

RDBMS is under attack!

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What really is the R in the Name?

Relational algebra, first created by [Edgar F. Codd](#) while at IBM, is a family of algebras with a [well-founded semantics](#) used for modelling the data stored in relational databases, and defining queries on it.

The main application of relational algebra is providing a theoretical foundation for [relational databases](#), particularly [query languages](#) for such databases, chief among which is [SQL](#).

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

How does this help?

Queries can be represented as a **tree**, where

- the internal nodes are operators,
- leaves are **relations**,
- subtrees are subexpressions.

Our primary goal is to transform expression trees into equivalent **expression trees**, where the average size of the relations yielded by subexpressions in the tree is smaller than it was before the **optimization**. Our secondary goal is to try to form common subexpressions within a single query, or if there is more than one query being evaluated at the same time, in all of those queries. The rationale behind the second goal is that it is enough to compute common subexpressions once, and the results can be used in all queries that contain that subexpression.

Some concepts

- Set - A set is a well-defined collection of distinct objects.

[https://en.wikipedia.org/wiki/Set_\(mathematics\)](https://en.wikipedia.org/wiki/Set_(mathematics))

- Multiset - In mathematics, a multiset (aka bag or mset) is a modification of the concept of a set that, unlike a set, allows for multiple instances for each of its elements.

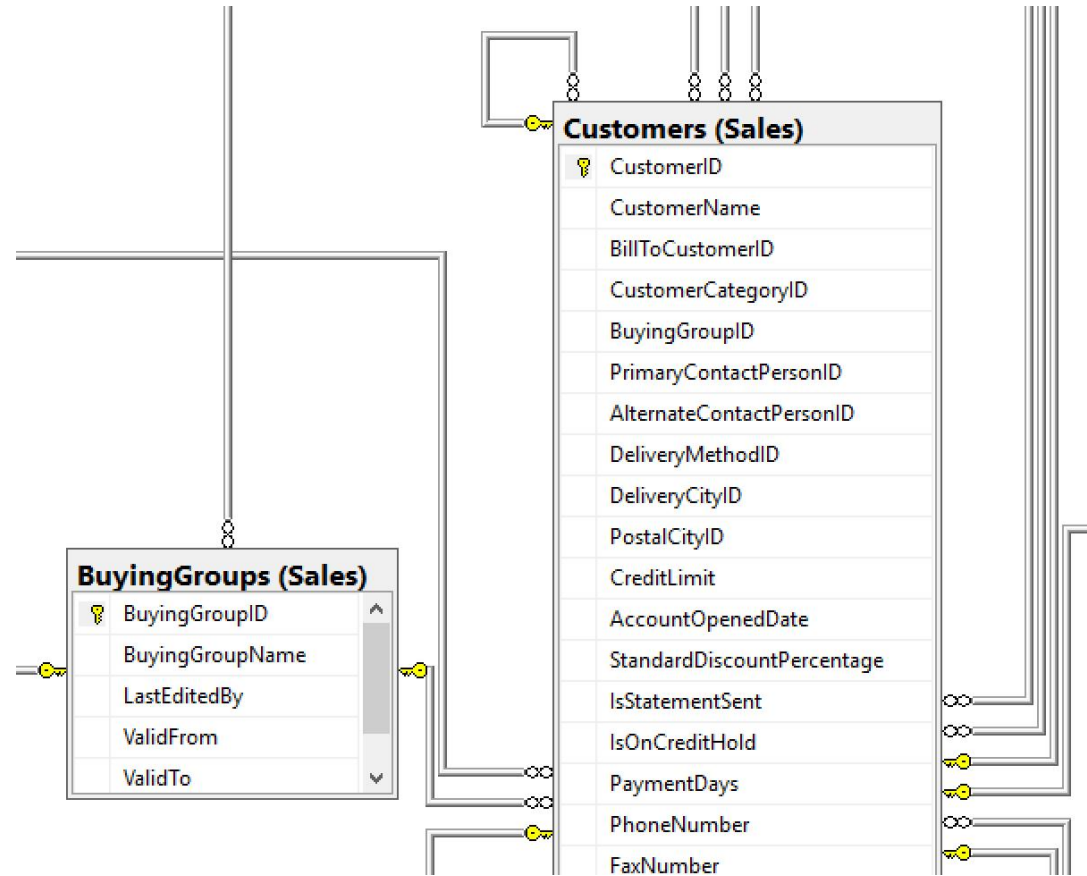
<https://en.wikipedia.org/wiki/Multiset>

- Normalization - is the process of restructuring a relational database in accordance with a series of so-called normal forms in order to reduce data redundancy and improve data integrity.

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

The Microsoft SQL Server

WideWorldImporters



What is the RDBMS good for?

Quora

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NoSQL

Relational Databases

SQL

Database Systems

List Question

Computer Programming

What are some reasons to use traditional RDBMS over NoSQL?

<https://www.quora.com/What-are-some-reasons-to-use-traditional-RDBMS-over-NoSQL#>

Pains to the Devs, maybe Ops too

- OR Mapping - Split World View
- Testing
 - Mock
 - Setup, INT, BVT, QA, UAT - all these builds
- Artifacts, Source Control
- Cross boundary communication

Compare to NoSQL?

<https://www.quora.com/What-is-the-mathematics-behind-NoSQL-design>

- Back to the math

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Relational Algebra

NoSQL

SQL

Database Systems

What is the mathematics behind NoSQL design?



Cameron Purdy, Illegitimate father of NoSQL.

Answered May 22, 2014 · Author has **1.6k** answers and **4.8m** answer views

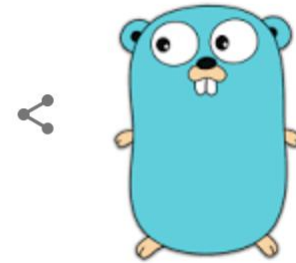
As I've mentioned elsewhere, NoSQL is not defined by what it *is*, but rather, by what it is not. It is **not** relational; it is **not** SQL. In other words, it explicitly is **not** based on relational algebra. That is the extent what you can state regarding NoSQL's relationship with math.

It's still messy days for NoSQL

- Other things that has a Math foundation:
 - λ -calculus - Functional Programming
 - communicating sequential processes (CSP) -
- Other things that also lack Math:
 - Biology
 - Stock Market?

Go

Programming language



The Market

Rank			DBMS	Database Model	Score		
May 2018	Apr 2018	May 2017			May 2018	Apr 2018	May 2017
1.	1.	1.	Oracle +	Relational DBMS	1290.42	+0.63	-63.90
2.	2.	2.	MySQL +	Relational DBMS	1223.34	-3.06	-116.69
3.	3.	3.	Microsoft SQL Server +	Relational DBMS	1085.84	-9.67	-127.96
4.	4.	4.	PostgreSQL +	Relational DBMS	400.90	+5.43	+34.99
5.	5.	5.	MongoDB +	Document store	342.11	+0.70	+10.53
6.	6.	6.	DB2 +	Relational DBMS	185.61	-3.34	-3.23
7.	↑ 9.	↑ 9.	Redis +	Key-value store	135.35	+5.24	+17.90
8.	↓ 7.	↓ 7.	Microsoft Access	Relational DBMS	133.11	+0.89	+3.24
9.	↓ 8.	↑ 11.	Elasticsearch +	Search engine	130.44	-0.92	+21.62
10.	10.	↓ 8.	Cassandra +	Wide column store	117.83	-1.26	-5.28

<https://db-engines.com/en/ranking>

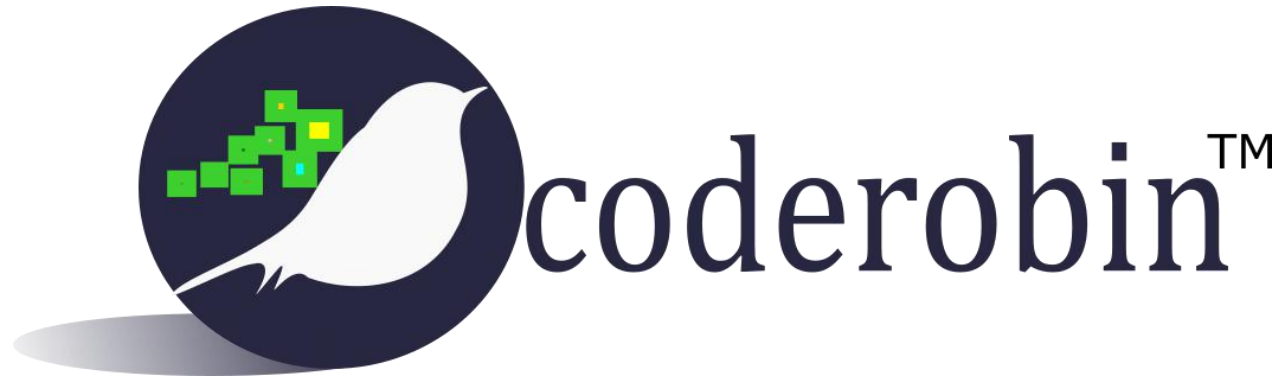
DevOps

- Microsoft SQL Server now runs on Linux, and inside Container
- Persistent Storage
- Cattle

Docker cmd

- `dong@dong-Ubuntu:~$ sudo docker run --name sql1 -e 'ACCEPT_EULA=Y' -e 'SA_PASSWORD=hell0W0rld!' -e 'MSSQL_PID=Developer' -p 1433:1433 -d microsoft/mssql-server-linux`
- (needs -v mapping, either volume or bind)

Thanks!



Useful Links:

- <https://hub.docker.com/r/microsoft/mssql-server-linux/>
- <https://docs.microsoft.com/en-us/sql/index?view=sql-server-2017>

SQL Supper

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<https://www.meetup.com/sqlsupperlondon/>