**Name: Jianwei Su**

**Date:12/14/2022**

# **Exercises**

## **Level 3: Tables 101**

***Note: For all SQL homeworks, just paste your code under the question in the Word document. No images or proof of output are necessary. Please make your answers bold and blue.***

Reminder: For all of the questions below no screenshots are necessary. Just provide the answers in English or the code you used to do it.

### **3.1: MAP**

1. Describe a map table in your own words.

**It is just like a dimension table. Map table can contain different type of information in one or more different layers, such as country, country\_code, region, sub\_region, etc. Map table is very simple and easy for users to understand. However, we can not use map table to track history of items.**

1. Is it ever appropriate to use a map table?

**No, it is not. Just like l mentioned it above, users can not track history of items in map tables. Also, what users can do in map table, they can do better in dimension tables.**

1. You own a store where you sell fishing equipment. You have a database of inventory and orders. What map table might be helpful to you?

**For a fish store, I might have a map table that maps each order number with a customer name and each fishing equipment with its name. That would be useful!**

### 

### **3.2: DIMENSION**

1. Describe in your own words what a dimension table is and why it is so critical for finance firms to use them.

**A dimension table which is a map table with records and it is companion table to the fact table contains descriptive attributes to be used as query constraining. It contains dimensions of a fact. It has no limit set for given for number of dimensions.**

**DIMENSION tables show the changes of item categorizations. FACT tables are used for prices and quantities. FACT tables have numbers.**

1. Why is it necessary to have START and END date on each row in a dimension table?

**Recording both START and END dates on each row in a dimension table has the advantage that you can represent non-uniform periods of time easily. That is easier for you to aggregate and compare data recorded with different periods. That means it is consistent for users to analyze data piece by piece.**

1. If we put an entry in the dimension table for Google, two week later Google changed their ticker to GOOGL and then a week later a trader executes two trades, how many rows for this company would exist in the dimension table?

**2 rows because they changed the ticker. A ticker changed.  The fact that there are two trades has nothing to do with a dimension table. Trades belong in a fact table.**

1. What if we had a fund XYZ in the fund dimension table from Jan 2000 until Feb 2000 and then they were no longer our client. In 2015 they joined us once again. What would the dimension entries look like?

### **I think it looks like similar to 2000’s before, but the start date changed to 2015. There would be a gap of time that this ticker doesn’t exist though.**

### **3.3: FACT**

1. Describe a fact table in your own words.

**A fact table contains fewer attributes and more records and it comes after the dimension table. It is expected to change daily and it is most frequently used table. Ideally, a fact table should have NO attributes, just KEY identifiers and values that change frequently.**

1. If we had a product level fact table, would it have multiple rows for TSLA, one for each trader?

**No, it would not.**  **A PRODUCT LEVEL fact table would only have each product once for each date.**

1. If we had a trader level fact table would it have tickers in it?

**No, it would not. A TRADER LEVEL fact table would have each trader summed up across all tickers once per a day.**

1. If we have two traders, A and B, and they both traded IBM yesterday for three clients each. If this was a trade level fact tables, how many rows would this information be on?

**There would be 6 rows.**

**Table

Description automatically generated**

1. Is a fact table captured yearly, monthly, daily, or continuously?

**I think it is captured daily.**  **A FACT table just means that it is a constant type of recording. We could have a daily fact table that shows once a day for each ticker. We could have an HOURLY fact table that shows once an hour. We could have a MONTHLY fact table that shows once a month. It doesn’t really matter, but in finance most common is either daily or continuous.**

### **3.4: KEYS**

1. Describe a primary key.

**Primary key uniquely identifies a record in the table. Primary keys can not accept null values. They are automatically created as a clustered index. Only one primary key can exist in a table.**

1. Describe a foreign key.

**Foreign key is a field in the table that is primary key in another table. Foreign keys can accept multiple null values. They do not automatically create an index, clustered or non-clustered. User can manually create an index on foreign key. Users can have more than one foreign key in a table.**

1. Why might you have a primary key column in your table?

**I think I might have it because it is to ensure uniqueness in the table which means no two rows can have the same key. Also, the primary key of one table can help to identify records in other tables, and be part of the second table’s primary key. It also makes sorting and finding items a lot faster.**

1. Why might you have a foreign key column in your table?

**I think I might have a foreign key column in my table because it is to allow us to establish a referential link between the data in two tables. That link can help us to match the foreign column data with the data of the referenced table data.**

### **3.5: INDEX & CONSTRAINTS**

1. What is a clustered index?

**A clustered index defines the direction of each table data in a database according to the key values which can be physically stored in a unique way.**

1. When deciding which columns to index which might be good candidates? Why those columns?

**It's all about what queries are going to run against the table, how fast they're going to be, how fast you need them to be and how often they're going to be run. If you need to be able to find records quickly based on it, index it.**

1. Is it faster or slower to read from an indexed table?

**I think it is faster.**

1. Is it faster or slower to write to an indexed table?

**I think it is slower.**

1. Is a primary key an index?

**Yes, I think a primary key is always an index.**

1. What are column constraints?

**Column constraints are NOT NULL, UNIQUE, PRIMARY KEY, FOREIGN KEY, CHECK, DEFAULT and INDEX.**

1. What does CHECK do?

**CHECK ensures that the values in a column satisfies a specific condition.**

1. What does DEFAULT do?

**DEFAULT sets a default value for a column if no value is specified.**