**[Table of Contents:](#Table_of_Contents)**

[View Statistics](#View_Statistics)

[Get Holiday List](#Get_Holiday_List)

[Add Holiday](#Add_Holiday)

[Maintain Population](#Maintain_Population)

[View Product by Category Report](#View_Product_by_Category_Report)

[View Actual vs. Predicted Revenue for Couches and Sofas Report](#View_Actual_vs_Predicted_Revenue)

[Get Available State List](#Get_Available_State_List)

[View Store Revenue by Year by State Report](#View_Store_Revenue_by_Year_by_State)

[View Groundhog Day Outdoor Furniture Report](#View_Groundhog_Day_Outdoor_Furniture)

[Get Year and Month List](#Get_Year_and_Month_List)

[View State with Highest Volume by Category Report](#View_State_with_Highest_Volume)

[View Revenue by Population Report](#View_Revenue_by_Population_Report)

[View Childcare Sales Volume Report](#View_Childcare_Sales_Volume_Report)

[View Restaurant Impact on Category Sales Report](#View_Restaurant_Impact_on_Category_Sales)

[View Advertising Campaign Analysis Report](#View_Advertising_Campaign_Analysis)

View Statistics

Abstract Code

* Show *“****Holiday Maintenance****”, “****View Product by Category Report****”, “****View Actual vs. Predicted Revenue for Couches and Sofas Report****”, “****View Store Revenue by Year by State Report****”, “****View Groundhog Day Outdoor Furniture Report****”, “****View State with Highest Volume by Category Report****”, “****View Revenue by Population Report****”, “****View Childcare Sales Volume Report****”, “****View Restaurant Impact on Category Sales Report****”, “****View Advertising Campaign Analysis Report****”,* and *“****Population Maintenance****”* buttons/links on the **Dashboard** form.
* Upon:
  + Click ***Holiday Maintenance*** button – Jump to the **Holiday Maintenance** form.
  + Click ***View Product by Category Report*** button – Jump to the **View Product by Category Report** task.
  + Click ***View Actual vs. Predicted Revenue for Couches and Sofas Report*** button – Jump to the **View Actual vs. Predicted Revenue for Couches and Sofas Report** task.
  + Click ***View Store Revenue by Year by State Report*** button – Jump to the **Get Available State List** task.
  + Click ***View Groundhog Day Outdoor Furniture Report*** button – Jump to the **View Groundhog Day Outdoor Furniture Report** task.
  + Click ***View State with Highest Volume by Category Report*** button – Jump to the **Get Year and Month List** task.
  + Click ***View Revenue by Population Report*** button – Jump to the **View Revenue by Population Report** task.
  + Click ***View Childcare Sales Volume Report*** button – Jump to the **View Childcare Sales Volume** **Report** task.
  + Click ***View Restaurant Impact on Category Sales Report*** button – Jump to the **View Restaurant Impact on Category Sales Report** task.
  + Click ***View Advertising Campaign Analysis Report*** button – Jump to the **View Advertising Campaign Analysis Report** task.
  + Click ***Population Maintenance*** button – Jump to the **Population Maintenance** form.
* Display statistics for “the count of stores”, “count of stores offering food (have a restaurant, a snack bar, or both)”, “count of stores offering childcare”, “count of products”, and “count of distinct advertising campaigns” on the **Dashboard** form.
  + Show “the count of stores”.
    - Query for total count of Store\_Number in the STORE table.
    - Display the total count.
  + Show “count of stores offering food”.
    - Query for the total count of Store\_Number in the STORE table that has either or both Has\_Restaurant and Has\_Snack\_Bar value as true.
    - Display the total count.
  + Show “count of stores offering childcare”.
    - Query for the total count of Store\_Number in the STORE table that has a Childcare center association in the CHILDCARE table.
    - Display the total count.
  + Show “count of products”.
    - Query for the total count of PID in the PRODUCT table.
    - Display the total count.
  + Show “count of distinct advertising campaigns”.
    - Query for the total count of Description in ADVERTISING\_CAMPAIGNS table.
    - Display the total count.

Get Holiday List

Abstract Code

* User clicked on the ***Holiday Maintenance*** button from the **Dashboard** form.
* Run the **Get Holiday List** task: query for information about the available Name field from the HOLIDAY table.

SELECT `date`, name

FROM Holiday

* + Display the holiday name list.
* Upon:
  + User enters Holiday Name (‘$HolidayName’) in input textbox and selects Date (‘$HolidayDate’) in Calendar Dropdown.
  + Click ***Add Holiday*** button –
    - Jump to the **Add Holiday** task.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

Add Holiday

Abstract Code

* User enters Holiday Name (‘$HolidayName’) in input textbox and selects Date (‘$HolidayDate’) in Calendar Dropdown.
* Click ***Add Holiday*** button.
* Run the **Add Holiday** task:
  + If data validation passed for both holiday name and date in Client Side, then:

INSERT INTO Day (date)

SELECT ’$HolidayDate’

FROM Day

WHERE NOT EXISTS (

SELECT 1 FROM Day WHERE date=’$HolidayDate’ LIMIT 1);

INSERT INTO Holiday (`date`, name)

SELECT `date`, name

FROM (SELECT ’$HolidayDate’ AS `date`, ’$HolidayName’ AS name) AS tmp

WHERE NOT EXISTS (

SELECT 1 FROM Holiday WHERE `date`= ’$HolidayDate’ AND name = ’$HolidayName’ LIMIT 1);

* + - If same holiday name and same holiday date exist:
* Go back to **Holiday Maintenance** form and show the failure message that this holiday with this date existed.
  + - If holiday name does not exist but date exists:
* Store the holiday name in HOLIDAY table and link its date with DAY table.
* Go back to **Holiday Maintenance** form and show success message.
  + - If both holiday name and date do not exist:
* Store the holiday name and date in both HOLIDAY and DAY tables.
* Go back to **Holiday Maintenance** form and show success message.
  + Else: display the invalid error message in **Holiday Maintenance** form.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

Maintain Population

Abstract Code

* User clicked on the ***Population Maintenance*** button from the **Dashboard** form.
* Run the **Get City List** task: query for information about the available *State\_Location*, *City\_Name,* and *Population* fields from the CITY table.
  + Display *State\_Location* list in ascending order in the drop-down list.
  + Select state and then display the available *City\_Name* (from the CITY table) list in the drop-down list.
  + Select target *City\_Name*, and display *Population* in view population textbox.
* User edits population textbox.
* Upon:
  + Click ***Update Population*** button –
    - Jump to the **Update Population** task.
* Run the **Update Population** task.
  + If data validation passed for *Population* in Client Side, then:
    - If the updated population entered is the same as the original population, do nothing.
    - Else if the updated population entered is different from the original population, update the *Population*and *Population\_Size\_Category* in the CITY table.
    - Else updated population is not entered, populate a message asking for user input.
  + Else: display the invalid error message in **Population Maintenance** form.

UPDATE CITY

SET Population = '$Population'

WHERE State\_Location = '$State\_Location' AND City\_Name = '$City\_Name';

* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Product by Category Report

Abstract Code

* User clicked on the ***View Product by Category Report*** button from the **Dashboard** form.
* Run the **View Product by Category Report** task: query for each category from CATEGORY, ASSIGNED, and PRODUCT tables, including those without products.
  + Find all Category\_Name data (from the CATEGORY table).
  + For each Category\_Name including those without products:
    - Find total number of products by counting their PID data (from the PRODUCT table).
    - Find minimum, average, and maximum Retail\_Price data for all products (from the PRODUCT table).
  + Sort by Category\_Name in ascending order.

SELECT C.Category\_Name, COUNT(P.PID) AS Cnt\_Product, MIN(P.Retail\_Price) AS Min\_RtlPrc, AVG(P.Retail\_Price) AS Avg\_RtlPrc, MAX(P.Retail\_Price) AS Max\_RtlPrc

FROM CATEGORY AS C

LEFT JOIN ASSIGNED AS A ON C.Category\_Name = A.Category\_Name

LEFT JOIN PRODUCT AS P ON A.PID = P.PID

GROUP BY C.Category\_Name

ORDER BY C.Category\_Name ASC;

* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Actual vs. Predicted Revenue for Couches and Sofas Report

Abstract Code

* User clicked on the ***View Actual vs. Predicted Revenue for Couches and Sofas Report*** button from the **Dashboard** form.
* Run the **View Actual vs. Predicted Revenue for Couches and Sofas Report**task:
  + Find the 'Couches and Sofas' category (from the CATEGORY table).
  + For each product in 'Couches and Sofas' category:
    - Find PID, Product\_Name, and Retail\_Price data (from the PRODUCT table).
    - Find the total number of units ever sold by aggregating Quantity (from the SALE table).
    - Find the total number of units sold at a discount by aggregating Quantity (from the SALE table) when the product has a Discount\_Price (from the DISCOUNT table).
    - Find the total number of units sold at retail price by aggregating Quantity (from the SALE table) when the product doesn’t have a Discount\_Price (from the DISCOUNT table).
    - Find the actual revenue by aggregating Total\_Amount (from the SALE table).
    - Find the predicted revenue by aggregating the following multiplication result: Retail\_Price (from the PRODUCT table) \* Quantity (from the SALE table) \* quantity multiplier. The quantity multiplier equals 0.75 when the product has a Discount\_Price (from the DISCOUNT table), otherwise, the quantity multiplier equals 1.
    - Find the revenue difference by subtracting predicted revenue from actual revenue.
  + If the revenue difference is greater than $5000 (positive or negative): Display revenue difference and sort in descending order.

SELECT P.PID, P.Product\_Name, P.Retail\_Price, SUM(IFNULL(S.Quantity,0)) AS Tot\_UnitSold,

SUM(IF(D.Discount\_Price IS NULL,0,1) \* IFNULL(S.Quantity,0)) AS Tot\_UnitSold\_AtDsct,

SUM(IF(D.Discount\_Price IS NULL,1,0) \* IFNULL(S.Quantity,0)) AS Tot\_UnitSold\_AtRtl,

SUM(IFNULL(S.Total\_Amount,0)) AS Act\_Revenue,

SUM(P.Retail\_Price \* IFNULL(S.Quantity,0) \* IF(D.Discount\_Price IS NULL, 1, 0.75)) AS Pred\_Revenue,

(SUM(IFNULL(S.Total\_Amount,0)) - SUM(P.Retail\_Price \* IFNULL(S.Quantity,0) \* IF(D.Discount\_Price IS NULL, 1, 0.75))) AS Diff\_Act\_Pred\_Revenue

FROM CATEGORY AS C

LEFT JOIN ASSIGNED AS A ON C.Category\_Name = A.Category\_Name

LEFT JOIN PRODUCT AS P ON A.PID = P.PID

LEFT JOIN SALE AS S ON P.PID = S.PID

LEFT JOIN DISCOUNT AS D ON S.Date = D.Date AND S.PID = D.PID

WHERE C.Category\_Name = 'Couches and Sofas'

GROUP BY P.PID

HAVING Diff\_Act\_Pred\_Revenue > 5000 OR Diff\_Act\_Pred\_Revenue < -5000

ORDER BY Diff\_Act\_Pred\_Revenue DESC;

* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

Get Available State List

Abstract Code

* User clicked on ***View Store Revenue by Year by State Report*** button from the **Dashboard** form.
* Run the **Get Available State List** task: query for information about the available *State\_Location* field from the CITY table.
  + Display *State\_Location* list in ascending order on the drop-down list.
* On the drop-down list, show ***Run Report*** button.
* Upon:
  + Click ***Run Report*** button –
    - If *State\_Location* is selected – Jump to the **View State Revenue by Year by State Report** task.
    - If *State\_Location* field is empty – Display a message asking for user input.

SELECT State\_Location From CITY ORDER BY State\_Location;

* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Store Revenue by Year by State Report

Abstract Code

* User clicked on the ***Run Report*** button from the drop-down list.
* If data validation is successful for *State\_Location* input field, then proceed.
* Run the **View State Revenue by Year by State Report** task:
  + Find all stores from the STORE table based on the *State\_Location* (from the CITY table) selected.
  + On every sale *date* (from the DAY table), find each product’s sale revenue based on Total\_Amount (from the SALE table).
    - Total\_Amount (from the SALE table) is calculated based on the Date purchased (from the DAY table), the Quantity (from the SALE table), and individual item price.
    - Individual item prices can be determined by Retail\_Price (from the PRODUCT table) or Discount\_Price (from the DISCOUNT table) when the product has a discount.
  + In each year, at each store in the selected state, find the total revenue by aggregating all products’ sale revenue on every sale date in that year.
  + Sort by sale year ascendingly, then sort by total revenue in descending order for each store in the selected state, display Store\_Number (from the STORE table), Street\_Address (from the STORE table) of the store, and City\_Name (from the CITY table).

SELECT STORE.Store\_Number, Street\_Address, City\_Name, YEAR(Date), SUM(IFNULL(Total\_Amount, 0)) AS Revenue

FROM STORE LEFT OUTER JOIN SALE ON STORE.Store\_Number = SALE.Store\_Number

WHERE State\_Location = '$State\_Location'

GROUP BY STORE.Store\_Number, YEAR(Date)

ORDER BY YEAR(Date) ASC, Revenue DESC;

* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Groundhog Day Outdoor Furniture Report

Abstract Code

* User clicked on the ***View Groundhog Day Outdoor Furniture Report*** button from the **Dashboard** form.
* Run the **View Groundhog Day Outdoor Furniture Report** task:
* Get and return the year (from the DAY table).
* For each year:
  + - Get the outdoor furniture category (from the CATEGORY table).
    - Get Quantity data for the products sold (from the SALE table) at the specific Date that year (from the DAY table); Find total number of products sold by aggregating Quantity in all sale days that year.
    - Find average number of products sold per day by dividing total number of products sold by 365.
    - Find total number of products sold on Groundhog Day (Feb 2) using Quantity and Date (from SALE and DAY tables).
  + Sort by year in ascending order.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

Get Year and Month List

Abstract Code

* User clicked on the ***View State with Highest Volume by Category Report*** button from the **Dashboard** form.
* Run the **Get Year and Month List** task: query for information about the available *year* and *month* fields from the DAY table.
  + Display both *year* and *month* lists in descending order on the drop-down list.
* On the drop-down list, show ***Run Report*** button.
* Upon:
  + Click ***Run Report*** button –
    - If both *year* and *month* are selected – Jump to the **View State with Highest Volume by Category Report** task.
    - If one or both fields are empty – Display a message asking for user input.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View State with Highest Volume by Category Report

Abstract Code

* User clicked on the ***Run Report*** button from the drop-down list.
* If data validation is successful for both *year* and *month* input fields, then proceed.
* Run the **View State with Highest Volume by Category Report** task:
  + Find all Sales data from the SALE table based on the *year* and *month* (from the DAY table) selected.
  + Get all categories by using Category\_Name data (from the CATEGORY table).
  + In each category, aggregate each state’s sales Quantity data (from the SALE table) by adding up all stores (from the STORE table)’s sales Quantity in each state (from the CITY table).
  + Find the states that sold the highest number of units in each category.
    - If two or more states tied for having the greatest number of units, then save all those states and their total units.
  + Sort by category name ascendingly, display each category name, its corresponding states with the highest units sold and total units sold.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Revenue by Population Report

Abstract Code

* User clicked on the ***View Revenue by Population Report*** button from the **Dashboard** form.
* Run the **View Revenue by Population Report** task:

SET SESSION TRANSACTION ISOLATION LEVEL READ UNCOMMITTED;

SELECT Src.citysize, Src.saleyear, SUM(Src.revenue)

FROM (

SELECT

CASE City.population

WHEN City.population < 3700000 THEN "small"

WHEN (City.population >= 3700000 AND City.population < 6700000) THEN "medium"

WHEN (City.population >= 6700000 AND City.population < 9000000) THEN "large"

ELSE "extralarge" END AS citysize,

YEAR(Sale.date) AS saleyear,

Sale.total\_amount AS revenue

FROM City

INNER JOIN Store ON City.state\_location = Store.state\_location AND City.city\_name = Store. city\_name

INNER JOIN Sale ON Store.store\_number = Sale.store\_number

INNER JOIN Day ON Sale.date = Day.date

) Src

GROUP BY Src.citysize, Src.saleYear

ORDER BY Src.citysize;

SET SESSION TRANSACTION ISOLATION LEVEL REPEATABLE READ;

* + Find the year, Population\_Size\_Category and sale’s Total\_Amount from the DAY, SALE, STORE, and CITY tables.
  + Group by year and Population\_Size\_Category, and then aggregate the Total\_Amount as total revenue.
  + Display Total Revenue in a tabular form:
    - Row: year, sorted in ascending order.
    - Column: Population\_Size\_Category, sorted in ascending order.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Childcare Sales Volume Report

Abstract Code

* User clicked on the ***View Childcare Sales Volume Report*** button from the **Dashboard** form.
* Run the **View Childcare Sales Volume Report** task:

SET SESSION TRANSACTION ISOLATION LEVEL READ UNCOMMITTED;

SELECT

Src.Store\_Number,

Src.TimeLimit,

SUM(IF(salemonth = 'Jan', revenue, 0)) AS 'Jan',

SUM(IF(salemonth = 'Feb', revenue, 0)) AS 'Feb',

SUM(IF(salemonth = 'Mar', revenue, 0)) AS 'Mar',

SUM(IF(salemonth = 'Apr', revenue, 0)) AS 'Apr',

SUM(IF(salemonth = 'May', revenue, 0)) AS 'May',

SUM(IF(salemonth = 'Jun', revenue, 0)) AS 'Jun',

SUM(IF(salemonth = 'Jul', revenue, 0)) AS 'Jul',

SUM(IF(salemonth = 'Aug', revenue, 0)) AS 'Aug',

SUM(IF(salemonth = 'Sep', revenue, 0)) AS 'Sep',

SUM(IF(salemonth = 'Oct', revenue, 0)) AS 'Oct',

SUM(IF(salemonth = 'Nov', revenue, 0)) AS 'Nov',

SUM(IF(salemonth = 'Dec', revenue, 0)) AS 'Dec'

FROM

(

SELECT

Store.store\_number,

DATE\_FORMAT(Sale.Date, "%b") AS salemonth,

Sale.total\_amount AS revenue,

Childcare.timelimit

FROM Store

INNER JOIN Sale ON Store.store\_number = Sale.store\_number AND Sale.Date >= Date\_add(Now(),interval - 12 month)

LEFT JOIN Childcare ON Store.timelimit = Childcare.timelimit

) Src

GROUP BY Src.store\_number, Src.timelimit;

SET SESSION TRANSACTION ISOLATION LEVEL REPEATABLE READ;

* + Find and aggregate the store monthly sales from the SALE and STORE tables based on the Store\_Number (from the STORE table) and month (Date from the DAY and SALE tables) based on the last 12 months.
  + Find stores with and without childcare category from the STORE and CHILDCARE tables.
  + Group the total sales by month and by childcare category (no childcare offer will be grouped as category “No childcare”).
  + Display Total Sale in a tabular form:
    - Row: month, sorted in ascending order.
    - Column: childcare category.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Restaurant Impact on Category Sales Report

Abstract Code

* User clicked on the ***View Restaurant Impact on Category Sales Report*** button from the **Dashboard** form.
* Run the **View Restaurant Impact on Category Sales Report** task:
  + Get all Category\_Name data that has product(s) assigned (from CATEGORY and PRODUCT tables).
  + For each category:
    - Get products in this category (from CATEGORY and PRODUCT tables).
    - Find stores with Has\_Restaurant (from the STORE table) = TRUE:
      * Display store type with value “Restaurant”.
      * Find total quantity sold by aggregating all Quantity (from the SALE table) of all products for these stores.
    - Find stores with Has\_Restaurant (from the STORE table) = FALSE:
      * Display the store type with value “Non-Restaurant”.
      * Find total quantity sold by aggregating all Quantity (from the SALE table) of all products for these stores.
* Group by Category\_Name ascendingly and with “Non-Restaurant” store data listed first.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.

View Advertising Campaign Analysis Report

Abstract Code

* User clicked on the ***View Advertising Campaign Analysis Report*** button from the **Dashboard** form.
* Run the **View Advertising Campaign Analysis Report** task: query for information about quantity sold during and outside campaign for all products from DISCOUNT, PRODUCT, SALE, DAY, and ADVERTISING\_CAMPAIGN tables.
  + Get Discount\_Price data for all products (from the DISCOUNT table).
  + While a Product has Discount\_Price:
    - Get PID and Product\_Name data (from the PRODUCT table).
    - Get Quantity data for this product sold during campaign (from SALE and ADVERTISING\_CAMPAIGN tables) at the specific discount Date (from DAY and DSICOUNT tables); Find total quantity sold during campaign by aggregating Quantity in all discount sale days that hold a campaign.
    - Get Quantity data for this product sold outside campaign (from SALE and ADVERTISING\_CAMPAIGN tables) at the specific discount Date (from DAY and DSICOUNT tables); Find total quantity sold outside campaign by aggregating Quantity in all discount sale days without a campaign.
    - Find difference by subtracting quantity sold outside campaign from quantity sold during campaign.
* Sort by difference in descending order and only display the top 10 followed by the bottom 10.
* When ready, user can click on the ***Return*** button to return to the **Dashboard** form.