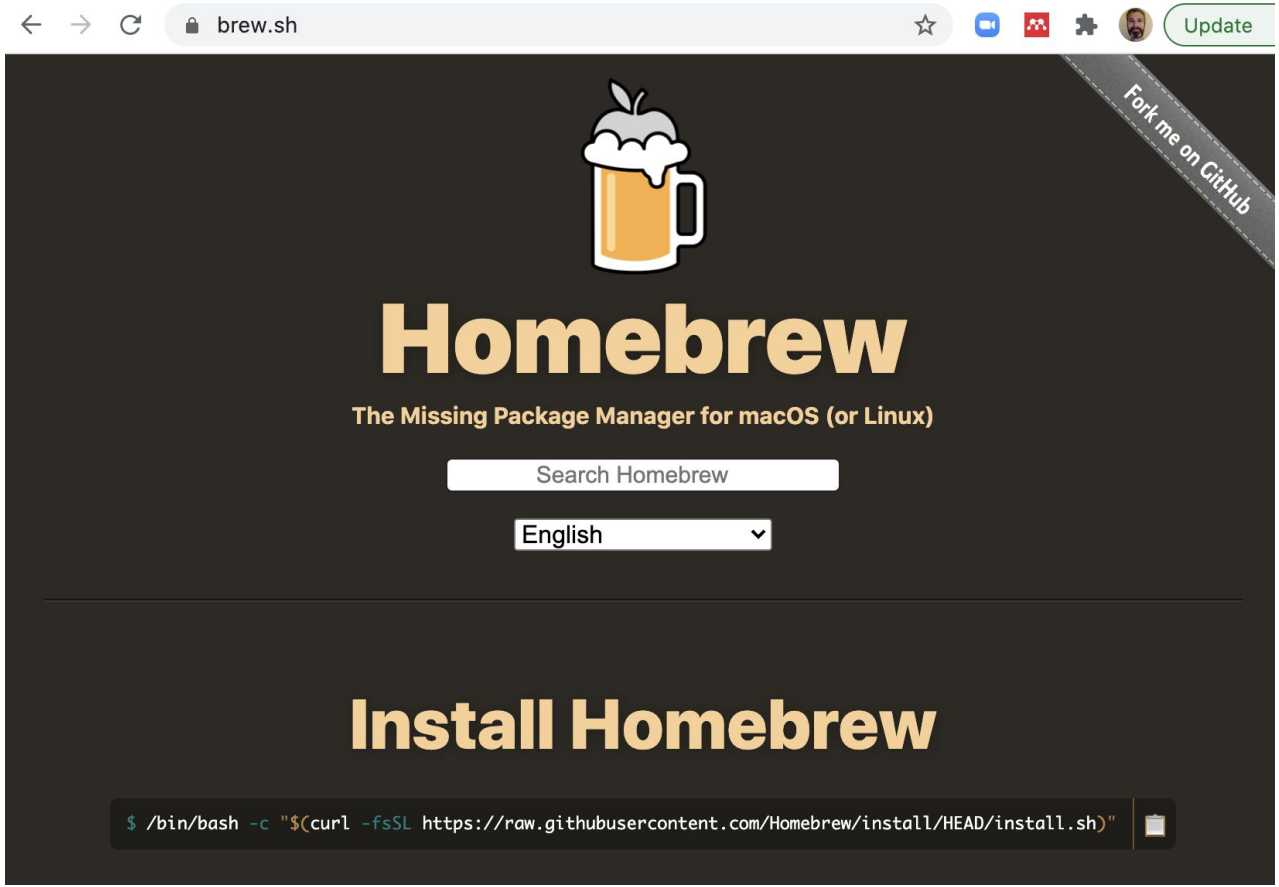
ORIE 3120

Lecture 2: SQL Intro

Install SQLiteStudio 3.4.4 for recitation & homework

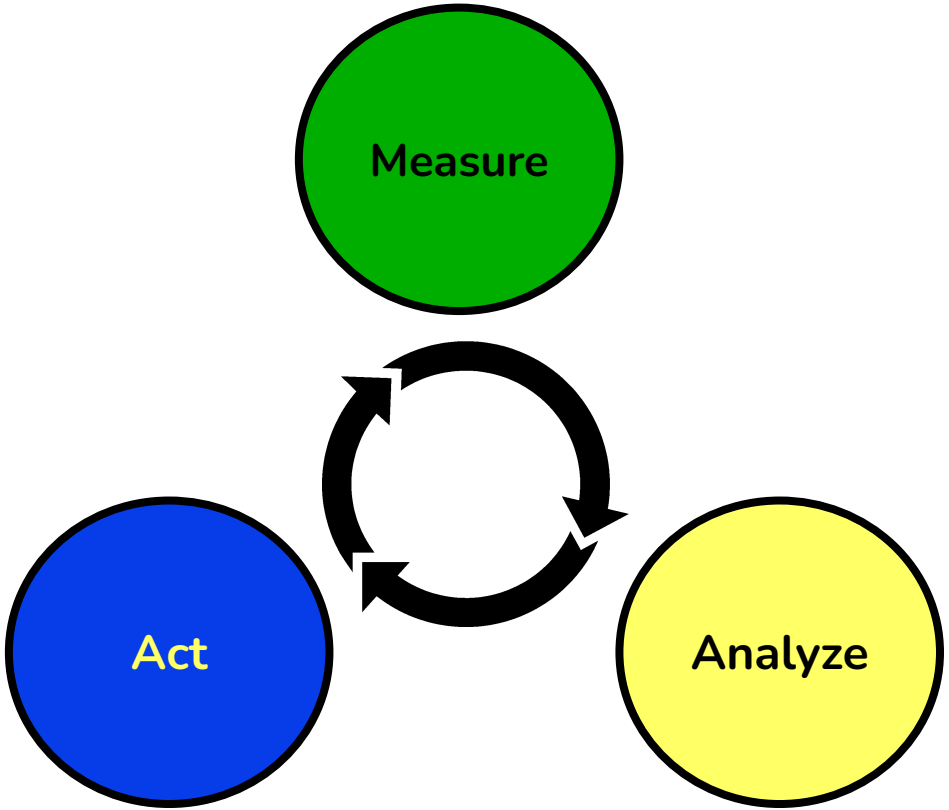
- Download from http://sqlitestudio.pl
- Has versions for Windows, Linux, and Mac OSX
- The Mac and Windows versions are a bit different
- Screenshots from recitations may be from a different version than what you are using
- Recitation TAs and office hours are there to help you [check course google calendar for office hours]



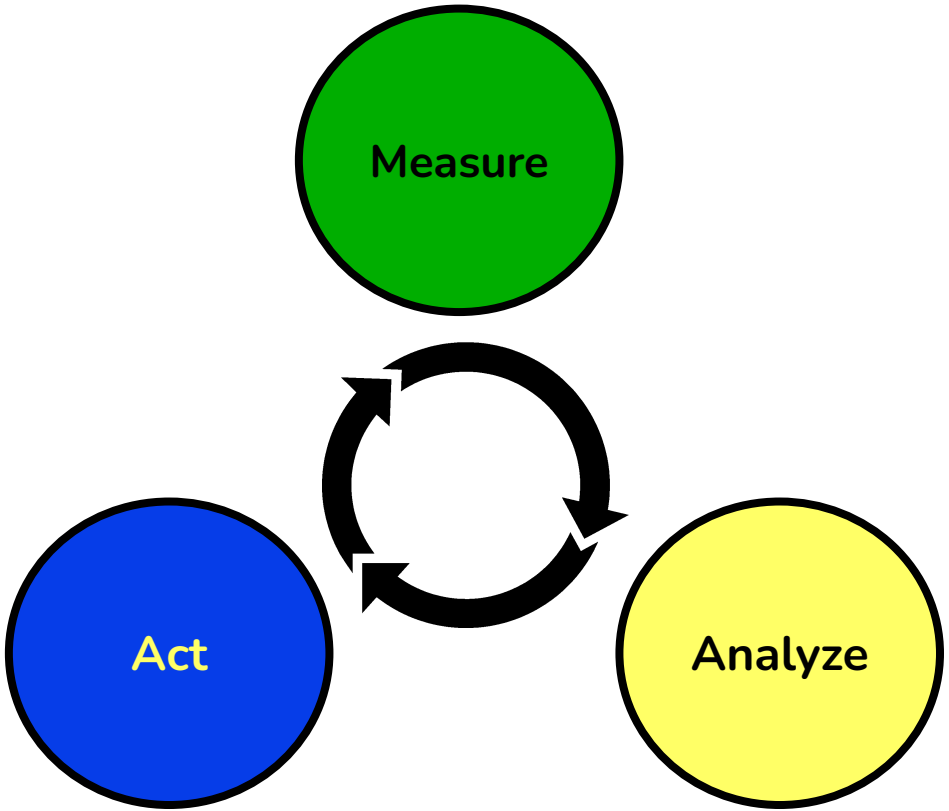
Alternatively, if you use homebrew

> brew install sqlitestudio

Remember the operational improvement cycle?



Measuring & analyzing involves data



Structured Query Language (SQL) is a language for manipulating data

- SQL is not a single software application made by a single company.
- Rather, it is a standard, which is used, packaged, and adapted by many software companies.
- Some SQL databases are free; some are not.
- Some SQL databases have non-standard features.

SQL

- 1970: Codd, Edgar F (June 1970). "A Relational Model of Data for Large Shared Data Banks"
- Early 1970s: SQL developed at IBM by Donald D. Chamberlin and Raymond F. Boyce after learning about the relational model from Ted Codd
- Late 1970s: Relational Software, Inc. (now Oracle Corporation) saw the potential of the concepts described by Codd, Chamberlin, and Boyce, and developed their own SQL-based database

https://en.wikipedia.org/wiki/SQL

Market Summary > Oracle Corp

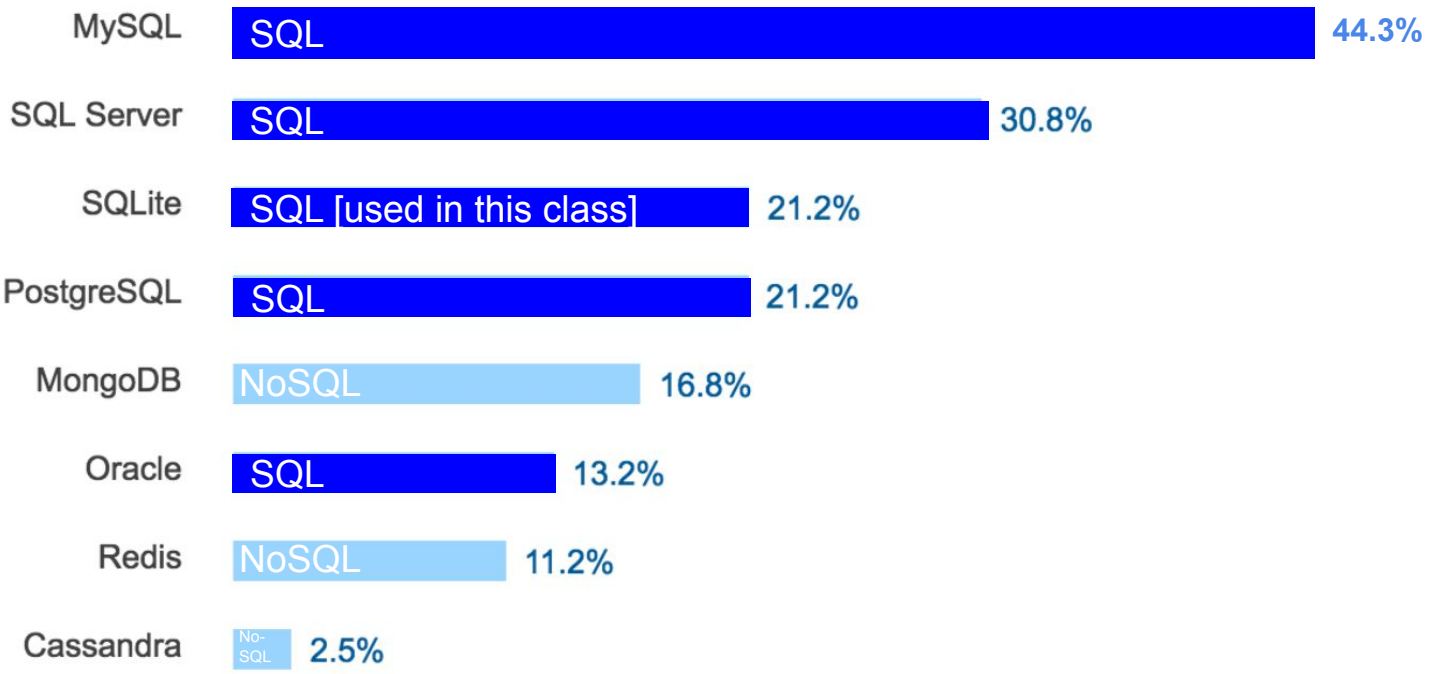
110.12 USD

+110.05 (157,214.29%) ↑ all time

Jan 23, 9:40 AM EST • Disclaimer

1D | 5D | 1M | 6M | YTD | 1Y | 5Y | Max

Most businesses store their data using SQL



Data from a 2017 StackOverflow survey

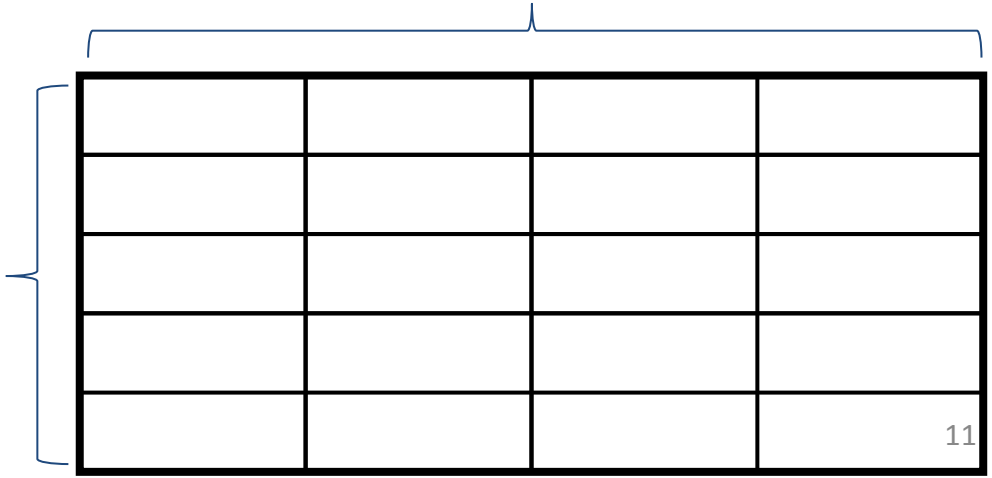
SQL is for “Relational” Databases

- A relational database consists of tables.
- Tables are logical units which are related to one another.
- This allows the data to be broken down into smaller, manageable units.
- By having common keys among tables, data from multiple tables can be joined to form one large set of data.

A table consists of fields and records

Fields: a fixed number of columns, each column having a prescribed data type (integer, single, double, text, date …) and length

Records: an unlimited number of rows, each row containing data in each column of the prescribed type



Here's an example table with a key

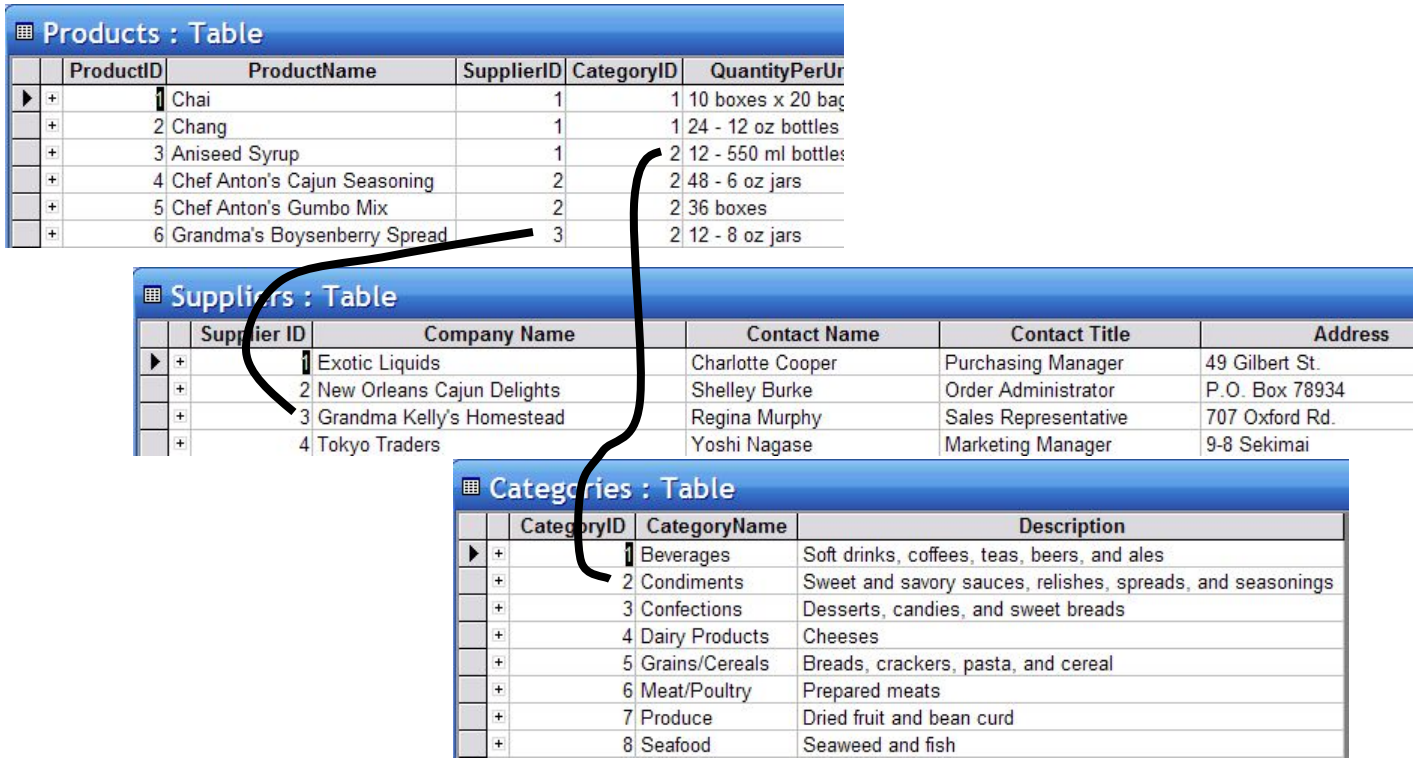
Products : Table

ProductID	ProductName	SupplierID	CategoryID	QuantityPerUnit	UnitPrice	UnitsInStock	UnitsOnOrder	ReorderLeve
1	Chai	1	1	10 boxes x 20 bags	$18.00	39	0	1
2	Chang	1	1	24 - 12 oz bottles	$19.00	17	40	2
3	Aniseed Syrup	1	2	12 - 550 ml bottles	$10.00	13	70	2
4	Chef Anton's Cajun Seasoning	2	2	48 - 6 oz jars	$22.00	53	0	
5	Chef Anton's Gumbo Mix	2	2	36 boxes	$21.35	0	0	
6	Grandma's Boysenberry Spread	3	2	12 - 8 oz jars	$25.00	120	0	2
7	Uncle Bob's Organic Dried Pears	3	7	12 - 1 lb pkgs.	$30.00	15	0	1
8	Northwoods Cranberry Sauce	3	2	12 - 12 oz jars	$40.00	6	0	
9	Mishi Kobe Niku	4	6	18 - 500 g pkgs.	$97.00	29	0	
10	Ikura	4	8	12 - 200 ml jars	$31.00	31	0	
11	Queso Cabrales	5	4	1 kg pkg.	$21.00	22	30	3
12	Queso Manchego La Pastora	5	4	10 - 500 g pkgs.	$38.00	86	0	
13	Konbu	6	8	2 kg box	$6.00	24	0	

Record: 1 of 77

Key: field, or ordered set of fields, whose data uniquely identify a record

Use keys to make relationships



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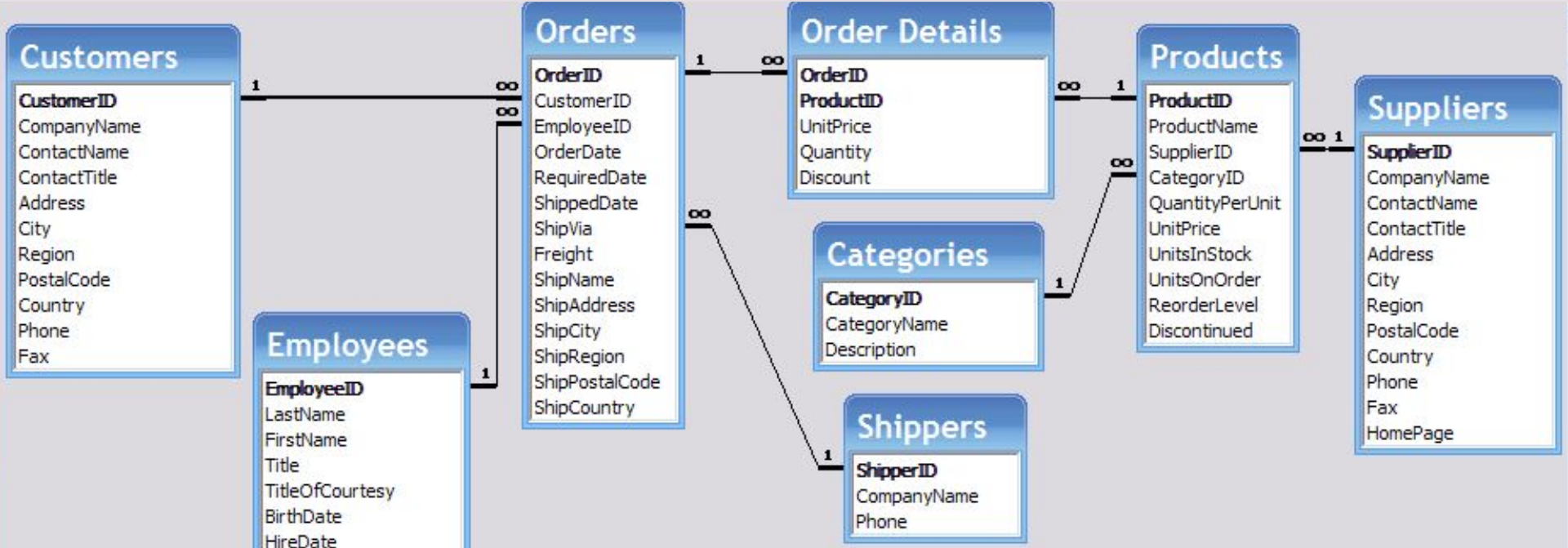
Suppliers : Table

Supplier ID	Company Name	Contact Name	Contact Title	Address
1	Exotic Liquids	Charlotte Cooper	Purchasing Manager	49 Gilbert St.
2	New Orleans Cajun Delights	Shelley Burke	Order Administrator	P.O. Box 78934
3	Grandma Kelly's Homestead	Regina Murphy	Sales Representative	707 Oxford Rd.
4	Tokyo Traders	Yoshi Nagase	Marketing Manager	9-8 Sekimai

Categories : Table

CategoryID	CategoryName	Description
1	Beverages	Soft drinks, coffees, teas, beers, and ales
2	Condiments	Sweet and savory sauces, relishes, spreads, and seasonings
3	Confections	Desserts, candies, and sweet breads
4	Dairy Products	Cheeses
5	Grains/Cereals	Breads, crackers, pasta, and cereal
6	Meat/Poultry	Prepared meats
7	Produce	Dried fruit and bean curd
8	Seafood	Seaweed and fish



A database schema is a collection of tables related by keys

Data Types

- String types (alphanumeric characters)
  - Fixed length
  - Varying length
  - Large amount of text
- Numeric types (number values)
  - Decimals
  - Integers
- Date and time types
- Unstructured binary data (e.g., images, audio)