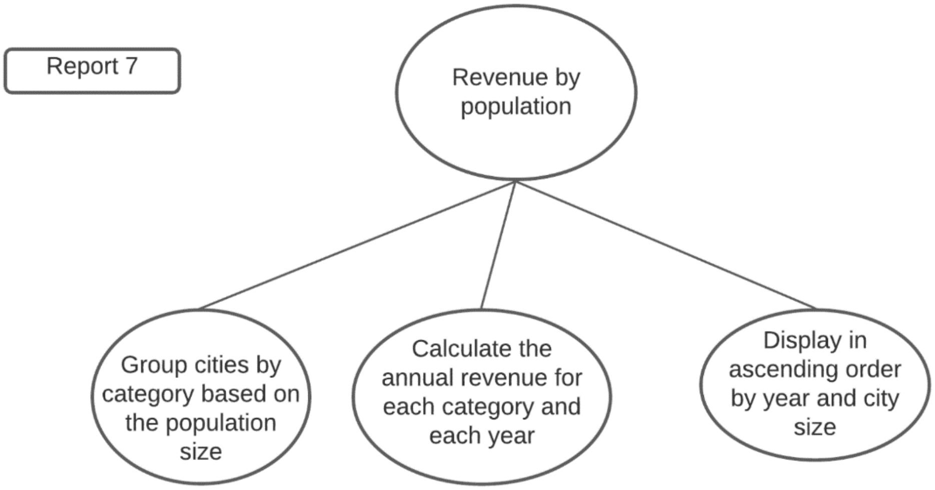
Abstract code:

- Populate the Year and Month dropdown from the available dates in the database (Button)
- If a month and a year is selected:
  - Display the states that sold the most for each category with an ascending order based on the category name (Task)

**Report 7 – Revenue by Population**

Task decomposition:

- Group cities by population category
- Calculate annual revenue for each population category and each available year
- Display in ascending order by year and population (city size)
- Read-only
- Consistency is not critical but the order is important to understand the report
- Must be decomposed into subtasks


Report 7
Revenue by population
Group cities by category based on the population size
Calculate the annual revenue for each category and each year
Display in ascending order by year and city size

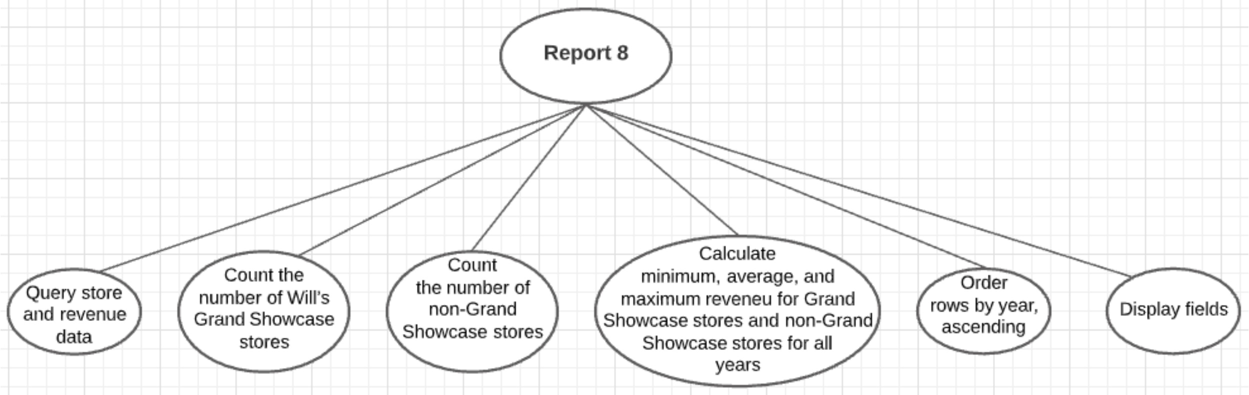
Abstract code:

Aggregate cities based on the population size (Task)
Calculate the total revenue by summing every quantity multiplied by every product's price for each sale that the city category made (Task)
Display the total revenue per ascending year and ascending population category in a tabular format

**Report 8 – Grand Showcase Store Revenue Comparison**
Task Decomposition:

- Query store and revenue data
  - Calculate revenue based on Sale entities and the associate Product entity prices, with Discounts and Special Days taken into consideration
- Count the number of Will's Grand Showcase stores
- Count the number of non-Grand Showcase stores
- For each year query
  - Minimum total revenue for all Grand Showcase stores
  - Average total revenue for all Grand Showcase stores
  - Maximum total revenue for all Grand Showcase stores
  - Minimum total revenue for all non-Grand Showcase stores
  - Average total revenue for all non-Grand Showcase stores
  - Maximum total revenue for all non-Grand Showcase stores
- Order rows by year, ascending
- Consistency is not immediately important
- Read-only
- Same frequency

- Multiple schema constructs needed
- Subtasks & Mother task are needed
- Can be done in any order
- Enabling conditions: click on link to Report 8


Report 8
Query store and revenue data
Count the number of Will's Grand Showcase stores
Count the number of non-Grand Showcase stores
Calculate minimum, average, and maximum reveneu for Grand Showcase stores and non-Grand Showcase stores for all years
Order rows by year, ascending
Display fields

Abstract Code:

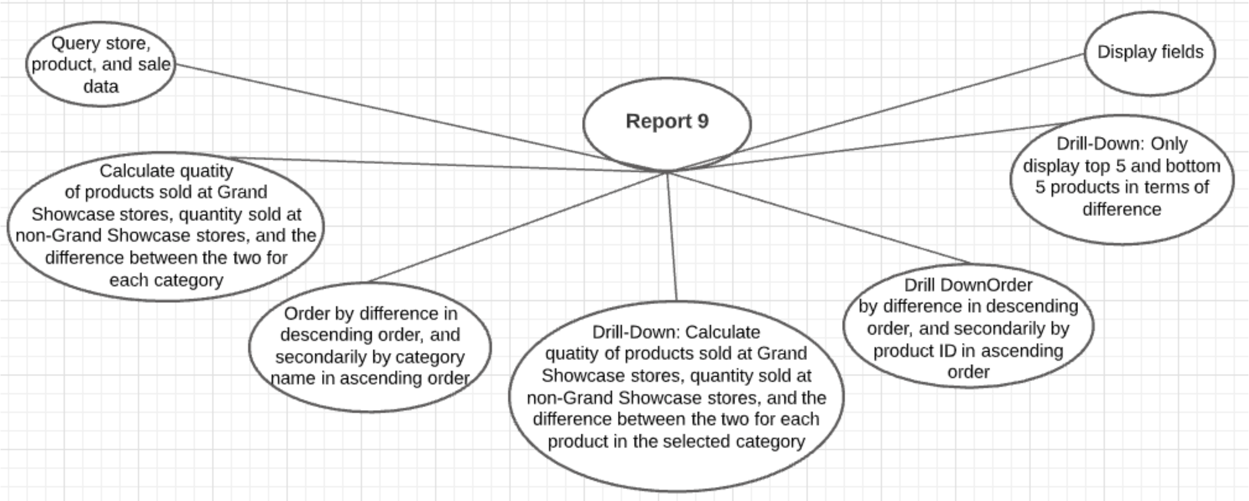
- Identify current user type
  - If Corporate or Marketing user display data for all stores
  - If Store Manager user then only display data for stores managed by the user
- Display Grand Showcase and non-Grand Showcase counts
- Display revenue statistics by store type and year
- Include link to send the user back to the previous menu

**Report 9 – Grand Showcase Store Category Comparison**

Task Decomposition:

- Query store, product, and sale data
- For each category calculate
  - Quantity of products sold at Grand Showcase stores
  - Quantity of products sold at non-Grand Showcase stores
  - Difference between quantities of Grand Showcase stores and non-Grand Showcase stores
  - Sort by difference in descending order, and secondarily by category name in ascending order
- Include drill-down detail accessible by hyperlink or button for each category
- When drill-down is clicked, for each product related to the selected category display:
  - Product ID
  - Product name
  - Quantity of products sold at Grand Showcase stores
  - Quantity of products sold at non-Grand Showcase stores
  - Difference between quantities of Grand Showcase stores and non-Grand Showcase stores

    - Sort by difference in descending order, and secondarily by category name in ascending order
    - Only display top 5 and bottom 5 products in terms of difference
- Consistency is not immediately important
- Read-only
- Same frequency
- Multiple schema constructs needed
- Subtasks & Mother task are needed
- Can be done in any order
- Enabling conditions: click on link to Report 9, and link for drill-down queries


Query store, product, and sale data
Report 9
Display fields
Drill-Down: Only display top 5 and bottom 5 products in terms of difference
Calculate quatity of products sold at Grand Showcase stores, quantity sold at non-Grand Showcase stores, and the difference between the two for each category
Order by difference in descending order, and secondarily by category name in ascending order
Drill-Down: Calculate quatity of products sold at Grand Showcase stores, quantity sold at non-Grand Showcase stores, and the difference between the two for each product in the selected category
Drill DownOrder by difference in descending order, and secondarily by product ID in ascending order

Abstract Code:

- Identify current user type
    - If Corporate or Marketing user display data for all stores
    - If Store Manager user then only display data for stores managed by the user
- Display Category statistics
- If drill-down link is clicked for a category
    - Display product statistics related to the selected category
- Include link to send the user back to the previous menu