Anupama Bhatta

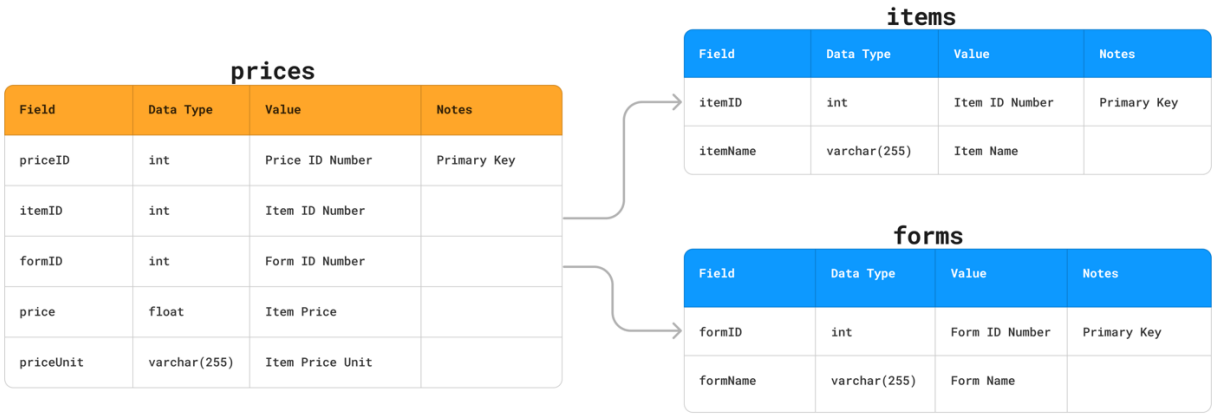
Professor Michael Hess

SI 564

November 29, 2023

Final Project: Fruits and Vegetable Prices in USA

Entity-Relationship Diagram (ERD)



From: Lawrence Summerset

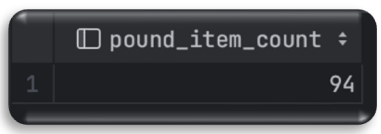
To: DBA team

Dear DBA team,

I trust this message finds you all well! Our research group has recently acquired a massive dataset containing information on fruits and vegetable prices in the USA. Unfortunately, I find myself overwhelmed with the intricacies of this dataset, and your support in deciphering it would be immensely beneficial.

We are interested in a handful of data points from the *fruits_n_veggies* data.

1. How many items in the dataset have a *priceUnit* of "pound"?
   -> There are a total of 94 items in the dataset that have a *priceUnit* of "pound".
   Queries:
   i. USE fruits_n_veggies;
   ii. SHOW tables;
   iii. SELECT COUNT(1) AS pound_item_count FROM prices WHERE priceUnit LIKE '%pound%';
   Screenshots:



2. Can you list all distinct forms and the count of items associated with each form?
   -> All the distinct forms and the count of items associated with each form are listed in the screenshot below.
   Queries:
   i. SELECT f.formName, COUNT(DISTINCT i.itemID) AS item_count FROM forms f LEFT JOIN prices p ON f.formID = p.formID LEFT JOIN items i ON p.itemID = i.itemID GROUP BY f.formName;
   Screenshots:

	formName	item_count
1	Canned	23
2	Dried	12
3	Fresh	39
4	Frozen	19
5	Juice	7

3. What are the top 5 most expensive items, including their prices and the forms they belong to?
   -> The top five most expensive items, including their prices and the forms they belong to are listed in the screenshot below.
   Queries:
   i. SELECT i.itemName, ROUND(p.price, 2) as price, f.formName FROM prices p JOIN items i ON p.itemID= i.itemID JOIN forms f ON p.formID = f.formID ORDER BY p.price DESC LIMIT 5;
   Screenshots:

	itemName	price	formName
1	Mangoes	10.55	Dried
2	Asparagus	6.7	Frozen
3	Pineapple	6.65	Dried
4	Raspberries	6.64	Fresh
5	Apricots	6.62	Dried

4. Calculate the average price for each *priceUnit* across all items.
   -> The average price for each *priceUnit* across all items is listed in the screenshot below.
   Queries:
   i. SELECT priceUnit, ROUND(AVG(price), 2) AS avg_price FROM prices GROUP BY priceUnit;
   Screenshots:

	priceUnit	avg_price
1	per pound	2.41
2	per pint	1.33

5. What is the average price of items for each form, displayed in descending order of average price?
   -> The average price of items for each form, displayed in descending order of average price is listed in the screenshot below.
   Queries:
   i. SELECT f.formName, ROUND(AVG(p.price), 2) AS avg_price FROM prices p JOIN forms f ON p.formID = f.formID GROUP BY f.formName ORDER BY avg_price DESC;
   Screenshots:

	formName	avg_price
1	Dried	4.29
2	Frozen	2.62
3	Fresh	2.27
4	Canned	1.56
5	Juice	1.24

6. What is the total amount spent on items for each form?
   -> The total amount spent on items for each form is listed in the screenshot below.
   Queries:
   i. SELECT f.formName, SUM(p.price) AS total_price FROM forms f LEFT JOIN prices p ON f.formID = p.formID GROUP BY f.formName;
   Screenshots:

	formName	total_price
1	Fresh	88.43
2	Canned	35.84
3	Juice	8.69
4	Dried	51.54
5	Frozen	49.73

7. What are the forms with the highest price variation among their items?
   -> The forms with the highest price variation among their items are listed as below,
   Queries:
   i. SELECT f.formName, ROUND(MAX(p.price) - MIN(p.price), 2) AS price_variation FROM prices p JOIN forms f ON p.formID = f.formID GROUP BY f.formName ORDER BY price_variation DESC;
   Screenshots:

	formName	price_variation
1	Dried	9.26
2	Fresh	6.28
3	Frozen	5.17
4	Canned	3.65
5	Juice	2.54

Lastly, can you please create an outline of why you made the database design choices you made? Examples of database design choices could be explaining what the primary table in the database is and why it's an important table (maybe it's the table that connects all other tables together in your database). You could also discuss other table relationships, or if you chose not to include specific fields/tables that were in your original data source explaining why you made those choices.
-> The *fruits_n_veggies* database showcases a deliberate design with three core tables: *items* for fruits and vegetables, *forms* for different varieties or forms of said fruits and vegetables, and *prices* for linking *items* and *forms* with pricing information. The *prices* table is my central table as it establishes crucial relationships between *items* and *forms* and connects various facets of the database. It employs auto-incrementing primary keys for unique identifiers and maintains referential integrity through foreign keys, which have been established for both *itemID* and *formID* across tables. In the *prices* table, the *itemID* field is a foreign key that references the *itemID* field in the *items* table. This relationship ensures that every entry in the *prices* table, representing a specific pricing instance, is associated with a valid item from the *items* table. Similarly, the *formID* field in the *prices* table is a foreign key that references the *formID* field in the *forms* table, establishing a connection between pricing information and various forms or varieties in the database. These foreign key constraints enforce referential integrity, preventing the creation of "orphaned" records and maintaining consistency in the relationships between items, forms, and prices.

To summarize, the structure reflects a normalized design, minimizing redundancy and optimizing data integrity. The choice of separate tables for distinct entities (*items*, *forms*, and *prices*) supports flexibility, allowing seamless additions without necessitating substantial schema alterations.

Database Export
The database export file has been linked here as fruits_n_veggies.sql and also submitted separately to Canvas.
Queries:
i. mysqldump --set-gtid-purged=OFF -h 34.71.12.223 --port 10940 -u axbhatta-rw -p fruits_n_veggies > fruits_n_veggies.sql

Thank you for your help on this matter! I'm looking forward to seeing your results.

Dr Lawrence Summerset

Head of Research

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Fruits & Vegetable Prices in the USA

Data Source: kaggle

Most Interesting Aspect: commonplace objects, typical everyday interaction

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Fruits and Vegetable Prices in USA:

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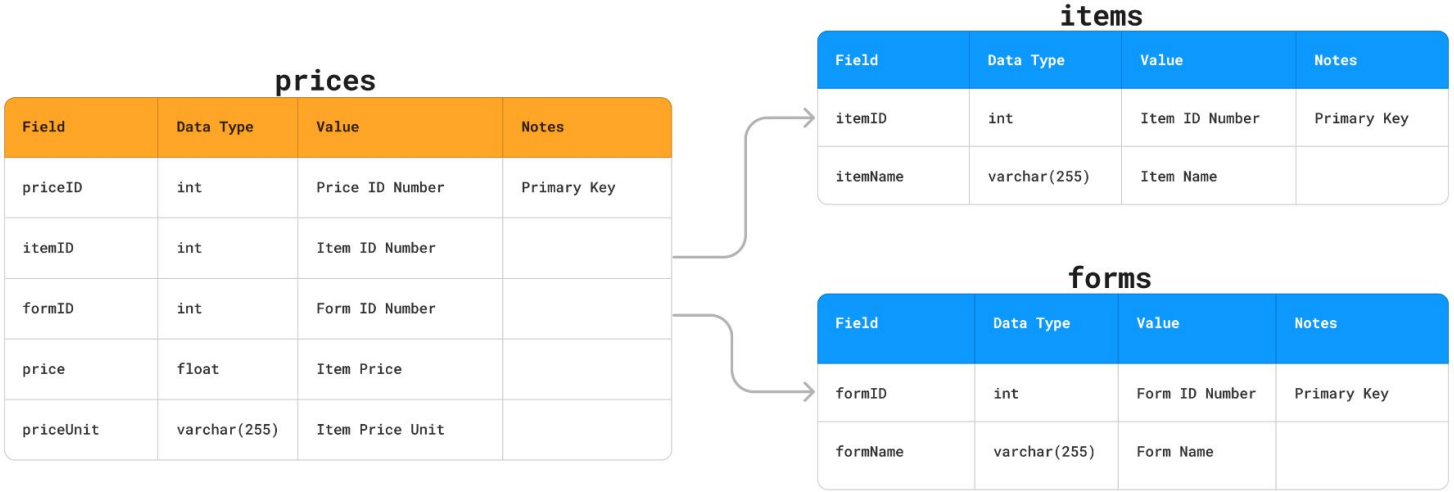

Most complicated aspect:
Manually (and carefully!) inputting 100 rows of data into the *prices* table.

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7. What are the forms with the highest price variation among their items?
-> The forms with the highest price variation among their items are listed as below,

Queries:

```
i. SELECT f.formName, ROUND(MAX(p.price) - MIN(p.price), 2) AS price_variation
FROM prices p JOIN forms f ON p.formID = f.formID GROUP BY f.formName ORDER
BY price_variation DESC;
```

Screenshots:

	formName	price_variation
1	Dried	9.26
2	Fresh	6.28
3	Frozen	5.17
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Given more time:
Gone back and set the data type for *price* as *decimal(10,2)* instead of using *float* and rounding the price values in my queries.

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