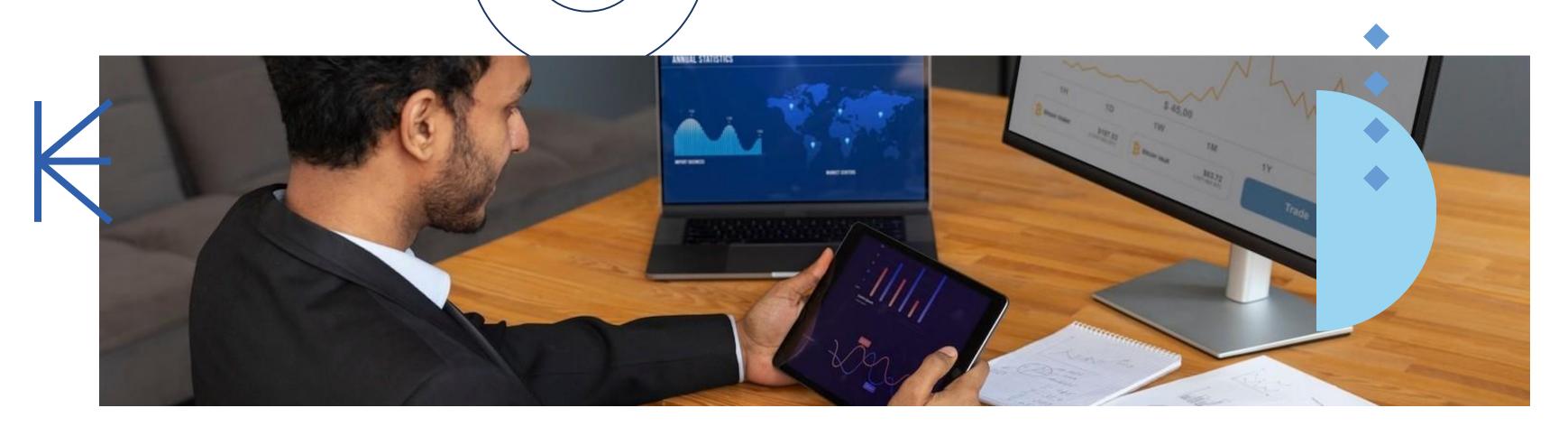# Advanced SQL Data Analysis for Maven Toys: Insights and Strategies
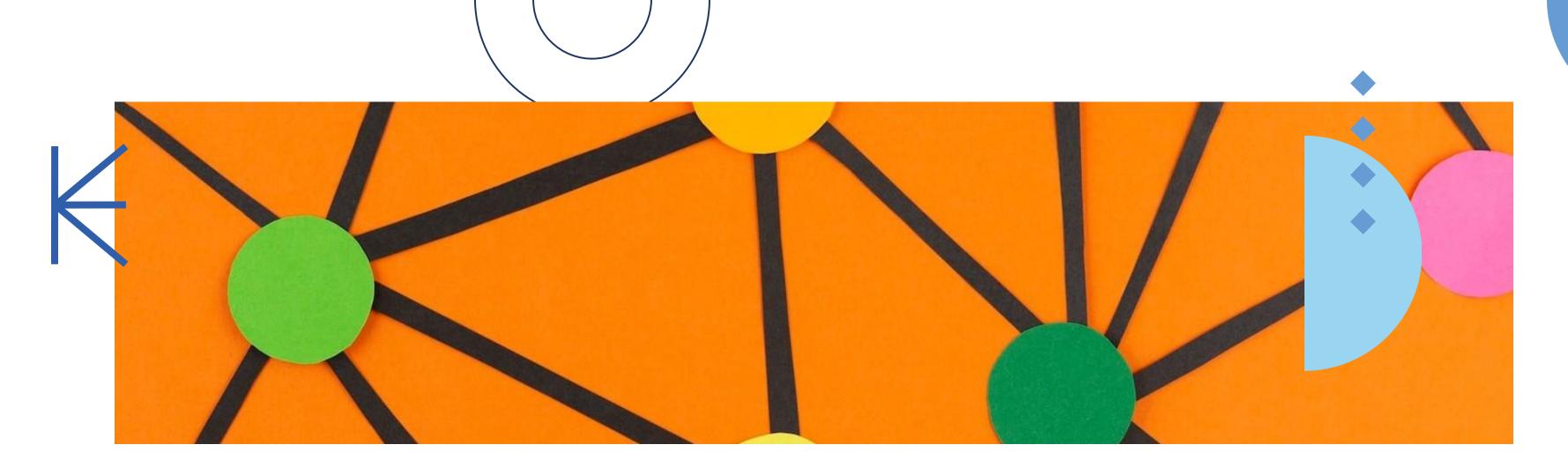
By Prashant Singh

Introduction to SQL

In this presentation, we will explore **Advanced SQL Data Analysis** techniques tailored for Maven Toys. Our focus will be on deriving **insights** and formulating **strategies** that can enhance decision-making and operational efficiency. Let's delve into the world of SQL and its capabilities.

Understanding Data Structures

To effectively analyze data, it's crucial to understand the underlying **data structures**. We will discuss **tables**, **relationships**, and **schemas** used in Maven Toys' database. This foundation will help us in crafting efficient queries and analyses.

Our Datasets(in CSV's) :

- **Inventory Table**:
  - Store_ID
  - Product_ID
  - Stock_On_Hand

- **Products Table**:
  - Product_ID
  - Product_Name
  - Product_Category
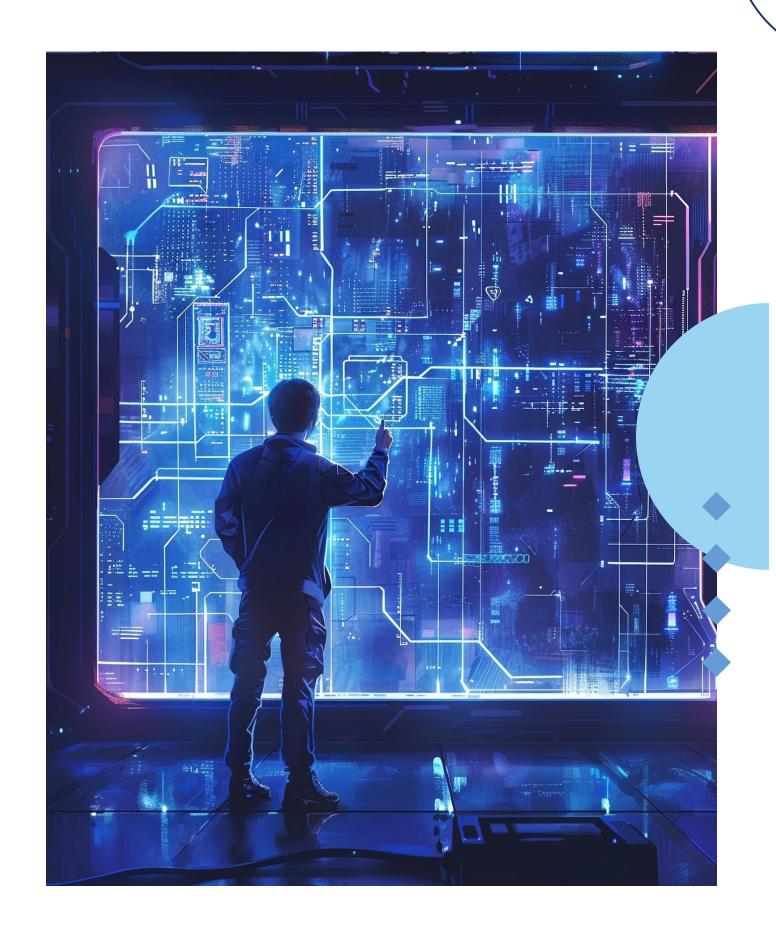 - Product_Cost
  - Product_Price

- **Sales Table**:
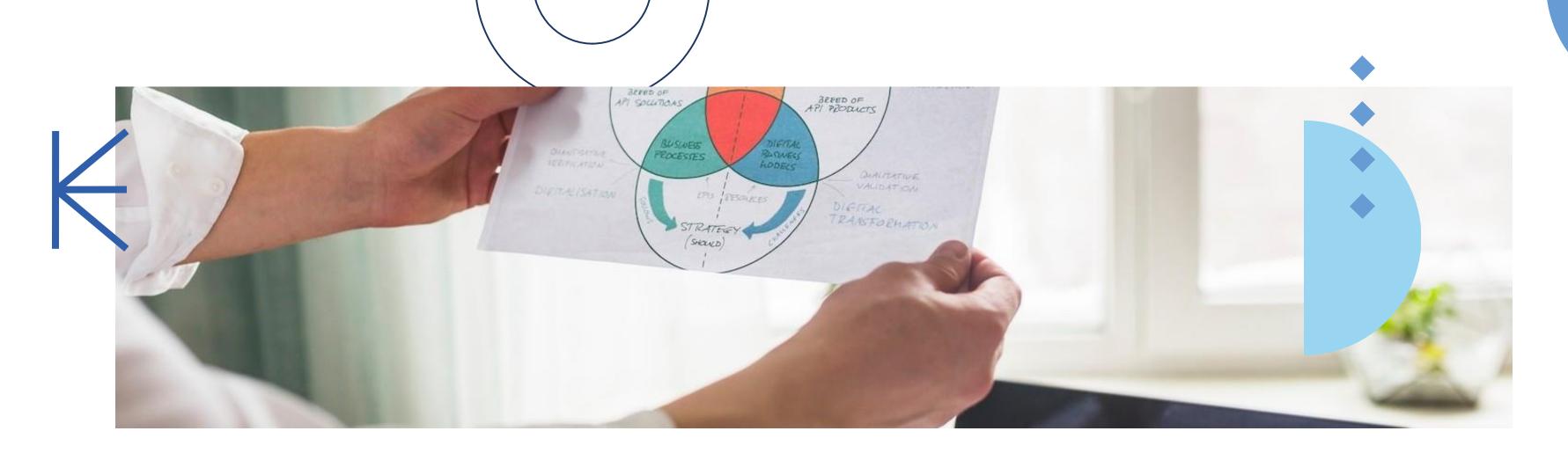 - Sale_ID
  - Date
  - Store_ID
  - Product_ID
  - Units

- **Stores Table**:
  - Store_ID
  - Store_Name
  - Store_City
  - Store_Location
  - Store_Open_Date

Key Findings:

--1. What is the total sales revenue generated by each store?
--2. Which products are the top-selling in terms of units sold?
--3. What is the sales performance by product category?
--4. What are the current inventory levels for each product at each store?
--5.How do monthly sales trends vary across different stores?
--6.Which stores have the highest and lowest sales performance?
--7. What is the profit margin for each product?
--8.How are sales distributed across different cities?
--9.Which products are out of stock in each store?
--10.How do sales vary by specific dates?
--11.What is the average cost of products in each category?
--12.What is the sales growth over time for the entire company?
--13.How does the store open date affect sales performance?
--14.What percentage of total sales does each store contribute?
--15.How do sales compare to current stock levels for each product?
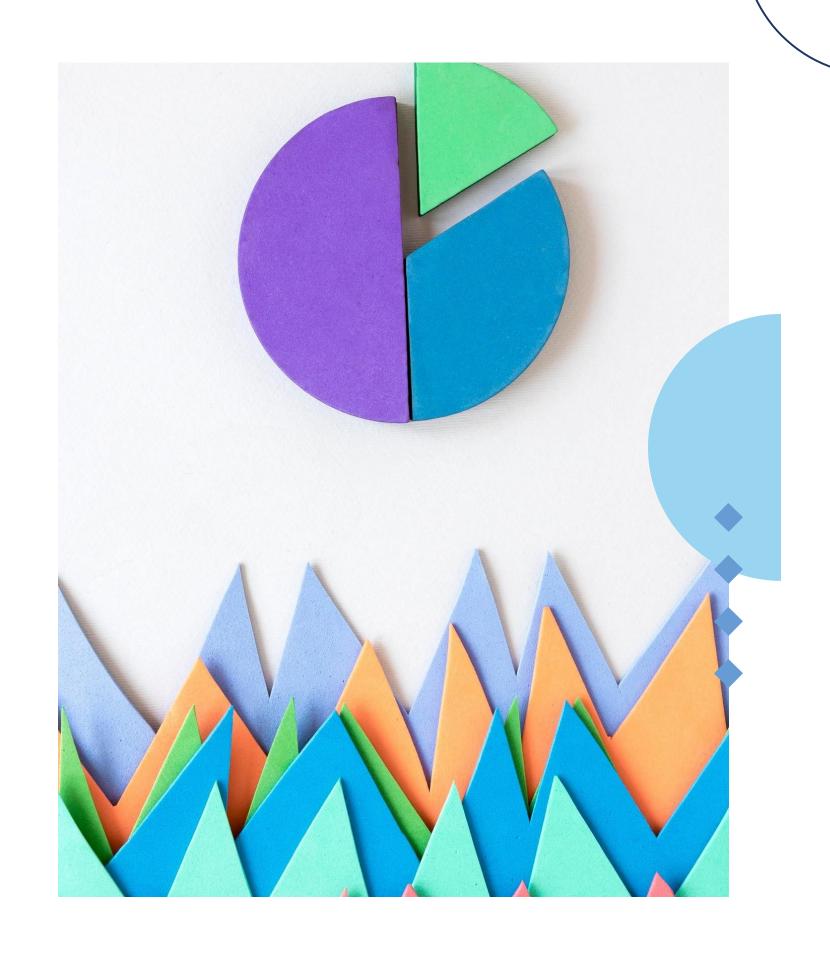
Data Cleaning Techniques

1. We Change all csv file to sql files using online sql compiler.

2. We Change formatting in product_cost, product_price to integer value and remove "$" sign using replace function in sql in product table.

3. We also change date format to timestamp and units format to integer in sales table.

Analyzing Sales Data

We will focus on analyzing sales data to uncover trends and patterns. We will use SQL to know our all key findings(15).

(1). Total Sales revenue generated by each Store :

- This is the list of Total Sales generated by each store.

• Store_ID 31 (Maven Toys Ciudad de Mexico 2) have the highest total sales among all that is equivalent~ 554.6k.

• Store_ID 26 (Maven Toys Campeche 2) have the lowest total sales among all that is equivalent~ 206.6k.

i	Store_ID	Store_Name	Total_Sales_Revenue
1		Maven Toys Guadalajara 1	261842.89
2		Maven Toys Monterrey 1	277959.14
3		Maven Toys Guadalajara 2	262435.02
4		Maven Toys Saltillo 1	330408.9
5		Maven Toys La Paz 1	210897.83
6		Maven Toys Mexicali 1	294019.42
7		Maven Toys Monterrey 2	372998.82
8		Maven Toys Pachuca 1	237676.15
9		Maven Toys Ciudad de Mexico 1	433556.21
10		Maven Toys Campeche 1	311786.44
11		Maven Toys Cuernavaca 1	221587.26
12		Maven Toys Chetumal 1	258919.35
13		Maven Toys Mexicali 2	292156.43
14		Maven Toys Guanajuato 1	313916.6
15		Maven Toys Tuxtla Gutierrez 1	229698.27
16		Maven Toys San Luis Potosi 1	263389.65
17		Maven Toys Toluca 1	411157.32
18		Maven Toys Merida 1	232097.72
19		Maven Toys Puebla 1	258533.87
20		Maven Toys Zacatecas 1	229983.04
21		Maven Toys Santiago 1	277598.14

(2). Top Selling Products in terms of Units Sold :

1. Colorbuds (104368)

2. PlsyDoh Can (103128)

3. Barrel O'Slime (91663)

4. Desk Of Cards (84034)

5. Magic Sands (60598)

6. Splash Balls (60248)

7. Lego Bricks (59737)

8. Action Figure (57958)

9. Rubik's Cube (45672)

10. Animal Figures (39089)

10
Best Selling Products
Online in India

(3). Sales Performance by Product Category :

1. Art & Craft (2.70 Millions)

2. Electronics (2.25 Millions)

3. Games (2.23 millions)

4. Sports & Outdoors (2.17 millions)

5. Toys (5.09 Millions)

Product Category

A product category is a way for businesses to group and organize products or services they sell. When products are categorized, it is easier for customers to find what they're looking for on a website and employees to quickly refer to and find a product.

(4). Inventory levels for each product at each store:

- This is the list of Inventory levels for each product at each store.

- We can use this data for maintaining proper inventory, planning for storage and balancing our productions.

Store_Name	Product_Name	Stock_On_Hand
Maven Toys Guadalajara 1	Etch A Sketch	19
Maven Toys Guadalajara 1	Foam Disk Launcher	3
Maven Toys Guadalajara 1	Gamer Headphones	12
Maven Toys Guadalajara 1	Glass Marbles	3
Maven Toys Guadalajara 1	Hot Wheels 5-Pack	2
Maven Toys Guadalajara 1	Jenga	8
Maven Toys Guadalajara 1	Kids Makeup Kit	7
Maven Toys Guadalajara 1	Lego Bricks	11
Maven Toys Guadalajara 1	Magic Sand	25
Maven Toys Guadalajara 1	Mini Basketball Hoop	11
Maven Toys Guadalajara 1	Mini Ping Pong Set	21
Maven Toys Guadalajara 1	Monopoly	2
Maven Toys Guadalajara 1	Mr. Potatohead	1
Maven Toys Guadalajara 1	Nerf Gun	9
Maven Toys Guadalajara 1	PlayDoh Can	54
Maven Toys Guadalajara 1	PlayDoh Playset	13
Maven Toys Guadalajara 1	PlayDoh Toolkit	33
Maven Toys Guadalajara 1	Playfoam	10
Maven Toys Guadalajara 1	Plush Pony	4
Maven Toys Guadalajara 1	Rubik's Cube	44

(5). Monthly Sales Trends vary across different stores:

- This is the table showing monthly trends across stores.

- We can use this data for planning future strategies.

i Store_Name	month_value	Total_Sales
Maven Toys Aguascalientes 1	10	12216.93
Maven Toys Aguascalientes 1	11	12106.86
Maven Toys Aguascalientes 1	12	14827.59
Maven Toys Campeche 1	01	25321.96
Maven Toys Campeche 1	02	29049.69
Maven Toys Campeche 1	03	27455.49
Maven Toys Campeche 1	04	30108.86
Maven Toys Campeche 1	05	27151.99
Maven Toys Campeche 1	06	34462.57
Maven Toys Campeche 1	07	33322.71
Maven Toys Campeche 1	08	29263.14
Maven Toys Campeche 1	09	19421.43
Maven Toys Campeche 1	10	12206.93
Maven Toys Campeche 1	11	19363.14
Maven Toys Campeche 1	12	24658.53
Maven Toys Campeche 2	01	19758.86
Maven Toys Campeche 2	02	20137.08
Maven Toys Campeche 2	03	25315.77
Maven Toys Campeche 2	04	18657.6
Maven Toys Campeche 2	05	23056.32
Maven Toys Campeche 2	06	20077.7

(6). Stores have the highest and lowest sales performance?:

Store_Name	Total_Sales
Maven Toys Ciudad de Mexico 2	554553.43
Maven Toys Guadalajara 3	449354.91
Maven Toys Ciudad de Mexico 1	433556.21
Maven Toys Toluca 1	411157.32
Maven Toys Monterrey 2	372998.82
Maven Toys Guadalajara 4	348466.64

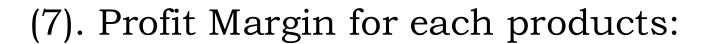- This table showing Highest sales performance.

- We clearly see Maven Toys Ciudad de Mexico 2 have the highest sales performance.

- This table showing Lowest sales performance.

- We clearly see Maven Toys Campeche 2 have the highest sales performance. (urgent need attention)

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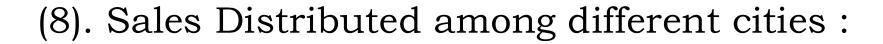| Store_Name	Total_Sales
Maven Toys Campeche 2	206055.23
Maven Toys La Paz 1	210897.83
Maven Toys Cuernavaca 1	221587.26
Maven Toys Durango 1	222318.78
Maven Toys Toluca 2	222364.36
Maven Toys Tuxtla Gutierrez 1	229698.27
Maven Toys Zacatecas 1	229983.04
Maven Toys Merida 1	232097.72

(7). Profit Margin for each products:

- This is the table showing Profit margin of different Products

- We can use this data for planning future strategies and cross-cutting techniques.

i Product_Name	Profit_Margin
Action Figure	37.52
Animal Figures	23.09
Barrel O' Slime	50.13
Chutes & Ladders	23.09
Classic Dominoes	20.02
Colorbuds	53.37
Dart Gun	25.02
Deck Of Cards	42.92
Dino Egg	9.1
Dinosaur Figures	26.68
Etch A Sketch	47.64
Foam Disk Launcher	25.02
Gamer Headphones	28.59
Glass Marbles	45.5
Hot Wheels 5-Pack	33.39
Jenga	70.07
Kids Makeup Kit	30.02
Lego Bricks	12.5
Magic Sand	12.51
Mini Basketball Hoop	64.03
Mini Ping Pong Set	30.03

(8). Sales Distributed among different cities :
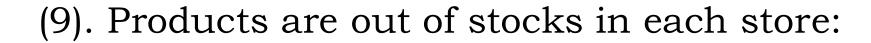
- This is the table showing sales distributed among cities.

- We can use this data for planning future strategies.

i Store_City	Total_Sales
Aguascalientes	239997.35
Campeche	517841.67
Chetumal	258919.35
Chihuahua	516713.04
Chilpancingo	242539.73
Ciudad Victoria	294803.99
Cuernavaca	221587.26
Cuidad de Mexico	1649492.01
Culiacan	251160.91
Durango	222318.78
Guadalajara	1322099.46
Guanajuato	869055.83
Hermosillo	903388.84
La Paz	210897.83
Merida	232097.72
Mexicali	586175.85
Monterrey	1261845.7
Morelia	273060.05

(9). Products are out of stocks in each store:

- This is the table showing out of stocks products in each store.

- We gain order from that store.
  We have to maintain inventory for those products.

Store_Name	Product_Name
Maven Toys Guadalajara 1	Animal Figures
Maven Toys Guadalajara 1	Classic Dominoes
Maven Toys Guadalajara 1	Toy Robot
Maven Toys Monterrey 1	Action Figure
Maven Toys Monterrey 1	Dino Egg
Maven Toys Monterrey 1	Etch A Sketch
Maven Toys Guadalajara 2	Hot Wheels 5-Pack
Maven Toys Guadalajara 2	Plush Pony
Maven Toys Saltillo 1	Toy Robot
Maven Toys La Paz 1	Etch A Sketch
Maven Toys La Paz 1	Foam Disk Launcher
Maven Toys La Paz 1	Hot Wheels 5-Pack
Maven Toys La Paz 1	Mini Ping Pong Set
Maven Toys La Paz 1	Playfoam
Maven Toys Mexicali 1	Action Figure
Maven Toys Monterrey 2	Dino Egg
Maven Toys Monterrey 2	Playfoam
Maven Toys Pachuca 1	Dino Egg
Maven Toys Pachuca 1	Gamer Headphones
Maven Toys Pachuca 1	Glass Marbles
Maven Toys Pachuca 1	Hot Wheels 5-Pack

(10). Salary Vary Specific Dates:

- This is the table showing salary vary specific dates.

- This table showing total sales on that particular date.

i Date	Total_Sales
2017-01-01	21076.15
2017-01-02	19750.94
2017-01-03	11759.5
2017-01-04	14814.4
2017-01-05	19791.3
2017-01-06	25685.54
2017-01-07	21927.21
2017-01-08	22253
2017-01-09	12262.67
2017-01-10	11709.4
2017-01-11	12995.12
2017-01-12	12845.78
2017-01-13	19813.12
2017-01-14	20650.89
2017-01-15	24218.86
2017-01-16	11565.94
2017-01-17	14874.41
2017-01-18	12351.78
2017-01-19	14573.26
2017-01-20	15907.48
2017-01-21	25991.42

(11). Average cost of products in each products category:

1. Art & Craft (13.12)

2. Electronics (20.66)

3. Games (12.37)

4. Sports & Outdoors (15.28)

5. Toys (15.99)

(12). Sales Growth over time for the entire company:

- This is the table showing growth over time for the entire company

- We can see the sales trend over months.

i Month	Total_Sales
01	1289751.13
02	1263983.84
03	1473000.83
04	1508764.05
05	1497689.39
06	1470279.47
07	1384383.09
08	1150299.8
09	1244038.52
10	623874.39
11	661304.15
12	877203.69

(13). Store open date affect sales performance :

- This is the table showing store open date affect sales performance.

- We can see store name, store open date, total sales.

i Store_Name	Store_Open_Date	Total_Sales
Maven Toys Guadalajara 1	1992-09-18	261842.88999999998
Maven Toys Monterrey 1	1995-04-27	277959.14
Maven Toys Guadalajara 2	1999-12-27	262435.02
Maven Toys Saltillo 1	2000-01-01	330408.9
Maven Toys La Paz 1	2001-05-31	210897.83
Maven Toys Mexicali 1	2003-12-13	294019.42
Maven Toys Monterrey 2	2003-12-25	372998.82
Maven Toys Pachuca 1	2004-10-14	237676.15
Maven Toys Ciudad de Mexico 1	2004-10-15	433556.21
Maven Toys Campeche 1	2005-01-14	311786.44
Maven Toys Cuernavaca 1	2005-04-19	221587.26
Maven Toys Chetumal 1	2006-05-05	258919.35
Maven Toys Mexicali 2	2006-08-30	292156.43
Maven Toys Guanajuato 1	2007-01-31	313916.6
Maven Toys Tuxtla Gutierrez 1	2007-03-05	229698.27
Maven Toys San Luis Potosi 1	2007-05-19	263389.65
Maven Toys Toluca 1	2007-12-09	411157.32
Maven Toys Merida 1	2008-08-22	232097.72
Maven Toys Puebla 1	2008-12-16	258533.87
Maven Toys Zacatecas 1	2009-05-29	229983.04
Maven Toys Santiago 1	2009-11-23	277598.14

(14). Percentage of total sales does each store contribute:

- This is the table showing percentage of total sales does each store contribute.

- We can see store name, sales percentage.

Store_Name	Sales_Percentage
Maven Toys Aguascalientes 1	1.661505402754274
Maven Toys Campeche 1	2.1585023941536075
Maven Toys Campeche 2	1.4265235758260437
Maven Toys Chetumal 1	1.7925027043116302
Maven Toys Chihuahua 1	1.7169653347334994
Maven Toys Chihuahua 2	1.8602471121272068
Maven Toys Chilpancingo 1	1.6791063392056742
Maven Toys Ciudad Victoria 1	2.040932627541583
Maven Toys Ciudad de Mexico 1	3.001516413879848
Maven Toys Ciudad de Mexico 2	3.839182057889032
Maven Toys Ciudad de Mexico 3	2.3359961916767995
Maven Toys Ciudad de Mexico 4	2.2427642864760897
Maven Toys Cuernavaca 1	1.5340520621228362
Maven Toys Culiacan 1	1.738790903006554
Maven Toys Durango 1	1.53911638650913
Maven Toys Guadalajara 1	1.8127424173966633
Maven Toys Guadalajara 2	1.8168417426355998
Maven Toys Guadalajara 3	3.1108910607519644
Maven Toys Guadalajara 4	2.412439916900274
Maven Toys Guanajuato 1	2.173249525106224
Maven Toys Guanajuato 2	1.9310136931814392

(15). sales compare to current stock levels for each product:

- This is the table showing sale compare to current stock levels for each products.

- We can use this data for planning future strategies and maintaining inventory.

i Product_Name	Total_Units_Sold	Stock_On_Hand
Action Figure	289790	0
Action Figure	57958	1
Action Figure	173874	2
Action Figure	57958	3
Action Figure	57958	4
Action Figure	231832	5
Action Figure	115916	6
Action Figure	57958	7
Action Figure	231832	8
Action Figure	231832	10
Action Figure	173874	11
Action Figure	57958	13
Action Figure	57958	14
Action Figure	115916	15
Action Figure	57958	16
Action Figure	57958	17
Action Figure	57958	18
Action Figure	57958	19
Action Figure	173874	21
Action Figure	57958	22
Action Figure	57958	23

Challenges in SQL Analysis

Despite its advantages, SQL data analysis comes with challenges such as **performance issues**, **complex queries**, and **data volume management**. We will address these challenges and discuss strategies to overcome them.

1. Indexing: Add indexes on frequently queried columns but avoid over-indexing.
2. Avoid SELECT : Select only the columns needed.
3. Efficient WHERE Clauses: Use indexed columns in `WHERE` clauses.
4. Limit Results: Use `LIMIT` or `TOP` to restrict result sets.
5. Optimize Joins: Join on indexed columns and choose the right join type.
6. Normalize Data: Ensure proper normalization to reduce redundancy.
7. Consider Denormalization: Denormalize for faster reads when necessary.
8. Partition Tables: Use partitioning to manage large tables.
9. Update Statistics: Keep database statistics current for accurate query optimization.
10. Rebuild Indexes: Regularly rebuild or reorganize indexes to reduce fragmentation.
11. Clean Up Data: Archive or delete old data to maintain performance.
12. Analyze Query Plans: Use execution plans to identify and address bottlenecks.
13. Optimize Subqueries: Rewrite subqueries as joins or use CTEs for better performance.
14. Manage Transactions: Keep transactions short and minimize lock contention.
15. Tune Database Configurations: Adjust database settings for optimal performance.
16. Optimize Hardware: Ensure adequate and efficient use of server resources.
17. Batch Operations: Group multiple operations into a single transaction where possible.
18. Implement Caching: Cache frequently accessed data to reduce database load.
19. Use Engine-Specific Tools: Leverage database-specific features and tools for optimization.
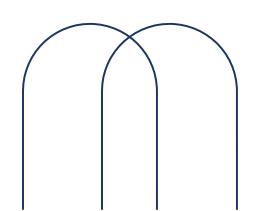
Conclusion and Future Steps

In conclusion, mastering **Advanced SQL Data Analysis** is crucial for Maven Toys' success. By implementing the insights and strategies discussed, we can enhance data-driven decision-making and drive business growth. Let's embrace these methodologies for future success.

Thanks!

DO YOU HAVE ANY QUESTIONS?

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