Team 104 Phase 1 Report

CS6400 Spring 2021

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# Data Types

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Entity | Attribute | Data Type | Description | Example |
| Store | **Store Number** | Integer | 10-digit integer | 1324605879 |
| Store | **Phone Number** | Varchar | 10-digit integer | 5162243274 |
| Store | **Street Address** | Varchar | Max 60-digit string | 123 abc rd |
| Store | **Childcare Limit** | Integer | Max 3-digit integer | 60 |
| Store | **Snack Bar** | Boolean | (Y/N) or (True/False) | Y or True |
| Store | **Restaurant** | Boolean | (Y/N) or (True/False) | Y or True |
| City | **Name** | Varchar | Max 30-character string | New York City |
| City | **State** | Varchar | 2 character string | NY |
| City | **Population** | Integer | Max 15-digit integer | 1528235 |
| Sales | **Qty** | Integer | Max 15-digit integer | 1420 |
| Product | **PID** | Integer | Max 10-digit integer | 1902348675 |
| Product | **Name** | Varchar | Max 30-character string | Super Comfy Chair |
| Product | **Retail Price** | Decimal | Max 15-digit decimal with 2 decimal places | 132.40 |
| Category | **Name** | Varchar | Max 30-character string | Sofas |
| Discount | **Discount Price** | Decimal | Max 15-digit Decimal with 2 decimal places | 98.23 |
| Date | **Date** | Date | YYYY-MM-DD | 2021-02-15 |
| Campaign | **Description** | Varchar | Max 60-character string | Summer Radio Ads |
| Holiday | **Holiday Name** | Varchar | Max 30-character string | Christmas |

We have used foundational data types. However, some data types may change in later phases of the project depending on our choice of database. For example, MySQL does not have a Boolean data type whereas PostgreSQL does.

# Business Logic Constraints

1. A **Store’s** **Childcare Limit** must not be below 0
2. A **Store’s** **Store Nbr**, **Phone** **Number**, **Street** **Address**, **Childcare** **Limit**, **Snackbar**, **Restaurant** cannot be Null
3. **City** **Name** must be in United States
4. **City** **State** must be in United States
5. **City** **Name**, **State**, and **Population** cannot be Null
6. **Product** cannot be sold at **Retail** **Price** and **Discount** **Price** for a single date
7. The **Discount** **Price** that is related to a **Product** must be less than the **Retail** **Price** of the **Product**
8. **Product** **PID**, **Name**, and **Retail** **Price** cannot be Null

# Task Decomposition and Abstract Code

## Main Menu:

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get List of **Categories** sorted alphabetically

For Each **Category**

## Update Populations

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get List of **Categories** sorted alphabetically

For Each **Category**

## Update Holidays:

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get List of **Categories** sorted alphabetically

For Each **Category**

## Report 1:

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get List of **Categories** sorted alphabetically

For Each **Category**

Get all **Products** and **Prices** that match the category

Count all **Products**

Average their **prices**

Find the Max **Price**

Find the Min **Price**

Display the four numbers

## Report 2

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get a list of **PID** in category “Couches and Sofas”

For each **PID**:

Get the list of **discounted dates**

For each **discounted date**:

Get the **Sales Qty** for this PID for this date

Get the **Discounted Price**, **Retail Price** for this **PID** and **date**

Calculate Actual Revenue as **Discounted Price** \* **Sales Qty**

Calculated Projected Qty as **Sales Qty**\*0.75

Calculate Projected Revenue as **Retail Price** \* **Projected Qty**

Sum up the Actual Revenue, Projected Revenue, Sales Qty, Projected Qty

Calculate Revenue Difference as Actual Revenue – Projected Revenue

Display **PID**, **Product Name**, **Retail Price**, **Sales Qty,** Actual Revenue, Predicted Qty, Projected Revenue

Order by Diff Desc

## Report 3

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get list of **States** for all **Cities**

Display **States**

When a button is pushed, then do the following:

Get list of Stores using the selected **State**

For each **Store:**

Get **Store** **Nbr** and **Store** **Address**

Get **City** **Name** from **City**

Get list of **Sales** for **Store**

Get list of **Dates** from **Sales**

Calculate list of Years from **Dates**

For each Year:

For each **Sale** within Year:

Get **Date** of **Sale**

Get **PID** of **Sale**

If **Discount** of **Date** and **PID** exists:

Get **Discount** **Price** as Price

Else:

Get **Retail** **price** as Price

Get **Sales** **Qty** of **Sale**

Sum (**Sales** **Qty** \* Price) for each Year AS Total Year Revenue

Sum Total Year Revenue for each **Store** AS Total Revenue

Display **Store** **Nbr**, **Store** **Address**, **City** **Name**, Year, Total Revenue

Sort by Total Revenue descending and Year ascending;

## Report 4

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get list **Dates** from **Calendar**

Calculate list of Years from **Dates**

Get the list of **PIDs** that belong to the Category **Name** “Outdoor Furniture”

For Each **PID:**

Get the Sales for that **PID**

For each **Date** from the Sales

Get the Sale **Qty**

Add the Sale to the bucket for that Year

If the date of the sale is February 2:

Add the sale to the bucket for “Groundhog Day” for that year.

Divide the totals in each Year bucket by 365 to get Year Daily Average

Display Year Daily Average and “Groundhog Day” numbers.

## Report 5

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get list **Dates** from **Calendar**

Calculate list of Months and Year from **Dates**

Display the years and months

Let the user select one year-month set.

Get the list of Categories in ascending order.

With each Category

Get the list of **PIDs** for that category

With each **PID**

Get the Sales for that **PID** for the required Year and Month.

For each **Sale**

Get the **Store Number** for the sale

Get the **State** for that **Store Number**

Sum up all the Sales quantities by **State**

Select the **State** (or **states**) with the Highest Total Unit Sale

List out the top State or **States**

## Report 6

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get list of all **City Names** and their **population**

For each **City Name:**  
Assign Each **city** to a population category using condition\*\*

For each population category:

Get the list of **cities** for that category

For each **city:**

Get the list of stores in the city

For each **Store:**

Get the total sales by **PID** by date  
For each **PID**:

If the **sales** happed on a discount date:

Then Revenue is **Sales**\* **Discount price**

Else:

Revenue is **Sales**\* **Retail price**

Sum up revenue by year

Sum up annual revenues for this category

\*\* 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).

## Report 7

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get list **Dates** of **Sales**

Calculate list of Months from **Dates**

Limit Month list to most recent 12 months

Get list of **Childcare** **Limits**

For each **Childcare** **Limit**:

Get list of **Stores** with **Childcare** **Limit**

For each Month:

For each **Store**:

Get list of **Sales**

For each **Sale:**

Get **Date** of **Sale**

Get **PID** with **Sale**

If **Discount** of **Date** and **PID** exists:

Get **Discount** **Price** as Price

Else:

Get **Retail** **price** as Price

Get **Sales** **Qty** of **Sale**

Sum (**Sales** **Qty** \* Price) as Total Revenue

Display **Childcare** **Limit**, Month, Total Revenue

IF **Childcare** **Limit** = 0:

**Childcare** **Limit** = “No Childcare”

## Report 8

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get the List of **Categories**

For each **Category**

Get the list of **PIDs** for the **Category**

For each **PID**:

Get all the **Sales**

For each **Sale:**

Get the **Store**

Check if the Store has a **Restaurant Y/N**.

If the **Store** has a **Restaurant**

Add the Sale Qty to the Restaurant bucket for that Category

Else:

Add the Sale Qty to the Non-Restaurant bucket for that Category

Display the total **Sale Qty** for the Restaurant and non-Restaurant bucket for this **Category**

## Report 9

### Task Decomposition

**Lock Types:**

**Number of Locks:**

**Enabling Conditions:**

**Frequency:**

**Consistency (ACID):**

**Subtasks:**

### Abstract Code

Get the list of all **PIDs**

For each **PID**

Get the **Discount Dates** for the **PID**

For each **Discount Date**

Get the **Sales** for that **PID** for that **Date**.

Check to see if the **Discount/Sale Date** also had an **advertising campaign** running on the same **Date**.

Assign the **Sales** to either the Campaign or non-Campaign bucket.

Sum up the **sales** for each bucket.

Get the differences for each bucket

Put all the **PID, Product Names**, campaign, non-campaign and difference numbers in descending order by difference.

Display the top 10 and bottom 10.